Published by International Association of Educators

ijpe

International Journal of Progressive Education

ISSN: 1554-5210

INASED
International Organization

ijpe.penpublishing.net

PENACADEMIC PUBLISHING

IJPE International Journal of Progressive Education

Volume 15 Number 4 August 2019

DOI: 10.29329/ijpe.2019.189

An International Journal Published by International Association of Educators (INASED)

International Journal of Progressive Education

Frequency: Six times a year.

ISSN: 1554-5210

Owner: International Association of Educators

Publisher: Pen Academic Publishing

Indexing/Abstracting:

1. OCLC-WorldCat: http://www.oclc.org/worldcat/default.htm
2. Journal Finder: http://journalfinder.uncg.edu/demo/
3. Directory of Open Access Journals: (DOAJ): http://www.doaj.org/home
4. EBSCO Publication: http://www.ebsco.com
5. AERA e-journals: http://aera-cr.asu.edu/ejournals/
6. NewJour (A Listing of New Electronic Journals)
7. Cabell's Directory of Publishing: http://www.cabells.com
8. International Society for Exploring Teaching and Learning: http://www.isetl.org
9. Australian Government Education Portal: http://www.education.gov.au/goved/go
10. Education Network Australia: http://www.edna.edu.au/edna/go
11. ERIC: http://www.eric.ed.gov

2019 Subscription Rates

- $35 Association Member USA (Canada: $40; Rest of World: $50)
- $45 Individual USA (Canada: $50; Rest of World: $55)
- $35 Student USA (Canada: $40; Rest of World: $50)
- $140 Library/Institution USA (Canada: $160; Rest of World: $160)

Single Issues and Back Issues: $25 USA (Canada: $35; Rest of World: $35)

If you wish to subscribe for the printed edition of IJPE, please send the subscription fee as check or money order (payable to International Association of Educators) to the following address:

International Association of Educators

c/o: Dr. Alex Jean-Charles
901 S National Ave Hill Hall 205D Springfield, MO 65897

Print copies of past issues are also available for purchased by contacting the Customer Service department ijpe-editor@penpublishing.net

International Journal of Progressive Education, Volume 15 Number 4, 2019

Tayfun Tasbilek Canakkale Onsekiz Mart University, Turkey
Ulas Yabanova Dumlupınar University, Turkey

TABLE OF CONTENTS

Volume 15, Number 4
August 2019

Articles

International Journal of Progressive Education, Volume 15 Number 4, 2019

Explanatory Strategies of Preservice Mathematics Teachers about Divisibility by Zero

Nejla Gürefe [i]
Usak University

Gülfem Sarpkaya Aktaş [ii]
Aksaray University

Abstract

In this study, it was aimed to reveal the explanatory strategies that preservice teachers use in the process of explaining the concept of divisibility by zero. It was investigated how the concept of divisibility by zero, which can be used in expressing the case where the denominator is present in the definition of important concepts of the secondary school curriculum such as the fraction and rational number, is defined and explained. A scale consisting of three open-ended questions, in which it was questioned what the definition of the concept of divisibility by zero is and how this concept can be explained to the secondary school/high school student, was used as a data collection instrument. The data were collected through this scale and the content analysis method was adopted in the data analysis. As a result of the analyses made, it was determined that the preservice teachers use the rule strategy the most on the subject of divisibility by zero.

Keywords: zero number; strategies; preservice teachers.

DOI: 10.29329/ijpe.2019.203.1

---

[i] **Nejla Gürefe**, Assist. Prof. Dr., Usak University, Mathematics Education.

Correspondence: nejlacalik@gmail.com

[ii] **Gülfem Sarpkaya Aktaş,** Assist. Prof. Dr., Aksaray University, Mathematics Education.

INTRODUCTION

One of the most important factors determining the quality of teaching is the knowledge of the teacher. Shulman (1986) expressed that the knowledge that teachers should have is the field knowledge, knowledge of understanding the student, and field-specific pedagogical knowledge. While the field knowledge is the teacher's knowledge of understanding the mathematics with its concepts, principles, and rules (Ball, 1990; Ma, 1999), the pedagogical field knowledge is the teacher's knowledge of how to teach using also the field knowledge. Teacher's explaining the mathematical concepts with their most appropriate forms of representation to students and being able to give the most powerful examples and make the most powerful explanations in explaining the mathematical concepts depends on the teacher's field knowledge. Therefore, the pedagogical content knowledge requires the field knowledge. However, that does not mean that the pedagogical knowledge of an individual with good field knowledge is also good. In addition to good mathematics knowledge, the pedagogical knowledge in which a teacher realizes teaching with explanations that are appropriate for the student level (Baki, 2013), will be significant. The pedagogical field knowledge includes all the educational activities, skills, and features that the teacher has, such as the ability to transfer knowledge effectively to students, that is, to turn the knowledge into a form that the student can easily understand (McDiarmid, Ball, and Anderson, 1989). One of the most important components of the pedagogical field knowledge is making appropriate educational explanations associated with mathematical concepts, principles, theorems, and rules. Much of the research in the literature has shown that explanations that teachers and preservice teachers use in teaching are based on rote-learning rather than conceptual understanding, that is, they are more rule and operation-based (Kinach, 2002). Educational explanations related to the concepts teachers use in the process of mathematics teaching are important because knowledge of the mathematical knowledge of these individuals can be had by examining the educational explanations that teachers have made on the mathematical concepts. In this study, educational explanations of preservice teachers who will be the teachers of the future were examined. Explanations made by preservice teachers will reveal how they associate what they learned in their abstract algebra lesson with school mathematics and thus, the effects of the lessons they took. Furthermore, these educational explanations of preservice teachers will inform us about how they will transfer this subject to their students when they become teachers in the future.

In their studies, many researchers have revealed that the number zero and teaching this number is quite difficult, teachers and students have problems in interpreting the number zero (Ma, 1999; Quinn, Lamberg, and Perrin, 2008), and that teachers and students have insufficient knowledge of what the division of any number by *0* means (Arsham, 2008; Tsamir, Sheffer, and Tirosh, 2000). Ball (1990) showed that understandings of preservice teachers are based on rote learning rather than conceptual understanding. Although the division by zero is not included in the curriculum as a direct achievement, it is a situation that is encountered by students in the process of defining the rational number, which is among important learning domains of the secondary school and high school. In secondary school textbooks, the rational number is defined as 'a number that can be written as *a/b*, provided that*a* and *b* each being an integer $(b \neq 0)$' (Keskin, 2016). The *a/b* expression has raised the subject of divisibility. The divisibility in abstract algebra textbooks is defined as '$a,b \in Z$, and if there is $c \in Z$ provided that $a=bc$, then *b* divides*a* and it is shown as $b|a$' (Arıkan and Halıcıoğlu, 2012). While there is no problem for students in the case where the denominator is not zero in the divisibility expression, in the case where the denominator is zero, the operation leads us to the undefinability, which seems to be a difficult situation to understand for many students (Tsamir, Sheffer, and Tirosh, 2000). This is because most students at the secondary school level think that the result of all mathematical operations must be a numerical value, and even though individuals at the high school and advanced levels know that it is impossible to divide a number by zero, they have difficulty in explaining it and they tend to explain the situation with answers such as "My teacher said so" (Reys and Grouws, 1975). The division of any number other than zero by 0 is undefined. This can be explained in different ways. For example, if *a/0* were defined provided that $a \neq 0$, there would be $c \in \square$ with $a/0 = c$. In this case, it would be $a=0.c$, that is, $a=0$. This conflicts with $a \neq 0$. Therefore, the division of a number other than zero by zero is undefined (Kadıoğlu and Kamali, 2009; Özmantar and Bozkurt, 2013). In other words, *a* division as *a/b* expresses a multiplication as *a(1/b)* provided that

$a, b \in \square$. We know that zero has no inverse in multiplication. There is no real number to multiply with zero and to get 1. In this case, the division such as *a/0* is also undefined (Qiiinn, Lamberg, and Perin, 2008). Therefore, the student who wants to interpret the definition of the rational number must also properly interpret what the division by zero is. Teachers are the ones who teach, organize and shape the learning environment in schools (Zikre and Eu, 2016). This responsibility belongs to the teacher. Such that, incorrect explanations that the teacher uses in the lecturing process can lead to various misconceptions in students (Baştürk and Dönmez, 2011). In this case, first of all, the teacher himself/herself must understand these concepts or processes at the conceptual level (Ma, 1999). In this study, it was aimed to reveal the knowledge that preservice teachers have on the division by zero and which explanatory strategies they use for the concept. Therefore, the problems of the research were determined as follows;

- What are the strategies that preservice teachers use in the meaning of the concept of division by zero and in the process of expressing it to secondary school/high school students?
- What are the abstract mathematical arguments (AMA) strategies that preservice teachers use in the meaning of the concept of division by zero and in the process of expressing it to secondary school/high school students?
- What are the analogy use strategies that preservice teachers use in the meaning of the concept of division by zero and in the process of expressing it to secondary school/high school students?
- What are the rule-based strategies that preservice teachers use in the meaning of the concept of division by zero and in the process of expressing it to secondary school/high school students?

METHOD

Research Model

This study is a qualitative research, and the descriptive review model was adopted as the research design because it was desired to determine the preservice teachers' concept definitions and explanatory strategies related to the divisibility by zero.

Participants of the Research

The participants of the study consisted of 48 individuals who were senior students studying at the department of elementary mathematics teaching and students who graduated from the department of mathematics and attending the pedagogical formation program. All of the participants are individuals who took the abstract algebra lesson and learned the concepts questioned in the study in the class. In the study participants were coded as T1, T2, ..., T48. The first 24 (T1, ..., T24) of these preservice teachers (PT) consisted of those who graduated from the department of mathematics and received the pedagogical formation education and the others (T25, ..., T48) consisted of those who study at the department of mathematics teaching.

Data Collection Instruments and Process

In the study, a form consisting of five open-ended questions that investigate what the definitions of the concepts of prime number and divisibility by zero are and how these concepts can be explained to secondary/high school students was used as a data collection tool and opinions of two different lecturers, one of them being an abstract algebra lecturer, were asked in the creation of the form. Open-ended interview questions including the prime number and divisibility by zero were

written on paper and handed out to the participants and preservice mathematics teachers were given one course hour to answer the questions.

Data Analysis

In the study, the content analysis method was used to analyze the data collected in the 2017-2018 fall semester. Cofer's (2015) categories were used for the explanatory strategies that the preservice teachers used in the process of definition and explanation of divisibility by 0. Cofer (2015) expressed the explanatory strategies as the abstract mathematical argument (AMA), analogy, and rules. AMA expresses the use of techniques of abstract mathematical thinking and formal reasoning to explain a definition. In this strategy, mathematical definitions, theorems, axioms, and formulas are used. The analogy is the use of tangible contexts (physical representation) without being intangible to build the reasoning. Rules are the production of individuals with alternative rules and explaining it using expressions such as "It is defined in such a way in the book". Table 1 below shows these strategies and coding examples.

Table 1 Explanatory strategies (Cofer, 2015)

Strategies	Explanations	Example
Abstract Mathematical Argument (AMA)	It is the use of techniques of abstract mathematical thinking and formal reasoning to describe a definition. Mathematical definitions, theorems, axioms, and formulas are used.	1/0=undefined. For example, it equals number a. When a/0=xa=x.0, a≠0, there is no number to give for X, so it is undefined.
Analogy	It is the use of tangible contexts without being intangible to build the reasoning. This context is a physical representation.	…If "1" is divided by "0", it is impossible to get a result since there is no number to divide "1". For example, 5 pieces of candy cannot be divided into non-existent kids, that is, a nullity.
Rules	If individuals produce alternative rules for themselves and explain their rights by using expressions such as "It is defined in such a way in the book".	Number 0 can be divided by all real numbers; however, all real numbers cannot be divided by 0. Their value will be undefined and indefinite. 1/0 has no meaning because it has no known value and it is undefined.

In the data analysis, the first author coded all data according to the specified categories. Thereafter, for the reliability of the coding, half of the data was coded by the second researcher and the inter-rater concordance was calculated to be 94% in the coding using the reliability coefficient calculation formula [Reliability = Consensus/(Consensus+Dissensus)] specified by Miles and Huberman (1994). It can be said that the classification is reliable since the reliability calculations are over 70% (Miles & Huberman, 1994).

FINDINGS

The PTs were addressed questions *"What do you think about divisibility by 0? Interpret the meaning of 1/0."* and *"How do you explain the concept of divisibility by 0 to secondary school or high school students?"*and the answer given by each participant was classified according to the AMA, Analogy, and Rules categories. The answers of the PTs in these categories were explained as the meaning of the division by zero and as the strategies used in the explaining process. The PTs, who interpreted the division by zero, expressed the number in the numerator and denominator as undefined, indefinite, infinite, zero, and no result according to their features. In the first and second questions, 10 participants used the AMA, 11 used analogies, 31 used rules, and 1 left blank (Table 2). In the third question, 1

used the AMA, 14 used analogies, and 20 used rules, 5 used other strategy methods and techniques, and 11 left this question unanswered (Table 2). There was also a shift in the strategies used by some participants in these questions. For example, a student who started with the rule finished the explanation with the AMA or analogy. Furthermore, some participants gave answers that can be included in multiple categories. Therefore, the total number of frequencies was higher than the number of participants.

Table 2 Strategies used in the process of expressing the concept of divisibility by zero

		AMA			Analogies				Rule						O	Empty
		Ud	Id	Ze	Ud	In	NR	O	Ud	Id	In	Ze	Un-In	O		
Zero division means	0/0		2							3						1
	0/number											1				
	1/0	7	1	2	3	7	1		14	1	10		1	1		
	a/0								8	2	1	2				
Total		12			11				44							1
Explanation Process	1/0	1			4	4	1	5	2		1		1		5	11
	a/0								13	1	2					
Total		1			14				20							11

Ud: Undefined, Id: Indefinite, In: Infinite, Ze: Zero, NR: No result, O: Other, Ud-Id: Undefined (Indefinite)

The PTs used the rules the most and AMA strategies the least for division by zero. Some of the preservice teachers addressed the division by zero as separate situations where both the numerator and denominator are 0 (0/0) simultaneously, the numerator is zero and denominator is a number other than zero, the numerator is 1 and denominator is 0 (1/0), and the numerator is any number and denominator is 0 (for example, a/0). The answers of the PTs are given by being coded as 0/0=indefinite, 0/number=zero, 1/0=undefined, indefinite, infinite, no result, undefined-indefinite (Table 2). 5 participants explained that the expression 0/0(zero over zero)is indefinite by using the AMA and rule strategies. Some of the preservice teachers concentrated on the meaning of zero in the process of answering this question and expressed it as “nullity and nothing”. Moreover, while some of the preservice teachers who stated that 1/0 is infinite expressed this with the limit approach and indicated that it can be plus infinite or minus infinite according to the approach from the right and left to the number 0, others explained that 1/0 can be infinite using directly the anthology and rule strategies without explaining it through the limit approach. Upon examining the data, it was observed that students who graduated from the department of mathematics and received the pedagogical formation education used intensively the rules and mathematics teaching students used intensively the analogies for expressing the meaning of the division by zero and 1/0.

The preservice teachers who would explain the division by zero to secondary school or high school students used the AMA, analogy, and rule among the explanatory strategies and furthermore, 5 PTs thought the explaining as lecturing and explained how to they would teach the lesson and which methods and techniques they could use in general. Apart from that, 11 PTs left this question unanswered. Among these strategies, the rule was used the most and the AMA was used the least. Only a few of the preservice teachers who tried to explain the division by zero concentrated on the meaning of zero and stated that zero expresses the “nullity” and interpreted the division of a number by zero as undefined. Some of the preservice teachers stated that they would explain 1/0 to secondary school student as undefined and to high school students as infinite. They stated that this can be explained by the limit approach since there is a subject about the limit in high school. It was observed that mathematics teaching students would explain the divisibility by zero by using mostly the analogies and mathematics department students by using mostly the rules.

The Use of the Abstract Mathematical Argument (AMA)

This strategy is among strategies in which abstract mathematical thinkings are expressed with reasoned explanations. Using the AMA strategy, the PTs interpreted the meaning of expressions 0/0 and 1/0 as indefinite, undefined, and infinite. However, only one of the PTs explained to the students that 1/0 is undefined by using the AMA. It was observed that PTs using this strategy are mostly students of the department of mathematics receiving the pedagogical formation education.

Table 3 The AMA strategy explaining the divisibility by "0"

Categories	Sub-categories	Examples of Student Answers
The meaning of 0/0	Indefinite	*…0/0 is indefinite. However, in the case where 0=0.x, x can be given an infinite number of values, but since the number zero is an absorbing element, the value given will be indefinite... (T16, T26)
The meaning of 1/0	Indefinite	*0 cannot be divided by any number but itself and the result of 1/0 is indefinite. If 1/0=a, there is not a number a providing 1=0.a. (T12)
	Undefined	*1/0 is undefined. For example, it equals to number a. Since a/0=x $\Rightarrow$ a=x.0, a≠0, there is no number to give for x; therefore, it is undefined.(T7, T8) *1/0 is undefined because there is no such number providing 1=0.x…(T16, T26) *1/0 is undefined because if a≠0, a/0=x, and it will be a=0.x. Let's try to denominate x here. Since there is no such number that "gives a value other than zero when multiplied by zero", it is undefined.(T15) *Since x.0=0 if 1/0=x, x can get any value. Since $x \in (-\infty, +\infty)$, 1/0 is undefined. (T18) *The division of a number by 0 is considered undefined.For a/0, limits of 0 from the right and left are examined.Results can be obtained in the limit values of $\lim_{x\to 0+}\frac{a}{0}$ and $\lim_{x\to 0^-}\frac{a}{0}$. (by converging to 0) (T5)
	Infinite	*…On the subject of limit, we learned that the division of a number by 0 is infinite. There are infinite numbers between two numbers. We have to divide this one unit place by such a small number to obtain infinite numbers. Therefore, we divide it by zero and get infinite. It is observed that the notation changes from right to left in operations $1/0^+=+\infty$, $1/0^-=-\infty$. (T27, T37)
In the explanation process	Undefined (1/0)	*Since x.0=0 if 1/0=x, x can get any value. Therefore, 1/0=undefined. (T18)

Preservice teachers explained the division by *0* separately as the division of zero by zero and the division of 1 by zero. T16 and T26, who explained that 0/0 is indefinite, performed cross-multiplication based on the equality of this to any x number and obtained the result of 0=0.x. One of them stated that as zero is an absorbing element, x can be given infinite values, and because the value to be given is indefinite, x is indefinite, and the other one stated that x has infinite values and therefore, it is also indefinite. The PTs, who equated the expression 0/0 to x, stated that x has infinite numbers of values to get and therefore, since it is impossible to determine which value it will have, x is indefinite. Here, the PTs used the infinite and indefinite concepts interchangeably. 7 of the participants in this category interpreted 1/0 as undefined and 2 as infinite. T15 made an explanation as *"When a≠0, a/0 is undefined, … 1/0 is undefined because let's say when a≠0, it is a/0=x. Therefore, it will be a=0.x. Let's try to denominate x here. Since there is no such number that "gives a value other than zero when multiplied by zero", it is undefined".* T15 stated that in the case where the number a is different from zero, *a/0* is undefined and indicated that the number *1/0* is undefined. In order to reveal

the undefinedness, he/she generalized number 1 to a different *a* number and tried to interpret the meaning of the number *a/0* and he/she used the AMA strategy for this. He/she equated the division of any *a* number by *0* to *x* and used the definition of proportion and performed cross-multiplication. As a result, he/she obtained an equation of *a=0.x*. Since there is no number that will give a value other than zero when multiplied by *0* in this result, he/she interpreted the divisibility by *0* as undefined. The majority of the participants using this strategy went from interpreting the divisibility by 0 to interpreting the meaning of *1/0* and stated that the result is undefined. In order to indicate why it is undefined, for example, T16 and T26 equated *1/0* any *x* number, and when they performed cross-multiplication, they came to a conclusion as *1=0.x*. Since there is no value that gives *1* when multiplied by *0* (this explanation was not made, but this result was reached from the explanation made), they stated that *1/0* is undefined. Furthermore, they explained that in the case where the numerator is *0* instead of *1(0/0)*, the result is indefinite. It was observed that some of the PTs who preferred this strategy made an error in the operations they performed and that they made reasoning based on the incorrect operation. For example, T18 equated 1/0 to x and as a result of the cross-multiplication wrote the equality as x.0=0. Here, he/she stated that x can have every value, thus he/she interpreted 1/0 as undefined. However, in this operation, the equation should have been written as x.0=1 and the interpretation should have been written according to this operation. However, even though the operation was incorrect since it was tried to prove it based on tangible mathematical reasoning and the mathematical definitions made included operations in the definition of divisibility by Arıkan and Halıcıoğlu (2012), the answers in this category were evaluated as the AMA. Some PTs, (T7 and T8), who think that 1/0 is undefined, also expressed this as "1/0=undefined".

There were also two PTs who interpreted 1/0 as infinite. T27 and T37 stated that by the limit approach, the value of 1/0 is $+\infty$ or $-\infty$, respectively, according to the approach to 0 from the right and left. These PTs actually addressed the case of x approaching 0 from the right and left in the 1/x function and stated with the operations they performed that x cannot be exactly 0 but can have a value that is very close to zero, and in this case, 1/x can approach infinity. From this aspect, since the operations performed were based on abstract mathematical reasoning, they were evaluated in the AMA category.

The Use of Analogy

This strategy refers to the use of tangible contexts or intangible objects, that is, physical representations, in expressing reasoning when explaining any concept. It was observed that this strategy was mainly used by students studying at the department of mathematics teaching and only 2 PTs are students graduated from the department of the mathematics. Some PTs using the analogy interpreted the division by zero as undefined, infinite, and no result and others did not specify what 1/0 equals to and explained what the division by zero is and what it represents. In this process, the PTs who used the physical representation or tangible context sometimes divided the numerator by the denominator expressing "nullity, nothing" or by gradually increasing or decreasing numbers, and other times searched for zero within a whole or interpreted the number obtained by dividing the numerator by the denominator and addressed the negativity state of this number. It was observed that the tangible representations of the PTs who used this strategy were mostly the "cake" model. Apart from the cake, they used representations such as "sweets, kid, person, board, apple, knife, knife stroke, whole, object" or tangible contexts such as searching for something non-existent within any number (Table 4).

Table 4 The analogy strategy explaining the divisibility by "0"

Categories	Sub-categories	Dimensions	Examples of Student Answers
Undefined	Dividing the numerator by the denominator(nullity, nothing) (T34, T36, T46, T44)	Dividing a concrete object into nothing	…I would group students in a group of 5. I would give some sweets to each student. I would say that divide the sweets among yourselves with this much for each and divide the last 5 pieces of sweets into nobody. Since a whole cannot be divided by nullity, it is undefined...(T44)
		Negativity of the division	…The number of knife strokes required to divide a loaf of bread into 0 is 0-1=-1…As a result, the student will understand that the number cannot be divided by 0. (T34)
	Dividing the numerator by the denominator (T1, T37)	Dividing existing object into non-existent object	…Let's divide nothing we have into 5 people, that is (0/5). As a result, we can say that zero falls to everyone's share. On the other hand, if "1" is divided by "0" as 1/0, it is impossible to obtain any result as there is nothing to share the number "1" into. For example, 5 pieces of sweets cannot be divided into non-existent kids, that is, the nullity. (T1, T37)
	Dividing the numerator by gradually decreasing numbers (T30, T31, T33, T37, T42)		Students are shown how to divide a cake into 5 pieces. Then, it is shown how to divide a cake into 2 pieces. For the next step, by dividing it into 0 pieces, that is, by dividing into a little piece, that is, by decreasing the amount of flour in the cake, the infinity is achieved. (T30, T33, T37, T42)
Infinite	Dividing the numerator by gradually increasing numbers (T32)		…For example, if we first divide an apple into 2 with a knife, then divide each piece into 2 and those pieces into 2, and keep on dividing, we will obtain so many pieces. If we keep dividing the apple continuously in this way, we will get infinite numbers of pieces. ...In other words, 1/0 is infinite. (T32)
	Searching for zero within a whole (T35)		1/0 is the division of a whole by 0. In other words, it is searching for the number of zeros within a whole. …For example, in the operation 10/2, we see how many 2s there are in 10 and we find 2s in 6 and we say that the result is 3. Similarly, if we search for 0 in 1, we can say that the result is infinite. (T35)
No result	Dividing the numerator by the denominator(nullity, nothing) (T15, T44)	Dividing a concrete object into nullity (nothing)	Nothing is divided by zero. …For example, we cannot divide a cake into non-existent people or 5 pieces of sweets into non-existent people…(T44)
Other	Dividing the numerator by gradually decreasing numbers	Dividing a whole by zero	…For example, I would ask students to first divide a whole consisting of 6 equal pieces into 6, then into 3, 2, 1, respectively, show the pieces they have obtained as a result of the division. Finally, I would ask them to divide a whole into 0. When students cannot divide it, I would tell them that numbers cannot be divided by 0. (T28)
	Dividing the numerator by the denominator(nullity, nothing) (T31, T36)		… I would take an apple to the class and divide this apple into 3 pieces. There would be 3 pieces in my hand. I would give these pieces to one of my students. …I would say that since I do not have any apples and there is no such concept as a nullity in the mathematics, we use the number zero instead. …(T31, T36)

Dividing the numerator by gradually increasing numbers (T32, T45)	…We can explain it by making students realize that the number of pieces increases when we try to obtain as many small pieces as possible by dividing an apple or any object into pieces. We can show them that the more pieces we divide the apple into, the smaller pieces will be obtained. We will try to make them realize that as the pieces get smaller, their size will approach zero. (T32, T45)

Some of the preservice teachers thought that dividing a whole (a cake, an apple etc.) by zero is dividing it by nullity and nothing, but they interpreted the result in different ways. The preservice teachers interpreted the result as infinite (T31 and T37) made a similar explanation to each other, such as *"... the division of a number by 0 is* ∞*. Let's divide something we have not into 5 people, that is (0/5). As a result, we can say that everyone gets zero. On the other hand, if the number "1" is divided by "0" as 1/0, it is impossible to reach any conclusion as there is nobody to share the number "1". For example, we cannot divide five pieces of sweets into non-existent kids, that is, nothingness."* Here, the participants used tangible objects such as "sweets" and "kids" to interpret the division by 0. Although they expressed that the division of a number by *0* is infinite,they interpret the expression of *0/5* at the first step and indicated that *0/5* equals *0*. It was observed that the participants interpreted the division by 0 as *0/5*, that is, dividing *0* by a number. That is, the participants misinterpreted the *number/0* as *0/number*. In interpreting the number 1/0, they stated that there was nobody to share the number *1* and considered the denominator where the number *1* was present as *5* and interpreted the number *5/0.* They tangibly represented *5* present in the numerator as "sweets" and *0* present in the denominator as "non-existent kid" and "nothingness", and interpreted the result as the number of sweets for each kid. Here, it was stated that an object (sweets) cannot be divided by or shared with a non-existent thing, that is, nothingness (0) and this situation of not being able to divide was interpreted as infinite. Moreover, some of the preservice teachers who also thought that the result is infinite (T30, T31, T33), made explanations that would indicate that the denominator dividing the numerator gradually decreased. The PTs used the expressions *"When a number is divided by 0, the result will be infinite. ...Let's take a cake as an example. We can obtain infinite numbers of slices if we slice the cake thin enough. In the operation 1/0, consider 1 as a cake. As we divide 1 by as small numbers as we can, we will approach 0 further. The slices we obtain will also increase each time. Based on this logic, 1/0 is infinite…"*The PTs did not think the denominator here directly as zero and stated that in the case where the denominator gradually decreases starting from a large number, we will approach zero and the result to be obtained by the approach of the denominator to zero is gradually increasing and it is infinite. In fact, it can be said that the PT made a hidden limit operation. Although the PTs do not use the limit operations, the reasoning that he/she made can only be explained by the limit approach. However, it is not correct to say that the words that the PTs used and the situation they tried to explain exactly coincide with each other. This is because the PTs mentioned the process of dividing a cake in a way to get small slices. Here, in the expression "*...We can obtain infinite numbers of slices if we slice the cake thin enough."*, he/she talks about the number of cake slices being more than possible, and even the number of slices being infinite. Therefore, he/she states the need for the denominator to gradually decrease with the statement "*As we divide 1 by as small numbers as we can, we will approach 0 further*". However, in order to increase the number of slices, the number in the denominator should not be reduced but be increased gradually. However, the PAs made an explanation by ignoring this situation. The state of concretization here is formed by the incorrect conclusions of the PTs. But as an exact opposite of the case, T32 made an explanation as "*...Let's take a number as an example. This number is 20. Divide 20 by 20. 20/20=1. If we continue by decreasing the number of parts that are divided: 20/20=1, 20/10=2, 20/5=4, ..., 20/1=20. As can be seen, if we reduce the number that we divide by a number, the result we obtain increases. In that case, if we divide the number 20 by values approaching 0, the result always increases. When we divide it by 0, it will approach an infinite value"*. T32 used the limit approach within the correct reasoning by expressing that the result will always increase and approach infinite if the number in the denominator decreases and approaches zero. Likewise, there are also PTs who interpreted the division of the numerator by nullity, a non-existent thing as undefined and no result apart from infinite. For example, T36 and T46 interpreted that the expression is undefined by saying "*We cannot divide something by nothing. For*

example, we can divide a cake into 2 to 3 pieces, but we cannot divide it into 0 …", and T44 interpreted the division by zero as no result by saying *"Nothing is divided by zero... For example, we cannot divide a cake or 5 pieces of sweets into non-existent people. …"*.

A PT (T34) who interpreted 1/0 as indefinite made an expression as *"Dividing a whole into 2 equal pieces tangibly is dividing 1 by 2. But it is impossible... to divide a whole by 0. In order to divide a whole into 2, a knife stroke of minus 1 of the number of the pieces desired is required; however, since -1 knife stroke is required for 0 pieces, it is undefined..."*. Here, the participant used tangible contexts and representations, including "whole", "piece", "knife", "knife stroke" for interpreting the number *1/0*.In order to interpret the number *1/0*, he/she first interpreted the number *1/2* and shifted from there to the case where the denominator is zero. It was stated that the number of knife strokes required to divide *1* whole into *2* equal pieces is as much as minus 1 of the desired number of pieces. He/she expressed that the number of piecesshould be *0* and the number of strokes should be *-1* in *1/0* and since the number of strokes cannot be negative, he/she interpreted *1/0* as undefined. As can be seen in these examples, analogies are actually limited to positive numbers. It is impossible to interpret, for example, number *-5/0* with these analogies.

Some PTs considered the number 0 in the denominator in 1/0 as nothing and interpreted it as the division of the number in the numerator by nothing, but did not state what the resulting expression would be like.

The Use of Rules

Rules are the state of definitions or theorems with mathematical significance. Rules are also used as explanatory strategies. However, this strategy refers to the mathematical realities that individuals remember and accept. That is, they explain the situations that individuals believe to exist. It was observed that the PTs use rule strategy the most on the division by zero. Furthermore, it was determined that the mathematics department graduates use this strategy more than the students studying at the department of mathematics teaching. Using these strategies, the PTs interpreted the division by zero as infinite, indefinite, undefined, undefined-indefinite, and zero to be able to divide by zero (Table 5).

Table 5 The rule strategy explaining the divisibility by "0"

Categories	Categories	Sub-categories	Examples of Student Answers
The meaning of division by zero	0/0	Indefinite	*…If a=0, a/0 is indefinite. (T6, T38)
	0/number	Zero	*0/number=0. (T24)
	1/0	Undefined	*1/0 is undefined… (T2, T9, T10, T11, T13, T14, T19, T38, T39, T40, T41, T48) *It is undefined because if we divide a number by nothing, we cannot reach a mathematical expression… (T23) (T29)
		Indefinite	*This number is a judgement that equals to infinity, as we have examined in integral. Such as the indefinity of 0.0.0.0…0=0. ∞ , 1/0 is also indefinite…(T25)
		Infinite	*All numbers are divided by zero. If we consider in the limit situation of 1/0, it is ∞ . (T17, T20, T27) *1/0 = ∞ . (T21, T22, T28, T42, T45) *We learned in the primary school and high school that the division of any number by 0 is undefined….(T4) *Undefined = The result is - ∞ or + ∞ according to the negativity or positivity of the numerator. (T47)
		Undefined-Indefinite	*The number 0 can be divided by all real numbers but all real numbers are not divided by 0. The value will be undefined and indefinite. (T3)
		Other	*I think; all numbers must be divided by 0 because zero is above all numbers. We can calculate the value of 1/0 as the limit. (T43)

	a/0	Undefined	*Number/0 is undefined. (T9, T13, T14, T19, T21, T24, T38, T40)
		Indefinite	*…In secondary schools and high schools, 'nothing' is used instead of 0. Can we say that the division of a number by 0 means that the number is not divided at all?... (T6) *…5/0= ∞ …(T10)
		Infinite	*No numbers can be divided by 0. If they did, the result would be infinite because there are infinite numbers of0 in the number...(T22, T28)
		Zero	*n/0=0. If any n number is divided by 0, the result will be zero….(T35)
The explanation process	1/0	Undefined	*1/0 is undefined… (T38, T41)
		Infinite	*For high school students, 1/0 = ∞ . (T27)
		Undefined(Indefinite)	*I would say that there is no number that can be divided by 0 and the result will be indefinite (undefined). (Ö3)
	a/0	Undefined	*Number/0 is undefined. (T2, T7, T9, T10, T13, T16, T19, T20, T24, T38, T47) *I would explain to secondary school students that the result is undefined. I would say that consider this as we cannot divide a number by a non-existent number...(T27, T42)
		Indefinite	*…In the operation 17/0, how many zeros in 17? …An indefinity occurs in our minds, does not it?...(T25)
		Infinite	*I would say that there are infinite numbers of 0 in every number. (T22, T35)

In the answers in the rules category, there are answers in which the meanings of 0/0, 0/number, 1/0, and a/0 were interpreted separately. While 0/0 was interpreted as indefinite, 1/0 was interpreted as infinite, indefinite, undefined, undefined-indefinite, and zero. The interpretations in this category reflected what participants recalled based on previous learning. Upon examining the answers in this strategy, it was observed that the majority of the PTs expressed 1/0 as undefined with a memorized sentence. It was determined that the answers here are generally as "*1/0 is undefined. Such an expression cannot be divided by 0.", "... there is nothing in zero", "If we consider in the case of 1/0 limit, it is* ∞ *.".* It was found that these explanations were not based on any abstract mathematical technique, but rather were the knowledge that the participant believed and accepted. The answers in the rules category reflected the lack of participants' understanding of the question. A preservice teacher (T3) used the word undefined simultaneously in the same sense as the word indefinite and the others used the concepts of undefined and indefinite in different meanings.

In this strategy, one of the PTs (T47) stated that 1/0 is infinite, but made an explanation on the paper as *"undefined = The result is* $-\infty$ *or* $+\infty$ *according to the negativity or positivity of the numerator."* Upon taking into account this explanation, it was observed that the PT used the concept of undefined instead of the concept of infinite.

CONCLUSION AND DISCUSSION

In this study, the divisibility by zero, the meaning of 1/0, and how these concepts will be explained to secondary school/high school students. It was observed that the PTs used the rule the most and the AMA strategy the least. It was found that in explaining the divisibility by zero, some PTs addressed 0/0, 0/number, 1/0, and number/0 expressions separately and they usually interpreted these expressions as undefined, indefinite, infinite, zero, and no result.

Upon examining the answers given by the PTs, it was seen that they mostly used the rule strategy in the explanation in the meaning of 1/0 and the process of explaining it to their students. It was found that the PTs produced this expression themselves and tried to explain it as much as they recalled from what they previously learned, without any mathematical basis. This is a clear indication that the PTs cannot fully conceptually understand the divisibility by zero. Since the PTs do not have a sufficient mathematical understanding in this regard, they even explained it to their students by the

rule and tried to make them memorize the rules. As a matter of fact, in some studies in the literature (Arsham, 2008; Ball, 1990; Cankoy, 2010; Crespo and Cynthia, 2006; Eisenhart et al., 1993; Quinn, Lamberg, and Perrin, 2008), the meaning of a ÷ 0 has also been questioned and the finding that the students and teachers lacked conceptual knowledge in this regard supported the finding in this study.

Another finding obtained in the research is the fact that the strategy mostly preferred by the PTs following the rule is the anthology. Moreover, it was determined that mathematics students studying at the department of mathematics use this strategy more than the students receiving the pedagogical formation education. This may be due to the fact that secondary school preservice teachers respond to the needs, interests, and needs of their students. That is because due to their age, secondary school students need more tangible experiences in terms of mental development than high school students. This may have led the secondary school mathematics preservice teachers to use their strategy preference in favor of the analogy where the concepts are described by concretizing. As a matter of fact, this finding also supports the finding by Karakuş (2017) that as the grade level increases, preservice teachers shift from tangible educational explanations to intangible educational explanations in explaining that the division of a number by zero is indefinite. Furthermore, Kinach (2002) stated that courses that PTs took in the university affect their explanatory strategy preferences. Therefore, this may also be due to the courses taken by the PTs.

In the study, it was observed that while the PTs explaining the concept by analogy expressed the expressions by concretizing, they made incorrect explanations in some cases and used real-life situations whose mathematical basis might be wrong. For example, in the expression of some PTs "*...we can obtain infinite numbers of slices if we slice the cake thin enough...As we divide 1 by as small numbers as we can, we will approach 0 further*", it was expressed that the number in the denominator is reduced to approach zero in order to obtain many slices of cake. However, the situation is exactly the opposite. In order to increase the number of slices, the number in the denominator needs to gradually increase. Here, the PT confused the size of a slice with the number of slices and was mistaken. A PT who makes such an explanation will confuse students and students will have difficulty in understanding the situation. Upon handling from this aspect, it seems very difficult to implement a teaching in which teachers can teach mathematics in accordance with the level of the students as long as the teachers do not have the proper mathematical knowledge, which they have learned with the reasons and equipment.

It was observed from the findings of the research that some of the preservice teachers (Table 5-T10) interpreted the meaning of 1/0 as undefined in the written form and interpreted as infinite symbolically or stated that it is undefined and later expressed that it is infinite (Table 5-T20, T21, T47). In other words, it was revealed that the PTs could not distinguish these two concepts from each other by the explanations that they made and that they thought that the concepts of indefinity and infinity had the same meaning. Some of the PTs stated that the concepts of undefinedness and indefinity had the same meaning by the expressions *"undefined(indefinite)"* they wrote on the paper. Furthermore, T16 and T26 stated that in cases of interpretation where 0/0 is undefined, 0/0=x and x can have an infinite number of values. However, they stated that the value of 0/0 that they expressed as x is indefinite. While these PTs gave an infinite number of values to the variable x, they interpreted this expression as indefinite because it is not possible to determine which of the infinite values is x. Here, upon examining the meanings that the PTs attributed to x, it is thought that they used the concepts of infinite and indefinite in the same meaning. Upon evaluating from this aspect, it can be said that the PTs do not clearly know the distinction between the indefinite and infinite, undefined and indefinite, and infinite and indefinite concepts, and could not distinguish them from each other. In a study they conducted, Jaffar and Dindyal (2011) showed that participants confused the concepts of undefinedness and indefinity and substituted these concepts for each other. Furthermore, in a research that they carried out with preservice teachers, Even and Tirosh (1995) found that teachers were able to distinguish the situations of indefinity and undefinedness from each other. However, the infinity is used as a place that cannot be reached or something that is too big (Nesin, 2002), undefinedness is used in situations where a proper result cannot be obtained while operating with a standard definition, and indefinity is used in situations where it cannot be determined which one of the different possible

results are valid or in situations where different results are obtained by different methods (Ozmantar, 2008). Therefore, these three concepts are used in completely different meanings.

Although the majority of participants in the study correctly interpreted 1/0 as indefinite, there were also those who stated that the meaning of this expression is infinite and indefinite. This may have been due to the fact that the preservice teachers confused the undefined, indefinite, and infinite concepts. In fact, they may have actually made an explanation assuming that these three concepts are the same. Such that, T23 stated that 1/0 is undefined and made an explanation as "*The meaning of 1/0 is 1/0= 2, 3, 5, … There is no definition in the division of 1 by zero since all numbers can be written in the numerator…"*.Upon examining this explanation of T23, it was observed that he/she actually defined indefinity. However, T23 mentioned indefinity when expressing undefinedness. As a matter of fact, in research, Kanpolat (2010) obtained similar results with this finding.

In conclusion, it was observed that the knowledge of the PTs on the divisibility by zero was inadequate and the explanations were mostly in the form of rules. As a matter of fact, a similar situation was observed in some of the studies in the literature (Crespo and Nicol, 2006; Even and Tirosh, 1995). Only a few of the PTs explained the divisibility by zero using the AMA strategy. This showed that the PTs are very weak in terms of using reasoning techniques that provide abstract mathematical thinking and definition. Therefore, in the field and field education courses at university, the definitions of these concepts should be explained with reasons, and especially the meaning of each concept should be carefully emphasized. The teaching of abstract algebra to preservice teachers should be reconsidered and the PTs should be helped to re-learn numbers and operations significantly in order to prepare them to interpret abstract mathematical concepts in such a way support teaching practices.

REFERENCES

Arıkan, A. & Halıcıoğlu, S. (2012). *Soyut Matematik [Abstract Mathematics]*. Palme yayıncılık.

Arsham, H. (2008). Zero in fourdimensions: Historical, psychological, cultural and logical. Retrieved January 02, 2018, from https://www.researchgate.net/profile/Dr_Hossein_Arsham/publication/252321603_Zero_in_Four_Dimensions_Historical_Psychological_Cultural_and_Logical_Perspectives/links/0deec529be358afe19000000.pdf

Baki, M. (2013). Pre-service classroom teachers' mathematical knowledge and instructionalexplanationsassociatedwithdivision. *Eğitim ve Bilim,* 38(167), 300-311.

Ball, D. L. (1990). The mathematical understandings that prospective Teachers bring to teachereducation. *The Elementary School Journal,* 90(4), 449–466.

Baştürk, S. & Dönmez, G. (2011). Matematik öğretmen adaylarının limit ve süreklilik konusuyla ilgili kavram yanılgıları. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi (EFMED),* 5(1), 225-249.

Cankoy, O. (2010). Mathematics teachers' topic-specific pedagogical content knowledge in the context of teaching a°, 0! and a/0. *Kuram ve Uygulamada Eğitim Bilimleri,* 10(2), 749-769.

Cofer, T. (2015). Mathematical explanatory strategies employed by prospective secondary teachers. *International Journal of Research in Undergraduate Mathematics Education,* 1:63–90.

Crespo, S. & Nicol, C. (2006). Challenging preservice teachers' mathematical understanding: The case of division by zero. *School Science and Mathematics,* 106(2), 84-97.

Çelik, D. & Akşan, E. (2013). Matematik öğretmeni adaylarının sonsuzluk, belirsizlik ve tanımsızlık kavramlarına ilişkin anlamaları. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi,* 7(1), 166-190.

Eisenhart, M.,Borko, H., Underhill, R., Brown, C., Jones, D., & Argard, P., (1993). Conceptual knowledge falls through the cracks: Complexities of learning to teach mathematics for understanding. *Journal of Research in Mathematics Education,* 24, 8-40.

Even, R. & Tirosh, D. (1995). Subject-Matter knowledge and knowledge about students as sources of teacher presentations of the subject-matter. *Educational Studies in Mathematics,* 29 (1), 1-20.

Jaffar, S. M. & Dindyal, J. (2011). Language-related misconceptions in the study of limits. In J. Clark, B. Kissane, J. Mousley, T. Spencer, & S. Thornton (Eds.), *Proceedings of the 34th annualconference of the Mathematics Education Research Group of Australasia and the 23rd biennial conference of the Australian Association of Mathematics Teachers, Alice Springs,* (pp. 390-397). Adelaide, SA: Aamt&Merga.

Kadıoğlu, E. & Kamali, M. (2009). *Genel matematik.* Erzurum: Kültür Eğitim Vakfı Yayınevi.

Kanbolat, O. (2010). *Bazı matematiksel kavramlarla ilgili epistemolojik engeller*. Yayınlanmamış Yüksek Lisans Tezi. Karadeniz Teknik Üniversitesi, Fen Bilimleri Enstitüsü, Trabzon.

Karakuş, F. (2017). İlköğretim matematik öğretmeni adaylarının öğretimsel açıklamalara ilişkin tercihleri: Sıfıra bölme konusu. *Türk Bilgisayar ve Matematik Eğitimi Dergisi,* 8(3), 352-377.

Keskin, C. (2016). *Ortaokul matematik 7 ders kitabı.* ADA Matbaacılık Yayıncılık, Ankara.

Kinach, B. M. (2002). Understanding and learning-to-explain by representing mathematics: Epistemological dilemmas facing teacher educators in the Secondary mathematics "methods" course. *Journal of Mathematics Teacher Education*, 5, 153–186.

Ma, L. (1999). *Knowing and teaching elementary mathematics: Teachers' understanding of Fundamental mathematics in China and the United States.* Mahwah, NJ: Erlbaum.

McDiarmid, G. W., Ball, D. L., & Anderson, C. (1989). Why staying one chapter ahead doesn't really work: subject-specific pedagogy. In M. C. Reynolds (Ed.), *Knowledge Base for the Beginning Teacher* (pp. 193-205). Elmsford, NY: PergamonPress.

Miles, M. B. & Huberman, A. M. (1994). Qualitative data analysis: an expanded sourcebook. (2nd Edition). Calif: SAGE Publications.

Nesin, A. (2002). Matematik ve sonsuz. http://www.alinesin.org/popular_math/S_7_matematik_ve_sonsuz.doc internet adresinden 15 Eylül 2017 tarihinde indirilmiştir.

Özmantar, F. (2008). Sonsuzluk kavramı: tarihsel gelişimi, öğrenci zorlukları ve çözüm önerileri. Eds. M.F. Özmantar, E. Bingölbali ve H. Akkoç. *Matematiksel Kavram Yanılgıları ve Çözüm Önerileri* (s.151-180). Pegem Akademi, Ankara.

Özmantar, M. F. & Bozkurt, A. (2013). Tanımsızlık ve belirsizlik: kavramsal ve geometrik bir inceleme. İ.Ö. Zembat, M. F. Özmantar, E. Bingölbali, Şandır, H. , & A. Delice (Edt.), *Tanımları ve tarihsel gelişimleriyle matematiksel kavramlar* (ss. 437-461) (1. Baskı). Ankara: Pegem Akademi.

Reys, R. E. & Grouws, D. A (1975). Division ınvolving zero: some revealing thoughts from ınterviewing children. *School Science and Mathematics*, 78, 593-605.

Shulman, L. S. (1986). ThoseWho understand: knowledge growth in teaching. *Educational Researcher,* 15(2), 4-14.

Quinn, R. J., Lamberg, T. D. & Perrin, J. R. (2008). Teacher perceptions of division by zero. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas,* 81(3), 101-104.

Tsamir, P., Sheffer, R., & Tirosh, D.(2000). Intuitions and undefined operations: The Cases of division by zero. *Focus on Learning in Mathematics*, 22 (1), 1–16.

Zikre, N. M. & Eu, L.K. (2016) Malaysian mathematics teachers' beliefs about the nature of teaching and learning. *The Malaysian Online Journal of Educational Science*, 4(1), 21-29.

International Journal of Progressive Education, Volume 15 Number 4, 2019

An Evaluation on the Education of Turkish Language in Australia

Yasemin Uzun [i]
Çanakkale Onsekiz Mart University

Abstract

The level and rate of learning the mother tongue of individuals whose mother tongue is different from the language of the society they live is not the same compared to people who learn their mother tongue in their homeland. Turkish people who live in abroad, have to study more in order to learn Turkish compared to people in Turkey. The language students learn who live in abroad and the language they use in their homes may negatively affect either their success in their lessons or the relationships they have with people who speak the same mother tongue. It is expected from students who live in abroad to be academically successful and build healthy relationships and to learn their mother tongue as well as the language they are educated in order to sustain their culture. Providing opportunity to learn their mother tongue in schools they receive education live positively affects their success. It is extremely important especially in multi-cultured societies. Countries which adopt multi-culturalism also give importance to mother tongue education. Australia, which is a multi-cultured country, provides opportunity for different societies to learn their mother tongue. Certain hours in schools is spared for migrants to learn their mother tongue. Australia prepared and executed Turkish curriculum in 2005. In this paper, Turkish curriculum being applied in the state of Victoria in Australia was evaluated and obtained data were compared in accordance with the purpose, approach and grammar that is applied in Turkey. On the basis of this purpose, the research was conducted with document analysis among qualitative research methods. As a result, it was concluded that Turkish curriculum in Australia is prepared in order to develop metacognitive skills and corresponds to constructivist approach that is being applied in Turkey since 2005.

Keywords: Mother tongue education, Turkish education, Australia, Turkish curriculum, multi-culturalism

DOI: 10.29329/ijpe.2019.203.2

---

[i] **Yasemin Uzun**, Assist. Prof. Dr., Çanakkale Onsekiz Mart University, Turkish Language and Literature Education.

Correspondence: yaseminuzun@hotmail.com

INTRODUCTION

It is possible for individuals to realize themselves and build a healthy communication by a successful language acquisition. Mother tongue education in schools develops the comprehension and interpretation skills of an individual as well as the development of the society. The main purpose of the education of mother tongue is to provide individuals to use their language as good as possible both written and oral (Arslan, 2017:64). With the education of mother tongue, cultural transfer can be achieved as well. Language, which is the most important tool for an individual to socialize also function as a bridge in handing the culture down from generation to generation. Solely with linguistic researches valuable information and trustworthy clues can be obtained about the lifestyle, beliefs, traditions, world perspective and various qualities of a nation even though there are no information on the various incidents that take place in a society throughout the history (Aksan, 2000:64-65).

Language which forms the education system, culture and the essence of the society it is spoken gives the feeling of identity, security, belonging and having a mutual past. It hands down the cultural heritage of the past to today's generation. "The identity of a society can be defined with symbols, clothes, religious beliefs and attitudes, traditions but language is the strongest tool in the formation and definition of the identity" (Yağmur&Yalçınkaya, 2014:284). Culture which is defined in the simplest terms as "Culture may even be described simply as that which makes life worth living "(Eliot, 1949:26) can be transferred the most easily and effectively with the education of mother tongue. Since language provides personal and social developments of individuals as well as culture transfer, the importance of the education of mother tongue can be seen clearly.

Education of mother tongue is extremely important especially for children who live outside of their homeland in terms of not losing their ties with their past and completing their individual and personal developments. The level and rate of learning the mother tongue of children whose mother tongue is different from the language of the society they live is not the same compared to people who learn their mother tongue in their homeland. Turkish people who live in abroad, have to study more in order to learn Turkish compared to people in Turkey. The language students learn who live in abroad and the language they use in their homes may negatively affect either their success in their lessons or the relationships they have with people who speak the same mother tongue. It is expected from students who live in abroad to be academically successful and build healthy relationships with the society and to learn their mother tongue as well as the language they are educated in order to sustain their culture. As individuals' skill improve in their mother tongue, their control on the culture of their nation they belong to also increases (Melanlıoğlu, 2008:66)

The major factor for providing a healthy education for mother tongue is a well-prepared curriculum. Today's curricula are planned student-centered in many countries including Turkey and prepared in accordance with constructivist approach. This system which makes students more active, aims to improve metacognitive skills in the process of constructing the information. Linguistic and mental skills obtained at early ages would contribute to the development of metacognitive skills such as questioning, analyzing, inferring and evaluating that would be acquired at later ages. "The education and habits children acquire in their family and during pre-school period form an important basis about how they will process and use the knowledge they learn at later ages" (Demirel&Yağmur, 2017:96). For this reason, curricula in schools should be planned in accordance with this. At the end of the education process it is expected for metacognitive skills such as learning, problem-solving, critical thinking, and reflective thinking to be improved. In this education process questioning and evaluating the information and creating new information is essential. (Güneş, 2012). With these acquirements, students are prepared to the difficulties of real life. Curricula are regulated with this approach. Education programs that are based on behavioral approach in Turkey are started to be prepared in accordance with constructivist approach since 2005. With the execution of constructivist approach, the human type that is aimed to be raised also changed with Turkish language education.

To what extent Turkish language curriculum that is prepared with this approach corresponds to Turkish curriculum prepared for Turkish people in abroad? The answer for this question is sought in

this research. Providing opportunity to learn their mother tongue in the schools they receive education live positively affects their success. It is extremely important especially in multi-cultured societies. Countries which adopt multi-culturalism also give importance to mother tongue education. Australia has accepted that they have a multi-cultured structure in 1974 (Parlak, Avara, 2012:1826). In this study, Turkish language curriculum prepared for Turkish children in Australia which have a multi-cultured structure will be examined.

Australia is one of the countries which contain many local and immigrant cultures and has a multi-cultured structure. Australia, the sixth largest country in the world, is comprised of states (http://www.ga.gov.au). After the discovery of the continent, the country began to receive immigration from all over the world and is among the few countries in the world in terms of ethnic diversity. (https://dfat.gov.au). The Ministry of Education of each state in Australia, which consists of six states as West Australia, South Australia, Queensland, Tasmania, New South Wales and Victoria, is responsible for the education of the schools in their region (Australian Government Department of Immigration and Citizenship, 2006).

The total population of Australia is 24.992,400 according to the data of June 30, 2018. 6.459.800 of this population lives in Victoria, which is the second most crowded state in terms of population density (http://www.abs.gov.au). For these reasons, Turkish Language Curriculum applied in Victoria is examined.

In Victoria, certain hours in schools is spared for migrants to learn their mother tongue. In accordance with "The Multi-Cultural Policy" (Victorian Government Report in Multicultural Affairs, 2017) that is adopted in Victoria State in 2004, ethnic languages and cultures are attempted to be protected. In parallel with this purpose a program called "Language Other Than English/Study Design/Turkish" was prepared for Turkish language (Parlak, Avara, 2012:1827). Then ACARA authorities considered the request of Turkish society and included Turkish, Hindi, Australian Sign Language (Auslan) along with Classic Languages to the Australian National Curriculum in November 21, 2011 (Parlak, Avara, 2012:1832).

Turkish students whose education of mother tongue is regulated as such can take university exam in Turkish. The scores they have taken from Turkish exam effects their admission to the university (Parlak, Avara, 2012: 1829).

Purpose of the research

In this study it was aimed to evaluate the basic approach, learning domain and acquisition of the curriculum prepared in 2005 for the education of Turkish language in Australia from basic level to 10th level and to compare the aims and planning of mother tongue curricula that is prepared in Turkey in accordance with constructivist approach with the obtained data.

METHOD

In this study, document analysis was used among qualitative methods. Document analysis involves the analysis of written materials that includes information about the fact or facts that is aimed to be researched (Yıldırım and Şimşek, 2005:187).

Collecting the Data

The data of the study, as document, constitute of Turkish language curriculum being applied in Australia and prepared from basic level to 10th level and mother tongue curricula that is prepared in Turkey in accordance with constructivist approach with the obtained data.

Analysis of the Data

In the analysis of data, descriptive analysis technique was used. Descriptive analysis includes the summary and interpretation of the data in accordance with the pre-ordained themes (Yıldırım and Şimşek, 2005:224). Turkish language curriculum that is being applied in Australia was evaluated by taking into consideration the constructivist approach with the mother tongue curriculum in Turkey.

FINDINGS

In Australian education system, curricula are regulated on the basis of literacy, numeracy, information and communication technologies, critical and creative thinking, personal and social ability, ethical understanding and intercultural approach. Sustainability in education is pursued. Teaching knowledge, skill, values and the idea of world perspectives that can be perceived as the necessity of its multicultural structure have shaped the curriculum. These expectations have also reflected on Turkish language curriculum. Turkish language curriculum was performed according to the curricula of other languages up until 2005. The curriculum exclusive for Turkish language was prepared and applied in 2005 (Turkish Curriculum: 2016).

The student type that is demanded to be raised according to Turkish language curriculum in Turkey have changed as of 2005. The rapid change in science and technology necessitates raising individuals who can produce information, can use it functionally in life, have problem-solving and critical thinking, entrepreneur, decisive, have communication skills, can empathize, contribute to the society and culture etc. Individual differences were taken into consideration and the program which is aimed to acquire value and skill was prepared with a cyclical approach. A total of curricula was constituted with using metacognitive skills, providing meaningful and permanent learning, solid and associated learning with early knowledge, integrated learning with other disciplines and values, skills and competences of daily life (TÖP, 2018:3). Desire of raising a student type which can keep up with the developments in science and technology, aim to acquire metacognitive skills and give importance to personal development are the common point of both programs.

Turkish language curriculum in Australia is regulated as two-phase; from beginner level to 6th level and 7th level to 10th level. Turkish language education in Turkey is approached in the scope of primary school, from 1st grade to 8th grade. It is included in secondary education from 9th grade to 12th grade. Each grade has different acquisitions.

In Turkish language curriculum in Australia, beginner level with 2nd, 3rd grade and 4th grade, 5th grade and 6th grade, 7th grade and 8th grade, 9th grade and 10th grade are approached together. These grades that are evaluated in doubles are planned under the title of **communication, comprehension and success criterion**. There are sub-dimensions of socializing, informing, creating, translating, reflecting in communication; language systems, linguistic diversity and change, the role of language and culture in comprehension. Under Success Criterion title, the condition of actualizing the acquisitions is explained by giving Turkish examples (TF-6, 2016).

A classification is adopted for Turkish language curriculum as communication, comprehension and success criterion in Australia, and listening/watching, speaking, reading and writing in Turkey. In Turkey, acquisitions are grouped according to listening/watching, speaking, reading and writing skills and given under different titles in accordance with grade levels. Reading consists of sub-dimensions as readiness to reading, fluent reading and comprehending in 1st grade and fluent reading, vocabulary and comprehension in later grades.

In the Turkish language curriculum of Australia, in the socializing chapter of communication it is expected from students to communicate with games in beginning level and 2nd level, to participate to the conversations and activities with questions in 3rd and 4th levels, in addition to the other levels to make verbal, written and digital interactions and explanations in 5th and 6th levels, to participate and manage activities such as planning and discussing in 7th and 8th levels and metacognitive skills such as

discussing, problem-solving, analyzing as well as comparing point of views, preferences and responsibilities in 9th and 10th levels. With socializing it is aimed for individuals to actively participate in society. Digital interactions are experienced after 5th level. When the expected skills are evaluated, it can be seen that the curriculum is prepared according to constructivist and cyclical approach. Studies about metacognitive skills are in 9th and 10th levels.

In socializing chapter, behaviors such as recognizing the usages of other languages, sharing information about their teachers, peers and themselves; participating in activities such as singing and playing; using gesture, mimic and concrete materials and following in-class rules are expected from students in beginner and 2nd level.

In 3rd and 4th levels, they are required to participate in conversations, participating in environments where they share their learning experiences such as cooking and handicraft activities, asking questions and answering the questions.

In 5th and 6th levels, students are required to participate in sharing their opinions and experiences with verbal, written and digital interactions, to plan activities such as demonstration or presentation, interview, awareness campaign or virtual shopping, to ask questions and answer them, to make explanations.

In 7th and 8th levels, skills such as continuing their personal reactions and social interactions as verbal and written including discussing their experiences as the members of different language communities and friends, participating mutual activities in real or imaginary situations that includes planning, practicality, negotiating and taking action, interacting with their peers and teachers where they can apply what they have learned by managing discussions are aimed.

In 9th and 10th levels, students are required to change their ideas, opinions and expectations, to compare their opinions, preferences and responsibilities with their experiences, to determine similarities and differences. Furthermore, students in this level participate in activities that include discussing, problem solving and negotiating. They ask analysis-aimed questions and answer these questions.

In the informing section of communication, there are finding, writing and explaining keywords and important points in simple texts in beginner and 2nd levels, editing and quoting the information in texts in 3rd and 4th levels, quoting information in 5th and 6thlevels, accessing information, analyzing and comparing information and evaluating the problems with a distinctive perspective in 7th and 8th levels, synthesizing, evaluating and presenting the information in 9th and 10th levels.

In the informing section, students are required to find and write keywords and important points in simple texts such as messages, announcements, graphics, lists or visuals; to make explanations by using gestures, mimics and supportive materials in beginner and 2nd levels.

In 3rd and 4th levels, students are required to find and edit the information in verbal, written and visual texts, to quote information by using simple expressions such as maps or graphics and supportive materials.

In 5th and 6th levels, it is planned for students to quote information appropriately about the characteristics of their languages, cultures and societies for different viewers and contexts.

In 7th and 8th levels, they are required to access information in written, digital and visual sources in order to better understand and evaluate personalities and conditions, to analyze and compare information, to evaluate local or global problems by using verbal, written and sources of different content with a distinct perspective and to quote the information about this subject.

In 9th and 10th levels, students are required to synthesize and evaluate the information, which they obtain by researching different perspectives and sources about a subject, by defining how culture and content affected the presentation of the information, to present the obtained information by using different methods in order to catch perspectives about incidents or social and cultural subjects their peer group interested in.

In the creating section of communication, students are required to create creative texts. Creativity is included in Turkish language curriculum in Turkey with constructivist approach. This concept that is in the aims and techniques of the program, in included in Turkish language curriculum in Turkey as "forming creative text".

It is considered for students to read stories, to listen and sing rhymes and songs in 3rd and 4th levels, to be interested in imaginary texts such as stories, puppet shows, songs or dances and to participate in activities by defining which one they like the best, to make simple creative texts such as story, dialog, song or cheering in 3rd and 4th levels. In 5th and 6th levels, students are required to be aware of creative texts such as TV programs, folk stories, games or cartoons by sharing their opinions about factors such as subject, message, character and theme and to make and act impressive and creative texts such as stories, dances, skits or video clips.

In 7th and 8th levels they are required to compare and interpret the presentation of values, characters and incidents of traditional and contemporary fictional texts, presenting alternative versions of songs, visuals or stories by adopting, creating or reinterpreting the incidents or characters to different situations or cultural contexts.

In 9th and 10th levels, they are required to analyze how the texts impressively and creatively reflect the aesthetic, humorous or emotional formations that are used in the reflection of cultural influence, to quote their life experiences in which societies speak Turkish and English, to create a series of creative and impressive texts in order to leave an emotional and humorous impression.

In the translation section of communication, it is expected from students to create bilingual and digital texts and to make explanations by recognizing cultural elements. This is important in terms of students to adapt the society they live in and to use both languages.

In beginner and 2nd levels, students are expected to explain the meanings of sentences and gestures with daily used Turkish words by recognizing the words that are similar to or different from English or other known languages in English, to create simple bilingual or digital texts such as illustrated dictionary, wall charts, classroom labels or identity cards. In 3rd and 4th levels, students are expected to identify the most spoken Turkish words or gestures which are translated/not translated to English and used in both languages, to create simple bilingual texts such as notices or subtitles. In 5th and 6th levels, they are required to translate simple texts from Turkish to English and vice versa, to determine elements that require interpretation and recognize words that are pronounced different, to create bilingual texts such as web sites, posters, class magazines and menus.

In 7th and 8th levels, students are required to translate and interpret short texts from Turkish to English or vice versa, to compare different versions, to evaluate how elements that include cultural information or understanding are discussed, to create short bilingual texts for the purpose of publishing in digital stories, comic books, blogs, news bulletins or web sites that reflect the idea of "living between languages". In 9th and 10th levels, they are required to compare the translations of Turkish texts such as informative or literary genre while considering factors that can influence the translation from one language to another, to make English explanations for cultural and contextual references in contemporary and traditional Turkish texts and to lexicalize.

In the reflection section of communication, students are expected to express themselves in the context of language, culture, identity in Turkish and English.

In beginner and 2nd level, it is expected from students to be careful about the different usage of Turkish and English in communication, to express themselves while considering their belonging to different groups by using simple expressions, gestures, mimics and supportive materials. In 3rd and 4th levels, they are required to recognize the differences and similarities in the usage and communication of the language while communicating in Turkish and English, to explore the individuality in their identities and belonging to a group and how to express this with different languages. In 5th and 6th levels, they are expected to switch between languages, to state when did they choose to use Turkish or English and to discuss their experiences in terms of how cultures influence the ways of communication, to compare the usage of Turkish and English by determining the advantages and difficulties of being bilingual or multilingual.

In 7th and 8th levels, they are required to think about the usage of Turkish and English in different contexts while considering the intercultural situation of their choices, to consider how personal features such as family origins, traditions, interests and experiences influenced their perception of identity and ways of communication. In 9th and 10th levels, they are expected to reflect their language preference and communication style while communicating with people who use different languages, to determine strategies which would help intercultural communication, to find the relationship between language, culture and identity, how it effects and shapes the ways of communication.

Students are expected to reach a certain grammar acquisition in the language systems section of understanding.

In beginner and 2nd level, students are required to identify the phonemes and spellings of / ı /, / ğ /, / ö /, / ü /, / ş / and / ç / letters special to Turkish and to make connections between speaking language, alphabetic elements and written forms of the language, to identify the frequently used words they know and speaking sections and to comprehend the basic rules of word order in simple sentences, to comprehend that the language is relevant a “text” that takes different forms and uses different structures. In 3rd and 4th levels, students are expected to comprehend and apply the rules of vowel harmony, Turkish pronunciation, toning and spelling forms, to recognize grammar forms and functions of appendixes, to comprehend and use the important grammar forms and structures such as simple tense verbs, to recognize the characteristic features of verbal and written texts that are similar to English and the words they use in their homes and communities. In 5th and 6th levels, students are required to understand the difference between toning and emphasis in Turkish and to apply it to their own written and verbal language, to recognize the grammar characteristics of verbal and written language such as conjugation and declension, positive and negative structures and sentences, to comprehend how different text forms such as verse and prose in Turkish have effects on different readers.

In 7th and 8th levels, students are expected to identify and use the appropriate features of Turkish verbal and written systems for creating texts that include special and less-known language usages, to comprehend structures such as grammatical shapes and duplexing, auxiliary verb and formal forms, to comprehend the effect of aim, reader and context on the structure and editing of texts. In 9th and 10th levels, students are required to comprehend the regular and irregular elements of spoken and written language and to use elements such as adding and creating compound patterns for producing complex expressions and detailed texts in the context of interaction, to analyze the effect of grammar elements such as abjunction and conjunction on more complex elements in the context and in word structure such as mode, to know how to create different text forms that are appropriate for different context, aim and reader and how the appropriate cultural and contextual elements are included.

In the language diversity and change section of understanding, the influence and borrow of different cultures are stressed.

In beginner and 2nd levels, students are expected to recognize how Turkish words, expressions, gestures and mimics are used for addressing and saluting people in different situations and contexts, to recognize that different languages borrowed words and expressions from each other, including Turkish. In 3rd and 4th levels, students are required to comprehend that language changes according to factors such as the age, gender and social standing of speakers and it includes regional dialects and accents, to accept that languages change over time and Turkish language has influenced other languages and cultures and influenced by them. In 5th and 6th levels, students are expected to comprehend that the verbal and written forms of Turkish language changes in terms of form according to context, aim and reader, to recognize that Turkish language changed and developed by getting influenced by other languages, cultures and changes.

In 7th and 8th levels, students are required to comprehend the nature of regional and national differences that occur even between context and reader in the usage of language, to comprehend how the usage of Turkish has changed over time in the contexts of social environment, school and society and to discuss the reasons of changes or adaptations. In 9th and 10th levels, students are expected to comprehend that the differences in the usage of spoken and written language is related to social roles, communities and contexts and to comprehend how and why they are different from similar differences in the usage of Australian English, to comprehend that Turkish, other languages and cultures constantly change over time and this change derives from factors such as education, changing value judgment, innovations in technology and intercultural changes.

In the role of language and culture section of understanding, it is aimed to comprehend the reflection of culture, value and belief systems on language.

Students are expected to consider how the usage of language methods of societies are shaped by value and belief systems and how they can be interpreted by the speakers of other languages in beginner and 2nd level, to recognize how and where people engage in language and how they use it in a way that will reflect their culture and what is important for them in 3rd and 4th levels, to make connections between Turkish language and culture by defining the words that reflect cultural values and practices, gestures and mimics, explanation forms or expressions in 5th and 6th levels.

In 7th and 8th levels, they are expected to comprehend that language is not ineffective, language structures and usages reflect cultural values, opinions and perspectives. In 9th and 10th levels, they are required to explore how Turkish language and related cultures are connected with each other just as all languages and cultures, how it has changed and shaped over time.

According to the information in the success criterion section, grammar teaching includes greeting, forming short sentences by which they introduce themselves and objects, quantifiers “many” and “any”, duplexing with songs, imperative sentences with in-class instructions, toning in question and exclamation sentences, object categories, the usage of adjectives while introducing themselves, letters that are specific to Turkish and organized sentences in beginner and 2nd levels. In 3rd and 4th levels, they are expected to comprehend celebrations, comparisons “... instead of ...”, present and future tense, requesting, pronunciation, toning and vowel harmony, to find the information by finding keywords, editing and presentation, verbs, adjectives, adverbs and conjunctions, case appendixes among appendixes, request and imperative sentences, characteristics of dialect and accent. In 5th and 6th levels, there are question sentences, accepting and feedback expressions, forming sentences with cause and effect relation, forming positive, negative and question sentences, conjunction of simple present tense and present continuous tense, punctuation marks, lexicalize, consonant harmony, the effect of long verbs on meaning, use of formal language, exemplifying foreign words in the language, the effect of belief and value system on the usage of language. In the 8th level it is required to form sentences about their first visits to Turkey and Australia, arguing their opinion and stating their decisions, evaluating, using different tenses in the same sentence, using reduplications, repetitions, auxiliary verbs, titles, characteristics of dialect and form sentences according to cause and effect relation with adverbs and adjectives. In the 10th level it is expected to express their desires and preferences comparatively with cause and effect relation, to explain the opinions they disagree with, to

answer in detail, to speak fluently, to use humorous language, to use different tenses and compound tenses, to recognize the colloquial language and to perform cultural analysis.

Sentences that introduce themselves and objects are expected between beginner and 4th level, collaborative learning studies are expected between 4th and 8th levels and studies about pronunciation and toning are expected in all levels. Turkish and English translations, bilingual text creation and borrowings in language are expected in all language levels (https://www.australiancurriculum.edu.au).

RESULT AND SUGGESTIONS

In Australian education system, curricula are regulated on the basis of literacy, numeracy, information and communication technologies, critical and creative thinking, personal and social ability, ethical understanding and intercultural approach. Turkish language curriculum in Turkey is prepared in accordance with raising a student who can produce information, can use it functionally in life, have problem-solving and critical thinking, entrepreneur, decisive, have communication skills, can empathize, contribute to the society and culture etc. because of the rapid change in science and technology. Both countries include similar purposes in this context.

Sustainability in education and individual differences are included in the curricula of both countries (TÖP, 2018: 6-7).

Desire of raising a student type which can keep up with the developments in science and technology, aim to acquire metacognitive skills and give importance to personal development are the common point of both programs.

Turkish language curriculum in Australia is regulated as two-phase; from beginner level to 6th level and 7th level to 10th level. Turkish language education in Turkey is approached in the scope of primary school, from 1st grade to 8th grade. It is included in secondary education from 9th grade to 12th grade. Each grade has different acquisitions.

A classification is adopted for Turkish language curriculum as communication, comprehension and success criterion in Australia, and listening/watching, speaking, reading and writing in Turkey. A classification is adopted for Turkish language curriculum as communication (socializing, informing, creating, translating, reflecting), comprehension (language systems, language variety and change, the role of language and culture) and success criterion in Australia and a curriculum for Turkish language as listening/watching, speaking, reading and writing skills in Turkey. Reading consists of sub-dimensions as readiness to reading, fluent reading and comprehending in 1st grade and fluent reading, vocabulary and comprehension in later grades. Acquisitions show similarities with success criterion.

When the expected skills of curricula of both countries are evaluated, it can be seen that the curriculum is prepared according to constructivist and cyclical approach.

Students are expected to form creative texts in Australia. Creativity included in Turkish language curriculum with constructivist approach in Turkey. This concept that is in the aims and techniques of the program, in included in Turkish language curriculum in Turkey as “forming creative text”.

There is also a study of translation in Australian curriculum. Cultural elements are included in both curricula. In Australian curriculum, the influence and borrow of different cultures with each other are stressed. And this is because the country has a multicultural structure. Furthermore, in the curriculum there is also the reflection of value and belief systems on the language.

When the grammar subjects in the curricula are evaluated as a whole both of them show similarities.

Grammar teaching is attempted to be taught with examples by recognizing and adumbration.

In Turkish language curriculum in Turkey, there are basic values such as justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism, helpfulness (TÖP, 2018:4). In Turkish language curriculum in Australia, these values are recognized in the regulation of curriculum but are not included separately.

Turkish language curriculum in Turkey is regulated according to Turkish Qualifications Framework. In this context, there are eight key competences as, communication, communication in foreign languages, mathematical competence and basic competences in science/technology, digital competence, learning to learn, competences about socializing and citizenship, taking initiative and entrepreneurship, cultural awareness and expression (TÖP, 2018:4-5). These competences are also included in Australian Turkish language curriculum.

Turkish language curriculum in Australia is regulated in the same framework and content with other curricula that is being taught in the country such as German, French, Italian, Spanish, Greek, Korean (https://www.australiancurriculum.edu.au).

When the Turkish language curriculum in Australia is compared with the one in Turkey, similarities can be observed in terms of aim, approach and grammar.

Both curricula are regulated on the basis of constructivist approach and towards developing metacognitive skills. When this is examined in terms of teaching Turkish in abroad, these determinations are pleasing in terms of teaching Turkish correct, favorably and efficiently.

These evaluations can shed light on the education of Turkish in other countries.

REFERENCES

ACARAa (Australian Curriculum, Assessment and Reporting Authority). (2015). *Draft shape of the australian curriculum: languages.* (retrieved from https://www.australiancurriculum.edu.au/f-10-curriculum/languages/framework-for-aboriginal-languages-and-torres-strait-islander-languages/ on 26.12.2018).

ACARAb (Australian Curriculum, Assessment and Reporting Authority) (2015). *Consultation report draft shape of the australian curriculum: languages*. (retrieved from www.acara.edu.au on 25.12.2018).

Aksan, D. (2000). *Her yönüyle dil.* Ankara: TDK Yayınları.

Australian Government Department of Immigration and Citizenship (2018). (retrieved from http://www.immi.gov.au on 11.10.2011).

Bloom, L & Lahey, M. (1978). *Language development and language disorders*. New York: John Wiley.

Bloom, L. (1980). Language Development, Language Disorders, And Learning Disabilities: LD. *Bulletin of the Orton Society. 30, 115-133.*

Century for the Multicultural Education Unit (DEECD) (2018). (retrieved from http://www.multiculturalaustralia.edu.au on 03.12.2018)

Demirel, G., & Yagmur, K. (2017). Uluslararasi PIRLS Uygulamaları Ölcütlerine göre Türk Öğrencilerin Üst Düzey Düsünme Becerilerinin Degerlendirilmesi (in Turkish). *Journal of Language Education and Research*, 3(2), 95-106.

Eliot, T. S. (1948). *Notes towards a definition of culture*. New York: Harcourt, Brace and Company.

Güneş, F. (2012). Öğrencilerin Düşünme Becerilerini Geliştirme. *TÜBAR*. XXXII- Güz: 128-130. (retrieved from http://dergipark.gov.tr/tubar/issue/16973/177364 on 03.01.2019).

Güzel, A. (2010). *Iki dilli Türk çocuklarına Türkçe öğretimi: almanya örneği*. Ankara: Öncü Yay.

Güzel, A. (2010). *Iki dillilere Türkçe öğretimi.* Ankara: Vizyon Yayınevi.

Halliday, M. A. K. (1975) . *Learning how to mean: explorations in the development of language (explorations in language study)*. London: Edward Arnold.

Kagan, S. L., Moore, E. and Bredekamps, S. (Eds.). (1998). Reconsidering Children's Early Development and Learning Toward Common Views and Vocabulary. *National Education Goals Panel*. (retrieved from http://files.eric.ed.gov/fulltext/ED391576.pdf on 20.12.2018).

Turkish Foundation to Year 6 (TF-6) (2016). http://docs.acara.edu.au (ET: 28.12.2018)

Turkish Year 7-10 (T7-10) (2016). http://docs.acara.edu.au (ET: 28.12.2018)

Turkish Foundation to Year 10 (TF-10) (2015). http://docs.acara.edu.au (ET:28.12.2018)

LOTE and Interpersonal Development, Department of Education and Early Childhood Development. (retrieved from http://www.education.vic.gov.au on 24.02.2012).

Melanlıoğlu, D. (2010). Kültür aktarımı açısından Türkçe öğretim programları. *Eğitim ve Bilim*. 33(150), 64-73.

The State of Victoria Department of Premier and Cabinet (2017). *Victorian government report in multicultural affairs*. (retrieved from http://www.multicultural.vic.gov.au on 04. 04. 2011).

MEB (2018). *Ortaöğretim Türk dili ve edebiyatı dersi öğretim programı 9, 10, 11 ve 12. sınıflar.* Ankara. (retrieved from http://mufredat.meb.gov.tr on 28.12.2018).

Parlak H. & Avara H. (2012). Avustralya/Viktorya'nın Dil ve Eğitim Politikası Çerçevesinde Türkçenin Öğretimi, *Turkish Studies - International Periodical For The Languages, Literature and History of Turkish or Turkic*. 7/1, 1826. (retrieved from www.australiancurriculum.edu.au on 28.12.2018).

Australian Curriculum, Assessment and Reporting Authority (ACARA) (2016). *Turkish curriculum* (retrieved from https://www.australiancurriculum.edu.au/f-10-curriculum/languages/turkish/ on 04.01.2019).

MEB (2018). *Türkçe dersi öğretim programi-ilkokul ve ortaokul 1, 2, 3, 4, 5, 6, 7 ve 8. sınıflar*. Ankara. (retrieved from http://mufredat.meb.gov.tr on 20.12.2018).

Yağmur K, Yalçınkaya K. (2014). Batı Trakya Türklerinin Anadillerine ve Kültürlerine Karşı Tutumları. *Bilig*, 70, 284.

Yıldırım, A. ve Şimşek, H. (2005). *Sosyal bilimlerde nitel araştırma yöntemi*. Ankara: Seçkin Yayıncılık.

International Journal of Progressive Education, Volume 15 Number 4, 2019

The Effect of Self-Regulation Based Strategic Reading Education on Comprehension, Motivation, and Self-Regulation Skills*

Tuncay Türkben [i]
Aksaray University

Abstract

The changes occurred in science and technology affect the content of education directly. In alignment with this change, the upbringing of students from an early age to be able to adapt and improve in alignment with the changing life conditions, to take learning responsibilities, to solve problems, to be able to think critically, to be entrepreneurial and to have communication skills is directly related to models and methods used in their learning environments. With self-regulated education that emerged in alignment with this perspective, students follow a path that is cognitively, motivationally and behaviorally active during their education. The purpose of this study is to identify the effects of self-regulation based strategic reading on the comprehension, reading motivation and self-regulation skills of 5th grade students. The study was conducted in two middle schools that are in the middle level socioeconomically in the city of Aksaray. An experimental model with pre-test and post-test control group was used in the study. Paired groups were assigned to experiment and control groups randomly in alignment with the research design. In the test group, a program geared towards improving self-regulation based reading skills was used while the current education program is used in the control group. Reading comprehension scale, motivation and learning strategies scale, reading motivation scale, and reading strategies scale were used as data collection instruments. The findings showed that self-regulation based strategic reading education has an effect on reading comprehension, motivation and self-regulation skills.

Keywords: Turkish education, Self-regulation based learning, reading comprehension, motivation, self-regulation skills.

DOI: 10.29329/ijpe.2019.203.3

---

* This is the expanded version of the study presented at the "XII. International Educational Research Conference" held in Rize in April 25-28, 2019

[i] **Tuncay Türkben**, Assist. Prof. Dr., Aksaray University, Faculty of Education, Department of Turkish Education.

Correspondence: tuncayturkben57@gmail.com

INTRODUCTION

Rapid changes occurring in science and technology concern individuals' lives closely. Individuals can adapt to the change by acquiring life-long learning skills. Educational programs should be structured in a way to help students acquire skills to regulate their life-long learning. Students with self-regulation skills have skills such as problem-solving, critical thinking, entrepreneurial and communication as well as skills for regulating their own learning.

Regulation of one's own learning activity depends on the person's awareness of their own learning and skills, structuring information and engaging with the learning process actively. One of the most critical language skills an individual can use during the process of life-long learning is reading. Thus, a strong foundation for reading education should be provided during elementary education. Students encounter new information, incidents, and experiences by accessing different resources through the reading skill. This skill entails a process including learning, researching, interpreting, discussing and critical thinking. An individual's success in academic life and afterwards is possible with having an advanced level of reading skills. When successful readers' characteristics are evaluated, it is seen that they use cognitive and metacognitive reading strategies effectively, they have reading motivation, and regulate their own learning by using self-regulating strategies. Studies conducted in recent years focus on self-regulated learning in which individuals take the responsibility for their own learning (Azevedo, Moos, Grene, Winters & Cromley, 2008; Bates, 2006; Cabı, 2009; Camahalan, 2006; Eker, 2012; Graham, Haris & Mason, 2005; Gülay, 2012; İsrael, 2007; Müldür, 2017; Oruç, 2012; Tolaman, 2017; Uyar, 2015; Uygun, 2012; Zumbrunn & Bruning, 2013). It is seen that studies mostly focus on the effects of self-regulation on writing skills, academic success, attitude, persistency, and perceptions of self-efficacy. The current study focused on the effects on reading comprehension, motivation, and self-regulation skills.

Self-Directive Learning Process

Self-regulation is the skill of regulating cognition, behaviors, actions and motivations strategically and autonomously in academic skills and learning to reach the identified goals. Pintrich (2000) defines self-regulation, which is one of the fundamental principles of social cognitive theory, as a structuring process that students identify goals for their learning, regulate and control their cognition and behaviors while Schunk (1989; as cited in Schunk, 1994, p.75) defines it as activities such as an individual's engagement and concentration in the learning process, organization, coding and repetition of knowledge to be remembered, creation of an efficient study environment and use of resources efficiently, having positive belief in the results of expected behaviors, value of learning, factors affecting learning, and feeling happy with efforts made. According to Risenberg and Zimmerman (1992), self-regulation is to identify goals and using strategies to achieve these goals, and monitoring the outcomes closely. Zimmerman (2008) examined self-regulated learning in terms of processes including identifying goals, strategic planning, selecting and using strategies, self-monitoring and self-assessment skills, learning and remembering information and academic skills. Self-regulation based learning definitions share a common view that students follow an active path in terms of cognitive, motivation and behavior in their learning processes.

When the literature is examined, it is seen that different models for self-regulated learning were developed by Boakerts, Borkowksi, Winne, Zimmerman and Pintrich (Aydın & Atalay, 2015). The current study is framed with Zimmerman & Pintrich's sociocognitive self-regulation models. Zimmerman considers self-regulation not as an intellectual skill or academic trait but as a self-oriented process in which students transform their intellectual skills into academic skills (Zimmerman, 1998, p.1-2; Zimmerman, 2002). According to the sociocognitive theory, learning is not only influenced by personal processes but also environmental and behavioral incidents (Zimmerman, 1998).

Self-regulation process includes three phases from a social cognitive theory perspective. These phases are forethought phase, performance phase and self-reflection phases. Forethought phase refers

to processes that reveal efforts before behaviors and the behavior. It has two sub-categories that are distinctive but related; task analysis and self-motivation beliefs. There are two types of task analysis that are goals setting and strategic planning. In this process, first goals related to learning are identified and second, strategies are planned to achieve the identified goals (Zimmerman, 2000, p.17). Self-motivation beliefs plays an important role in goal setting and strategic planning. These beliefs are self-efficacy, outcome expectations, intrinsic interest/value, and goal orientation (Zimmerman, 2000, p.17). Self-efficacy describes an individual's beliefs on learning behaviors at identified levels and their beliefs on their skills (Bandura, 1986, 1997). Research show that self-efficacy predicts students; academic motivation and learning (Pajares, 1996; Schunk, 1995, 1996). While outcome expectations is related to the outcome of a person's performance, it also shows motivation. Intrinsic interest/value is the responsibility that an individual feels for learning and mastering a task. Goal orientations can be described as the main reasons for individuals to engage in certain tasks, courses or activities (Anderman, Austin and Johnson, 2002, p.198).

There are two important processes, self-control and self-observation, in the second phase of self-regulated learning. Self-control involves the regulation and use of certain methods and strategies during the performance process. The sub-processes of this dimension includes imagery, self-instruction, attention-focusing, and task strategies (Zimmerman, 2000, p. 18- 19). The second important element of the performance phase is self-observation which refers to observing one's own performance and environmental factors impacting the performance during the process (Zimmerman, 1998, p.2-5).

During the self-reflection phase, students react to the efforts they make and engage in self-assessment (Zimmerman & Schunk, 2004). This phase consists of self-judgment and self-reaction dimensions. Self-judgement is concerned with an individual's evaluation of performance and characteristics. Judgements based on self-assessment are judgements based on causes (Zimmerman, 2000, p.21). Self-reaction process is more concerned with internal evaluation and causal attribution and consists of self-satisfaction/affect and adaptive and defensive processes.

Self-Regulating Learning Strategies

Self-regulating learning strategies refer to a series of metacognitive and behavioral methods a student can use to control their own learning process (Zimmerman & Martines-Pons, 1986; Zimmerman, 1990). According to Zimmerman (1990), self-regulating learners are aware of the information and skills they need to possess at a certain situation and they take the necessary steps to acquire those skills and information. Pintrich & De Groot (1990) state that self-regulating learning strategies include students' metacognitive strategies and self-management.

Self-regulating learning model includes three general strategies that are cognitive learning strategies, metacognitive strategies, and resource management strategies.

Cognitive strategies are strategies related to cognitive process and behaviors that students use to accomplish a task or a goal during their learning (Eker, 2012, p.33). Weinstein & Mayer (1986, as cited in Pintrich, 1999, p.460) define the most important cognitive strategies related to academic performance in classroom as repetition, detailing, and organizing strategies. Repetition strategies include tasks such as repeating, highlighting and summarizing information (Schunk, 2009). Detailing strategies are those that help students to store information in long-term memory rather than copying the information as it is, to take notes by re-organizing ideas, to ask and answer questions (Kayıran, 2014, p.28). Organizing strategies include use of several methods for drawing key ideas from a text, summarizing what's learned, selecting important ideas, and organizing (Pintrich, 1999; Hoffer et al., 1998 as cited in Aydın & Atalay, 2015, p.9).

Meta-cognitive self-regulation strategies are those that students use to plan, observe and regulate their cognitive strategies (Boakearts, 1999, p.454). Flavell (1976, p.231) defines meta-cognition as "an individual's knowledge on cognitive procedures and outcomes or anything related to

these." Schraw & Moshman (1995) states that there are two elements of meta-cognition that are cognition information and regulation of cognition. İnformation on cognition involves students' information on individual, task, and strategy variables while self-regulation of cognition involves students' observation, control, and regulation of self cognitive activities and behaviors. Regulation of cognition consists of planning, observing, and regulation strategies. Planning strategies include activities such as setting goals for studying, reviewing a text before reading, raising questions, and problem task analysis (Kayıran, 2014, p.29). Observation strategies include self-judgment skills to control learning (Schraw et al., 2006). A person's observation of self-learning process is important for academic success. It involves monitoring whether progress has been made in alignment with set goals by using criteria identified, and whether there are any issues in the learning process during meta-cognitive observation process (Harvey and Goudvis, 2007, p. 77-78; Thiede, Griffin, Wiley and Redford, 2009, p. 85; Zwiers, 2010, p. 173-201; as cited in Uyar, 2015, p.66)). Regulation strategies include a students' evaluation of the learning process by evaluating its compatibility with cognitive activities, and the results.

Resource management strategies is related to efficient use of opportunities that are around to achieve goals (Eker, 2012). These strategies include students' management and control of their teachers and peers by using efforts, study environments, and strategies to asking for help (Zimmerman & Martinez-Pons, 1986). These strategies help students to adapt and change their environments according to their goals and needs (Kayıran, 2014, p.30).

Zimmerman & Martinez-Pons (1986) identified certain self-regulation strategies used by student during the learning process:

1. *Self-judgment:* Evaluation of a students' learning process and its quality.

2. *Organization and transformation:* Creating learning materials and plans to organize the learning process of students.

3. *Setting goals and planning:* Student's engagement with identifying goals and making plans to achieve these goals.

4. *Searching for information:* Students' engagement with obtaining knowledge from multiple resources to complete their tasks.

5. *Note taking and observing:* Students' engagement with documenting the incidents and outcomes.

6. *Organizing the environment:* Organization of the learning environment by students.

7. *Internal results:* Identification of awards and punishments or arrangements for successful and unsuccessful results by students.

8. *Memorizing and repetition:* Memorizing or repeating explicitly or privately in order to remember what's learned.

9. *Seeking for social support:* Receiving support from peers, teachers and adults.

10. *Reviewing notes:* Review of notes, exams or textbooks by students.

Considering the strategies students use, it is seen that they use cognitive, meta-cognitive and resource management strategies of self-regulation.

Reading Education Based on Self-Regulation

Reading is a foundational learning field that contributes to language and cognitive skills (Güneş, 2014, p.127). According to Ülper (2010, p. 3), reading is a meaning making process in which individuals, who recognize the semantic and grammatical characteristics of the language of the text, engage in decrypting codes and using strategies in alignment with certain goals. Reading is a multidimensional learning field including cognitive, affective, and kinesthetic aspects. The purpose of the reading process is to make meaning of a text completely and accurately. The reading comprehension process involves finding meaning, thinking on the meaning, searching for causes, drawing conclusions and evaluation. Comprehension includes mental activities such as reviewing, selecting, interpretation, translating, analysis and synthesis (Balcı, 2013, p.14).

A good reader is has the skills of reading comprehension, can read the text with methods compatible with the structure of the text, and has a critical perspective. Akyol (2014) describes the things a good reader should do as:

"A good reader engages with a text with the expectation of meaning making. First, the reader reviews the text quickly to determine the type and identifies the purpose of the reading. Then, transfers his prior knowledge on the topic to the reading environment. A good reader controls the comprehension, asks questions to himself, creates imagery, examines important points more carefully, and clarify complex statements during reading. If the reader does not reach an open and clear outcome on the meaning of the text or the paragraph, then he uses strategies to help in the process. Re-reading the section that was not understood or asking for help from the teacher or a peer are examples of such strategies. After finishing the reading, a good reader summarizes the text appropriately, critiques and evaluates the text. This process should be experienced by all students effectively." (Akyol, 2014, p. 33-34).

A good reader regulates his own reading process, observes their own reading, and act strategically. Ülper (2010) describes the strategies that a reader should do before, during, and after the reading process as;

1. *Strategies before Reading:* These strategies are defined as organizing strategies by Asubel and they allow the reader to be prepared for the reading.

   - ✓ Identifying the purpose of the reading,
   - ✓ Identifying the type and pace of text according to the purpose,
   - ✓ Making predictions based on the text visuals,
   - ✓ Making predictions based on the title, sub-titles, and boldified or italicized sections of the text,
   - ✓ Discussing predictions with peers,
   - ✓ Reviewing the introduction and conclusion sections of the text,
   - ✓ Searching for key words reflecting the topic of the text,
   - ✓ Looking up the definitions of unknown words,
   - ✓ Activating the structural schema.
   - ✓ Strategies during reading: These are strategies that a reader can use in the phase after preparing himself to read and make meaning of a text by using strategies before reading.

- ✓ Predicting the meaning of words,
- ✓ Predicting semantic relationship,
- ✓ Predicting and approving the message of the text through elements such as title, headings, sub-headings, visuals, etc. as the reading progresses,
- ✓ Reading at a pace that is compatible with the purpose of reading,
- ✓ Utilizing the activated structural schema,
- ✓ Reviewing the questions related to the text raised prior to reading and correcting,
- ✓ Creating a visual imagery,
- ✓ Paying more attention to important information in the text than other information,
- ✓ Making notes of important sections,
- ✓ Highlighting or circling key messages, pausing at times to evaluate what's read,
- ✓ Reading by skipping some words or sentences and going back to these pieces later,
- ✓ Discussing with peers after reading,

2. *Post-Reading Strategies:* These are the strategies to be used after reading a text based on strategies for pre-and during reading.

- ✓ Reviewing pre-reading expectations and drawing conclusions,
- ✓ Reviewing highlighted parts and notes taken during reading,
- ✓ Summarizing the text,
- ✓ Discussing the text with peers after reading,
- ✓ Answering questions related to the text read,
- ✓ Completing the semantic map of the text read,
- ✓ Critiquing and making judgement on the text.

Students need to identify goals, use reading strategies effectively, observe their comprehension, and evaluate their progress towards their goals during reading. Uyar (2015, p.82) defines self-regulated reading as a process in which reader uses cognitive resources effectively, observes and controls the comprehension process meta-cognitively, control and organize all variables affecting the process including environmental resources and is highly motivated. In the current study, the purpose of developing reading skills in alignment with the self-regulated learning model is due to the compatibility of activities used by a successful reader before, during, and after reading with the prediction, performance, and evaluation phases of the self-regulated learning perspective. This study is significant in that the reading program applied would provide guidance for students who have trouble in comprehending, and contribute to the field.

Purpose of the Study

The purpose of the study is to identify the impact of self-regulated reading strategy teaching on the comprehension, reading motivation and self-regulation skills of 5th grade students. Within this context, following hypotheses were tested:

1. When the pre-test scores of the test group consisting of students with self-regulation based learning skills and the control group consisting of students educated with the Turkish Teaching Program, are controlled for, the test group shows a significant difference in the post-test scores.

2. When the pre-test scores of students' reading strategies cognitive awareness strategies of the test group consisting of students with self-regulation based learning skills and the control group consisting of students educated with the Turkish Teaching Program, are controlled for, the test group shows a significant difference in the post-test scores.

3. When the motivation pre-test scores of the test group consisting of students with self-regulation based learning skills and the control group consisting of students educated with the Turkish Teaching Program, are controlled for, the test group shows a significant difference in the post-test scores.

4. When the motivation and learning strategies pre-test scores of the test group consisting of students with self-regulation based learning skills and the control group consisting of students educated with the Turkish Teaching Program, are controlled for, the test group shows a significant difference in the post-test scores.

METHODOLOGY

Research Model

In this study, the effect of self-regulation based learning and reading strategies on students' comprehension, reading motivation and self-regulation skills were examined. The design of the study is in experimental nature. In the experiment setup, participants matched for characteristics were randomly assigned to groups. In this setup, one test and one control group were used. Both groups completed a pre- and a post- test. The intervention was done only in the test group for the independent variable (Karasar, 2017, p.130)

Table 1. Classical Experiment Design

Group	Measurement$_1$	Intervention	Measurement $_2$
Control	Pre$_1$	–	Post$_1$
Test	Pre$_2$	Self-regulation based strategic reading education	Post$_2$

In a classical test setup, no significant difference is expected between the pre- and post-test scores ($Post_1$-Pre_1=0) in the control group, while the expectation in the test group would be a difference between the pre- and post-test scores ($Post_2$-$Pre_2 \neq 0$). However, before coming to this conclusion, it should be shown that the pre-test scores of both the control and the test group are equal (Pre_2-Pre_1=0). On the other hand, a significant difference is expected in the post-scores of control and the test group (Erkuş, 2017, p.112).

Participants

The study was conducted in two public middle schools that are socioeconomically mid-level in the city of Aksaray. In determining the schools to conduct the study, socioeconomical aspects were taken into consideration. Based on the information obtained from the Provincial Directorate of National Education, 125.Yıl Middle School and Güller Ceylan Acar middle school were selected as the study sites. A drawing was performed to identify the classes to participate in the study, and the class 5-C in the 125. Yıl middle school was determined to be the test group and the class 5-A in the Güller Ceylan Acar middle school was determined to be the control group.

Data Collection Tools

In developing the scale, the researched consulted with an expert after identifying 10 different types of text in the first phase. Then, one informative, one narrative, and one poetic text were selected among the ten texts to identify the level of comprehension of students.

Multiple data collection tools were used in collecting the data. A reading comprehension scale developed by Yıldırım (2010) was used to measure the effect of the applied program on students' reading comprehension skills. For acquisition of comprehension skills, a 45-item, multiple choice comprehension test was created. The questions were reviewed by two experts in the field. For testing the reliability and validity of the instrument, the questionnaire was randomly distributed to 176 students in 6th grade in two schools with similar characteristics. After the test application, item and test analyses were performed. Based on the results of the analyses, three items were removed. The scale was found to be at a mid-level in term of power (.68) and the correlation coefficient calculated between the two halves of the test (r=.73) showed that the scores obtained from the test are reliable ((Yıldırım, 2010, p.150).

To identify the self-regulating learning skills in the study, the "Motivated Strategies for Learning Questionnaire" developed by Pintrich, Smith, Garcia, & Mckeachie (1991), and adapted to Turkish by Kayıran (2009) was used. The scale consists of two sub-dimensions that are motivation and learning strategies. Motivation sub-scale consists of dimensions of cognitive strategies and cognitive awareness strategies (repetition, detailing, organizing, critical thinking, cognitive awareness self-regulation) and resource management (study time and environment, efforts for organizing, peer collaboration, asking for help). The process of scale adaptation involved working with experts who are fluent in both languages and knowledgeable in both cultures. Expert feedback was sought for the form adapted to Turkish. Experts were asked to respond to the length of items in a 5 point Likert scale with 1 being not at all likely and 5 being extremely likely. Based on the expert feedback, 3 of the items of 50 related to motivation dimension were removed. A pilot questionnaire was developed consisting of 80 items total including 47 items related to motivation. Then, the questionnaire was piloted. The expert feedback and the data obtained from the pilot test, the scale was reviewed. Then, the questionnaire was distributed to 802 students in 5th grade for a reliability and validity test. An exploratory and a confirmatory factor analyses were performed to test the validity of the scale. Two methods were employed in the reliability study. To examine the internal consistency between the scale scores, Cronbach alpha coefficients were calculated. A test-retest method was utilized to test the scale consistency against time. The analyses revealed that the Cronbach alpha internal consistency score was .92 and the test-retest test correlation was .66.

In the current study, "Reading Strategies Cognitive Awareness Scale" developed by Karatay (1992) was used to identify the effect of the tested program on the use of reading strategies. A measurement scale was developed to determine the level of cognitive awareness on planning, organizing, and evaluating the reading process needed to comprehend, critique, and evaluate a text in academic readings. Drawing from resources related to the topic and expert opinions, reading strategies that can be used by students during comprehension process were identified and then these strategies were transformed into a Likert type scale.

After the first intervention, the items that did not load were corrected and a confirmatory factor analysis was completed on the data obtained from 381 elementary, 466 middle, and 491 college students to identify the reliability and validity of the scale. A three dimensional -planning (9 items), organizing (14 items), and evaluating (9 items) reading- scale consisting of 32 items was distributed to students and teachers. The results for internal consistency coefficients revealed that all factors and the sum (.88) of the scale were above .50.

Reading Motivation Scale that was adapted to Turkish and tested for reliability and validity by Yıldız (2010) was used in the study to identify the effect of the intervention program on reading motivation. The Reading Motivation Scale was developed by Wigfield & Guthire (1995, 1997) and re-structured through several analyses over time (Baker & Wigfield, 1999; Wang & Guthire, 2004). The scale which addresses reading motivation from multiple dimensions is one of the most frequently used scales in the literature for reading motivation measurement. Yıldız (2010), in their study, modified the version updated by Wang & Guthire (2004) to include internal and external motivation. The scale is a 4-point Likert scale with 1 being "very different from me", 2 being "different from me", 3 being "similar to me" and 4 being "very similar to me." According to the reliability analyses completed within the scope of modification studies showed the scale's internal consistency coefficient as (α) .86.

Data Analysis

In analyzing the data, first the assumption of normality was checked to decide whether parametric or non-parametric tests should be used. According to the classical test setup to test the hypotheses, the means of test and control groups were compared.

Testing the Assumption of Normality

In order to test the assumption of normality, a Kolmogorov-Smirnov test was completed on all the groups and the results are presented in table 2.

Table 2. Kolmogorov-Smirnov test results

Group	Statistical Test Value	p Value*
Motivation and Learning Pre-test	.093	.200
Motivation and Learning Post-test	.090	.200
Reading Comprehension Pre-test	.125	.039*
Reading Comprehension Post-test	.139	.012*
Reading Motivation Pre-test	.149	.005**
Reading Motivation Post-test	.143	.008**
Reading Strategies Pre-test	.073	.200
Reading Strategies Post-test	.091	.200

**significant at the .05 level ** significant at the .01 level*

According to the results shown in table 2, the pre-test and post-test scores for "Motivation and Learning Scale", and the pre-test and post-test data for "Reading Strategies Scale" are normally distributed ($p>.05$) while the pre-test and post-test data for "Comprehension Scale" and the re-and post-test data for "Reading Motivation Scale" are not normally distributed ($p<.05$). According to these results, independent and dependent paired samples t-tests as parametric tests were completed for the Motivation and Reading Strategies data, while Wilcoxon signed rank test was completed on dependent samples, and Mann Whitney U test was completed for independent samples as non-parametric tests on the data for Comprehension and Reading motivation.

Application of Experimental Procedures

This study was conducted in the second semester during the 2018-2019 academic year. The intervention took place as 4 hours a week over 12 weeks. A literature search was completed to frame the study and then the materials were prepared to use in the study. During the process of preparing lesson plans for self-regulation based Turkish courses, first a literature search was completed. When the lesson plans and activities were prepared, they were presented to experts for feedback and necessary changes were made based on the feedback. During the process of lesson plan preparing, phases and processes defined by Zimmerman (2002, p.67) and the self-regulation learning strategies defined by Pintrich (1999, p.460) were used.

The lesson plans were organized in three phases that are; "Forethought Phase", "Performance Phase," and "Self-Reflection" phase in alignment with self-regulating strategies. In the forethought phase, environmental structuring, organization of the physical environment, identifying goals and planning were prioritized. In the performance phase, motivation – self-observation and management strategies were prioritized. Reading strategies to be used during and after reading are identified. In the self-reflection phase, the purpose is to evaluate the text that's read. Students compare the prior knowledge with the new knowledge and evaluate with a critical lens.

During the process of lesson plan creation, the gradual responsibility transfer model was used. First, ways of using learning and reading strategies were taught by the teacher. Then, students engaged in the activities under the supervision of the teacher. The teacher intervened when needed. In the last phase, students made meaning of the text by using these strategies independently.

FINDINGS AND DISCUSSION

1. When the comprehension pre-test scores were controlled for in the control group and the test group that received self-regulation based learning skills, the test group showed a significant difference in the post-test scores.

Table 3. Wilcoxon signed ranks test results of pre- and post-test for comprehension scale in the control group

Group	N	Mean Ranks	Sum of Ranks	Z	p*
Negative Rank	13	12.19	158.50		
Positive Rank	9	10.50	94.50	-1.04	.297
Equal	4				

**significant at the .05 level ** significant at the .01 level*

According to the results presented in table 3, there was no significant difference between pre-test and post-test scores in the comprehension scale (z=-1.04; p>.05). As there was no intervention in the control group, this was an expected outcome.

Table 4. Mann Whitney U test results of pre-test scores for comprehension scale in the control and test groups

Group	N	Mean Ranks	Sum of Ranks	U	p*
Control	26	23.17	602.50	251.50	.076
Test	27	30.69	828.50		

**significant at the .05 level ** significant at the .01 level*

The results presented in table 4 show that there is no significant difference between the pre-test scores of test and control groups in comprehension (U=251.50; p>.05). In experimental designs, the expectation is that the control and test groups are similar in the beginning in order to observe the

effect of the intervention. According to this, the results of the analysis show that the pre-test scores of control and test groups have similar means.

Table 5. The results of the Wilcoxon Signed Ranks test completed between pre- and post- test scores in the test group for comprehension

Group	N	Rank Means	Sum of Rank	Z	p**
Negative Rank	0	0	0		
Positive Rank	26	13.50	351.00	-4.47	.000
Equal	1				

**significant at the .05 level ** significant at the .01 level*

According to the results presented in table 5, there is a significant difference between the pre- and post-test scores of the test group that received self-regulation based strategic reading education (Z=-4.47; p<.01). This difference is in the post-test scores of the test group. Thus, the self-regulation based strategic reading education in the test group had a positive, significant effect on comprehension scores in the test group.

Table 6. The results of Mann Whitney U Test completed in post-test scores for comprehension in the control and test groups

Group	N	Mean Ranks	Sum of Ranks	U	p**
Control	26	13.60	353.50	2.50	.000
Test	27	39.91	1077.50		

**significant at the .05 level ** significant at the .01 level*

According to the results presented in table 6, there is a significant difference between the post-test scores of control and test groups in comprehension (U=2.50; p<.01). Thus, the intervention applied in the test group resulted in a positive and significant difference compared to the control group. In other words, the self-regulation based strategic reading education is more effective than the current program.

2. When the pre-test scores for reading strategies cognitive awareness strategies are controlled for in the test group with improved self-regulation based learning skills and the control group that were taught according to the for Turkish Course lesson plan, there was a difference between the post-test scores in the test group.

Table 7. t test results for the control group in reading strategies

Group	N	Mean	Standard Deviation	t	Df	p*
Pre-test	26	105.27	13.35	-1.80	25	.084
Post-test	26	109.50	9.79			

**significant at the .05 level ** significant at the .01 level*

According to the results presented in table 7, there is no significant difference between the pre- and post-test scores in reading strategies for the control group (t=-1.80; p>.05). As there was no intervention in the control group, these results were expected.

Table 8. t test results of pre-test scores between the control and the test group in reading strategies

Group	N	Mean	Standard Deviation	t	Df	p*
Control	26	105.27	13.35	1.58	51	.120
Test	27	98.81	16.18			

**significant at the .05 level ** significant at the .01 level* (Levene's test for homogeneity of variance F=.71; p>.05)

The results seen in table 8 show that there is no significant difference found between the pre-test scores of the control and the test groups in reading strategies (t=1.58; p>.05). In experimental designs, the initial state of control and test groups are expected to be similar in order to observe the effect of the intervention. Within this context, it is seen that the pre-test scores of control and test groups have similar means.

Table 9. t-test results for pre-and post-test scores of the test group in reading strategies

Group	N	Mean	Standard Deviation	t	Df	p**
Pre-test	27	98.81	16.18	-12.99	26	.000
Post-test	27	136.41	8.85			

**significant at the .05 level ** significant at the .01 level*

Table 9 shows that there is a significant difference between the pre- and post-test scores of the test group which received the intervention (t=-12.99; p<.01). This difference lies in the post-test scores and indicates that the intervention had a positive effect on reading strategies.

Table 10. t-test results between post-test scores in the control and test groups of reading strategies

Group	N	Mean	Standard Deviation	t	Df	p**
Control	26	109.50	9.79	-10.50	51	.000
Test	27	136.41	8.85			

**significant at the .05 level ** significant at the .01 level* (Levene's test for homogeneity of variance F=.44; p>.05)

According to the results presented in table 10, there is a significant difference between the post-test scores in the test group for reading strategies (t=-10.50; p<.01). Thus, the intervention affected the test group positively and significantly compared to the control group. In other words, self-regulation based reading education had an effect on the use of reading strategies.

3. When the pre-test scores in reading motivation for the test and the control group, there was a significant difference in the test group in terms of the post-test scores.

Table 11. Signed Ranks Test results between pre-test and post-test scores in reading motivation in the control group

Group	N	Rank Means	Sum of Ranks	z	p*
Negative Rank	8	9.69	77.50		
Positive Rank	12	11.04	132.50	-1.03	.302
Equal	6				

**significant at the .05 level ** significant at the .01 level*

The results in table 11 show that there is not significant difference between the pre- and post-test scores in reading motivation in the control group (z=-1.03; p>.05). As there was no intervention in the control group, this is an expected result.

Table 12. Mann Whitney U Test results in reading motivation pre-test scores in the control and test groups

Group	N	Rank Means	Sum of Ranks	U	p*
Control	26	28.71	746.50	306.50	.428
Test	27	25.35	684.50		

**significant at the .05 level ** significant at the .01 level*

According to the results presented in table 12, there is no significant difference in pre-test scores between the test and the control groups in reading motivation (U=306.50; p>.05). In experimental designs, the initial state of control and test groups are expected to be similar in order to observe the effect of the intervention. Within this context, it is seen that the pre-test scores of control and test groups have similar means.

Table 13. Signed Ranks Test Results in reading motivation scores between pre-test and post-test scores in the test group

Group	N	Rank Mean	Sum of Rank	Z	p**
Negative Rank	0	0	0		
Positive Rank	27	14.00	378.00	-4.55	.000
Equal	0				

**significant at the .05 level ** significant at the .01 level*

The results in table 13 show that there is a significant difference between the pre- and post-test scores of the test group in self-regulation based reading education (Z=-4.55; p<.01). This difference is in the post-test scores. The intervention on the test group had a positive and significant effect on reading motivation.

Table 14. Mann Whitney U test results in post-test scores of control and test groups in reading motivation

Group	N	Rank Means	Sum of Ranks	U	p**
Control	26	16.40	426.50	75.50	.000
Test	27	37.20	1004.50		

**significant at the .05 level ** significant at the .01 level*

According to the results presented in table 14, there is a significant difference between the post-test scores of the test and the control groups in reading motivation (U=75.50; p<.01). This difference is seen in the test group scores. Based on the results, the intervention in the test group had a positive and significant difference compared to the control group. The program implemented that focused on self-regulation had an impact on the reading motivation of students.

4. When the pre-test scores for motivation and learning strategies are controlled for, the test group showed a significant difference.

Table 15. t-test results of pre- and post-test scores in motivation and learning strategies for the control group

Group	N	Mean	Standard Deviation	t	df	p*
Pre-test	26	133.04	20.71	-0.680	25	.503
Post-test	26	135.65	17.06			

**significant at the .05 level ** significant at the .01 level*

As seen in table 15, there is no significant difference between the pre- and post-test scores in motivation and learning strategies in the control group (t=-0.680; p>.05). As there was no intervention in the control group, this is an expected result.

Table 16. t-test results of pre-test scores of control and test groups in motivation and learning strategies

Group	N	Mean	Standard Deviation	T	df	p*
Control	26	133.04	20.71	-.825	41.49	.414
Test	27	136.96	12.85			

**significant at the .05 level ** significant at the .01 level* (Levene's test for homogeneity of variance F=6.21; p<.05)

As reported in table 16, there is no significant difference between the pre-test scores of test and control groups in motivation and learning strategies (t=-0.825; p>.05). In experimental designs, the initial state of control and test groups are expected to be similar in order to observe the effect of the intervention. Within this context, it is seen that the pre-test scores of control and test groups have similar means.

Table 17. t-test results for pre- and post-test scores if the test group in motivation and learning strategies

Group	N	Mean	Standard Deviation	t	df	p**
Pre-test	27	136.96	12.85	-15.37	26	.000
Post-test	27	164.15	12.01			

**significant at the .05 level ** significant at the .01 level*

According to the results presented in table 17, there is a significant difference in the post-test scores of the test group (t=-15.37; p<.01). Thus, the intervention resulted in a positive and significant effect on motivation and learning strategies. The program implemented was effective on the self-regulation skills of students.

Table 18. t-test results of post-test scores between the control and test groups in motivation and learning strategies

Group	N	Mean	Standard Deviation	t	df	p**
Control	26	135.65	17.06	-7.05	51	.000
Test	27	164.15	12.01			

**significant at the .05 level ** significant at the .01 level* (Levene's test for homogeneiety of variance F=.89; p>.05)

According to the table 18, there is a significant difference in post-test scores between the control and the test groups in motivation and learning strategies (t=-7.05; p<.01). This difference lies in the scores of the test group. Thus, the intervention done in the test group resulted in a positive and significant difference in comparison to the control group. In other words, self-regulation based reading education is more effective than the current education program.

DISCUSSION AND CONCLUSION

Analyses were completed on the pre- and post-test scores of the findings and the results for each hypothesis are as follows:

1. No significant difference was found between the pre- and post-test scores of the control groups as expected.

2. No significant difference was found between the pre-test scores of the control and test groups. In experimental designs, both groups are expected to be similar initially in order to observe the effect of the intervention. This condition was met.

3. Significant differences in the post-test scores were found between the test group's pre- and post-test scores as a result of the self-regulation based strategic reading education. This program resulted in a positive and meaningful effect in the test groups which is shown in figure 1.

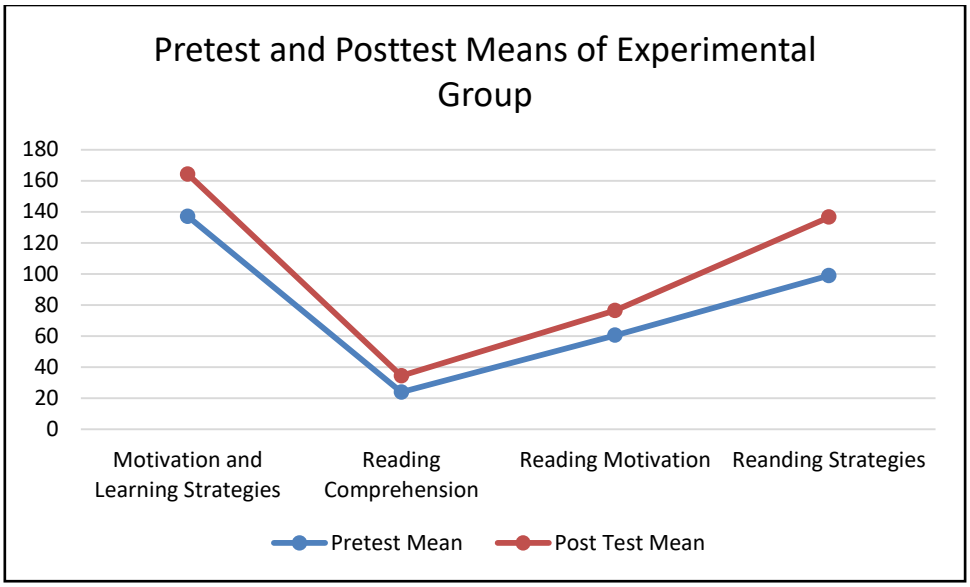


Figure 1. Change in the means of pre- and post-test scores of the test group

According to figure 1, the post-test scores are higher than the pre-test scores in the test group.

4. There was a significant difference in the post-test scores of the test group. This is a desired outcome of the intervention in experimental studies. This is shown in figure 2.

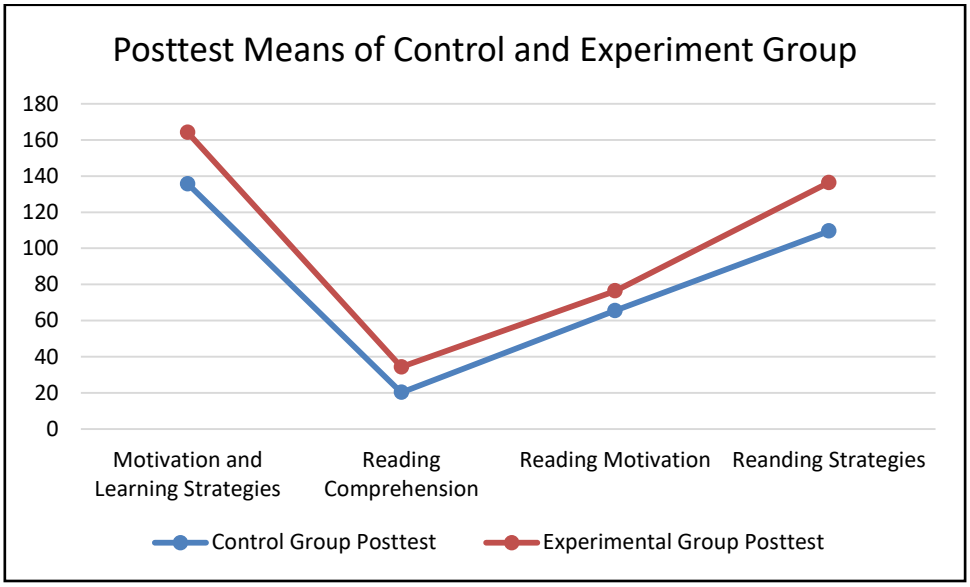


Figure 2. Change in the means of post-test scores of the control and test groups

Figure 2 shows that the post-test mean scores in the test group are higher than the control group. The findings show that the self-regulation based reading strategy education had a positive and significant effect on 5th grade students' comprehension, reading strategies, reading motivation and self-regulation skills. The literature shows that self-regulated learning strategies have an effect on academic success (Ataş, 2009; Camahalan, 2006; Eker, 2012; Gülay, 2012; İsrael, 2007; Kayıran, 2014; Müldür, 2017; Souvignier & Mokhlesgerami, 2006; Oruç, 2012; Tolaman, 2017; Tracy, Reid & Graham, 2009; Uyar, 2015; Uygun, 2012; Zubrunn & Bruning, 2013). Some of these studies focus on improving reading skills. In their study, Oruç (2012) investigated the effects of self-regulated learning on comprehension skills in Turkish courses, attitudes towards this course, and the meta-cognitive thinking skills. It was found that the self-regulated learning improved students' comprehension and meta-cognitive thinking skills. These findings are compatible with the findings of the current study. Kayiran (2014) conducted a study on 5th grade students and found that self-regulated learning model impacts comprehension skills. The intervention had effects on cognitive awareness-learning strategies, self-efficacy, time and study environment management, and task value while it did not have any effects on test anxiety, and asking for help. These findings are compatible with the findings of the current study. Uyar (2015) conducted a study with 5th and 8th grade students focusing on improving their self-regulation based reading skills and identifying the effects of improvements on comprehension. After the intervention, a significant increase in comprehension levels of students was found in the test group while no change was found in the control groups.

Studies show that improvement of self-regulated learning skills has an effect on academic success. These studies emphasize that teachers play an important role in improving self-regulation strategies and learner-centered education styles impact academic success, self-regulation, and motivation positively. In the current study, a gradual responsibility transfer model in teaching self-regulated learning strategies and reading strategies was used. Students learned how to use strategies with the guidance of their teachers and tried to reach to the level of independent user.

Recommendations

1. To improve students' reading, the use of cognitive and meta-cognitive strategies, and self-regulation strategies should be conveyed within the frame of gradual responsibility transfer model.

2. Students' self-regulation based reading skills should be supported in the classroom.

3. In order to develop positive attitudes in students for classes taught with self-regulated learning, self-regulated learning strategies should be used in a more effective, fun, and attention drawing way.

4. Turkish Course Education Program should be developed through structuring it within the frame of self-regulation learning model.

5. Teachers should be trained on how to teach self-regulation based strategies through in-service workshops.

REFERENCES

Akyol, H. (2014). *Türkçe öğretim yöntemleri*. Ankara: Pegem Akademi.

Aydın, S.& Atalay, T.D. (2015). *Öz-düzenlemeli öğrenme.* Ankara: Pegem Akademi.

Anderman, E. M., Austin, C. C., & Johnson, D. M. (2002). The development of goal orientation. In A. Wigfield & J. Eccles (Eds.), Development of achievement motivation. (pp. 197-220), San Diego, CA: Academic Press.

Azevedo, R., Moos, D. C., Greene, J. A., Winters, F. I., & Cromley, J. G. (2008). Why is externally-facilitated regulated learning more effective than self-regulated learning with hypermedia?. *Educational Technology Research & Development*, 56, 45-72.

Balcı, A. (2013). *Okuma ve anlama eğitimi*. Ankara: Pegem Akademi.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Bates, C. H. (2006). The effects of self-regulated learning strategies on achievement, control beliefs about learning, and intrinsic goal orientation. *Dissertation Abstract Internatioal*, 67 (5). (UMI Number: 3218874).

Boekaerts, M. (1999). Self-regulated learning: Where we are today. *International Journal of Educational Research*, 31, 445-457.

Cabı, E. (2009). *The effect of blended learning based on self-regulated on students achievement and motivation.* Doctoral of dissertation, Gazi University, Ankara.

Camahalan, F. M. G. (2006). Effects of self-regulated learning on mathematics achievement of selected Southeast Asian children. *Journal of Instructional Psychology*, 33 (3), 194-205.

Eker, C. (2012). *Educational effect of the diaries on the self regulation strategies.* Doctoral of dissertation, Abant Izzet Baysal University, Bolu.

Erkuş, A. (2017). *Davranış bilimleri için bilimsel araştırma süreci.* Ankara: Seçkin Yayıncılık.

Flavell, J. H. (1976). Metacognitive aspects of problem solving. In L.B. Resnick (eds.).*The nature of intelligence* (ss. 231–245). Mahwah, NJ: Lawrence Erlbaum.

Graham, S., & Harris, K. R. (1994). The role and development of self-regulation in the writing process. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 203-228).

Gülay, A. (2012). *Effect of self regulated learning on 5th grade students' academic achievement and scientific process skills.* Unpublished master's thesis, Recep Tayyip Erdoğan University, Rize.

Güneş, F. (2014). *Türkçe öğretimi yaklaşımlar ve modeller.* Ankara: Pegem Akademi.

Harvey, S. & Goudvis, A. (2007). *Strategies that work: Teaching comprehension for understanding and engagement*. Portlan, ME: Stenhouse Publishers.

Hofer, B. K., Yu, S.L., & Pintrich, P.R. (1998). Teaching college students to be self-regulated learners. In B. J. Zimmerman and D.H. Schunk (Eds.), *Self-regulated learning from teaching to self-reflective practice* (pp.57-85). London: Guilford Press.

Israel, E. (2007). *Self Regulation Instruction, Science Achievement and Self Efficacy*. Doctoral of dissertation, Dokuz Eylül University, İzmir.

Karasar, N. (2017). *Bilimsel Araştırma Yöntemi Kavramlar İlkeler Teknikler (32.Basım).* Nobel Yayınevi: Ankara.

Karatay, H. (2009). A metacognitive awareness inventory of reading strategies. *Abant Izzet Baysal University Journal of Social Sciences*, 2 (19), 58-80.

Kayıran, B.K. (2014). *The effects of self regulated learning on the academic achievement of reading comprehension, self-regulatory skills and reading strategies.* Doctoral of dissertation, Çukurova University, Adana.

Müldür, M. (2017). *The effect of self-regulated writing instruction on middle school students' informative writing skills, self-regulated writing skills, and self-efficacy perception.* Doctoral of dissertation, Gazi University, Ankara.

Oruç, A. (2012). *The effect of self regulated learning upon reading comprehension attitude and metacognitive thinking.* Unpublished master's thesis, Bülent Ecevit University, Zonguldak.

Pajares, F. (1996). Self-efficacy beliefs in achievement settings. *Review of Educational Research*, 66, 543-578.

Pintrich, P. R. & De Groot, E.V. (1990) Motivational and self-regulated learning components of classroom academic performance. Journal of Educational Psycholog, 82, 33-40.

Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Journal of Educational Research, 31*, 459-470.

Pintrich, P.R. (2000). The roal of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich ve M. Zeidner (Eds.), Handbook of Self-Regulation: Theory, Research and Applications (ss. 452–502) In San Diego, CA: Academic Pres.

Risemberg, R., & Zimmerman, B. J. (1992). Self-regulated learning in gifted students. Roeper Review, 15 (2), 98-102.

Schraw, G., & Moshman, D. (1995). Metacognitive theories. *Educational Psychology Review*, 7(4), 351-371.

Schraw, G., Grippen, K.J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as port of a broader perspective on learning. *Research in Science Education*, 36, 111- 139.

Schunk, D. H. (1994). Self-regulation of self-efficacy and attributions in academic settings. In D. H. Schunk & B. J. Zimmerman (Eds.), Self-regulation of learning and performance: Issues and educational applications (pp. 75-101). New Jersey: Lawrence Erlbaum Associates Publishers.

Schunk, D. H. (2003). Self-efficacy for reading and writing: Influence of modeling, goal setting, and selfevaluation. *Reading and Writing Quarterly*, 19, 159-172.

Schunk, D. H. (1995). Self-efficacy and education and instruction. In J. E. Maddux (Ed.), *Self-efficacy, adaptation, and adjustment: Theory, research, and application* (pp. 281-303). New York: Plenum Press.

Schunk, D. H. (1996). Goal and self-evaluative influences during children's cognitive skill learning. *American Educational Research Journal*, 33, 359-382.

Schunk, D. H. (2009). Öğrenme teorileri, eğitimsel bir bakışla (çev. M. Sahin). Ankara:Nobel Yayın Dağıtım.

Souvignier, E., & Mokhlesgerami, J. (2006). Using self-regulation as a framework for implementing strategy instruction to foster reading comprehension. *Learning and Instruction*, 16, 57-71.

Thiede, K. W., Griffin, T. D., Wiley, J., & Redford. J. S. (2009) Metacognitive monitoring during and after reading. In D. J. Hacker, J. Dunlosky, & A. C. Graesser (Eds.), *Handbook of metacognition in education.* (pp.85-106) New York, NY: Routledge.

Tracy, B., Reid, R., & Graham, S. (2009). Teaching young students strategies for planning and drafting stories: The impact of self-regulated strategy development. *The Journal of Educational Research*, 102 (5), 323-332.

Tolaman, T.D. (2017). *Self-regulated strategy development model for the development of writing skills: An action research.* Doctoral of dissertation, Sakarya University, Sakarya.

Uyar, Y. (2015). *Development of self regulated reading skills and its impact on comprehension.* Doctoral of dissertation, Gazi University, Ankara.

Uygun, M. (2012). *The effects of self regulated strategy development on writing expression, self regulation of writing, retention and writing attitude.* Doctoral of dissertation, Hacettepe University, Ankara.

Ülper, H. (2010). *Okuma ve anlamlandırma becerilerinin kazandırılması*. Ankara: Nobel Yayın Dağıtım.

Yıldırım, K. (2010). *The effects of cooperative learning on certain variables related to reading, parents?, and studens? opinions toward cooperative learning.* Doctoral of dissertation, Gazi University, Ankara.

Yıldız, M. (2010). *The relationship between 5th graders? reading comprehension, reading motivation and reading habits.* Doctoral of dissertation, Gazi University, Ankara.

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. Educational Psychologist, 25(1), 3-17 .

Zimmerman, B. J. & Martines Pons, M. (1986). Construct validation of a strategy model of student self-regulated learning. Journal of Educational Psychology, 80, 284-290.

Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology,* 82, 51-59.

Zimmerman, B.J. (1998). Developing self-fulfilling cycles of academic regulation: An analysis of exemplary instructional models. In B. J. Zimmerman ve D.H. Schunk (Eds.), *Self- regulated learning from teaching to self- reflective practice* (pp. 1-19). London: Guilford Press.

Zimmerman, B. J. (2000). Attaining sef-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich and M. Zeidner (Eds.), *Handbook of Self-Regulation: Theory, Research and Applications* (pp.13- 39). San Diego, CA: Academic.

Zimmerman, B. J. (2002). Becoming a self- regulated learner: An overview. Theory into Practice, 41(2), 64- 70.

Zimmerman, B. J. ve Schunk, D. H. (2004). Self-regulating intellectual processes and outcomes: A social cognitive perspective. In D.Y. Dai ve R.J. Sternberg (Eds), Motivation, emotion and cognition: Integrative perspectives on intellectual functioning and development (ss. 323–350) In, Mahwah, NJ: Erlbaum.

Zimmerman, B.J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Journal of International Research*, 45, 166-183).

Zumbrunn, S., & Bruning, R. (2013). Improving the writing and knowledge of emergent writers: The effects of self-regulated strategy development. *Reading and Writing*, 26 (1) 91-110.

Zwiers, J. (2010). *Building comprehension habits in grades 6-12: A Toolkit of Classroom Activities.* (2'nd ed). Newark: International Reading Association.

An Investigation into Teacher Burnout in Relatıon To Some Varibles

Mehmet Ali Akın [i]
Mardin Artuklu University

Abstract

In organizations with intense human relations, due to reasons such as the business environment, the intensity of competition and the high number of expectations, employees could be expected to experience such negativeness as mental and emotional tiredness, anxiety, stress, and low performance. In other words, due to the reasons listed above, employees may experience a sense of burnout. Teaching is one of the professions in which intense relationships and related burnout are experienced. Therefore, research aims to describe the phenomenon of burnout experienced by teachers.

The aim of the study is to describe the perceptions of teachers about burnout levels. In this context, it was investigated whether there was a significant difference between teachers' perceptions of burnout levels according to gender, type of duty, branch, marital status, school type and child status.

The research is designed as mixed research (both quantitative and qualitative). "Maslach Burnout Inventory" were used in order to collect the quantitative data of the study, and semi-structured interview form were used to collect qualitative data of the study.

The research population consists of 3478 teachers working in the central Yenişehir district of Diyarbakır province. The sample size of the quantitative dimension was 460 for the 95% confidence level and 30 for the qualitative data.

In the study, arithmetic mean and standard deviation were used in the analysis of quantitative data, and in the evaluation of variables, for F values that are significant with t-test and ANOVA, Tukey HSD test was used to determine the source of the difference. The significance level of the statistical analysis was evaluated as 0.05. In the analysis of qualitative data, direct quotations are given.

Some of the results of the research can be summarized as follows:

1. Participant perceptions of the sub-dimensions of burnout according to gender variable are negative. Whereas in some studies, a significant difference was found between the participants' perceptions, there was no significant difference in other studies.

2. According to the type of task, sometimes teachers and sometimes managers have more burnout than the other.

3. There was no significant difference between teachers' perceptions according to the branch variable. However, a significant difference was found between teachers' perceptions of burnout in some sub-dimensions.

4. In respect to the marital status variable, participants' perceptions of burnout differed according to the sub-dimensions of burnout.

5. In respect to the school type variable, the participants' perceptions of burnout differed according to the sub-dimensions of burnout.

6. According to the child status variable, the participants' perceptions of burnout differed depending on whether they have children or not.

According to gender, type of duty, branch, marital status, school type, and child status variables, both quantitative and qualitative researches can be done in the primary, secondary and high schools to determine the reasons for the burnout of teachers and their solution offers.

Keywords: Teacher, Burnout, Teacher Burnout

DOI: 10.29329/ijpe.2019.203.4

---

[i] **Mehmet Ali Akın**, Assist. Prof. Dr., Mardin Artuklu University, Literature Faculty. Department of Educational Sciences.

Correspondence: akina7215@hotmail.com

INTRODUCTION

Employees in organizations where human relationships are experienced intensely are expected to suffer from problems such as mental and emotional exhaustion, anxiety, stress and underperformance caused by factors including co-workers, work environment, the severity of competition, multitude of expectations, etc. In other words, due to reasons listed above employees may experience burnout.

The term burnout, introduced in 1974 by clinical psychologist Freudenberger who studied on organizational stress for years (Tansel, 2015), awakened researchers' interest in the later years, and a plethora of studies were conducted upon this term. The term burnout was defined by Freudenberg as "people's failure to meet high demands caused by their excessive workloads", in other words, as emotional exhaustion (Freudenberger, 1974).

From the definition of burnout by Freudenberger (1974), it is prominent that burnout "refers to failure, exhaustion, loss of energy, in other words, the state of exhaustion that occurs as a result of unsatisfied desires by internal resources of the individual". This emphasizes the emotional exhaustion dimension of the term burnout. Burnout is an outcome that results from marks left on the individual's emotional life by occasions that are perceived to be unalterable. This is a "professional autism" (Storlie, 1979). Subsequently Maslach and Jackson defined the term burnout in a broader sense as the state resulting in a decrease in the sense of personal accomplishment along with an increase in individuals' emotional exhaustion and depersonalization (Maslach and Jackson, 1985).

According to the definition of Maslach, burnout refers to "emotional exhaustion, depersonalization and reduced personal accomplishment" observed in employees who are in intense relationships with others as part of their jobs. This three-dimensional definition is the most widely accepted definition of burnout (Cited by Sürgevil, 2006). According to Maslach, *Emotional exhaustion* occurs when an individual feels that his/her emotional resources gradually decrease psychologically (Cited by Akçamete, Kaner and Sucuoğlu, 2001). According to Maslach, Schaufeli & Leiter (2001), *Emotional Exhaustion* refers to the stress dimension of burnout, and is defined as loss of energy, and fatigue. Though emotional exhaustion is a stress-like reaction, it separates off from stress since it is addressed along with other dimensions of burnout, which are depersonalization and reduced personal accomplishment. According to Maslach, *Depersonalization* arises from a decrease in emotional resources of the individual, and refers to the individual's negative and cynic attitudes, unfavourable feelings and behaviours against his/her co-workers (Akçamete, Kaner and Sucuoğlu, 2001). Maslach, Schaufeli & Leiter (2001) suggest that *Depersonalization* is related to the interpersonal relationship dimension of burnout and refers to a decrease in the employee's sensitivity towards him/herself and people s/he works for, in other words, the individual's emotional and cognitive alienation from him/herself and people s/he works for. According to Maslach, *Reduced Personal Accomplishment* is described as depression, demoralization, avoiding interpersonal relationships, reduced productivity, failure to manage stress, the sense of failure, and low sense of self (Akçamete, Kaner and Sucuoğlu, 2001). Byrne (1994) suggests that *reduced personal accomplishment* occurs when individuals, who experience emotional exhaustion and keep their distance from work, fail to feel productive and successful enough.

In brief, burnout can be regarded as the concurrent experience of an individual's emotional exhaustion, depersonalization in interpersonal relationships and reduced personal accomplishment in terms of performance. Furthermore, there may be a mention about some clues and results of burnout.

Some physical and emotional disorders are symptoms of burnout. While pains such as ulcer, insomnia and migraine are among the examples of physical disorders, some emotional disorders include depression, pessimism and anger (Hock, 1988). Individuals experiencing burnout face problems such as health concerns, psychological problems, lack of self-confidence and growing negative attitudes towards their work (Cihan, 2011). In general among the results of burnout are neglecting and hindering work, alienation from the work environment, failure to go to work, going to

work late, the tendency to leave work early, breakdown in relationship at work or outside of work, domestic problems, underperformance, reduced organizational commitment, health problems, sudden anger, paranoia, reduced self-esteem, depression, insomnia, and use of alcohol and drugs (Sürgevil, 2006; Karaman, 2009; Izgar, 2011).

Though the term burnout was first studied in the field of health in which human relationships are experienced intensely, recently it has been addressed in some areas of profession with intense human relationships such as teaching, policing and management (Gündüz, 2004).

Reviewing the literature, it is observed that the issue of burnout is experienced more particularly by employees who are employed in areas of profession which require intense communication and interaction (Oplatka, 2002; Hoyos & Kallus, 2005). The teaching profession is one of these areas. The origins of handing down human values and lifestyles to new generations, notably children, date back to ancient ages. Given that the focus of this profession called teaching is intense human relationships, it is likely to expect that practitioners of this profession experience exhaustion and fatigue.

As the teaching profession, which is not being practiced solely for financial purposes, involves emotion and effort, and is one of the value-centred and backbreaking professions, teachers are expected to experience burnout, though in various amounts (Yılmaz and Altınkurt, 2014). Considering the teaching profession in relation to human relationships, teachers tend to experience high level of burnout (Baltaş & Baltaş, 1993).

Among the prominent causes of burnout in the majority of teachers are the organizational culture and climate (Gold, 1985), teachers' loss of hope in their ideals, unwillingness and alienation from the profession due to factors such as obstructive school culture, organizational characteristics, gender, type of school, lack of physical infrastructure and resources, conflicts with the administration, education level, age, etc. (Friedman 1991; Şişman, 2004; Troman & Woods, 2000), teachers' belief related to losing the classroom management (Bardo, 1979), lack of co-deciding, and poor relations (Sparks, 1979).

There is a plethora of studies related to burnout levels of teachers and teacher candidates in literature. Among these are Durak & Seferoğlu, (2017); Wang, H., Hall, N.C. & Rahimi, S. (2015); Yılmaz, Altınkurt, Güner & Şen, (2015); Çelik & Yılmaz, (2015); Yılmaz, (2014); Seferoğlu, Yıldız & Yücel, (2014); Skaalvik & Skaalvik, (2010); Polat, Topuzoğlu, Gürbüz, Hotalak, Kavak, Emirikçi, & Kayış, (2009); Grayson & Alvarez, (2008); Kan, (2008); Cemaloğlu & Erdemoğlu-Şahin (2007); Ören & Türkoğlu, (2006). However, quantitative research techniques were used in these studies. This was regarded as a basis for doing mixed researches, in which only qualitative or both qualitative and quantitative researches are applied together, and thus the present study was conducted via a mixed research method.

This study aims to represent the perceptions of teachers regarding burnout levels. In this context, researchers are seeking answers for following sub-problems.

1. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Gender?

2. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Task Type?

3. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Branch?

4. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Marital Status?

5. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the School Type?

6. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Number of Children Owned?

RESEARCH METHOD

A mixed research method was applied in the present study. A mixed research is an approach that is a combination of qualitative and quantitative methods or paradigms (Balcı, 2009, 44). In this method, researcher convincingly and meticulously collects and analyses both qualitative and quantitative data based on research questions and blends these two types of data through combination (integration) by placing one of the data types into the other or building one of them on the other respectively (Creswell & Plano Clark, 2015).

"Maslach Burnout Inventory" was applied to collect the quantitative data of the study. Turkish version of the inventory developed by Maslach and Jackson (1981) was created by Ergin (1992). "Maslach Burnout Inventory" includes three dimensions: 1. "Emotional Exhaustion", (1,2,3,6,8,13,14,16 ve 20) 2. "Depersonalization", (5,10,11,15 ve 22) and 3. "Reduced Personal Accomplishment", (4,7,9,12,17,18,19 ve 21) (Karadağ, 2013). All items of the inventory composed of 22 items in total were scaled as 1- Never, 2- Very seldom, 3-Sometimes, 4- Frequently and 5- Always as a five point likert type. "Emotional Exhaustion" and "Depersonalization" sub-dimensions include negative statements while the "Reduced Personal Accomplishment" sub-dimension includes positive statements. Scores of all sub-dimensions are calculated separately in the inventory in which total score cannot be obtained (Cited by Erdemoğlu-Şahin, 2007).

The validity and reliability studies of the inventory were conducted by Çapri (2006). According to the validity and reliability studies conducted, Kaiser Meyer-Olkin (KMO) value of the inventory was found as 0,96 in the principal components factor analysis. Barlett Sphericity test was found significant in the study (χ 2 =8.703,07; p<0,01). As a result of the factor analysis, it was found that the inventory was single factorial as it is in its original, yet that it was three dimensional and explained 53,96% of the total variance (variance explanation rates are 42,96%, 6,23%, 4,77% respectively). However, correlation results of the item test carried out related to the item validity and homogeneity of the inventory were found between r=0,31 and r=0,76. The reliability of the inventory was calculated via Cronbach alpha internal consistency coefficient and test-retest reliability coefficient methods. Cronbach alpha internal consistency coefficient α=0,93 was found as 0,83, 0,75 and 0,88 for sub-dimensions respectively. Cronbach alpha internal consistency coefficient α=0,78 was found as 0,85, 0,76 and 0,79 for sub-dimensions respectively. According to the results of the validity and reliability analyses related to the inventory, the inventory was accepted as valid and reliable.

A semi-structured interview form was used to collect the qualitative data. An interview form composed of an open-ended question was prepared by researchers. As all dimensions, "Emotional Exhaustion", "Depersonalization" and "Reduced Personal Accomplishment" included in Maslach Burnout Inventory referred to negative feelings and thoughts of teachers when practicing their profession within the interview form, teachers were asked "What are the negative feelings and thoughts that your job (teaching/administration) arouses in you?". To provide the validity of the inventory, an interview form composed of a single question prepared by three domain experts in educational sciences was given, and the interview form was put into final form in line with the opinions and suggestions of domain experts. The interview form was applied to five teachers who were not included in the study group prior to the application. After the relevant question in the interview form was found to be clear and understandable, it was given to thirty teachers with various demographic properties, and those filled in by teachers were collected by researchers.

Population and Sample

The population of the study is composed of totally 3478 teachers working in Yenişehir, Diyarbakır, during the spring term of the academic year of 2017-2018 (https://yenisehir21.meb.gov.tr/). The sample size of the quantitative dimension was found as 460 teachers according to the calculation made for a confidence level of 95%. Statistical data related to the sample are given in Table 1.

Table 1. Data related to the quantitative sample and the qualitative study group

Variables		N		%	
		Quantitative	Qualitative	Quantitative	Qualitative
Gender	Female	240	9	52,2	30
	Male	220	21	47,8	70
Task Type	Administrator	70	12	15,3	40
	Teacher	390	18	84,7	60
Branch	Class Teacher	150	13	33,6	43,3
	Branch Teachers	310	17	66,4	56,6
Marital Status	Married	200	17	43,4	56,6
	Single	249	13	56,6	43,4
	Elementary	150	7	32,6	23,3
School Type	Secondary	200	11	43.4	36,7
	High School	110	12	23,0	40
	No child	316	12	68,7	40
Number of Children	One Child	90	10	19,6	33
	Two or more children	54	8	11,7	27

Analysis of Data

In the study, arithmetic mean and standard deviation were used to analyse the quantitative data. To assess the variables, t-test and ANOVA were used while Tukey HSD test, one of the multiple comparison tests to determine the source of the difference, was used for F values which were found significant. Significance level in the statistical analyses in the study was found as 0.05. Low points in the inventory related to sub-dimensions of “Emotional Exhaustion” and “Depersonalization” represented low burnout levels whereas low point related to the sub-dimension of “Reduced Personal Accomplishment” referred to high burnout levels.

To assess the qualitative data, participants were first given codes to ensure that they could be identified. To set an example, the fifth female participant was coded as KK5 (in which the first “K” stands for female and the second “K” stands for participant), the fifteenth participant class teacher was coded as KS15, and the twenty-eighth participant branch teacher was coded as KB28. In this way, information given by participants was used through direct quotation. Responses given to the question included in the semi-structured interview form were assessed based on sub-problems.

FINDINGS

This section includes primarily findings related to the quantitative data and then findings related to the qualitative data obtained from participants.

Quantitative Findings

While presenting quantitative findings, findings related to sub-problems were presented separately.

1. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Gender? Findings related to its sub-problem.

Table 2: Statistics of the Gender Variable and T-Test Results

Points	$\bar{X}$		SS		t	df	P
Gender	Female	Male	Female	Male			
Emotional Exhaustion	2,22	2,19	,73	,69	,329		,742
Depersonalization	1,82	1,88	,68	,63	-1.000	458	,316
Reduced Personal Accomplishment	3,67	3,78	,54	,63	-1,876		,061

* p<.05

It is highlighted in Table 2 that the arithmetic mean of female participants' perceptions related to the sub-dimension "Emotional Exhaustion" depending on the "Gender" is $\bar{X}$=2,22 while the arithmetic mean of male participants' perceptions is $\bar{X}$=2,19, and that the arithmetic mean of female participants' perceptions related to the sub-dimension "Depersonalization" is $\bar{X}$=1,82 while the arithmetic mean of male participants' perceptions is $\bar{X}$=1,88 and at the level of "Very Seldom". It is observed that the arithmetic mean of female participants' perceptions related to sub-dimension "Reduced Personal Accomplishment" is $\bar{X}$=3,67 while the arithmetic mean of male participants' perceptions is $\bar{X}$=3,78 and at the level of "Frequently". Besides, it is also seen that as the results of the t-test carried out for participant perceptions depending on the gender regarding sub-dimensions "Emotional Exhaustion", "Depersonalization" and "Reduced Personal Accomplishment" of burnout are t=,742, ,316 and ,061 respectively and p>.05, there is not a significant difference among the perceptions of male and female participants related to the sub-dimensions of burnout depending on the gender.

2. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Task Type? Findings related to its sub-problem.

Table 3: Statistics of the Task Type Variable and T-Test Results

Points	$\bar{X}$		SS		t	df	P
Task Type	Teacher	Administrator	Teacher	Administrator			
Emotional Exhaustion	2,21	2,18	,71	,73	,290		,456
Depersonalization	1,85	1,87	,66	,65	-,263	458	,988
Reduced Personal Accomplishment	3,72	3,79	,56	,72	-,866		,089

* p<.05

As seen in Table 3, the arithmetic mean of teachers' perceptions related to the sub-dimension "Emotional Exhaustion" of burnout depending on the "Task Type" is $\bar{X}$=2,21 while the arithmetic mean of administrators' perceptions is $\bar{X}$=2,18, and that the arithmetic mean of teachers' perceptions related to the sub-dimension of "Depersonalization" is $\bar{X}$=1,85 while the arithmetic mean of administrators' perceptions is $\bar{X}$=1,87 and at the level of "Very Seldom". The arithmetic mean of teachers' perceptions related to "Reduced Personal Accomplishment" is $\bar{X}$=3,72 while the arithmetic mean of administrators' perceptions is $\bar{X}$=3,79 and at the level of "Frequently". Moreover, as the results of the t-test carried out for participant perceptions depending on the task type regarding sub-dimensions "Emotional Exhaustion", "Depersonalization" and "Reduced Personal Accomplishment" of burnout are t=,456 ,988 ve 089 respectively and p>.05, there is not a significant difference among the perceptions of participants related to the sub-dimensions of burnout.

3. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Branch? Findings related to its sub-problem.

Table 4: Statistics of the Branch Variable and T-Test Results

Points	$\bar{X}$		SS		t	df	P
Branch	Class	Branch	Class	Branch			
Emotional Exhaustion	2,13	2,24	,67	,72	-1,332		,448
Depersonalization	1,75	1,89	,59	,68	-1,919	458	,144
Reduced Personal Accomplishment	3,76	3,71	,50	,62	-,796		,048

* p<.05

Table 4 demonstrates that the arithmetic mean of class teachers' perceptions related to the sub-dimension "Emotional Exhaustion" depending on the "Branch" is $\bar{X}$=2,13 while the arithmetic mean of branch teachers' perceptions is $\bar{X}$=2,24, and that the arithmetic mean of class teachers' perceptions related to the sub-dimension "Depersonalization" is $\bar{X}$=1,75 while the arithmetic mean of branch teachers' perceptions is $\bar{X}=1,89$ and at the level of "Very Seldom". The arithmetic mean of class teachers' perceptions related to the sub-dimension "Reduced Personal Accomplishment" is $\bar{X}$=3,76 while the arithmetic mean of branch teachers' perceptions is $\bar{X}=3,71$ and at the level of "Frequently". In addition, it is also seen that as the results of the t-test carried out for participant perceptions depending on the branch regarding sub-dimensions "Emotional Exhaustion" and "Depersonalization" of burnout are t=,448 ve ,144 and p>.05, there is no significant difference between the perceptions of class and branch teachers; however, as it is t=,048 and p<.05 related to "Reduced Personal Accomplishment", there is a significant difference between the perceptions of class and branch teachers.

4. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Marital Status? Findings related to its sub-problem.

Table 5: Statistics of the Marital Status Variable and T-Test Results

Points	$\bar{X}$		SS		t	df	P
Marital Status	Married	Single	Married	Single			
Emotional Exhaustion	2,10	2,27	,66	,73	-2,484		,145
Depersonalization	1,74	1,92	,58	,69	-2,657	458	,011
Reduced Personal Accomplishment	3,84	3,66	,57	,59	-3,106		,480

* p<.05

Table 5 shows that the arithmetic mean of married participants' perceptions related to the sub-dimension of "Emotional Exhaustion" of burnout depending on the "Marital Status" is $\bar{X}$=2,10 while the arithmetic mean of single participants' perceptions is $\bar{X}$=2,27, and that the arithmetic mean of married participants' perceptions related to the sub-dimension of "Depersonalization" is $\bar{X}$=1,74 while the arithmetic mean of single participants' perceptions is $\bar{X}=1,92$ and at the level of "Very Seldom". It is also observed that the arithmetic mean of married participants' perceptions related to the sub-dimension "Reduced Personal Accomplishment" is $\bar{X}$=3,84 while the arithmetic mean of single participants' perceptions is $\bar{X}=3,66$ and at the level of "Frequently". Moreover, as the results of the t-test carried out for participant perceptions depending on the marital status regarding sub-dimensions "Emotional Exhaustion" and "Reduced Personal Accomplishment" of burnout are t=,145 and ,480 respectively and p>.05, there is no significant difference among teachers' perceptions related to these sub-dimensions depending on the marital status; however, as it is t=,011 and p<.05 for the sub-dimension "Depersonalization", there is significant difference between the perceptions of married and single participants.

5. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the School Type? Findings related to its sub-problem.

Table 6: Statistics of the School Type Variable and One Way Anova Tests Findings

Burnout Levels		N	$\bar{x}$	SS	Variance Source	Sum of Squares	sd	Mean of Squares	F	p	Difference
Emotional Exhaustion	Elementary	150	2,15	,66	Intergroup	,594	2	,297	,581	,560	None
	Secondary	200	2,23	,74	In-Groups	208,306	458	,512			
	High School	110	2,23	,72	Toplam	208,900	460				
	Total	460	2,21	,71							
Depersonalization	Elementary	150	1,75	,58	Intergroup	2,079	2	1,039	2,390	,093	None
	Secondary	200	1,90	,69	In-Groups	177,017	458	,435			
	High School	110	1,90	,68	Total	179,096	460				
	Total	460	1,85	,66							
Reduced Personal Accomplishment	Elementary	150	3,75	,51	Intergroup	,264	2	,132	,376	,687	None
	Secondary	200	3,70	,61	In-Groups	142,788	458	,351			
	High School	110	3,75	,64	Total	143,052	460				
	Total	460	3,73	,59							

* p<.05

Table 6 highlights that the arithmetic mean of participants' perceptions related to the sub-dimension "Emotional Exhaustion" depending on the "School Type" is $\bar{x}$=2,15 for participants working at elementary school, $\bar{x}$=2,23 for participants working at secondary school and $\bar{x}$=2,23 for participants working at high school, and that the arithmetic mean of participants' perceptions related to the sub-dimension "Depersonalization" is $\bar{x}$=1,75 for participants working at elementary school, $\bar{x}$=1,90 for participants working at secondary school and $\bar{x}$=1,90 for participants working at high school and at the level of "Very Seldom" and that the arithmetic mean of participants' perceptions related to the sub-dimension "Reduced Personal Accomplishment" is $\bar{x}$=3,75 for participants working at elementary school, $\bar{x}$=3,70 for participants working at secondary school and $\bar{x}$=3,75 for participants working at high school and at the level of "Frequently". Besides, as the results of One Way Anova Test conducted related to the school type are F=,581, 2,390 and ,376 respectively and (p values are ,560, ,093 and ,687 respectively) and p>.05, there is no significant difference among the perceptions of participants working at elementary, secondary and high school related to the sub-dimensions "Emotional Exhaustion", "Depersonalization" and "Reduced Personal Accomplishment" of burnout.

6. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Number of Children? Findings related to its sub-problem.

Table 7: Statistics of the Number of Children Variable and One Way Anova Test Findings

Burnout Dimensions		N	X	SS	Variance Source	Sum of Squares	sd	Mean of Squares	F	p	Difference
Emotional Exhaustion	No Child	316	2,24	,72	Intergroup	2,597	2	,866	1,703	,166	None
	One Child	90	2,13	,64	In-Groups	206,303	458	,508			
	Two or More Children	54	2,08	,71	Total	208,900	460				
	Total	460	2,15	,69							
Depersonalization	No Child	316	1,88	,68	Intergroup	1,850	2	,617	1,413	,239	None
	One Child	90	1,76	,58	In-Groups	177,246	458	,437			
	Two or More Children	54	1,75	,52	Total	179,096	460				
	Total	460	1,79	,59							
Reduced Personal Accomplishment	No Child	316	3,68	,60	Intergroup	2,896	2	,965	2,796	,040*	Available
	One Child	90	3,89	,51	In-Groups	140,156	458	,345			
	Two or More Children	54	3,82	,49	Total	143,052	460				
	Total	460	3,79	,53							

* p<.05

Table 7 highlights that the arithmetic mean of participants' perceptions related to the sub-dimension "Emotional Exhaustion" of burnout depending on the "Number of Children" is $\bar{x}$=2,24 for participants with no child, $\bar{x}$=2,13 for participants with one child and $\bar{x}$=2,08 for participants with two or more children, and that the arithmetic mean of participants' perceptions related to the sub-dimension "Depersonalization" is $\bar{x}$=1,88 for participants with no child, $\bar{x}$=1,76 for participants with one child and $\bar{x}$=1,75 and at the level of "Very Seldom". The arithmetic mean of participants' perceptions related to the sub-dimension "Reduced Personal Accomplishment" is $\bar{x}$=3,68 for participants with no child, $\bar{x}$=3,89 for participants with one child and $\bar{x}$=3,82 for two or more children and at the level of "Frequently". Moreover, as the results of One Way Anova Test conducted related to the number of children are F=1,703 and 1,413 respectively for the sub-dimensions "Emotional Exhaustion" and Depersonalization" (p values are ,166 and ,239 respectively) and p>,05, there is no significant difference in these dimensions; however, as it is F=2,796 and P=,040 and p<,05 related to the sub-dimension "Reduced Personal Accomplishment", there is a significant difference among participants related to this sub-dimension depending on the number of children. According to Tukey HSD test (Table 8) conducted to determine between which groups there is a significant difference, it is seen that the significant difference is between participants with no child and participants with one child and in favour of participants with one child.

Table 8: Tukey HSD Test Results Related To the Sub-Dimension Reduced Personal Accomplishment of Burnout Depending On the Number of Children Variable

Burnout	The Number of Children	Mean Difference	p
The sub-dimension Reduced Personal Accomplishment	1- No Child 2- One Child	-0,21	0,03*

* p<.05

QUALITATIVE FINDINGS

While presenting the qualitative data, the order of the quantitative data was taken as basis. In other words, findings were presented based on sub-problems.

1. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Gender variable? Findings related to its sub-problem.

The perceptions of female and male participants related to burnout depending on the Gender are negative and similar. To illustrate this, opinions of two participants among female and male participants were given directly. While KK28 coded female teacher stated her perceptions as *"It is sad for me to see that students are irrelevant and inattentive, and are affected by negative things around them, and I feel as if I fought on my own to change students' behaviours and it makes me sad that I cannot communicate with their families"* while KE30 coded male teacher expressed himself as *"Mental and emotional exhaustion negatively influence their after-school activities, and lack of inspection and control at the school obstruct good things. Besides, it makes me upset to see the instability in the system."*

2. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Task Type variable? Findings related to its sub-problem.

The perceptions of teachers and administrators related to burnout depending on the Task Type are similar and negative. To prove this, opinions of one of the teachers and administrators each were given directly. KÖ29 coded teacher expressed that *"ıt concerns me for the future that students are have no willingness and expectations for the future and that they do not enjoy studying. As there is lack of support by parents in understanding the meaning of life, I fail to show success I wish for and this worries me a lot"* while *KY17* coded administrator stated that *"The stress arising from the work becomes a nuisance, reflects on my daily life, and I particularly experience intolerance against the noise after work."*

3. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Branch? Findings related to its sub-problem.

The perceptions of class and branch teachers related to burnout depending on the Branch variable are negative. Besides, teachers and administrators share similar perceptions related to burnout. To reveal that they possess negative perceptions, their opinions were given directly. KS2 coded class teacher stated that *"When children are offended as I shout at them, I feel bad, and it makes me very sad to have the impression that teachers get well-paid"* while KB22 coded branch teacher expressed that *"Being away from my parents, having no time for myself, keeping up with cultural differences and striving to understand students with different languages are issues that exhaust me mentally and emotionally."*

4. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Marital Status? Findings related to its sub-problem.

The perceptions of married and single teachers related to burnout depending on the Marital Status variable are negative; besides, negative perception is at a higher level in married teachers. To present their perceptions, opinions of one married and one single teacher were given directly. KE3 coded married teacher stated that *"Fear of being late in the mornings and disrespectful behaviours of students towards me are among some of the negative feelings I experience"* while KB27 coded single teacher expressed that *"Being criticized continuously and not being appreciated reduce my motivation and job satisfaction."*

5. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the School Type? Findings related to its sub-problem.

The perceptions of elementary, secondary and high school teachers related to burnout depending on the School Type variable are similar and negative. Furthermore, the perceptions of high school teachers are slightly more negative. To set forth their perceptions, opinions of one of elementary, secondary and high school teachers were given directly. Kİ9 coded elementary teacher remarked that *"Among the negative feelings I am experiencing are disrespectful behaviours and negative demeanours of students and their parents",* KO6 coded secondary school teacher pointed out that *"Having no feedback from studies, disloyalty to knowledge and science and unstable student profile make me feel bad professionally"* and KL14 coded high school teacher stated that "*As* m*isdirection of students by insensible parents and their inefficiency cause distress and trivialize our profession, I am dispirited and discouraged and thus I do not want to do this job anymore."*

6. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Number of Children? Findings related to its sub-problem.

The perceptions of teachers with no child, one child and two and more children related to burnout depending on the Number of Children variable are similar and negative. To put forward the perceptions, opinions of three teachers were given directly. KÇ8 coded teacher with no child expressed that *"I am vexed at seeing people do uncoordinated works and fail to fulfil their duties and get stressed",* K1Ç18 coded teacher with one child said that *"I am disappointed at seeing that students do not understand what I teach them, their lack of interest in our language and getting nothing in return for our effort"* and K2Ç11 coded teacher with two or more children remarked that "*I feel humiliated in front of students and parents with what I am doing as part of job as I have to wear uniform and see that workmen double my salary."*

RESULT AND DISCUSSION

1. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Gender? Result and discussion related to its sub-problem.

According to the quantitative data, it was found that the perceptions of female and male participants related to the "gender" variable were different from those of female and male participants related to the sub-dimensions "Emotional Exhaustion", "Depersonalization" and "Reduced Personal Accomplishment" of burnout but that this difference was not statistically significant. According to the qualitative data, it was determined that the perceptions of female and male participants related to burnout depending on the gender variable were similar and negative. Besides, the qualitative and quantitative data of the study overlap. Studies carried out by Çelik and Yılmaz (2015); Bilgen and Genç, (2014); Özşaker, (2013); Türkçapar, (2011); Yıldırım, (2007) and Pillay, Goddard and Wilss (2005) found that the difference between the perceptions of females and males related to burnout depending on the gender variable was not statistically significant. These findings overlap with the findings of this study. In addition, studies in the body of literature show that there is a significant difference between some sub-dimensions of burnout, and that there is no significant difference between some sub-dimensions of burnout. Among these studies are those carried out by Durakoğlu and Seferoğlu, (2017); Seferoğlu, Yıldız & Avcı-Yücel; (2014); Büyüközkan, (2012); Çağlar, (2011) Bayramoğlu, (2008); Evers, Tomic and Brouwers, (2004); Bibou-Nakou, Stogiannidou and

Kiosseoglou, (1999) and Sucuoğlu, Kuloğlu-Aksaz (1996). Considering these findings as a whole, it can be concluded that participants' perceptions related to the sub-dimensions of burnout depending on the gender variable are negative, and that while there is a significant difference among the perceptions of participants in some studies, there is no significant in some others. This result demonstrates that the teaching profession which involves intense human relationships exhausts teachers as practitioners of this profession in various amounts regardless of the gender.

2. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Task Type? Result and discussion related to its sub-problem.

According to the quantitative data, it was found that there was no significant difference among the perceptions of participant teachers and administrators in the sub-dimensions of "Emotional Exhaustion", "Depersonalization" and "Reduced Personal Accomplishment" of burnout depending on the "task type" variable. As regards the qualitative data related to the task type, it was determined that the perceptions of participant teachers and administrators were similar and negative. The qualitative and quantitative data of the study overlap. However, the study carried out Ersoy Yılmaz and Yazıcı & Yazıcı (2014) found that the perceptions of teachers related to burnout were higher than those of administrators in all the sub-dimensions of "Emotional Exhaustion", "Depersonalization" and "Reduced Personal Accomplishment". Yet this finding is remarkable as general view is that administrators who are in charge and have the responsibility of making important decisions tend to have burnout more intensely. Furthermore, the study by Başol andAltay (2009) found that administrators had more burnout than teachers. According to these findings, it can be concluded that teachers and administrators have more burnout at different times. Teachers may have more burnout due to the fact that they are not involved in decision-making sufficiently, spend most of their time at school with students, possess excessive course load, do not have the opportunity to have a healthy and effective communication with administrators and meet parents more. On the other hand, administrators may experience more burnout as they are in charge of anything at school, deal with issues from the very beginning to the end and cannot keep up with the legislation upon frequent legislative amendments.

3. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Branch? Result and discussion related to its sub-problem.

It was found from the quantitative data that there was a difference against branch teachers among the perceptions of participant class and branch teachers related to the sub-dimensions "Emotional Exhaustion" and "Depersonalization" depending on the "branch" variable but that the relevant difference was not statistically significant, and that there was a significant difference in favour of class teachers among the perceptions of class and branch teachers related to the sub-dimension "Reduced Personal Accomplishment". According to the qualitative data, it was determined that the perceptions of class and branch teachers related to burnout were negative and similar. The qualitative data of the study overlap the quantitative data. It was found in the study by Durakoğlu and Seferoğlu, (2017) that while there was a significant difference in some sub-dimensions of burnout, there was not any significant difference in some others. Besides, Seferoğlu, Yıldız and Yücel (2014) found that there was no significant difference among the perceptions of class and branch teachers related to burnout. These findings also overlap with the findings of this study. Considering all these findings as a whole, it can be concluded that there is no significant difference among the perceptions of teachers related to burnout in general depending on the branch variable, but that there is a significant difference among the perceptions of teachers in some sub-dimensions of burnout. This result reveals that teachers experience burnout, though in low levels, regardless of their branches, and that branch teachers experience this feeling more than class teachers in some sub-dimensions of burnout, which can be associated with puberty-and- adolescence-related psychological, sociological, socioeconomic and physiological changes experienced by students who are the target group of branch teachers.

4. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Marital Status? Result and discussion related to its sub-problem.

According to the quantitative data, it was found that there was no significant difference among the perceptions married and single participants related to the sub-dimensions "Emotional Exhaustion" and "Reduced Personal Accomplishment" of burnout depending on the marital status variable, but that there was a significant difference in favour of married participants among the perceptions of married and single participants related to the sub-dimension "Depersonalization" of burnout. According to the qualitative data, it was concluded that the perceptions of married and single participants related to burnout were negative, but that married participants had more negative perceptions. The qualitative and quantitative data of the study overlap in some aspects; however, they dissociate in some aspects. It was found in the studies carried out by Ergül, Saygın and Tösten, (2013); Çağlar, 2011; Cemaloğlu and Erdemoğlu-Şahin, (2007) and Beck and Gargiulo (1983) that the perceptions of teachers related to burnout depending on the marital status demonstrated a statistically significant difference. These findings overlap with the findings of this study in which the perceptions of participants change depending on the marital status variable. However, studies by Çelik and Yılmaz (2015); Bilgen and Genç, (2014); Bağcı and Karagül, (2013); Özben and Argun, (2012) and Pillay, Goddard & Wilss (2005) found that the difference among the perceptions of participants related to burnout depending on the marital status variable was not statistically significant. These findings overlap with the findings of this study that reveal that the perceptions of participants related to burnout do not change depending on the marital status variable (Emotional Exhaustion and Reduced Personal Accomplishment). With reference to all these findings, it can be concluded that the perceptions of participants related to burnout depending on the marital status variable differentiate depending on both the overall burnout and its sub-dimensions. However, these findings are sometimes statistically significant and sometimes they are not significant. This result can be due to the fact that married participants have more responsibilities due to their marriage; that teachers included in the sample possess different demographic properties, and that participants may have expressed their feelings more comfortably when filling in the semi-structured form.

5. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the School Type? Result and discussion related to its sub-problem.

According to the quantitative data, it was found that there was no statistically significant difference among the perceptions of participants working at elementary, secondary and high school related to the sub-dimensions "Emotional Exhaustion", "Depersonalization" and "Reduced Personal accomplishment" of burnout depending on the school type variable. It was found from the qualitative data that though the perceptions of participant teachers working at elementary, secondary and high school related to burnout depending on the school type variable were negative and similar, the perceptions of high school teachers were more negative. The quantitative and qualitative data of the study broadly overlap. Seferoğlu, Yıldız and Yücel (2014); Türkçapar, (2011) and Başören (2005) found in their studies that there was no statistically significant difference among the perceptions of teachers related to burnout depending on the school type. These findings match up with the findings of this study. Çelik and Yılmaz (2015); Önal, (2010), and Cemaloğlu and Erdemoğlu-Şahin (2007) found out that while there was a statistically significant difference among the perceptions of teachers related to some sub-dimensions of burnout, there was not any statistically significant difference in some others. These findings also match up with the qualitative data of this study. Considering these findings as a whole, it can be concluded that the perceptions of participants related to burnout depending on the school type differentiated depending on the sub-dimensions of burnout. It can be inferred that this conclusion have occurred as factors such as students' school-type-based changing levels of development, expectations, and socioeconomic and cultural status, etc. affect teachers at different levels.

6. Is there a significant difference among the perceptions of teachers related to burnout levels depending on the Number of Children? Result and discussion related to its sub-problem.

It was determined from the quantitative data that there was no statistically significant difference among the perceptions of participants related to the sub-dimensions "Emotional Exhaustion" and "Depersonalization" of burnout depending on the number of children variable while

there was a significant difference in favour of participants with no child or one child among the perceptions of participants related to the sub-dimension "Reduced Personal Accomplishment" of burnout. According to the qualitative data of the study, while the perceptions of teachers with no child, one child or two or more children related to burnout depending on the number of children variable were negative, the perceptions of participants with one child or more than one child were more negative. Besides, while the qualitative data of the study overlap with some parts of the quantitative data, there is no overlapping between the two in some other parts. In his study, Aslan (2009) found out that as the number of children owned by teachers increased, no change occurred in the sub-dimension "Emotional Exhaustion" and a decrease occurred in the sub-dimension "Depersonalization, and that the point averages of "Reduced Personal Accomplishment" increased. It was suggested in studies by Babaoğlan (2007) and Ersoy Yılmaz, and Yazıcı & Yazıcı (2014) that the sense of accomplishment reduced in participants more than those having a child depending on general burnout and reduced personal accomplishment dimension. Considering these findings as a whole, it can be concluded that the perceptions of participants related to burnout differentiate depending on having a child or not. Prospects of teachers related to work and life may differ depending on having a child. In this sense, teachers who have children or have the responsibility of child rearing may be more tolerated against problems arising from work and life.

CONCLUSION AND SUGGESTIONS

Results

1- Participants have negative perceptions in all sub-dimensions of Emotional Exhaustion, Emotional exhaustion, Depersonalization and Self-Failure according to gender variable. However, in some studies about burnout, there was a significant difference between participants' perceptions; there was no significant difference in some studies.

2- There was no significant difference between the participant perceptions of Emotional Exhaustion, Desensitization and Personal Failure Sensation which are sub-dimensions of burnout according to duty type variable. However, in some different studies, some aspects of burnout are teachers; managers of some sizes also live more.

3- There was no significant difference between teachers' perceptions of burnout according to branch variable. In the sub-dimensions of Emotional Exhaustion and" Desensitization" of burnout, branch teachers experience more burnout. In the sub-dimension of Feeling of Personal Failure, class teachers live more sense of burnout.

4- There was no significant difference between the participants in the Emotional Exhaustion" and "Feelings of Personal Failure" sub-scale of burnout. The depersonalization sub-dimension of burnout is more common for the married than single

5- No statistically significant difference was found between the sub-dimensions of "Emotional Exhaustion", "Sensation of Depersonalization" and "Feeling of Personal Failure" among the participant perceptions of primary school, secondary school and high schools regarding the school type variable.

6- There was no statistically significant difference between "Emotional Exhaustion" and "Desensitization" sub-dimensions of burnout according to the child status variable. However, in the sub-dimension of "Feeling of Personal Failure" of burnout, participants with a single child experience more burnout than those without children.

Suggestions

1- According to gender, type of duty, branch, marital status, school type and child status variables, both quantitative and qualitative researches can be done in primary, secondary and high schools to determine the reasons and solutions for the burnout of teachers and managers.

2- It is possible that teachers and administrators may lead to burnout, school and class classes, socio-economic and cultural conditions of the students, parents' interest in education and so on. both qualitative and quantitative research can be done in primary, secondary and high schools where variables are investigated.

REFERENCES

Akçamete, G., Kaner, S., & Sucuoğlu, B. (2001). *Öğretmenlerde Tükenmişlik, İş Doyumu ve Kişilik.* Ankara: Nobel Yayın Dağıtım.

Aslan, N. (2009). *Kars ili ilköğretim okullarında görev yapan öğretmenlerde mesleki tükenmişlik düzeyi,* Yayımlanmamış yüksek lisans tezi, Kafkas Üniversitesi Sosyal Bilimler Enstitüsü Eğitim Bilimleri Anabilim Dalı.

Babaoğlan, E. (2007) "İlköğretim okulu yöneticilerinde tükenmişliğin bazı değişkenlere göre araştırılması", *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi*, 14: 55–67.

Balcı, A. (2009). *Sosyal Bilimlerde Araştırma Yöntem, Teknik ve İlkeler*, 7. Baskı Pegem Akademi, Ankara.

Bağcı, H., & Karagül, S. (2013). Türkçe öğretmenlerinin mesleki tükenmişlik düzeyi, *Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 8*(5), 184-193.

Baltaş, A. ve Baltaş, Z. (1993). *Stres ve başa çıkma yolları*. İstanbul: Remzi Kitabevi.

Başol, G. ve Atay, M. (2009) "Eğitim yöneticisi ve öğretmenlerin mesleki tükenmişlik düzeylerinin incelenmesi", *Kuram ve Uygulamada Eğitim Yönetimi*, 58:191-216.

Başören, M. (2005). *Çeşitli değişkenlere göre rehber öğretmenlerin tükenmişlik düzeylerinin incelenmesi (Zonguldak ili örneği)*. Yayımlanmamış yüksek lisans tezi, Zonguldak Karaelmas Üniversitesi Sosyal Bilimler Enstitüsü.

Bardo, P. (1979). The pain of teacher burnout: A case history. *Phi Delta Kappan***,** 61 (4), 252-254.

Bayramoğlu, F. (2008). *Genel lise, anadolu lisesi, özel liselerde çalışan öğretmenlerin tükenmişlik düzeyleri ve çeşitli değişkenlere göre karşılaştırılmasına ilişkin bir uygulama (İstanbul ili örneği)*. Yayımlanmamış yüksek lisans tezi, Beykent Üniversitesi Sosyal Bilimler Enstitüsü.

Beck, C. L., & Gargiulo, R. M. (1983). Burnout in teachers of retarded and nonretarded children. *The Journal of Educational Research, 76*(3), 169-173.

Bibou-Nakou, I., Stogiannidou, A., & Kiosseoglou, G. (1999). The relation between teacher burnout and teachers' attributions and practices regarding school behaviour problems. *School Psychology International, 20*(2), 209-217.

Bilgen, S., & Genç, S. Z. (2014). The rate of burnout of elementary school teachers and elementary mathematics teachers. *The International Journal of Educational Researchers, 5*(1), 1-9.

Byrne, B. M. (1994). Burnout: Testing for the Validity, Replication, and Invariance of Causal Structure Across Elementary, Intermediate, and Secondary Teachers, *American Educational Research Journal*,31 (3), 645-673.

Büyüközkan, A. S. (2012). *Öğretmenlerin örgütsel yurttaşlık davranışları ile tükenmişlikleri arasındaki ilişkinin incelenmesi.* Yayınlanmamış yüksek lisans tezi, Mersin Üniversitesi Eğitim Bilimleri Enstitüsü.

Cemaloğlu, N. & Erdemoğlu-Şahin, D. (2007). Öğretmenlerin mesleki tükenmişlik düzeylerinin farklı değişkenlere göre incelenmesi. *Kastamonu Eğitim Dergisi, 15*(2), 465-484.

Cihan, B. B. (2011). *Farklı illerde çalışan ilköğretim okullarında görevli beden eğitimi öğretmenlerinin, mesleki tükenmişlik düzeylerinin incelenmesi ve karşılaştırılması*. Yayınlanmamış yüksek lisans tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü.

Creswell, J. W. & Plano Clark, V.L. (2015) *Karma yöntem araştırmaları tasarımı ve yürütülmesi*, (Çev. Dede, Y. ve Demir, S.Y). Ankara: Anı Yayıncılık

Çağlar, Ç. (2011). Okullardaki örgütsel güven düzeyi ile öğretmenlerin mesleki tükenmişlik düzeyinin bazı değişkenler açısından incelenmesi. *Kuram ve Uygulamada Eğitim Bilimleri, 11*(4), 1827-1847.

Çapri, B.(2006). Tükenmişlik Ölçeğinin Türkçe Uyarlaması: Geçerlik ve Güvenirlik Çalışması, *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, Cilt 2, Sayı 1, Haziran 2006, ss. 62-77.

Çelik, M. & Yılmaz, K. (2015). Öğretmenlerin mesleki profesyonelliği ile tükenmişlikleri arasındaki ilişki, *Sakarya Üniversitesi Eğitim Fakültesi Dergisi;* 2015; (30): 102-131

Durak, H. Y. & Seferoğlu. S. S. (2017). Öğretmenlerde tükenmişlik duygusunun çeşitli değişkenler açısından incelenmesi, *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi*, 37(2): 759-788

Erdemoğlu-Şahin, D. (2007). *Öğretmenlerin mesleki tükenmişlik düzeyleri (Ankara ili ilköğretim ve ortaöğretim okulları örneği)*. Yayınlanmamış yüksek lisans tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü.

Ergül, H. F., Saygın, S., & Tösten, R. (2013). Sınıf öğretmenlerinin tükenmişlik düzeylerinin çeşitli değişkenler açısından incelenmesi. *Dicle Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 5*(10), 266-285.

Ersoy Yılmaz, S., Yazıcı, N. & Yazıcı, H. (2014). Öğretmen ve yönetici öğretmenlerin tükenmişlik düzeylerinin incelenmesi, *Yönetim ve Ekonomi Araştırmaları Dergisi* – Sayı:24 (2014).

Evers, W. J. G., Tomic, W., & Brouwers, A. (2004). Burnout among teachers students' and teachers' perceptions compared. *School Psychology International, 25*(2), 131-148.

Freudenberger, (1974). "Staff Burnout", *Journal of Social Issues*, Vol.30, No.1, 159-165.

Friedman, I. A. (1991). High and low burnout schools: School culture aspects of teacher burnout. *Journal of Educational Research, 84*(6), 325-333.

Gold, Y. (1985). Burnout; causes and solutions. *Clearing House*, 58 (5), 210-212.

Grayson, J. L. & Alvarez, H. K. (2008). School climate factors relating to teacher burnout: A mediator model. *Teaching and Teacher Education* 24 (2008) 1349–1363

Gündüz, B. (2004). *Öğretmenlerde tükenmişliğin akılcı olmayan inançlar ve mesleki bazı değişkenlere göre yordanması.* Yayınlanmamış doktora tezi, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü.

Hock, R.R, (1988), Professional burnout among public school teachers. *Public Personal Management,* 17 (2), 167-189.

Hoyos, T., & Kallus, K. W. (2005). Burnout risk factors: Stress-recovery-state and coping among teachers. *Department of Psychology*. University of Graz. Austria.

Izgar, H. (2001). *Okul yöneticilerinde tükenmişlik.* Ankara: Nobel Yayın Dağıtım.

Kan, Ü. D. (2008). Bir grup okul öncesi öğretmeninde tükenmişlik durumunun incelenmesi, *Kastamonu Eğitim Dergisi* Ekim 2008 Cilt:16 No:2 ss. 431-438

Karadağ, N. (2013). *Tükenmişlik ve iş doyumu (Kırklareli Devlet Hastanesi Hemşireleri Örneği),* Yüksek lisans tezi, Sosyal Bilimler Enstitüsü, Beykent Üniversitesi, İstanbul.

Karaman, P. (2009). *Örgütsel adalet algısı ile tükenmişlik arasındaki ilişkinin incelenmesine yönelik öğretmenler üzerinde bir uygulama.* Yayınlanmamış yüksek lisans tezi, Yıldız Teknik Üniversitesi Sosyal Bilimler Enstitüsü.

Maslach, C., & Jackson, S. E. (1985). The role of sex and family variables in burnout. *Sex Roles, 12*(7-8), 837-850.

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job Burnout. *Annual Reviews of Psychology,* 52, 397-

Oplatka, I. (2002). Women principals and the concept of burnout: An alternative voice? *International Journal of Leadership in Education, 5*(3), 211-226.

Önal, M. (2010). *Eğitim işgörenlerinin duygusal zekâları ile mesleki tükenmişlik düzeyleri arasındaki ilişki*. Yayınlanmamış yüksek lisans tezi, Selçuk Üniversitesi Sosyal Bilimler Enstitüsü.

Özben, Ş., & Argun, Y. (2003). İlköğretim öğretmenlerinin umutsuzluk ve tükenmişlik düzeyleri üzerine bir araştırma. *Ege Eğitim Dergisi, 3*(1), 36-48.

Özşaker, M. (2013). Beden eğitimi ve spor öğretmenlerinin öz-yeterlikleri, tükenmişlikleri ve iş doyumlarının incelenmesi (Aydın ili örneği). *Uluslararası Hakemli Akademik Spor Sağlık ve Tıp Bilimleri Dergisi, 3*(8), 37-57.

Ören, N. & Türkoğlu, H. (2006). Öğretmen adaylarında tükenmişlik, *Muğla Üniversitesi Sosyal Bilimler Enstitüsü Dergisi* (İlke) Bahar 2006 Sayı 16

Pillay, H., Goddard, R., & Wilss, L. (2005). Well-being, burnout and competence: implications for teachers. *Australian Journal of Teacher Education, 30*(2), 22-33.

Polat, G., Topuzoğlu, A., Gürbüz, K., Hotalak, Ö., Kavak, H., Emirikçi, S., & Kayış, L. (2009). Bilecik ili, Bozüyük ilçesi, lise öğretmenlerinde tükenmişlik sendromu. *TAF Preventive Medicine Bulletin, 8*(3), 217-222.

Seferoğlu, S. S., Yıldız, H., & Avcı-Yücel, Ü. (2014). Öğretmenlerde tükenmişlik: Tükenmişliğin göstergeleri ve bu göstergelerin çeşitli değişkenler açısından incelenmesi. *Eğitim ve Bilim, 39*(174), 348-364.

Skaalvik, E. M. ve Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and Teacher Education*, 26 (2010) 1059-1069

Sparks, D. (1979): A Teacher Center Tackles The Issue. *Today's Education***,** 68:254.

Storlie, F.J. (1979). Burnout: The elaboration of a concept. *American Journal of Nursing.* 21 OS-2110.

Sucuoğlu, B., & Kuloğlu, N. (1996). Özürlü çocuklarla çalışan öğretmenlerde tükenmişliğin değerlendirilmesi. *Türk Psikoloji Dergisi*, *10*(36), 44-60.

Sürgevil, O. (2006). *Çalışma hayatında tükenmişlik sendromu tükenmişlikle mücadele teknikleri.* Ankara: Nobel Yayın Dağıtım.

Şişman, M. (2004). *Öğretim liderliği*. Ankara: PegemA Yayıncılık.

Tansel, B.(2015). Üniversite Öğrencilerinin Tükenmişlik Düzeylerinin İncelenmesi, *Çukurova Üniversitesi Eğitim Fakültesi Dergisi* Cilt: 44 Sayı: 2 Sayfa: 241-262

Troman, G., & Woods, P. (2000). Careers under stress: Teacher adaptations at a time of intensive reform. *Journal of Educational Change*, *1*(3), 253-275.

Türkçapar, Ü. (2011). Beden eğitimi öğretmenlerinin farklı değişkenlere göre tükenmişlik düzeylerinin incelenmesi. *Türkiye Sosyal Araştırmalar Dergisi, 15*(3), 135-146.

Wang, H., Hall, N. C. & Rahimi, S. (2015). Self-efficacy and causal attributions in teachers: Effects on burnout, job satisfaction, illness, and quitting intentions. *Teaching and Teacher Education* 47 (2015) 120-130

Yıldırım, S. (2007). *Anaokulu öğretmenlerinde tükenmişlik düzeyi ve umutsuzluk düzeyleri arasındaki ilişki.* Yayınlanmamış yüksek lisans tezi, Yeditepe Üniversitesi Sosyal Bilimler Enstitüsü.

Yılmaz, K., & Altınkurt, Y. (2014). Öğretmenlerin mesleki profesyonelliği ölçeği geçerlik ve güvenirlik çalışması. *Uluslararası İnsan Bilimleri Dergisi, 11*(2), 332-345.

Yılmaz, K. (2014). The relationship between the teachers' personality characteristics and burnout levels. *Anthropologist, 18*(3), 783-792.

Yılmaz, K., Altınkurt, Y., Güner, M. & Şen, B. (2015). The relationship between teachers' emotional labor and burnout levels. *Eurasian Journal of Educational Research, 59,* 75-90.

(https://yenisehir21.meb.gov.tr/). İndirilme tarihi 16.07.2018

International Journal of Progressive Education, Volume 15 Number 4, 2019

Investigation of the Football Fanaticism Levels of Physical Education Teachers

Kemal Kurak [i]
Çanakkale Onsekiz Mart University

Abstract

The aim of this study is to investigate fanaticism activities and fanaticism levels of physical education teachers as football supporters. The sample of the study consists of a total of 1292 teachers, 754 males and 538 females, who were working as physical education teachers in the cities of Gaziantep, Malatya, Elazığ and Kahramanmaraş in the 2017-2018 education period. Within the scope of this study, the "Football Supporter Fanaticism Scale" (FSFS), which includes 13-items, was used. The data obtained in the data collection period were analyzed using SPSS software. The physical education teachers in the study were investigated for their fanaticism, age, gender, marital status and years of professional experience. It was determined that the participants consisted of 17.6% of fanatics, 35.8% of team supporters and 46.6% of football spectators.

Keywords: Physical Education Teacher, Football, Fanaticism, Supporter

DOI: 10.29329/ijpe.2019.203.5

---
[i] **Kemal Kurak**, Assoc. Prof. Dr., Çanakkale Onsekiz Mart University, Sports Science Faculty.

Correspondence: kemalkurak@hotmail.com

INTRODUCTION

Football, which has increasingly grown in recent years, has become a giant entertainment industry and it is seen in every platform as an important part of popular culture (Toşur and Kılıç, 2018). In the literature, it is observed that football frequently includes terms such as spectators (sports fans), fanatics, supporters etc. Individuals who watch a sportive activity directly or through the media are called spectators while those who are connected to their team, who follows the team or the athletes and support them with positive feelings are called supporters (Arslanoğlu, 2005) and those who are connected to their teams with extreme passion are called fanatics (Koruç, 2004).

Fanaticism is defined as an extreme devotion to something with enthusiasm and passion, that drives people to extremes, blind partisanship, bigotry and conservatism, in other words, a devotion or addiction that disables people's mind and reasoning (Püsküllüoğlu, 2001). Fanaticism or fanatic behaviors have been investigated for more than a decade (Dwyer et al., 2018). According to previous studies, fanaticism refers to the character of the belief between the supporters and their teams. Through football, individuals experience identity formation and sense of belonging as well as discharging by losing themselves with passion football (Murphy, Williams & Dunning, 1990).

In terms of football spectators, fanaticism covers the type of spectators who exhibits behavioral characteristics such as viewing every way necessary to win as legitimate, not being interested in the aesthetics and the beauty of sports, only paying attention to the result, and sickly caring about the colors and anthems of their teams (Arıkan, 2007). The most significant difference between a fanatic and a supporter is that a fanatic is connected more to their teams than a supporter. According to Poyraz (2007), this connection in fanaticism turns into an addiction and supporters connect to their teams in a blind and bigoted way (Poyraz, 2007).

It has been deemed important to reveal how to objectively measure the behaviors of individuals who exhibit violent fanatic behaviors, which progressively stand out in the concepts of spectators and supporters as widely seen in the community (Özgüven, 1994). These types of groups centralize their own identities rather than any type of connection and they can easily exhibit antisocial behavior or assume a violent attitude (Dalpian et al., 2014).

Such a type of tendency to fanaticism in physical education teachers can set a bad example for the students, who take them as examples. Therefore, in this study, it was aimed to determine the connection levels of physical education teachers to football, which is one of the professional experience or professional practices of them and to reveal their fanaticism tendencies. It is believed that this study will contribute to the field and the results of the study will inspire future studies.

METHOD

Population and Sample

The sample of the study consists of a total of 1292 teachers, 754 males and 538 females, who were working as physical education teachers in the cities of Gaziantep, Malatya, Elazığ and Kahramanmaraş in the 2017-2018 education period.

Data Collection Process

The data in this study was collected in the 2017-2018 Education period. After obtaining the necessary permissions from the related institutions, physical education teachers were contacted and explained the aims of the study and about how to answer the questions on the scale. The questionnaires were handed out to physical education teachers, who participated in the study voluntarily. The physical education teachers who did not support any teams were excluded from the questionnaire.

Data Collection Tools

As the data collection tool, the "Football Supporter Fanaticism Scale (FSFS)", which was developed by Taşmektepligil, Çankaya & Tunç (2015), was used. The scale was prepared a Likert-type scale and it contains 13 items. The answers in FSFS contains four options as "a) Completely Agree" (1), "b) Agree" (2), "c)Disagree" (3)" and "d) Completely Disagree" (4).

The form consists of two sections. The first section includes questions for the socio-demographic characteristics of physical education teachers, which includes fanaticism, age, gender, marital status and years of professional experience. In the second section, the first 8 items of the scale (the first factor) covers the "tendency to violent thoughts and activities" and the last 5 items of the scale (the second factor) covers the items expressing the attitudes about the feeling of "corporate belonging". The minimum obtainable score of FSFS was calculated as 13 while the maximum was 52. In the study conducted by Taşmektepligil et al. (2015), it was determined that the internal consistency coefficient, which reveals the reliability, was determined as 0.875 while in this study the internal consistency coefficient was determined as 0.724.

Data Analysis

The statistical analyses were conducted using SPSS software. The data were subjected to normality analysis to determined appropriate test methods. In the analyses, the t-test was used for two sample comparisons while one-way variance analysis (ANOVA) and Kruskal Wallis tests were used for multiple sample comparisons. In order to determine the sources of the differences observed in the analysis results, LSD and Scheffe tests were used for parametric data while Mann Whitney U test was used for non-parametric data. The level of statistical significance was determined as alpha $p<0.05$.

FINDINGS

The participant physical education teachers in this study were investigated in terms of fanaticism, age, gender, marital status, years of professional experience as well as whether they buy merchandise of their teams and how they follow the matches of their teams. The obtained findings were presented in tables.

Table 1. Distribution of the Related Status of the Study group

Spectatorship State	Points	n	%
Fanatic	13-21	227	% 17.6
Team Supporter	22-30	462	% 35.8
Spectator	31-52	603	% 46.6
Total		1292	% 100

It was determined that the participants consisted of 17.6% of fanatics, 35.8% of team supporters and 46.6% of football spectators.

Table 2. Analysis Results of the Study Group According to the Variable of Gender

Gender		n	Mean	Sd	t	p
Tendency to Violence	Male	754	13.14	4.27	-6.448	,000*
	Female	538	23.36	4.75		
Corporate Belonging	Male	754	16.22	4.65	-7.023	,003*
	Female	538	12.68	3.38		
Total Score	Male	754	29.36	7.35	-6.924	,000*
	Female	538	36.04	5.25		

*p<0.05

According to Table 2, it was determined that there were statistically significant differences in the tendency to violence and corporate belonging subscales, and total scores in the attitudes of supporters in the study group according to the variable of gender.

Table 3. Analysis Results of the Study Group According to the Variable of Age

Age		n	Mean	Sd	F	p	Difference Scheffe
Tendency to Violence	22-27 years old	211	13.38	5.46	9.837	,000*	1<3.4.5 2<3.4.5
	28-33 years old	301	14.31	6.54			
	34-39 years old	243	15.81	4.19			
	40-45 years old	294	15.90	5.34			
	45-… years old	243	16.26	4.67			
Corporate Belonging	22-27 years old	211	14.35	3.24	7.538	.004*	1>3.4.5 2>3.4.5
	28-33 years old	301	14.45	4.65			
	34-39 years old	243	12.69	2.26			
	40-45 years old	294	12.17	3.92			
	45-… years old	243	12.36	3.43			
Total Score	22-27 years old	211	27.77	8.31	9.004	,024*	1<2.3.4.5
	28-33 years old	301	28.76	8.30			
	34-39 years old	243	28.50	6.47			
	40-45 years old	294	28.07	6.80			
	45-… years old	243	28.62	5.64			

*p<0.05

According to Table 3, it was determined that there were statistically significant differences in the tendency to violence and corporate belonging subscales, and total scores in the attitudes of supporters in the study group according to the variable of age.

Table 4. Analysis Results According to the Variable of Marital Status

Marital Status		N	Mean	SD	F	p
Tendency to Violence	1. Married	623	16.18	3.76	,582	,493
	2. Single	528	16.49	3.26		
	3. Divorced	141	16.42	3.39		
Corporate Belonging	1. Married	623	12.92	2.30	,481	,614
	2. Single	528	12.43	2.81		
	3. Divorced	141	12.27	3.45		
Total Score	1. Married	623	29.01	6.14	,963	,486
	2. Single	528	28.92	5.12		
	3. Divorced	141	26.69	5.46		

According to Table 4, it was determined that there was no statistically significant difference between the attitudes of supporters in the study group according to the variable of marital status.

Table 5. Analysis Results According to the Variable of Years of Professional Experience

Years of Professional Experience		n	Mean	Sd	X^2	P	Difference U test
Tendency to Violence	1-5	322	14.31	3.46	3.714	.062	
	6-10	285	14.54	3.91			
	11-15	183	14.65	3.37			
	16-20	216	15.71	4.52			
	21+…	286	15.58	4.25			
Corporate Belonging	1-5	322	13.34	3.30	18.467	.000*	5>1.2.3.4
	6-10	285	13.95	4.47			
	11-15	183	13.35	3.59			
	16-20	216	13.47	3.12			
	21+…	286	15.02	4.42			
Total Score	1-5	322	27.65	7.50	11.233	.026*	5>1.2.3.4
	6-10	285	28.49	8.22			
	11-15	183	28	7.52			
	16-20	216	29.18	10.12			
	21+…	286	30.6	8.93			

*p<0.05

According to Table 5, it was determined that there were statistically significant differences in both the corporate belonging subscale and the total scores in the attitudes of supporters in the study group according to the variable of years of professional experience.

DISCUSSION, CONCLUSION AND SUGGESTIONS

It was determined that the participants consisted of 17.6% of fanatics, 35.8% of team supporters and 46.6% of football spectators. In a study conducted by Altungul and Karahüseyinoğlu (2017) to determine love of football in university students, it was determined that they perceived 48.2% of themselves as football spectators followed by 27.6% of fanatics and 24.2% of team supporters. In a study of Karahüseyinoğlu et al. (2016) investigating the levels of following football in convicts and prisoners, convicts and prisoners defined 35.6% of themselves as supporters followed by 33.7% spectators and 30.7% fanatics (Karahüseyinoğlu et al., 2016). In a study conducted by Açak et al. (2018) for football supporters, it was determined that the participants, who were all males, included 14.6% of fanatics, 29.4% team supporters and 56% of football spectators (Açak et al., 2018). In a study conducted by Yıldız and Açak (2018) with high school students, it was determined that the participants included 2.5% of fanatics, 13.8% of team supporters and 83.7% of football spectators (Yıldız and Açak, 2018). It is believed that the reason for the diversity of the results is due to the sample group of the study.

According to the variable of gender in the study, it was determined that there were statistically significant differences between the supporter attitudes in the subscales of the tendency to violence and total scores. Contrary to our study, Kural (2017) reported that there was no significant difference in football supporters' subscales of the tendency to violent thought and activity and corporate belonging subscales according to gender (Kural, 2017). In a study conducted by Dimmcok & Grove (2005), no significant difference was observed (Dimmcok & Grove, 2005).

According to the variable age, it was determined that there were statistically significant differences between the supporter attitudes in tendency to violence and corporate belonging subscales and total scores. In the investigation of the literature, it was observed that Açak et al. (2018) found similar results in their study.

According to the variable of marital status, it was determined that there was no statistically significant difference between the supporter attitudes. This result was not in parallel with the studies of Açak et al. (2018) and Taşmektepligil (2015). While I conducted this study with physical education teachers, Açak and Taşmektepligil conducted their studies with supporter communities. I believe that this is the reason for the difference.

According to the variable of years of professional experience, it was determined that there were statistically significant differences in both the corporate belonging subscale and the total scores in the attitudes of supporters. It is believed that physical education teachers who started their professional lives recently did not develop their formation sufficiently and for this reason, their fanaticism levels are high while with increased professional experience, they give up this tendency to fanaticism.

In conclusion, according to the findings of the study, it is believed that physical education teachers, whom the students take as examples the most, should be rather careful about their states and behaviors. Therefore, vocational training should be conducted and practices for eliminating fanaticism behavior should be taught. Physical education teachers should inform their students in the physical education lesson about the harms of fanaticism and hooligan behavior.

REFERENCES

Açak, M., Düz, S., Karataş, Ö., Karademir, T., Kurak, K., & Bayer, R. (2018). Türkiye futbol federasyonu 1. ligindeki taraftarlarının fanatiklik durumlarının incelenmesi. *Beden Eğitimi ve Spor Bilimleri Dergisi, 20*(3), 7-22.

Altungul, O. & Karahüseyinoğlu, M. F. (2017). Determining the level of fanaticism and football fanship to university athletes. *Journal of Education and Training Studies. Vol. 5.* No. 11. s: 171-176.

Arıkan, Y. (2007). Futbolda şiddet ve polis. *Polis Bilimleri Dergisi.;9:* 1-4.

Arslanoğlu K. (2005). *Futbolun Psikiyatrisi.* İthaki Yayınları. İstanbul.

Dalpian, P.R.C., Zylbersztejn, V.S., Batistella, Z., & Rossi, V.A.V. (2014). Fanatical Women and Soccer: An Exploratory Study. *Soccer&Society. 15*(4). 564-577.

Dwyer, B., Le Crom, C., Greenhalgh, GP. (2018). Exploring and Measuring Spectator Sport Fanaticism. *Communication & Sport. 6*(1).58-85.

Karahüseyinoğlu, M.F., Kırtepe, A., Gacar, A. & Karahüseyinoğlu, F. (2016). Tutuklu Ve Hükümlülerin Futbol Takip Düzeyleri. *Spor ve Performans Araştırmaları. 7*(2). 121-126.

Koruç Z, Bayar P, Arslan F. (2004) Türkiye'de futbol fanatikleri: Sosyal kimlik ve şiddet. Türkiye Futbol adamları Derneği Ankara Şubesi ve Spor Toto Genel Müdürlüğü Futbol Müsabakalarında Terörün Nedenleri ve Önleme Yolları Bilimsel Araştırma Yarışması. Ankara.

Kural S. (2017). Futbol Süper Lig Takım Taraftarlarının Sporda Fanatizm Ve Şiddete İlişkin Görüşleri. Ankara Üniversitesi. Sağlık Bilimleri Enstitüsü. Yüksek Lisans Tezi. Ankara.

Murphy P. Williams J. Dunning E. (1990). Football on Trial. Spectator Violence And Development İn The Football World. Routledge. London.

Özgüven, İ.E. (1994). *Psikolojik testler.* Yeni Doğuş Matbaası. Ankara.

Poyraz, H. (2007). Fanatizm, bağlanma ve ahlak. *Cogito Üç Aylık Düşünce Dergisi.;53:* 27-36.

Püsküllüoğlu, A. (2001) *Türkçedeki yabancı sözcükler sözlüğü. 2. Basım.* Arkadaş Yayınları. Ankara.

Taşmektepligil MY. Çankaya S. Tunç T. (2015). Futbol taraftarı fanatiklik ölçeği. Journal of Sports and Performance Researches. 6(1). s: 41-49.

Toşur A., Kılıç T., 2018 (2018), A Comparison of Some Parameters of Football Players According to the Leagues They Play In, *Journal of Education and Trainin Studies; 6* (11), 135-142.

Yıldız H, Açak M. (2018). Lise Öğrencilerinin Futbol Fanatiklik Düzeylerinin İncelenmesi. İnönü Üniversitesi Eğitim Fakültesi Dergisi, 19(3), 738-748.

International Journal of Progressive Education, Volume 15 Number 4, 2019

The Predictive Relationships between the Social Media Addiction and Social Anxiety, Loneliness, and Happiness

Önder Baltacı [i]
Ahi Evran University

Abstract

The purpose of this study is to examine how well university students' social anxiety, happiness and loneliness levels explain their levels of social media addiction. The research was designed as a correlational survey model. The research group consisted a total of 312 university students, 165 female (53%) and 147 male (47%), attending at a state university in Turkey during the 2017-2018 academic year. The data collected using a Personal Information Form, a Social Media Addiction Scale, a Social Anxiety Scale, the short form of the Oxford Happiness Questionnaire, and the short form of the UCLA Loneliness Questionnaire. Pearson correlation and hierarchical regression analysis were conducted in SPSS to investigate the relationship between students' social media addiction and their social anxiety, happiness, and loneliness levels. The findings showed that there was a positive relationship between students' social media addiction levels and their social anxiety and loneliness levels. On the other hand, there was a negative relationship between students' social media addiction levels and their happiness levels. According to these findings, social media addiction variable significantly predicted by the social anxiety and happiness variables, but it did not significantly predicted by the loneliness variable. The findings were discussed in the light of the relevant literature and recommendations were presented.

Key Words: Social media addiction, social anxiety, loneliness, happiness

DOI: 10.29329/ijpe.2019.203.6

---

[i] **Önder Baltacı**, Dr., Ahi Evran University, Psychological Counseling and Guidance.

Correspondence: baltacionder@gmail.com

INTRODUCTION

Human life and behavior constantly change and as a result various problems arise. One of these problems is addiction. The term *addiction* reminds using chemicals such as alcohol, cigarettes, cannabis, and cocaine (Padwa & Cunningham, 2010). According to Bradley (1990), addiction means that a person becomes dependent on an object or a substance that contains narcotic components. Although addiction has traditionally been treated as a condition that can only be caused by psychoactive substances, in recent years, it has been shown that ordinary habits and activities can lead to addiction. For instance, excessive eating, gambling, internet use, shopping and sex can cause similar problems that alcohol, drugs, and psychoactive substances cause (Padwa & Cunningham, 2010). Whether video games, internet use, and exercise should be considered as addiction become the subject of discussions in social networks (social media) (Griffhits, Kuss & Demetrovics, 2014).

Together with the technological developments, social media has become a part of our lives. Social media can be defined in general as tools and groups formed by these tools that people use to share their thoughts, life experiences, perceptions, attitudes, music, video, and photographs (Lai & Turban, 2008). Social media provides users with many possibilities such as creating and sharing information, establishing and improving relationships (Kwon & Wen, 2010). Social media can be defined as online environments accessed via internet that individuals use when they want to share their instantaneous thoughts and feelings and even their behaviors with others by means of photos and videos. Social media should be evaluated in the context of internet addiction because it is an internet application and can be used over internet.

Social media, especially for youths, provides easy and fast access to real-time activities such as various events, visual sharing, and chatting. Youths spend most of their time on social media, updating their contacts and status (Fox & Moreland, 2015). The increase in the popularity of social media and becoming dependent on the virtual structure of these social networks leads to an increase in the number of individuals with negatively affected lives by being isolated from real life and individuals with damaged relationships (Eliphinston & Noller, 2011). Social media applications have been widely used with the emergence of interactive web technologies, and the overuse of these applications cause addiction problems (Andreassen, Torsheim, Brunborg & Pallesen, 2012).

Şahin and Yağcı (2017) define social media addiction as having various psychological, physical, and social problems that occur in every age group of individuals who spend excessive time in social media and consequently having problems in fulfilling their personal, social, educational, and professional responsibilities. When the reasons behind social media addiction are evaluated, these reasons behind it show similarities with other addictions. Excessive use of social networks can cause serious problems especially for young individuals, and individuals who addicted to these networks show symptoms similar to those who experience drug addiction or other behavioral addictions (Echeburúa & Corral, 2009; Kuss & Griffiths, 2012).

Social anxiety is a condition in which an individual is hesitated to talk in front of a society, meeting with a new person or being introduced to a person, worrying when he needs to talk to an authorized person, and even the individual is disturbed by thinking about these situations (Baltacı, 2010; Baltacı & Hamarta, 2013). Individuals who have difficulty in expressing themselves in social environments express themselves more easily on internet. It is seen that youths tend to avoid from socially worrying environments and try to exist in social networks (Morahan-Martin & Schumacher, 2000). It is reported that socially anxious individuals use internet for social interaction (Peter, Valkenburg & Schouten, 2006). Caplan (2007) explains this situation with the term *privacy*, which is one of the fundamental features of internet. Individuals perceive less risk when they communicate using virtual environments rather than face to face communications. It is emphasized that social anxiety is related to internet addiction, problematic internet use, and social media addiction (Doğan & Tosun, 2016; Ko, et al., 2012; Rosenthal, 2009; Yen, et al., 2012; Yılmaz, Şar & Civan, 2015). Therefore, social anxiety is thought to be an important predictor of the social media addiction.

Individuals who have fear of being away from social media report feeling loneliness when they spent time not using social media (Dossey, 2014). Loneliness is an emotion that can be seen in almost every period of individual's lives. Individuals feel loneliness when they need the support of a social group in which they perceive sincerity and security but do not belong such a group, or if they cannot do so because they do not have the maturity to establish appropriate social relationships with others. Loneliness is an indication of there are important shortcomings in the social relations of an individual, in other words, a clue that points out some things are going wrong (Batıgün, 2008). While Primack et al. (2017) defined loneliness as a risk factor for the social media addiction, Vendor (2018) stated that social media addiction cause loneliness. Loneliness and social anxiety lead to internet addiction (Hardie & Tee, 2007). In addition, social anxiety also mediates the relationship between loneliness and internet addiction (Caplan, 2007). On the other hand, happiness is a condition in which individuals frequently have more positive emotions and less negative emotions and receive high satisfaction from their experiences (Doğan & Sapmaz, 2013). According to Seligman and Csikszentmihalyi (2000), there are many concepts that may be related to happiness, and these concepts should be investigated. Happiness is found to be related with problematic internet use (Baltacı, Sırakaya, & Dansız, 2017), facebook addiction (Uysal, Seller, & Akin, 2013), and social media use (Colak & Dogan, 2016; Pittman & Reich, 2016) and reported to be predicting these concepts.

Although the negative use of technological developments causes problems at every age level, youths are the significant group at risk. Moreover, university students are emphasized to be one of the important groups under abuse of technology (Pawlowska, et al., 2015). In this period of their lives, university students face many problems due to blending into a new social environment, academic studies, financial problems, and lacking family support due to the separation. Therefore, it is important to investigate what kinds of choices youths choose to escape from these problems and what types of psychosocial variables leads to these choices. Hence, it is important to determine the relationships between the social media addition and social problems that university students face in their social environments, their perception of happiness and loneliness. It is thought that investigating these relationships can also shed light on the future studies. In the light of the above information, the purpose of this study is to examine university students' social media addiction levels in terms of social anxiety, happiness and loneliness levels. Thus, the following questions are examined in this study:

(1) Is there a significant relationship between university students' social media addiction and their social anxiety and their happiness and loneliness levels?

(2) Do social anxiety, happiness and loneliness significantly predict university students' social media addiction?

METHOD

In this study, a correlational survey model was used to investigate the relationships between university students' social media addiction and their social anxiety, happiness and loneliness levels. "Correlational survey model are research models aiming to determine the presence and/or degree of coexistence between two or more variables. According to the correlational survey model, the relationships among variables are examined in an existing situation without the intervention of the researcher (Fraenkel ve Wallen, 2006, s. 328).

Participants

The research group consisted a total of 312 university students, 165 female (53%) and 147 male (47%), attending at a state university in Turkey during the 2017-2018 academic year. Students' age ranged between 19 and 25 with a standard deviation of 1.23.

Data Collection Tools

Personal Information Form: The form was developed by the researchers and consisted questions in order to collect participants' socio-demographic information and to collect information and thoughts on their social media usage.

Social Media Addiction Scale - Adult Form (SMAS-AF): The SMAS-AF was developed by Şahin and Yağcı (2017). The scale included 20 items that were written as five-point Likert-type items and could be clustered under two factors (virtual tolerance and virtual communication). Confirmatory factor analysis showed that the two-factor model was fitting the data ($\chi 2$ = 7051.32; *SD* = 190, and p = .00; *RMSEA* = .059; *SRMR* = .060; *NFI* = .59; *CFI* = .96; *GFI* = .90; and *AGFI* = .88). Internal consistency coefficients were calculated as .92 and .91 for virtual tolerance and virtual communication sub-dimensions, respectively. Coefficient of the total internal consistency was .94. The test-retest reliability coefficient of the overall scale was calculated as .93 (.91 for the virtual tolerance and .90 for the virtual communication). The confirmatory factor analysis proved that SMAS-AF was a valid and reliable source in determining the social media addiction among adults.

Social Anxiety Scale (SAS): The scale was developed by Özbay and Palancı (2001) in order to determine the "social anxiety" related problems experienced by university students. The scale, which has been developed for the university students, has been developed in a way that can measure university students' skills that are convenient for social situations and their concerns that may occur in these situations. Factor analysis showed that the scale with three subtests explained 32.9% of the total variance. The Cronbah Alpha value, which shows internal test consistency, was calculated as .89. The scale included Likert-type items with a five-point rating system (0-4). The increment in the scale scores indicated increments in the social anxiety levels.

The Oxford Happiness Questionnaire-Short Form (OHQ-SF): This questionnaire was developed by Hills and Argyle (2002). The questionnaire included eight items and there was a positive correlation (.93, $p < .001$) among 29 items in the original form. The OHQ- SF was translated into Turkish by Doğan and Çötok [30]. As a result of conducting an exploratory factor analysis, a single factor structure was obtained that contained seven items with an eigenvalue of 2.782, and it explained 39.74% of the total variance. The single factor structure of the OHQ-SF was analyzed by conducting a confirmatory factor analysis and goodness of fix indices were calculated as follows: v2/df = 2.77, AGFI = .93, GFI = .97, CFI = .95, NFI = .92, IFI = .95, RMSEA = .074). The internal consistency coefficient of the OHQ-SF was calculated as .74, and the test–retest reliability coefficient was calculated as .85.

The UCLA Loneliness Questionnaire-Short Form (ULS-8): This questionnaire was developed by Russell, Peplau, and Ferguson and was re-organized in 1980 (Russell, Peplau & Cutrano, 1980). The Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted to determine the factor structure of the questionnaire. Moreover, the criterion-related validity and internal consistency were tested. The EFA yielded a single factor that explained 36.69% of the total variance. Next, the CFA was performed in order to verify the previously identified single factor structure of the questionnaire. The CFA revealed that the single factor structure of the questionnaire had a reasonably satisfactory goodness of fit. The correlation between the ULS-8 and the UCLA Loneliness Questionnaire was .88 ($p < .001$). With a Cronbach's Alpha value of .72, the internal consistency of the questionnaire was found to be good. The questionnaire included eight items (six were direct coded and two were reverse coded). In each item of the questionnaire, a condition that stated an emotion or a thought about a social relationship was presented and the individuals were asked to state how often they come across this type of a condition rating on a four-point Likert scale. Higher scores were accepted as a sign of loneliness that was come across very occasionally. In Turkey, the validity and reliability study of the UCLA Loneliness Questionnaire was completed by Doğan, Çötok, and Tekin (2011).

Data Analysis

The data of the study were collected from university students who participated on a voluntary basis during the 2017-2018 academic year. Before the application process, the participants were informed about the purpose of the study and data collection tools, and the application process was carried out by the researchers in regular classroom environments. The collected forms were checked before they were being included in the data analysis process. Hence, 14 incomplete forms were determined and not included in the analysis. The SPSS 21 package program was used to analyze the data. Pearson correlation coefficient was used in determining the relationship between the social media addiction and social anxiety, loneliness, and happiness. Finally, a hierarchical regression analysis was conducted to understand whether independent variables (social anxiety, loneliness, and happiness) predict the dependent variable (social media addiction).

RESULTS

The descriptive statistics, which included mean and standard deviation values, and Pearson correlation coefficients among the independent variables (social anxiety, loneliness, and happiness) and dependent variable (social media addiction) are presented in Table 1.

Table 1. Pearson correlation coefficients and descriptive statistics

Variables	1	2	3	4
1. Social Media Addiction	1			
2. Social Anxiety	.427*	1		
3. Happiness	-0.298*	-0.457*	1	
4. Loneliness	.185*	.506*	-0.453*	1
Arithmetic Mean	53.14	36.6	23.75	12.58
Standard Deviation	12.31	17.22	3.6	3.19
Skewness	.025	.405	-0.303	.633
Kurtosis	-0.600	.278	.041	.120

*$p < .01$

When the results in Table 1 are examined, there was a positive moderate level interaction between the social media addiction and social anxiety (r = .427, $p < .01$) and a positive low level interaction between the social media addiction and loneliness (r = .186, $p < .01$). On the other hand, there was a negative low level interaction between the social media addiction and happiness (r = -.298, p < .01). In order to determine the predictors of the social media addiction, a hierarchical regression analysis was conducted. The results of the analysis are presented in Table 2.

Table 2. The prediction of the social media addiction by the independent variables: Regression analysis results

Predicted Model	B	SH_B	β	t	F	R	R^2	ΔR^2
Constant	41.974	1.485		28.270**	69.080	.427	.182	.180
Social Anxiety	.305	.037	.427	8.311**				
Constant	54.087	5.539		9.765**	37.575	.442	.196	.190
Social Anxiety	.263	.041	.367	6.407**				
Happiness	-0.445	.196	-0.130	-2.269*				
Constant	59.503	6.702		8.879**	25.817	.448	.201	.193
Social Anxiety	.286	.044	.401	6.484**				
Happiness	-0.529	.204	-0.155	-2.589*				
Loneliness	-0.340	.238	-0.088	-1.430				

Dependent Variable: Social Media Addiction; ** $p < .01$; * $p < .05$

When the R^2 values are analyzed in Table 2, it is seen that social anxiety scores explain 18% of the total variance in the first stage [$F_{(1, 310)}$: 69,080; $p < .01$]. In the second stage, including happiness scores in the prediction process, 19.6% of the total variance was explained [$F_{(2, 309)}$: 37.575; $p < .01$]. In the third stage, including loneliness scores in the prediction process, the percentage of the total variance explained was increased at 20% [$F_{(3, 308)}$: 25,817; $p < .01$] ($R^2 = .201$, r = 0.448, $p < .01$). The regression coefficients related to the loneliness (β = -0.088; t = -1,430; $p > .05$) scores in the third stage were not statistically significant. As a result of the hierarchical regression analysis, we found that the most important contribution to the prediction of the social media addiction came from the social anxiety variable (β = .401), followed by the happiness (β = -0. 155) and loneliness variables (β = -0. 088). When the directions of the relationships between variables are examined, we found that students' social anxiety levels positively predicted their social media addiction levels. On the other hand, their happiness and loneliness levels negatively predicted their social media addiction levels. Therefore, as a result of the regression assumption analysis, we can conclude that the model was significantly explaining university students' social media addiction levels because it did not yield multicollinearity and covariation issues, and the error terms were normally distributed (Sipahi, Yurtkoru, & Zinko, 2006).

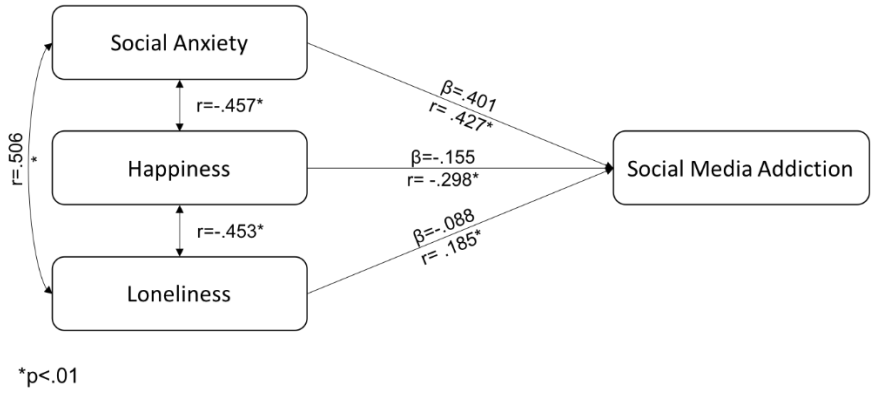


Figure 1: The obtained model that expresses the prediction of the social anxiety, happiness, and loneliness levels of the social media addiction level.

DISCUSSION, CONCLUSIONS, AND SUGGESTIONS

This study investigated whether university students' social anxiety, happiness, and loneliness predicted their social media addiction. The results showed that students' social anxiety and happiness significantly predicted their social media addiction. This result showed similarities with previous studies (e.g., Doğan & Tosun, 2016; Ko, et al., 2012; Rosenthal, 2009; Yen, et al., 2012; Yılmaz, Şar, & Civan, 2015) that suggested a positive relationship between social anxiety and social media addiction and with studies that suggested a negative relationship between happiness and social media addiction (e.g., Baltacı, Sırakaya, & Cansız, 2017; Çolak & Doğan, 2016; Pittman & Reich, 2016; Uysal, Satıcı, & Akın, 2013). Individuals who have difficulty communicating with others in social environments and who choose to establish this type of social interaction using internet tools show characteristics of the social anxiety (Peter, Valkenburg & Schouten, 2006). Baltacı, Sırakaya, and Dansız (2017) reported that happiness significantly predicts university students' problematic internet use. They stated that individuals who are happy in their social environment and do not worry about being evaluated in this environment usually do not search for different online communication tools. Thus, their possibility of being addicted to social media decreases.

In this study, the relationship between loneliness and social media addiction were found to be low. This finding is in line with the studies (e.g., Bonetti, Campbell, & Gilmore, 2010; Bozoğlan, Demirer, & Şahin, 2013; Primack et al., 2017) that found association between loneliness and social

media addiction. However, in this current study, the loneliness variable did not significantly predict the social media addiction. In this study, we also identified a moderate relationship between loneliness and social anxiety and between loneliness and happiness. It is possible that a marginal effect caused by these moderate relationships leads to a decrease in the predictive power of the loneliness variable. When loneliness, which is a psychosocial variable, is analyzed in terms of internet addiction, internet abuse, and social media addiction variables, it is seen that loneliness is both the reason (e.g., Primack et al., 2017) and the result (e.g., Dossey, 2014; Satıcı, 2008) of these addictions. When the regression analysis results were examined, social anxiety and happiness explained 20% of the total variance of the social media addiction. Therefore, social anxiety and happiness have the power for explaining university students' social media addiction. Thus, suggestions for future studies are presented in terms of this context.

The regression model obtained in this study can be tested again in samples with similar characteristics. In addition, the structural equation model (SEM) can be used in order to examine the indirect effects of these independent variables on the dependent variable. Furthermore, a qualitative study can be designed by conducting in-depth interviews with individuals who have social media addiction. In this study, social anxiety and happiness were found to be predictors of the social media addiction. Hence, doing psycho-educational group studies aiming to improve university students' social relations and life skills can make a multifaceted effect on the development of all living spaces. Thus, we suggest that psychological counseling services should disseminate psychological support for university students in order to eliminate their social anxiety related problems.

REFERENCES

Andreassen, C. S., Torsheim, T., Brunborg G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports, 110*(2) 501–517.

Baltacı, Ö. (2010). *Üniversite öğrencilerinin sosyal kaygı, sosyal destek ve problem çözme yaklaşımları arasındaki ilişkinin incelenmesi* [Analyzing the relationship between social anxiety, social support and problem solving approach of university students]. (Unpublished Master's Thesis). Selçuk Üniversitesi Eğitim Bilimleri Enstitüsü, Konya.

Baltacı, Ö., & Hamarta, E. (2013). Analyzing the relationship between social anxiety, social support, and problem solving approach of university students. *Education & Science, 38*(167), 226–240.

Baltacı, Ö., Sırakaya, M., & Cansız, C. (2017) *Problemli internet kullanımı ile mutluluk arasındaki ilişkinin incelenmesi*. Paper presented at the second INES Academic Research Congress, Alanya/Turkey.

Batıgün, A. (2008). İntihar olasılığı ve cinsiyet: İletişim becerileri, yaşamı sürdürme nedenleri, yalnızlık ve umutsuzluk açısından bir inceleme. *Türk Psikoloji Dergisi, 23*(62), 65–75.

Bonetti, L., Campbell, M. A., & Gilmore, L. (2010). The relationship of loneliness and social anxiety with children's and adolescents' online communication. *Cyberpsychology, Behavior, and Social Networking, 13*, 279–285.

Bozoglan, B., Demirer, V., & Sahin, I. (2013). Loneliness, self-esteem, and life satisfaction as predictors of internet addiction: a cross-sectional study among Turkish university students. *Scandinavian Journal of Psychology, 54*, 313–319.

Bradley, P. B. (1990). Behavioral addictions: Common features and treatment implications. *British Journal of Addiction, 85*, 1417–1419.

Caplan, S. E. (2007). Relationship among loneliness, social anxiety, and problematic internet use. *Cyberpsychology, Behavior, and Social Networking, 10*, 239–242.

Çolak, T. S., & Doğan, U. (2016). Does the use of social media ensure social support and happiness? *International Online Journal of Educational Sciences, 8*(4), 229–240.

Doğan, T., & Sapmaz, F. (2012). Oxford mutluluk ölçeği Türkçe formunun psikometrik özelliklerinin üniversite öğrencilerinde incelenmesi. *Düşünen Adam Psikiyatri ve Nörolojik Bilimler Dergisi, 25*, 297–304.

Doğan, T., & Çötok, A. N. (2011). Oxford mutluluk ölçeği kısa formunun Türkçe uyarlaması: Geçerlik ve güvenirlik çalışması [Adaptation of the short form of the oxford happiness questionnaire into Turkish: A validity and reliability study]. *Türk Psikolojik Danışma ve Rehberlik Dergisi, 4*, 165–172.

Doğan, U., & Tosun, N. İ. (2016). Lise öğrencilerinde problemli akıllı telefon kullanımının sosyal kaygı ve sosyal ağların kullanımına aracılık etkisi. *Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 8*(22), 99–128.

Doğan, T., Çötok, N. A., & Tekin, E. G. (2011). Reliability and validity of the Turkish Version of the UCLA Loneliness Scale (ULS-8) among university students. *Procedia Social and Behavioral Sciences, 15*, 2058–2062

Dossey L. (2014). FOMO, digital dementia, and our dangerous experiment. *Explore: The Journal of Science and Healing, 2*(10), 69–73.

Echeburúa, E., & de Corral, P. (2009). *Addiction to new technologies and to online social networking in young people: A new challenge*. *Adicciones, 22(2),* 91-5.

Elphinston, R. A., & Noller, P. (2011). Time to face it! Facebook intrusion and the implications for romantic jealousy and relationship satisfaction. *Cyberpsychology, Behavior, and Social Networking, 14*(11), 631–635.

Fox, J., & Moreland, J. J. (2015). The dark side of social networking sites: An exploration of the relational and psychological stressors associated with Facebook use and affordances. *Computers in Human Behavior, 45*, 168–176.

Fraenkel, J. R., & Wallen, N. E. (2006). *How to Design and Evaluate Research in Education*. New York: McGraw-Hill.

Griffiths, M. D., Kuss, D. J., & Demetrovics, Z. (2014). Social networking addiction: An overview of preliminary findings. *Behavioral addictions: Criteria, evidence and treatment*, 119–141.

Hardie, E., & Tee, M. (2007). Excessive Internet use: The role of personality, loneliness and social support networks in Internet addiction. *Australian Journal of Emerging Technologies & Society, 5*, 34–47.

Hills, P., & Argyle, M. (2002). The Oxford happiness questionnaire: A compact scale for the measurement of psychological well-being. *Personality and Individual Differences, 33*, 1073–1082.

Ko, C. H., Yen, J. Y., Yen, C. F., Chen, C. S., & Chen, C. C. (2012). The association between internet addiction and psychiatric disorder: A review of the literature. *European Psychiatry, 27*, 1–8.

Kuss, D. J., & Griffiths, M. D. (2012). Internet and gaming addiction: A systematic literature review of neuroimaging studies. *Brain Sciences, 2*(3), 347–374.

Kwon, O., & Wen, Y. (2010). An empirical study of the factors affecting social network service use. *Computers in Human Behavior, 26*(2), 254–263.

Lai, L. S., & Turban, E. (2008). Groups formation and operations in the Web 2.0 environment and social networks. *Group Decision and Negotiation, 17*(5), 387–402.

Morahan-Martina, J., & Schumacher, P. (2000). Incidence and correlates of pathological internet use among college students. *Computers in Human Behavior, 16*, 13–29.

Özbay, Y., & Palancı, M. (September, 2001). *Sosyal kaygı ölçeği: Geçerlik güvenirlik çalışması.* Paper presented at the Sixth Ulusal Psikolojik Danışma ve Rehberlik Kongresi, ODTU, Ankara.

Padwa, H., & Cunningham, J. (2010). *Addiction: A Reference Encyclopedia.* California: Greenwood Publishing.

Pawlowska, B., Zygo, M., Potembska, E., Kapka-Skrzypczak, L., Dreher, P., & Kedzierski, Z. (2015). Prevalence of Internet addiction and risk of developing addiction as exemplified by a group of Polish adolescents from urban and rural areas. *Annals of Agricultural and Environmental Medicine, 22*(1), 129–136.

Peter, J., Valkenburg, P. M., & Schouten, A. P. (2006). Friend networking sites and their relationship to adolescents' well-being and social self-esteem. *CyberPsychology, Behavior, and Social Networking*, 9, 584–589.

Pittman, M., & Reich, B. (2016). Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words. *Computers in Human Behavior, 62*, 155–167.

Primack, B. A., Shensa, A., Sidani, J. E., Whaite, E. O., Lin, L. Y., Rosen, D., et al. (2017). Social media use and perceived social isolation among young adults in the US. *American Journal of Preventive Medicine, 53*(1), 1–8.

Rosenthal, J. (2009). *The effect of internet use and treatment sought in individuals diagnosed with social phobia* (Doctoral dissertation). Walden University, United State of America.

Russell, D., Peplau, A., & Cutrano, C. E. (1980). Concurrent and discriminant validity evidence for the UCLA Loneliness Scale. *Journal of Personality and Social Psychology, 39*, 462–475.

Satıcı, S. A. (2018). Facebook addiction and subjective well-being: A study of the mediating role of shyness and loneliness. *International Journal of Mental Health and Addiction*, 1–15.

Seligman, M., & Csikzentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist, 55*, 5–14.

Şahin, C., & Yağcı, M. (2017). Sosyal medya bağımlılığı ölçeği- yetişkin formu: Geçerlilik ve güvenirlik çalışması. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi (KEFAD), 14*(1), 523–538.

Uysal, R., Satici, S. A., & Akin, A. (2013). Mediating effect of Facebook® addiction on the relationship between subjective vitality and subjective happiness. *Psychological Reports, 113*(3), 948–953.

Yen, Y. Y., Yen, C. F., Chen, C. S., Wang, P. W., Chang, Y. H., & Ko, C. H. (2012). Social anxiety in online and real-life interaction and their associated factors. *CyberPsychology, Behavior, and Social Networking, 15*(1), 7–12.

Yılmaz, G., Şar, H., & Civan, S. (2015). Investigation of adolescent mobile phone addiction by social anxiety effect of some variable. Online *Journal of Technology Addiction & Cyberbullying, 2*(1), 20–37.

Sipahi, B., Yurtkoru, S. E., & Çinko, M. (2006). *Sosyal Bilimlerde SPSS'le Veri Analizi.* İstanbul: Beta Basım.

International Journal of Progressive Education, Volume 15 Number 4, 2019

Exploring Pre-Service Teachers' Pedagogical Beliefs in Primary Education*

Çiğdem Şahin Taşkın [i]
Çanakkale Onsekiz Mart University

Abstract

Considerable research emphasized that pre-service teachers enter teacher education programs with beliefs about teaching and learning and relate their beliefs to the experiences they gained through their previous studies. Then, their pre-existed beliefs have been shaped through the teacher education. Therefore, understanding pre-service teachers' pedagogical beliefs plays an important role in their professional development. The purpose of this research is to understand pre-service teachers' pedagogical beliefs in primary education in Turkey. Pedagogical Beliefs Scale developed by the author is used in order to understand their pedagogical beliefs. Scale development included data from 553 pre-service teachers. To understand primary pre-service teachers' pedagogical beliefs, data gathered from 310 primary pre-service teachers. Findings revealed that majority of the pre-service teachers hold constructivist beliefs. Although there is no statistically significant difference among the primary pre-service teachers regarding the year they enrolled, statistically significant difference found in favour of female pre-service teachers. Findings of this research revealed that pre-service teachers hold compatible pedagogical beliefs with the demands of the primary curriculum in Turkey.

Keywords: Pedagogical beliefs, pre-service teachers, scale development, teacher education

DOI: 10.29329/ijpe.2019.203 .7

---

* I would like to thank the Scientific and Technological Research Council of Turkey (TUBITAK) for sponsoring this research (project number 112K321). I also would like to thank to Dr. Victoria Whitington, University of South Australia, for helping me with the English translation of the Pedagogical Beliefs Scale.

[i] **Çiğdem Şahin Taşkın**,Prof. Dr., Çanakkale Onsekiz Mart University, Department of Primary Education.

Correspondence: csahin@comu.edu.tr

INTRODUCTION

Understanding teachers' and pre-service teachers' beliefs has been the subject of educational research for many years (Pajares, 1992; Calderhead, 1996). Beliefs are defined as disposition to action and measure determinants of behaviour (Brown & Cooney, 1982). More specifically, Nespor (1987) indicated that beliefs involve moods, feelings, emotions and subjective evaluations and therefore they are of great importance in defining teaching tasks and organizing the knowledge and information relevant to those tasks. Nespor (1987) further explained that beliefs help to make sense of the context and environment within teachers work and problems they encounter. Therefore, beliefs play an important role in teaching. A substantial body of research pointed out that teachers' beliefs influence their teaching practices (Fang, 1996; Kagan 1992; Pajares, 1992). For example, Pajares (1992) stated that teachers' perceptions and judgments are affected by their beliefs, which in turn influence their teaching practices. In order to understand teaching comprehensively, research has also focused on pre-service teachers' beliefs and indicated that beliefs play a significant role in pre-service teachers' future practices (Lee, 2015). Kagan (1992) expressed that pre-service teachers hold already well-established beliefs about teaching and learning when they enter teacher education programs and these beliefs have also been shaped through their education. Besides, Richardson (2003) considered pre-service teachers' beliefs as important in two ways. Firstly, she claimed that beliefs are considered as the focus of change in teacher education program. Secondly, since pre-service teachers already hold beliefs when they enter teacher education programs, beliefs are important in the way that pre-service teachers make sense of what they are studying through their existing beliefs within a constructivist conception of learning.

Since 1980s, there is a shift in our understanding of learning from traditional to constructivist learning. In constructivism, the learner is required to make sense the information actively as well as use her/his experiences and make meaning from it (Maccallum, Hargreaves, & Gipps, 2000). However, in traditional approach direct instruction is important. Accordingly, many researchers expressed the differences in traditional and constructivist teaching and learning process (Kim, 2005; Lord, 1999). Thus, constructivism became an underlying theme of educational reform movements in Turkey as well as throughout the world.

In the 2005-2006 academic year a constructivist curriculum was introduced in primary education in Turkey. Then, secondary and high school curriculums were gradually developed. Through these alterations, some changes have also been made in teacher education programs in 2006. These changes included the following issues: Programs were arranged as % 50-60 subject knowledge courses, % 25-30 pedagogy courses and % 15-20 cultural courses. Higher education Council [HEC] is responsible for the structure of teacher education system as well as the university system in Turkey. Until 2006, the length of the programs, the number of credits, titles of courses, and a summary of the content of the courses were the same in all teacher education faculties in Turkey. However, after 2006, the faculties are given opportunities to change and modify the courses up to % 30. Researchers conducted research to understand the reflections of constructivist approach in teacher education courses regarding pre-service teachers' views pointed out that although traditional lecture methods were generally employed in the courses, cooperative group studies are performed on occasion and their previous knowledge about the subjects are examined, teaching methods supports pre-service teachers development of thinking skills are used (Cengizhan & Tanrıseven, 2011). Furthermore, they claimed that books reflecting different perspectives are used occasionally in pedagogy and subject knowledge classes; and course contents are modified regarding the interest, expectations and needs of the pre-service teachers.

As pedagogical beliefs involve beliefs about teaching and learning, exploring them is of great importance not only to understand to what extent teachers implement the changes suggested by these reform movements but also to understand the way they make sense of the context and environment in which they work. Besides, regarding pre-service teachers, understanding pedagogical beliefs will also help us to define how they make sense of their studies through their existing beliefs.

Pedagogical Beliefs

Pedagogical beliefs refer to beliefs about teaching and learning (Lim, 2008; Ertmer, 2005). Atweh and Abadi (2012) described pedagogical beliefs as 'what teachers deem to be important in planning and implementing teaching for effective learning experiences in the classroom' (p.325). Similar to this explanation, Chai (2010) identified pedagogical beliefs as preferred ways of teaching by teachers. Reviewing the literature revealed that pedagogical beliefs are classified by researchers under the two headings as traditional and constructivist (Calderhead, 1996; Entwistle Entwistle, Skinner, Entwistle & Orr, 2000; Snider & Roehl, 2007, Chai, 2010). Many researchers agree that teachers hold traditional beliefs about teaching and learning are more likely to consider their students as passive recipients, give them little responsibility for their own learning (Duffy & Jonassen, 1992) and have the control of the flow of the lesson (Sing & Khine, 2008). In contrast to this, teachers hold constructivist beliefs tend to conduct lessons in which students construct knowledge through their own experiences (Chai, 2010). Besides, Chai and Khine (2008) also indicated that although we examine pedagogical beliefs under these two headings, in reality, teachers often hold mixed beliefs. Since teachers' decisions based on their pedagogical beliefs influence the effectiveness of teaching and learning (Lim & Chai, 2008); understanding pre-service and in-service teachers' beliefs about pedagogical knowledge is of great importance.

Research Aims

The aim of this research is to understand the pedagogical beliefs of primary pre-service teachers. Regarding this aim the research questions are stated as follows:

- What are the primary pre-service teachers' pedagogical beliefs?
- Are there any differences between primary pre-service teachers' pedagogical beliefs regarding gender?
- Are there any differences between primary pre-service teachers' self-efficacy beliefs regarding their grades?

Data Analysis

A quantitative research approach was used in this study. Data are collected through the Pedagogical Beliefs Scale developed by the author. Statistical Package for Social Sciences (SPSS) 21.0 was used in order to analyse the data collected through the Pedagogical Beliefs Scale. To understand pre-service teachers' pedagogical beliefs descriptive statistics are employed. independent sample t test was used to compare pre-service teachers' pedagogical beliefs regarding gender. Anova test was performed to understand if there are any differences pre-service teachers' pedagogical beliefs regarding the year they enrolled.The aims and procedures of this research were approved by the university's Ethical Committee for Social and Educational Sciences.

Participants

For the scale development, participants involved 553 primary pre-service teachers from one of the state universities in Turkey. Data collection process were held during the 2012–2013 academic year. First of all, aims and procedures of the research were fully explained to the pre-service teachers including the information that non-participants would not be disadvantaged. To understand pre-service teachers' pedagogical beliefs the scale administered primary 313 pre-service teachers during the 2014-2015 academic year.

Development of the Pedagogical Beliefs Scale

Construction of the Scale

An extensive literature review was undertaken for generating an item pool. First of all, the scale was conceptualized through considering the definition of pedagogical beliefs. During this conceptualization, teaching-learning process including assessment and the issue of being a good teacher are taken into consideration.

As indicated above, pedagogical beliefs show teachers' preferred ways of teaching and they are most of the time associated with traditional and constructivist models of learning. In constructivist model, learning is described as a 'learner's active continuous process of constructing and reconstructing his or her conceptions of phenomena' (Tynjala, 1999: 364). Kim (1993 cited in Kim, 2005) indicated that many constructivist researchers accept that learners' experiences are of great importance in constructing knowledge and learning is internalized through the learner's constructive process in nature. Thus, knowledge is defined as the personal understanding of the outside world and learning is an active process of meaning making. Therefore, learners' perspectives become important in constructivism. Most of the constructivists also emphasized the importance of cooperative learning, problem solving, learning situation have to resemble real life situations (Loyens & Gijbels, 2008). In contrast to constructivism, traditional model requires direct teaching in which students are seen as passive recipients and mostly engaged in a seat work, drill and practice (Gipps, McCallum, & Hargreaves, 2000). However, constructivism is considered as an effective learning theory as opposed to traditional learning by many countries all over the world. As a result of this, collaboration and active participation of students are some of the essential characteristics of constructivist learning. Constructivism also proposes that meaning is constructed by individuals' experience. This reveals that context in which learning occurs should also be considered when creating a constructivist learning environment. In parallel to these developments, traditional assessment is also criticised for considering rote learning and turning students into passive learners (Hart, 1994). Thus, alternative assessment becomes important. Alternative assessment suggested not only using the alternative forms of assessment but also an alternative use of an assessment as a part of the learning process (Gipps & Stobart, 2003). Therefore, since pedagogical beliefs involve beliefs about teaching and learning, assessment is also considered as a part of teaching-learning process. For this reason, the issue of assessment is taken into account for this scale.

Harden and Crosby (2000) defines that a good teacher is a teacher who helps students to learn. Nevertheless Korthagen (2004) stated that although there is a difficulty of putting the essential qualities of a good teacher into words, many attempts are being made to describe these qualities and they are strongly supported by policy makers. Since constructivist model of learning is widely accepted by policymakers throughout the world, our understanding of being a good teacher has also been changed. For example, regarding constructivism, a good teacher should facilitate learning in which students actively make meaning of the information through interacting with it rather than teaching them directly (Gipps, McCallum, & Hargreaves, 2000). This entails a change in teachers' role in which a good teacher should elicit students' ideas and experiences and then elaborate on or restructure their current knowledge (Windtschitl, 2002) rather than should know everything and being a dispenser of knowledge (Holt-Reynolds, 2000). Besides, researchers as well as policy makers and parents identified characteristics of good teachers and they emphasized that a good teacher loves children, and should have lots of experience for caring children (Howes, Whitebook, & Phillips, 1992). These features are also considered as important issues influence teaching-learning process. Therefore, they are also covered in the scale.

Regarding the analysis above, it could be stated that pedagogical beliefs cannot be understood in depth only through considering the conceptions of teaching and learning on its own. In order to have an adequate understanding of teachers' pedagogical beliefs, the relevant aspects of pedagogical beliefs such as features of teachers and assessment should also be taken into account.

Item Development

The initial item pool was created through a comprehensive review of the literature. At this phase, including all content relevant to the construct was considered as important. Thus, 32 items that reflected teachers' pedagogical beliefs were generated. The preliminary item list was sent to 4 professional educators. They were asked to rate the preliminary 32 items according to the importance of each statement in assessing teachers' pedagogical beliefs and the clarity of the items. Most of the items were rated as high. Nevertheless, 3 items were deleted due to the redundancy from the list and 5 items were reorganized regarding the expression. Then, these items were given to 12 pre-service teachers who are in their final year. They were also asked to reflect on the items regarding the expression. This enabled the researcher to avoid academic wording and increased the items' clarity. Then, some of the items were also modified according to the student teachers' reflection. Thus, 29 items were chosen for a final item pool. 5-point likert-type scale ranging from 1 (strongly disagree) through 5 (strongly agree) are used to rate the responses to the items. The means were organized as follows: (5–1=4, 4/5=0.80) as 1.00–1.80, strongly disagree; 1.81–2.59, disagree; 2.60–3.39, neither agree nor disagree-undecided; 3.40–4.19, agree and 4.20–5.00, strongly agree.

Procedure

Exploratory Factor Analysis (EFA) was conducted in order to explore the dimensionality of the measure. First of all, in order to understand whether the data is suitable for factor analysis, Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy and Barlett's chi-square test of sphericity were used. KMO value varies between 0 and 1. When values approach 1, the data is considered as relatively reliable (Kaiser, 1974). Hutcheson and Sofroniou (1999) interpret KMO statistics as below: values between .7 and .8 are considered as middling, values between .8 and .9 are considered as meritorious and values over .9 are accepted as marvelous. Then, EFA was employed in order to establish the construct validity of the instrument. Thus, the numbers of factors underlying the items were determined. Principal component method and varimax rotation was used in the factor analysis. Confirmatory Factor Analysis (CFA) was also employed in order to verify the factor structure extracted through the EFA. A combination of fit indices were used in determining the how well the model fits the sample data. Goodness of fit indicators used in this research to assess the model involves Comparative Fit Index (CFI), Goodness-of-Fit statistic (GFI), Adjusted Goodness-of-Fit statistic (AGFI), Root Mean Square Residual (RMR), Standardized Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA) and relative Chi-square ($\chi 2/df$). Recommended values for CFI, GFI and AGFI > 0.95 (Hu and Bentler, 1999); RMR smaller the better, SRMR <.08 (Hu and Bentler, 1999), RMSEA < 0.07 (Steiger, 2007) and $\chi 2/df$ >2.00 (Tabachnick and Fidell, 2007).

Exploratory Factor Analysis

The EFA was performed with an initial item pool of 29 items to identify the most valid items and factors in the scale. Before employing EFA, a Barlett's sphericity test and KMO measure of sampling adequacy were performed. The Barlett's test of sphericity was significant ($\chi 2$=5,506E3, df=406, p<0.001) and KMO was 0.95. These results indicated that the data is suitable for factor analysis. Then, EFA using principal component analysis with varimax rotation was employed to clarify the structure of the scale (n=553). During the analysis eigenvalue greater than 1 and factor loadings greater than 0.4 were considered as criterions to delete items. The analysis yielded a three factor solution and they accounted for 39.59 % of the total variance. Through the EFA the initial 29 items were reduced to 22 items. During the item development, the issue of assessment is considered under the learning− teaching process. Therefore, the scale is constructed under the two headings: 'Learning − Teaching Process' and 'Being a Good Teacher'. However, the analysis suggested to consider the items related the assessment as a separate dimension rather than considering under the 'Learning-Teaching Process' subscale. Thus, three factors were retained and they were named as 'Learning−Teaching Process', 'Being a Good Teacher' and 'Assessment' (Table1).

Table 1. Factor Loadings of Pedagogical Beliefs Scale

Item	Learning–Teaching Process	Being a Good Teacher	Assessment
ITEM17	,783		
ITEM12	,775		
ITEM16	,771		
ITEM23	,768		
ITEM22	,746		
ITEM 13	,717		
ITEM 19	,715		
ITEM 24	,703		
ITEM 15	,686		
ITEM 11	,670		
ITEM 4	,658		
ITEM 18	,596		
ITEM 28	,594		
ITEM 8	,569		
ITEM 21	,565		
ITEM 5	,531		
ITEM 1		,687	
ITEM 3		,582	
ITEM 2		,534	
ITEM 29			,616
ITEM 20			,583
ITEM 6			,522

Reliability of the Pedagogical Beliefs Scale

Cronbach's α coefficient for the total score of the scale is calculated as .90. Cronbach's α calculated for the Teaching-Learning Process subscale as .93; the Teacher Quality subscale as .77 and Assessment subscale as .70. These results indicated the high degree of internal consistency of the scale. Furthermore, in order to examine test–retest reliability, a subsample (n=120) of the total respondents was randomly selected and asked to complete the same scale 8 weeks later. The analysis revealed that the test–retest reliability of the scale was r=0,708 p=0,001.

Confirmatory Factor Analysis

CFA was conducted using Lisrel 9.1. All model fit indices were evaluated through using multiple criteria as stated earlier. The results of the initial measurement model indicated an acceptable model fit (CFI=0.92, GFI=0.91, AGFI=0.88, RMR=0.038, SRMR=0.049, RMSEA=0.065, x^2/df= 3.36). However, a close examination of the initial measurement revealed that Item 6 had the low factor loading (0.37). Therefore, Item 6 has removed from the analysis. Besides, Item 4 has a relation with the Being a Good Teacher factor and Item 28 has a relation with the Assessment factor. For this

reason, another CFA in which Item 4 and Item 28 were considered under the stated factors was performed to see if it would result in a better model. According to the analysis goodness of fit indicators are determined as CFI=0.96 GFI=0.95 AGFI=0.92 RMR=0.29 SRMR=0.039 RMSEA= 0.061 x^2/df= 2.61. In sum, the CFA analyses suggested that the final version of the model more accurately represents the data than previous model. Thus, the final version of the model comprises 21 items and consists of three subscales (Table 2).

Table 2. Pedagogical Beliefs Scale

Factor 1. Teaching-Learning Process	
Item 1	In the learning and teaching process, the teacher needs to establish students a connection with real life in order to improve the level of long term retention.
Item 2	To enhance learning teachers should provide activities in which students use their five senses.
Item 3	Students' individual differences must be considered by teachers in the learning and teaching process.
Item 4	When students cooperate with their teachers and other students learning is more effective.
Item 5	Teachers' effective communication with students is the most significant factor in providing an effective learning and teaching environment.
Item 6	Teachers should be able to look at their subject materials from different angles and could explain the subject in different ways.
Item 7	When teachers enable their students to engage with real life problems and help them to solve these problems, learning is enhanced.
Item 8	Students' strengths and limitations should be taken into consideration by teachers for assessment to be effective.
Item 9	When teachers encourage students to interpret information through using their background knowledge, learning is more effective.
Item 10	Teachers should create a relaxing and fun classroom environment.
Item 11	The natural and social environment where student live should be considered in the selection of subject matter.
Item 12	Using teaching methods and techniques effectively is the most important feature of a good teaching.
Item 13	One of the most important duties of a teacher is to set up the classroom environment so that it facilitates learning.
Item 14	Students learn best when they actively participate in lessons.
Factor 2. Being A Good Teacher	
Item 15	Teachers should know everything.
Item 16	Being a good teacher requires a lot of experience.
Item 17	Good teachers mostly rely on their intuitions.
Item 18	Good teachers should love their profession.
Factor 3. Assessment	
Item 19	Assessment should focus on an acquired behaviour at the end of the learning process rather than students' individual development.
Item 20	When a student chooses the assessment method, this improves its effectiveness.
Item 21	Students' own interest should be taken into consideration in the assessment process.

Findings of the Pedagogical Beliefs Scale

The pre-service teachers' scores of the Pedagogical Beliefs Scale were analyzed by utilizing descriptive statistics (Table 3).

Table 3. Descriptive Statistics of Pedagogical Beliefs Scale

Scale/Factors	N	Min.	Max	x̄	SD
Pedagogical Beliefs Scale	313	1,95	5,00	4,24	0,39
Teaching-Learning Process	313	1,95	5,00	4,25	0,39
Being a Good Teacher	313	1,50	5,00	3,67	0,68
Assessment	313	1,33	5,00	3,87	0,71

The analysis indicated that pre-service teachers have high pedagogical beliefs towards constructivism. Examining the results showed that Teaching Learning Process subscale received the highest ($\overline{X}$=4.28 SD=0.39) and Being a Good Teacher subscale received the lowest ($\overline{X}$=3.67 SD=0.68) means. This revealed that although pre-service teachers have relatively low pedagogical beliefs in understanding of being a good teacher, their pedagogical beliefs were the highest for the teaching learning process such as they believe that students learn best when they actively participate in lessons and establishing students a connection with real life in order to improve the level of long term retention.

Independent sample t test was performed in order to compare male and female pre-service teachers' pedagogical beliefs the (Table 4).

Table 4. Comparison of Pre-service Teachers' Pedagogical Beliefs by Gender

Gender	N	M	SD	p	t
Female	254	4,27	0,37	0,01	2,51
Male	59	4,13	0,46		

The analysis above showed that there is statistically significant difference between female ($\overline{X}$ =4.27 SD=0.36) and male ($\overline{X}$=4.12 SD=0.46) pre-service teachers regarding pedagogical beliefs, conditions; t(308)=2.60, p=0.01. This result revealed that female pre-service teachers' pedagogical beliefs are more constructivist than male pre-service teachers.

To understand if there are any differences pre-service teachers' pedagogical beliefs regarding their grades anova test was utilised (Table 5).

Table 5. Anova of Pre-service Teachers' Pedagogical Beliefs by Grades

Source	Sum of Squares	df	Mean Square	F-ratio	p
Between Groups	1,379	5	0,275	1,808	0,109
Within Groups	46,572	307	0,152		
Total	47,950	312			

Anova results revealed that there is no statistically significant difference found among the primary pre-service teachers regarding their grades ($F(5,307)=1.808$, $p=0.109$).

DISCUSSION AND CONCLUSION

Through this research the Pedagogical Beliefs Scale was developed. The scale considers the relevant aspects of pedagogical beliefs that will help us to understand pedagogical beliefs in depth and to ensure valid results. In conclusion, developing the measure of pedagogical beliefs consists of the dimensions above provides a useful scale to explore pre-service teachers' beliefs comprehensively that can also be considered as indicators of teachers' classroom practices.

This research indicated that primary pre-service teachers have high pedagogical beliefs towards constructivism. In Turkey, since 2005-2006 academic year, teachers have been required to use constructivism in primary education during their teaching. Accordingly, teacher training programs also emphasize the importance of constructivism. Therefore, pre-service teachers' emphasis on constructivism regarding pedagogical beliefs is not surprising. Pre-service teachers Teaching Learning Process subscale received the highest and Being a Good Teacher subscale received the lowest means. Teaching Learning Process subscale involves items that express the use of cooperative learning, problem solving, creating a relaxing environment etc. In order to provide an effective teaching-learning process when they become teachers, pre-service teachers have courses such as Teaching Principles and Methods, Classroom Management during their training in Turkey (HEC, 2007). Findings indicated that pre-service teachers' training enables them to develop pedagogical beliefs regarding teaching-learning process that also meet the requirements of the primary curriculum in Turkey (Ministry of National education [MoNE], 2005). However, as stated above, pre-service teachers in this research achieved lowest means regarding the Being a Good Teacher subscale. Examining closely, findings of this research revealed that pre-service teachers' beliefs about Being a Good Teacher scale are at agree level ($\overline{X}$=3.67 SD=0.68). This showed that although pre-service teachers hold relatively low beliefs regarding the qualities of a good teacher compare to other subscales; their beliefs about it are still strong. Korthagen (2004) indicates that when teachers have a clear understanding of these qualities, they can promote reflection in teaching that is also an important issue in teacher education. Since, pre-service teachers' beliefs were deeply rooted in their individual experiences (Bird, Anderson, Sullivan & Swidler, 1992); further research focusing on their individual experiences will help us to understand how can we help them to develop stronger beliefs about being a good teacher. Besides, although many researcher states that beliefs can be considered as indicators of teachers' classroom practices (Johnson, 1999; Pajares, 1992); some researchers also pointed out that there is a mismatch between beliefs and practices (Jorgensen (Zevenbergen), Grootenboer, Niesche & Lerman, 2010; Lopes & Santos, 2013). Therefore, further exploration of pre-service teachers that considers to what extent their beliefs mismatch with their practices should also be taken into considered in future.

The findings also showed that statistically significant difference found in favour of female pre-service teachers regarding pedagogical beliefs. Teaching profession is being considered as a woman's job by researchers (Cruickshank, Pedersen, Hill & Callingham, 2015; De Course & Vogtle; 1997). Furthermore, Sarı & Basarır (2016:220) draw a conclusion from their study that 'male teachers are not sufficiently aware of the multiple roles and responsibilities that their female counterparts have'. Considering this statement, we can say that because of female pre-service teachers are more aware of their responsibilities, they internalize constructivism better than male pre-service teachers. Thus, there is a possibility that this may influence their pedagogical beliefs. Accordingly, this result indicates the importance of gender roles in shaping primary pre-service teachers' beliefs.

The research revealed that there is no statistically significant difference found among the primary pre-service teachers regarding their grades. This indicate the fact that pre-service teachers pedagogical beliefs do not change duration of their degree. Although pre-service teachers showed beliefs in favour of constructivism, the finding reveals that their pedagogical beliefs are not different

regarding their grades is unexpected. However, teacher training programs aims to change pre-service teachers' beliefs (Richardson, 2003). This leads us to two possibilities: either the teacher training program does not influence pre-service teachers' beliefs or since the findings of this study based on the self-report measurements of pre-service teachers' pedagogical beliefs, there is a possibility that pre-service teachers did not give honest responses. In self-report instruments it is important that participants give truthful responses (Korb, 2011). Although the importance of this research was explained to the participants and voluntary participation was taken into consideration, supporting findings of this research through different methods will assure the validity of the research.

REFERENCES

Allen, L. Q. (2010). Teachers' pedagogical beliefs and the standards for foreign language learning, *Foreign Language Annals*, *35*(5), 518–529.

Atweh, B., & Abadi, S. (2012). Investigating teachers pedagogical beliefs in Indonesia and Australia, *Asia-Pacific Education Researcher*, *21*(2), 325–335.

Becker, H. (2000). Findings from the teaching, learning, and computing survey. *Education Policy Analysis Archives*, *8*(51). Retrieved 11 April 2014, from http://epaa.asu.edu/ojs/article/view/442.

Becker, H. J., & Anderson, R. E. (1998). *Teacher's Survey: Combined Versions 1-4*. California: Center for Research on Information Technology and Organizations, University of California.

Bird, T., Anderson, L., Sullivan, B., & Swidler, S. (1992). *Pedagogical Balancing Acts: A Teacher Educator Encounters Problems in an Attempt to Influence Prospective Teachers' Beliefs*. Washington, DC: Office of Educational Research and Improvement.

Brown, C. A., & Cooney, T. J. (1982). Research on teacher education: A philosophical orientation. *Journal of Research and Development in Education*, *15*(4), 13–18.

Calderhead, J. (1996). Teachers: Beliefs and knowledge. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 709–725). New York: Macmillan.

Cengizhan, S. & Tanrıseven, I. (2011). The reflection of Constructivist Approach to Faculty of Education Programs, *1st International Conference on Curriculum and Instruction*, Eskisehir, Turkey.

Chai, C. S. (2010). Teachers' epistemic beliefs and their pedagogical beliefs: A qualitative case study among Singaporean teachers in the context of ICT-supported reforms, *The Turkish Online Journal of Educational Technology*, *9*(4), 128–139.

Chai, C. S., & Khine, M. S. (2008). Assessing the epistemological and pedagogical beliefs among pre-service teachers in Singapore. In M. S. Khine (Ed.), *In Knowing, knowledge and beliefs: Epistemological studies across diverse cultures* (pp. 287–299). Amsterdam, Netherlands: Springer.

Chan, K.W., & Elliott, R.G. (2004). Epistemological beliefs across cultures: Critique and analysis of beliefs structure studies. *Educational Psychology*, *24*(2), 123–142.

Cruickshank, V., Pedersen, S., Hill, A., & Callingham, R. (2015). Construction and validation of a survey instrument to determine the gender-related challenges faced by pre-service male primary teachers. *International Journal of Research & Method in Education*, *38*(2), 184–199.

Duffy, T. M., & Jonassen, D. H. (1992). Constructivism: New implications for instructional technology. In T. M. Duffy & D. H. Jonassen (Eds.), *Constructivism and the technology of instruction: A conversation* (pp. 1–16). Hillsdale, NJ: Lawerence Erlbaum.

De Corse, C. J. B., & Vogtle, S. P. (1997). In a complex voice: The contradictions of male elementary teachers' career choice and professional identity. *Journal of Teacher Education, 48*(1), 37–46.

Entwistle, N., Skinner, D., Entwistle, D., & Orr, S. (2000). Conceptions and beliefs about "good teaching": An integration of contrasting research areas. *Higher Education Research & Development*, *19*(1), 5–26.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: the final frontier in our quest for technology integration? *Educational Technology Research and Development*, *53*(4), 25–39.

Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational Research*, *38*(1), 47–65.

Fessakis, G., & Karakiza, T. (2011). Pedagogical beliefs and attitudes of computer science teachers in Greece, *Themes in Science and Technology Education*, *4*(2), 75–88.

Gipps, C., McCallum, B., & Hargreaves, E. (2000). *What makes a good primary school teacher?* London: Routledge Falmer.

Gipps, C., & Stobart, G. (2003). Alternative Assessment in T. Kellaghan & D.Stufflebeam (Eds), *International Handbook of Educational Assessment* (pp. 549–575). Dordrecht: Kluwer Academic Publishers.

Harden, R. M., & Crosby, J. (2000). AMEE Guide No 20: The good teacher is more than a lecturer-the twelve roles of the teacher, *Medical Teacher*, *22*(4), 334–347.

Hart, D. (1994). *Authentic assessment: A handbook for educators.* Menlo Park, CA: Addison-Wesley.

HEC (2007). Öğretmen yetiştirme ve eğitim fakülteleri (1982-2007). Ankara: Higher Education Council.

Holt-Reynolds, D. (2000). What does the teacher do? Constructivist pedagogies and prospective teachers' beliefs about the role of a teacher. *Teaching and Teacher Education*, *16*(1), 21–32.

Howes, C., Whitebook, M., & Phillips, D. (1992). Teacher characteristics and effective teaching in child care: Findings from the national child care staffing study, C*hild and Youth Care Forum*, *21*(6), 399–414.

Hu, L. & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structural analysis: conventional criteria versus new alternatives. *Structural Equation Modelling*, *6*(1), 1–55.

Hutcheson, G. D., and Sofroniou, N. (1999). *The Multivariate Social Scientist: An Introduction to Generalized Linear Models*. London: Sage Publications.

Jorgensen (Zevenbergen), R., Grootenboer, P., Niesche, R. & Lerman, S. (2010). Challenges for teacher education: The mismatch between beliefs and practice in remote Indigenous Contexts, *Asia Pacific Journal of Teacher education*, *38*(2), 161–175.

Johnson, K. E. (1999). *Understanding Language Teaching: Reasoning in Action*. Boston, MA: Heinle & Heinle Publishers.

Kagan, D. M. (1992). Implications of research on teacher belief. *Educational Psychologist*, *27*, 65–90.

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika 39*(1), 31–36.

Kim, J. S. (2005). The effects of a constructivist teaching approach on student academic achievement, self-concept, and learning strategies, *Asia Pacific Education Review*, 6(1), 7–19.

Korb, K. A. (2011). Self-report questionnaires: Can they collect accurate information? *Journal of Educational Foundations*, 1, 5-12.

Korthagen, F.A.J. (2004). In search of the essence of a good teacher: Towards a more holistic approach in teacher education. *Teaching and Teacher Education*, *20*, 77–97.

Lee, I. (2015). Student teachers' changing beliefs on a pre-service teacher education course in Hong Kong in T. Wright & Baumont, M. (Eds.), *Experiences of Second Language Teacher Education* (pp. 15–41), UK: Palgrave Macmillion.

Lim, C. P., & Chai, C. S. (2008). Teachers' pedagogical beliefs and their planning and conduct of computer-mediated classroom lessons, *British Journal of Educational Technology*, *39*(5), 807–828.

Lim, C. P., & Chan, B. C. (2005). MicroLESSONS in teacher education: Examining pre-service teachers' pedagogical beliefs, *Computers and Education*, *48*(3), 474–494.

Lopes, J. & Santos, M. (2013). Teachers' beliefs, teachers' goals and teachers' classroom management: A study with primary teachers, *Revista de Psicodidáctica*, 18(1), 5–24.

Lord, T. R. (1999). A comparison between traditional and constructivist teaching in Environmental Science, *The Journal of Environmental Science*, *30*(3), 22–28.

Loyens, S. M. M., & Gijbels, D. (2008). Understanding the effects of constructivist learning environments: Introducing a multi-directional approach, *Instructional Science*, *36*, 351–357.

MoNE (2005). *İlköğretim 1–5. Sınıf Programları*, Ankara, Devlet Kitapları Müdürlüğü Basım evi.

Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies*, 19, 317–28.

Ng, W., Nicholas, H., & Williams, A. (2010). School experience influences on pre-service teachers' evolving beliefs about effective teaching. *Teaching and Teacher Education*, *26*, 278–289.

Pajares, M. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, *62*, 307–332 .

Richardson, V. (2003). Preservice teachers' beliefs. In J. Raths & A. McAninch (Eds.), *Teacher beliefs and teacher education. Advances in teacher education* (pp. 1–22.). Greenwich, CT: Information Age Publishers.

Sarı, M. & Basarır, F. (2016). Analayzing teachers' perceptions of female teacher and male teacher within traditional gender roles. *International Journal of Education and Researcher, 4*(3), 205-224.

Seaman, C. E., Szydlik, J. E., Szydlik, S. D., & Bean, J. E. (2005). A comparison of preservice elementary teachers' beliefs about mathematics and teaching mathematics: 1968 and 1998. *School Science and Mathematics, 105*(4), 197–210.

Sing, C.C., & Khine M. S (2008). Assessing the Epistemological and Pedagogical Beliefs Among Pre service Teachers in Singapore. In M.S. Khine (Ed.), *Knowing, knowledge and beliefs. Epistemological studies across diverse cultures* (pp. 287–299). Australia: SpringerVerlag.

Snider, V. E., & Roehl, R. (2007). Teachers' beliefs about pedagogy and related issues, *Psychology in the Schools, 44*(8), 873–886.

Steiger, J.H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. *Personality and Individual Differences, 42*(5), 893–98.

Tabachnick, B. C., & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Boston, MA: Pearson Education, Inc.

Tynjala, P. (1999). Towards expert knowledge? A comparison between a constructivist and a traditional learning environment in the university, *International Journal of educational Research, 31*, 357–442.

Windtschitl, M. (2002). Framing Constructivism in Practice as the Negotiation of Dilemmas: An Analysis of the Conceptual, Pedagogical, Cultural, and Political Challenges Facing Teachers, *Review of Educational Research, 72*(2), 131–175.

Woolley, S. L., Benjamin, W. J. J., & Woolley, A. W. (2004). Construct validity of a self-report measure of teacher beliefs related to constructivist and traditional approaches to teaching and learning. *Educational and Psychological Measurement, 64*, 319–331.

International Journal of Progressive Education, Volume 15 Number 4, 2019

Opinions of Social Studies Candidate Teachers on "Democracy and Citizenship"*

Selda Şan [i]
Ege University

Nurhak Cem Dedebali [ii]
Sinop University

İskender Daşdemir [iii]
Ege University

Abstract

When considered the basis of social studies, it can be seen that citizenship and citizenship-related issues are of vital importance. After the industrial revolution and immigration, education was considered as a solution to keep people together healthily who have serious problems with each other and are from different cultures. Within the context of this solution, raising citizens capable of living in society was aimed and this duty was given to social studies education programs. During the time, different forms and perceptions of citizenship have emerged and expectations of countries/governments from their citizens have changed. In the course of globalization, perceptions and expectations of citizens also have been transformed. In past, raising citizens obeying the state was the aim, today the expectation is to raise citizens who can carry their states, nations and even the world to higher levels and who can criticize, explore, solve problems and develop themselves at a national and universal level. Since human beings have to live together with different cultures and nations, they are expected to respect different ones from themselves and to be loyal to democratic values with a sense of tolerance. Today, the concept of citizenship cannot be considered without democracy and values of democracy. It is also important to reveal what social studies candidate teachers understand from the combination of citizenship and democracy concepts, which have crucial place in the nature of social studies and its education. For this reason, the aim of this research is to reveal the opinions of social studies candidate teachers on democracy and citizenship. This research is carried out using a qualitative research method. Social studies candidate teachers educated at Ege University makes up the study group of this research. In the study, opinions of social studies candidate teachers were received using a questionnaire consisting of open-ended questions.

The research is carried out with 165 participants in total based on a voluntary basis. However, blank and meaningless data is eliminated and thus data of 135 participants is used in total. Data is collected with an open-ended questionnaire and is analyzed using content analysis method. In the result of the research, social studies candidate teachers defined citizenship as duties and responsibilities and they defined democracy rights-liberties and duties-responsibilities when they defined the concepts of democracy and citizenship. It can be said that according to social studies candidate teachers, democracy gives the meaning of rights and liberties to citizenship concept. They expressed a relation between two concepts and mentioned basic values/characteristics of democracy such as equality, justice, tolerance, freedom. However, results of this study demonstrate the necessity of a license program or teacher education program that handles the citizenship with a multi-dimensional and constructivist approach.

Keywords: Social Studies candidate teachers' opinions, democracy, citizenship

DOI: 10.29329/ijpe.2019.203.8

---

*This study was presented as an oral presentation at International Social Studies Education Symposium (USBES) in Kırşehir Ahi Evran University, in 2018.

[i] **Selda Şan**, Res. Assist, Ege University, Faculty of Education, Social Studies Education.

Correspondence: selda.san@ege.edu.tr

[ii] **Nurhak Cem Dedebali**, Assist. Prof. Dr., Sinop University, Education Science, Education Programes and Training.

[iii] **İskender Daşdemir**, Lecturer Dr., Ege University, Education Sciences, Social Sciences and Turkish Education, Social Studies Teacher Education.

INTRODUCTION

Citizenship and democracy are closely related concepts with each other. Democracy constitutes one of the most important values of citizenship and its education. As Ünal &Yıldız (2012) stated, the concepts of citizenship, democracy and human rights cannot be considered separately from democracy and citizenship education.

Definitions of concepts may vary and take different meanings over time. When examined the historical process, the concept of democracy, with the influence of experiences, has gained broader and more extensive definitions depending upon social development (Tunç, 2008; Korkmaz, 2016). Democracy is the use of popular will by public for benefit of public (Gömleksiz, Kan & Öner, 2012). Democracy is also defined as "a form of government based on popular sovereignty, hand power" (Türk Dil Kurumu, 2018). When examined the literature, though in the most general sense democracy is defined as a government regime based on popular sovereignty, it is in fact a government regime based on popular sovereignty whose main characteristics are freedom, justice, equality, tolerance, participation and human rights (Demircioğlu, Mutluer & Demircioğlu, 2011). According to Barro (1996), democracy is a concept that can have an effect on maintaining the rule of law. In fact, one of the questions that can be asked about democracy is whether democracy is a form of state or a type of government; however, one can see that democracy is used in both meanings (Kuçuradi, 1998). As for the concept of citizenship, this dates back to old history, to the debates of Plato and Ariston on "how an Athenian citizen should behave" (Dalton, 2008). Citizenship erodes local hierarchies, statues, and privileges based in principle on equality of rights (Holston & Appadurai, 1996).

As in the example of the concept of democracy, the concept of citizenship, too, has faced with different meanings and definitions. Moreover, it is mentioned with different attributives: effective citizenship, active citizenship, conscious citizenship, good citizenship etc. These concepts are finding their counterparts within each other. In recent years, the concept of conscious citizenship has found its counterparts in "active" or "effective" citizenship concepts (Hablemitoğlu & Mete, 2012). With these concepts, the goal is to educate citizens who assimilate participatory democracy concept and who know their rights and responsibilities and can use them (Atasoy & Koç, 2015). Good citizenship depends upon the abilities of individuals as effective producers and communicators (Mihailidis & Thevenin, 2013). According to this statement, if one wants to be a good and effective citizen, he/she should plant the democracy, grow and harvest it like a farmer. Again according to this expression, he/she, like a good communicator, should be able to display the democracy in his/her actions as he/she does in his/her sayings. In fact, this summarizes the relationship between democracy and citizenship very well.

> *In democracies, citizenship has these meanings: a) Citizenship gives membership statue to individuals in a political unit; b) confers an identity on individuals; c) constitutes a set of values, usually interpreted as a commitment to the common good of a particular political unit; d) involves practicing a degree of participation in the process of political life; and e) implies gaining and using knowledge and understanding of laws, documents, structure, and processes of governance (Abowitz & Harnish, 2006, s.653, as cited in Enslin).*

In the communities governed by democracy, citizens that are faithful to democratic values, human rights and liberties should be raised; and this can be realized through education (Toraman & Gözütok, 2014). The concepts of citizenship, democracy and human rights remain as a whole within citizenship education. Social studies lesson, which has emerged for citizenship education in United States, has the same aim in Turkey's educational system. In Turkey, curriculum for social studies is prepared not with a single-disciplinary educational approach but with an interdisciplinary or even with a multidisciplinary approach. Thus, educating of qualified citizens in terms of national and universal discipline is aimed. According to Keskin & Yüceer (2013), in the framework of social studies programs, knowledge, abilities and values are given to primary school children in accordance with the

citizenship models determined in Turkey and in the world, because curriculums have an important role in building an identity of nation-state or any other identities (İbrahimoğlu & Şan, 2018).

There is a direct relation between social studies and raising effective citizens according to social studies teachers (Kuş & Aksu, 2017). Besides social studies programs; families, neighbors, friends and school life have also an impact on young people to be participative and grown up citizens (Torney Purta, 2002). Despite the fact that individuals are equipped with knowledge, abilities and values, those acquisitions would be vain unless they are not used in social life (Sarı & Sadık, 2011). This situation demonstrates that meanings given to citizenship and democracy could have effects from social environment.

One of the most important values in creating a democratic citizenship model is democracy. As one of the most important parts of citizenship education is the concept of democracy, it will be useful to examine how social studies candidate teachers perceive the relation between these two concepts. For this reason, the aim of current study is to investigate opinions on the concepts of democracy and citizenship of social studies candidate teachers who are responsible for teaching citizenship, human rights and democracy. Because, discovering how social studies teachers or candidate teachers -who wish to develop this education and necessary knowledge, abilities and values- perceive these two concepts and making suggestions according to findings would contribute to academic literature.

In line with this purpose, we sought responses to following sub-questions for the research:

1. How do social studies candidate teachers define the concept of democracy?

2. How do social studies candidate teachers define the concept of citizenship?

3. According to social studies candidate teachers, what are the basic values/characteristics of democracy?

4. According to social studies candidate teachers, how is the relation between democracy and citizenship?

5. According to social studies candidate teachers, what are the characteristics of a good citizen?

METHOD

This research is a qualitative research. Document analysis methods are used within the framework of qualitative research paradigm. Social studies candidate teachers who are educating at 1st, 2nd, 3rd and 4th classes of Ege University, Faculty of Education, Department of Social Studies Teacher Education during 2017-2018 education period and who are volunteer for the research makes up the study group of this research.

Interview, observation and analysis of written documents are the most widely used data collecting methods in qualitative research (Yıldırım, 1999). A questionnaire consisting of six open-ended questions is used as a data collection asset in order to receive opinions of social studies candidate teachers. Three professors' opinions are asked regarding the questions in this form, and in accordance with their views, number of questions is reduced to five. By using this form, our aim is receive opinions of social studies candidate teachers on the concept of democracy and citizenship. In this study, a questionnaire consisting of open-ended questions is chosen in order to be able to receive more participators.

The research is carried out with 165 participants in total based on voluntary basis. However, blank and meaningless data is eliminated and data of 135 participants is used in total. During data analysis phase, content analysis method is used as part of document analysis. Content analysis method

aims to produce impartial and systematic content-based information (Koçak & Arun, 2006). Obtaining concepts and relations that could explain the collected data is essentially targeted in content analysis process (Selçuk, Palancı, Kandemir & Dündar, 2014).

FINDINGS

1. How do social studies candidate teachers define the concept of democracy?

Table 1. Definitions for democracy of social studies candidate teachers

Theme	*Categories*	*Frequencies (f)*
Value		***45***
	Equality	15
	Tolerance	13
	Justice	8
	Freedom	5
	Respect	4
Governance		***75***
	Form of government	33
	Government by representative/public's sovereignty	26
	Fair governance/Ensuring justice	8
	Governance in compliance with law	5
	Participating in state policy/governance	3
Rights and Liberties		***119***
	Equal rights/right to speak	30
	Freedom of expression	24
	Right to elect and to be elected	16
	Living freely/No restriction of freedom	13
	Respect for individual rights and liberties	10
	Using rights freely	7
	Community life in welfare	7
	Protection of rights / Securing rights	6
	Free will	4
	Reducing and removing injustice	1
	Securing freedom	1
Total: 3 Themes	17 Categories	249

When looked at Table 1, democracy definitions of social studies candidate teachers can be reunited under 3 theme and 17 categories. Category of rights and freedom has the highest frequency (119) among the categories of value, governance, rights and liberties. Category of governance has (75) frequency in second rank and category of values has (45) frequency in third rank.

When the categories are directly examined, democracy is defined at first as a value (f45) of equality, tolerance, justice, freedom and respect. Secondly, it is defined as a form of government (f33) under governance title and lastly is defined as a representative governance (f26) under category of freedom.

Under rights and liberties category, democracy is defined as equal rights/right to speak, freedom of expression, right to elect and to be elected, living freely/no restriction of freedom, respect for individual rights and liberties, using rights freely, community life in welfare, protection of rights / securing rights, free will, reducing and removing injustice, securing freedom. Under the governance category, democracy is defined as a form of government, government by representation/public's sovereignty, fair governance/ensuring justice, governance in compliance with law, participating in state policy/governance. Only three participants mentioned the sub-category of "participating in state policy/governance".

2. How do social studies candidate teachers define the concept of citizenship?

Table 2. Definitions of citizenship by social studies candidate teachers

Theme	*Categories*	*Frequencies (f)*
Duties and Responsibilities		106
	Fulfilling responsibilities	38
	Patriotism	18
	Being a part of community /protecting social values /keeping up with the community	14
	Knowing his/her responsibilities/Being aware of his/her responsibilities	10
	Being beneficial to the community/country	9
	Obeying the law/rules, Benefiting from law	7
	Tax-paying	5
	Serving in Military	2
	Respect for others' rights	2
	Being a good individual	1
Sense of belonging/Loyalty		61
	Being Loyal to country /Having a sense of belonging to country	27
	Being Loyal to state/nation or Having a sense of belonging to state/nation	24
	Being Loyal to homeland /Having a sense of belonging to homeland/motherland	10
Rights and Liberties		20
	Knowing his/her rights / benefiting from rights	6
	Voting	6
	Using his/her rights and liberties	4
	Knowing his/her rights and liberties	3
	Right of education	1
Total:3 Theme	*18 Categories*	*187*

According to Table-2, definitions of social studies candidate teacher regarding citizenship are reunited under three theme. Citizenship definitions are gathered under different categories according to their frequency: duties and responsibilities (f106), Sense of belonging/loyalty (f61), rights and liberties (f20). Within the categories under the main categories, citizenship is defined as fulfilling his/her responsibilities (f38), being loyal to country/having a sense of belonging to country (f27), being loyal to his state/nation (f24), patriotism (f18).

Under the theme of duties and responsibilities, citizenship is defined most as fulfilling responsibilities (f38), patriotism (f18), and being a part of community /protecting social values /keeping up with the community (f10), knowing his/her responsibilities/being aware of his/her responsibilities (f10). As for the other definitions, they are being beneficial to the community/country (f9), obeying the law/rules and benefiting from the law (f7), tax-paying (f5), serving in military (f2), respect for others' rights (f2) and being a good individual (f1).

Under the theme of loyalty/belonging, citizenship is defined as being loyal to country /having a sense of belonging to country (f27), being loyal to state/nation or having a sense of belonging to state/nation (f24) and being loyal to homeland /having a sense of belonging to homeland/motherland (f10).

Under the theme of rights and liberties, citizenship is defined as knowing his/her rights / taking advantages of rights (f6), voting (f6), using his/her rights and liberties (f3), knowing his/her rights and liberties (f4) and right of education (f1). It is interesting that the statement of "knowing and using his/her rights and liberties" is scarcely expressed for a citizenship definition.

3. According to social studies candidate teachers, what are the basic values/characteristics of democracy?

Table 3. Basic values/characteristics of democracy according to social studies candidate teachers

Values	*Frequency*	*Values*	*Frequency (f)*
Equality	73	Responsibility	7
Freedom	65	Populism	6
Justice	51	Empathy	5
Rights/human rights	31	Independency	4
Freedom of thought and conscious/free will	19	Emphasis on Republic	4
Right to elect and to be elected /participating in governance	19	Unity and Solidarity	3
Respect	18	Laicism	3
Tolerance	12	Love	3
Trust in legislative/law/rule of law	12	Others	15
Total: 18			

From the Table 3 shown above, it can be seen that the most repeated value by social studies candidate teachers is equality (f73) as basic values/characteristics of democracy. Second most repeated value is freedom (f65). In the third rank, justice (f51) is stated as basic characteristics of democracy. Another most repeated value is rights/human rights (f31).

Apart from the most repeated first four values/characteristic, these are least repeated values: freedom of thought and conscious /free will (f19), right to elect and to be elected/participating in governance (f19), respect (f18), tolerance (f12), trust in legislative/law/rule of law (f12), responsibility (f7), populism (f6), empathy (f5), independency (f4), emphasis on republic (f4), unity and solidarity (f3), laicism (f3) and love (f3).

4.According to social studies candidate teachers, how is the relation between democracy and citizenship?

Table 4. Relation between democracy and citizenship according to social studies candidate teachers

Categories	*Frequencies (f)*
Protection and using of rights and liberties of citizens through democracy	22
Essentialness of democracy in fulfilling civic duties/citizenship	21
Necessity that citizens should live in a democratic environment based on tolerance	16
Essentialness of democracy for being a good citizen,	15
Choices of citizens result in democracy	10
The two concepts feed each other	10
Democracy facilitates life of citizens	9
Necessity that each citizen should build democracy	8
Necessity of conscious citizens to run democracy	7
Democracy is a necessity of community life	4
Democracy ensures existence/survival of state	3
Necessity of fulfilling civic duties for existence/continuity of democracy	3
Attaching importance to thoughts and emotions	3
Total: 13 Category	

According to Table 4, social studies candidate teachers expressed that there is a relation between democracy and citizenship concepts. At this point, “protection and using of rights and liberties of citizens through democracy” (f22) is the most repeated statement. In other words, social studies candidate teachers stated that democracy should exist in order to protect and use rights and liberties of citizens. Another most repeated statement is “essentialness of democracy in fulfilling civic duties/citizenship” (f21). This is only one frequency different from the statement of “protection and using of rights and liberties of citizens through

democracy". The most repeated statements after that are "necessity that citizens should live in a democratic environment based on tolerance" (f16), "essentialness of democracy for being a good citizen" (f15), "that choices of citizens result in democracy" (f10) and "that the two concepts feed each other" (f10).

Other statements among the opinions of social studies candidate teacher regarding the relation between democracy and citizenship are respectively that "democracy facilitates the life of citizens" (f9), "necessity that each citizen should build democracy" (f8), "necessity of conscious citizens to run democracy" (f7), "that democracy is a necessity of community life" (f4), "that democracy ensures existence/survival of state" (f3), "necessity of fulfilling civic duties for existence/continuity of democracy" (f3), "attaching importance to thoughts and emotions" (f3).

5.According to social studies candidate teachers, what are the characteristics of a good citizen?

Table 5. Characteristics of a good citizen according to social studies candidate teachers

Categories	*Frequencies (f)*	*Categories*	*Frequencies (f)*
Being aware of/fulfilling/protecting his/her responsibilities	44	Being able to express him/herself	3
Knowing/using/protecting his/her rights and liberties	18	Feeling empathy	3
Voting	15	Solidarity/Cooperation	3
Obeying community rules/law/legislations	13	Having a say in governance	3
Respect for others	13	Carrying out research	2
Being fair	12	Serving in military	2
Being tolerant	11	Modernity	2
Patriotism	11	Being scientific	2
Contributing to development of the country	10	Sensitivity	2
Taxpaying	8	Playing a role in democracy	2
Respecting for individual rights and liberties	7	Being hard-working	2
Supporting equality	6	Protecting public order	2
Being liberal	6	Being productive	2
Acting with free will	6	Having moral values	2
Being sensitive about environment	6	Belonging to community	2
Questioning	5	Being not racist	1
Loyal to his/her state and loving his/her state	5		
Prioritize interests of the country	3		
Total: 34 Category			*236*

According to Table 5, the most repeated characteristic that is stated by social studies candidate teachers among the characteristics expected from a good citizen is "being aware of/fulfilling/protecting his/her responsibilities" (f44). Second most repeated characteristic "knowing/using/protecting his/her rights and liberties" is only repeated/stated by 18 participants. After that, "voting" (f15), "obeying community rules/law/legislations" (f13), "respect for others" (f13), "patriotism" (f11) and "contributing to development of the country" (f10) follow.

"Taxpaying" (f8), "respecting for individual rights and liberties" (f7), "supporting equality" (f6), "being liberal" (f6), "acting with free will" (f6), "being sensitive about environment" (f6), "questioning" (5), "loyal to his/her state and loving his/her state" (f5) are among the least repeated characteristics. "Prioritize interests of the country" (f3), "being able to express him/herself" (f3), "feeling empathy" (f3), "solidarity/cooperation" (f3), "having a say in governance" (f3), "carrying out research" (f2), "serving in military" (f2), "modernity" (f2), "being scientific" (f2), "sensitivity" (f2), "playing a role in democracy" (f2), "being hard-working" (f2), "protecting public order" f(2), "being productive" (f2), "having moral values" (f2), "belonging to community" (f2), "being not racist" (f1) are the least repeated characteristics of a good citizen.

RESULTS AND DISCUSSION

According to social studies candidate teachers, democracy is defined as a form of government which is based on representation and popular sovereignty and which involves equal rights to speak, freedom of thought and expression, equality, tolerance, justice, freedom and respect. A definition within the context of governance and rights and liberties is emerged. Although freedom and democracy can be used in lieu of each other, the two concepts in fact are not synonymous. Democracy is a set of principles and notions regarding the concept of freedom (Yağcı, 1998). In the research, democracy is defined both as a form of government and being governed based on representation. Over the course of time, different kinds of democracy has been formed and representative democracy is one of them (Korkmaz, 2016; Moghadam, 2013). Turkish Institution of Language (TDK, 2018) defined democracy as a type of regime based on popular sovereignty. Democracy refers to a political regime in which citizens enjoy an array of civil, political, and social/economic rights that are institutionalized, and citizens participate through the formal political process; it also refers to a society governed by the values of tolerance and solidarity (Moghadam, 2013).

According to the research titled *"Opinions of social studies candidate teachers regarding qualifications of a democratic teacher"* and carried out by Demircioğlu, Mutluer & Demircioğlu (2011), social studies candidate teachers defined the democracy as a form of regime based on popular sovereignty, however they didn't mention the basic characteristics of democracy such as human rights, justice, tolerance. Likewise, in the current study, social studies candidate teachers defined democracy as a form of regime; on the other hand, they made a democracy definition with the basic characteristics of it such as tolerance, freedom, justice.

While the concept of democracy is defined within the context of rights and liberties and democratic values, the concept of citizenship is defined within the context of duties and responsibilities rather than rights and liberties. Citizenship is defined as being aware of his/her responsibilities and fulfilling them, being a part of his/her community and country, being loyal to and having a sense of belonging to his/her nation/state. However, in this study, defining the citizenship without rights and liberties is contradicting today's definition and sense of citizenship. Ulutaş (2014) defined the citizenship as an identity and belongingness. In other respects, Şimşek, Tıkman, Yıldırım & Şentürk (2017), *in their research titled "the views of pre-service social studies teachers and pre-service classroom teachers about citizenship education: a qualitative study"*, found that many of the social studies and classroom candidate teachers defined the citizenship as highlighting the concepts of rights, duties and responsibilities, freedom, loyalty. Even though they did not mention very much the concepts of rights when they define the democracy, their results match up with our results in terms of other concepts. Citizenship should be defined on the balance of rights-liberties and duties-responsibilities. As Aktaş (2015) stated, each citizen has basic rights and liberties under the protection of international law, which cannot be harmed or prevented by anyone/any institution.

In this study, it is concluded that social studies candidate teachers considered the citizenship only in a classical dimension. In the research carried out by Yiğit (2017) titled *"Citizenship and Turkish citizenship from the view of social studies candidate teachers"*, he concluded that views of social studies candidate teachers on citizenship concept should move away from traditional approach and should bear the traces of different aspects of citizenship such as digital citizenship, global citizenship, environmental citizenship.

Our results suggest that democracy definitions of social studies candidate teachers match up with the values/characteristics of democracy that they mentioned. According to social studies candidate teachers, basic characteristics/values of democracy in general are equality, freedom, justice, human rights, right to elect and to be elected, participating in governance, respect, tolerance and trust in law and rule of law. They also mentioned these values when they defined democracy. Freedom and equality are among the principles of democracy (Kalaycı & Hayırsever, 2014). Freedom, equality, justice and solidarity are the basic characteristics of social democracy (Gombert et al., 2009). From

political aspect, democracy aims to ensure that citizens are free from oppression and citizens participate in administrational rules they are subjected to.

When social studies candidate teachers described the relation between citizenship and democracy, they stated that democracy should exist in order to protect and use rights and liberties; they also emphasized that democracy is essential for fulfilling citizenship duties. In other words, it is concluded that democracy should persist in order that citizens fulfill their duties and responsibilities within the concept of citizenship and in order that rights and liberties are acquired, protected and used within the concept of citizenship.

The results of the study show that rights and liberties should be protected and used in order to be a good citizen and that democracy is essential in order to fulfill the citizenship duties. However, one interesting result is that fulfilling duties/responsibilities is considered more important than rights and liberties in terms of citizenship. Citizenship does not only refer to fulfilling duties and responsibilities. Citizens should be aware of their rights and liberties, and should know and fulfill their duties and responsibilities to their nations and world. In this context, individuals should not ignore their rights and liberties. At this point, rights-liberties and duties-responsibilities should be handled equally within the context of citizenship, democracy and human rights education of social studies candidate teachers who are responsible for citizenship education in general. In this way, democracy and human rights education can reach its goal under the roof of citizenship. Likewise, Kondu & Sakar (2013) stated that democracy would reach its goal if individuals use their rights and liberties and at the same time fulfill their responsibilities. On the other hand, in order to reach this goal, community should take responsibilities according to a communitarian approach.

Communitarian approach focuses on the rights and responsibilities of citizens, and it emphasizes the driving force of community in realizing the balance between these rights and responsibilities (Hablemitoğlu & Özmete, 2012). Because, on one side certain rules and regulations should be followed for the development of democracy and on the other side respect for citizens' rights is a very important point (Schmitter & Lynn Karl, 1991). In other words, democracy would find its true meaning when practiced in community rather than written on papers (Ural, 1999).

To sum up, an interesting point in the study is that according to social studies candidate teachers, citizenship is defined as fulfilling one's duties and responsibilities rather than as rights and liberties. From the data, it is concluded that democracy should exist in order to fulfill citizenship duties. When participants defined democracy, they expressed their view within a balance between duties-responsibilities and rights-liberties. This is also an interesting result in the study. In fact, although participants expressed a close and important relation between democracy and citizenship concepts, these two concepts are perceived differently in terms of duties-responsibilities and rights-liberties. That is to say, they understand citizenship only as duties/responsibilities, but they think democracy represents freedoms and rights. In other words, according to social studies candidate teachers, democracy gives the meaning of rights and liberties to citizenship concept. However, these concepts should be instructed in equilibrium within citizenship education.

Transforming citizenship education from a classical approach to a citizenship education suitable to 21st century's understanding can change the views of social studies candidate teachers on citizenship. This is essential for raising citizens useful to their countries, nations and to humanity. Because for a better, fairer and more democratic world, it is important to raise citizens who are aware of his/her and others' rights and liberties and who respect them, who protect his/her and others' rights and liberties, who know and fulfill his/her responsibilities. For this reason, as Sağlam (2011) suggested in his research titled "effective citizenship levels of candidate teachers", an effective citizenship education should be realized in teacher education. A citizenship education, which involves knowledge, abilities and values suitable to different dimensions of citizenship and requirements of the day and which is suitable to constructivist approach, should be realized.

REFERENCES

Abowitz, K. K. & Harnish, J. (2006). Contemporary discourses of citizenship. *Review Of Educational Research, 76* (4), 653-690.

Akın, U. & Özdemir, M. (2009). The examination of teacher candidates' democratic values in terms of various variables: The case of faculty of educational sciences. *Ankara University, Journal of Faculty of Educational Sciences, 42* (2), 183-198.

Aktaş, M. (2015). A critical look at the concept of democracy. *Journal of Social Sciences of Mus Alparslan University, 3* (1), 87-105.

Aktas, M. (2014). The Arab Uprisings and Democracy. Retrieved from http://istanbulnetwork.org/the-arab-uprisings-and-democracy/ on 20th July, 2018.

Atasoy, T. & Koç, H. (2015). The role of geography teaching in active citizeship education: The opinion of faculty members. *Zeitschrift für die Welt der Türken/Journal of World of Turks, 7*(2), 113-131.

Barro, R. J. (1996). Democracy and growth. *Journal of Economic Growth, 1*, 1-27.

Bennett, W. L. (2008). Changing citizenship in the digital age. W. Lance Bennett (Ed.) *Civic Life Online: Learning How Digital Media Can Engage Youth* (pp. 1-24). London: Mit Press.

Burdeau, G. (1964). *Democracy-Synthetic Testing*-.Bülent Nuri Esen (Trans.). Ankara: Ajans Türk Matbaası

Dalton, R. J. (2008). Citizenship norms and the expansion of political participation. *Political Studies, 56* (1), 76-98.

Demircioğlu, İ. H., Mutluer, C. & Demircioğlu, E. (2011). The perceptions of the social studies student teachers about democratic teacher. *Kastamonu Education Journal, 19* (2), 577-586.

Gombert, T. & et al (2009). *Social Democracy Handbook 1, Fundamentals of social Democracy.* Recai Hallaç (Trans.). Istanbul: Friedrich-Ebert-Stiftung.

Gömleksiz, M. N., Kan, A. Ü. & Ümmühan, Ö. (2012). Metaphorical perceptions of social studies teacher candidates about democracy as a value. *Journal of Values Education, 10* (24), 79-100.

Hablemitoğlu, Ş. & Özmete, E. (2012). A suggestion for effective citizenship education. *Journal of Ankara Health Sciences, 1*(3), 39-54.

Holston, J. & Appadurai, A. (1999). Cities and citizenship. James Holston (Ed.). *Cities and citizenship.* (1-21). London: Duke University Press.

İbrahimoğlu, Z. & Şan, S. (2018). Examination of curriculum of Azerbaijan in terms of citizenship training. *Marmara Geographical Review,* (37), 70-78. Doı: 10.14781/Mcd.386120

Kalaycı, N. & Hayırsever, F. (2014). An analysis of citizenship and democracy education text book in the context of gender equality and determining students' perceptions on gender equality. *Educational Sciences: Theory & Practice, 14* (3), 1065-1072.

Keskin, S. C. & Yüceer, D. (2013). Citizenship education in Denmark. *Journal of Social Studies Education Research, 4* (1), 97-120.

Koçak, A. & Arun, Ö. (2006). The sampling problem in content analysis studies. *Journal of Selçuk Communication, 4* (3), 21-28.

Kondu, Z. & Sakar, T. (2013). Why do we give education about citizenship and democracy? *Mehmet Akif Ersoy Unıversity Journal of The Institue Educational Sciences, 2* (3), 49-60.

Korkmaz, E. (2016). Deliberative democracy as one the concept of democracy and modern democracy theories (pp.365-369). Balcı, M. (Ed.). *Genç Hukukçular Hukuk Okumaları Birikimler (Young Lawyers Read Law Accumulations)–V-,* İstanbul: Hukuk Vakfı Yayınları.

Kuçuradi, İ. (1998). The concept and problems of democracy in the twenty-first century. *Hacettepe University Journal of Faculty of Letters, 15,* 21-27.

Kuş, Z. & Aksu, A. (2017). Social studies teachers' beliefs on citizenship and citizenship education. *International Journal of Türkish Education Sciences, 5* (8), 18-41.

Memişoğlu, H. (2014). The education of citizenship in regard to the opinions of social sciences teachers. *Electronic Turkish Studies, 9* (5).

Mihailidis, P. & Thevenin, B. (2013). Media literacy as a core competency for engaged citizenship in participatory democracy. *American Behavioral Scientist, 57*(11), 1611-1622.

Moghadam, V. M. (2013). What is democracy? Promises and perils of the Arab Spring. *Current Sociology, 61*(4), 393–408.

Sağlam, H. İ. (2011). Proficiency levels of student teachers effective citizenship. *Kastamonu Education Journal, 19* (1), 39-50.

Sarı, M. & Sadık, F. (2011). Democracy perceptions of teacher candidates (Çukurova University Sample). *International Journal of Curriculum and Instructional Studies, 1* (2), 67-82.

Schmitter, P. C. & Karl, T. L. (1991). What democracy is and is not. *Journal of Democracy, 2*(3), 75-88.

Selçuk, Z., Palancı, M., Kandemir, M. & Dündar, H. (2014). Tendencies of the researches published in education and science Journal: Content analysis. *Education and Science, 39* (173), 424-449.

Şimşek, U., Tıkman, F., Yıldırım, E. & Şentürk, M. (2017). The views of pre-service social studies teachers and pre-service classroom teachers about citizenship education: A qualitative study. *Dicle University Journal of Ziya Gökalp Faculty of Education, 32,* 913-925.

Toraman, Ç. & Gözütok, F. D. (2014). Evaluation of 8th grade "citizenship and democracy education" curriculum. *Elementary Education, 13* (3), 954-979.

Torney-Purta, J. (2002). What adolescents know about citizenship and democracy. *Educational Leadership, 59* (4), 45-50.

Tunç, H. (2008). Types of democracy and the concept of negotiating democracy. *Gazi University Faculty of Law Review, 12* (1-2), 1113-1132.

Türk Dil Kurumu (2018). *Democracy*. Retrieved from http://www.tdk.gov.tr in 27.09.2018.

Ulutaş, E. (2014). Constitutional Process and Citizenship in Turkey. *Journal of Academic Inquiries, 9* (1), 73-103.

Ural, Ş. (1999). The concept of demovravy, social values and individual. *Journal of The Faculty of Divinity of Ankara University, 40.*

Ünal, F. & Yıldız, A. (2012). Comparison of draft program of citizenship education in the Canton of Zürih, Switzerland with the program of democracy and citizenship education course in Turkey. *IBB International Refereed Academic Social Sciences Journal, 3* (5), 352-372.

Yağcı, E. (1998). Democracy ve education. *Education and Science, 22* (107), 15-22.

Yazıcı, K. (2011). Sosyal bilgiler öğretmen adaylarının demokratik değerlerinin çeşitli değişkenler açısından incelenmesi. *Education and Science, 36* (159), 165-178.

Yıldırım, A. (1999). Basic features of qualitative research methods and their importance in educational research. *Education and Science, 23* (112), 7-17.

International Journal of Progressive Education, Volume 15 Number 4, 2019

A Systematic Review of Critical Factors Regarding ICT Use in Teaching and Learning*

M. Kemal Aydın [i]
Yildiz Technical University

Mehmet Gürol [ii]
Yildiz Technical University

Abstract

ICT use has gained currency in the realm of education for about three decades. This has led to a proliferation of ICT research studies in educational settings, which has also made it more challenging for ICT practitioners and researchers to keep up with the current trends and identify the research gaps in the literature. In regard to this, the present review aims to summarize critical factors pertinent to ICT use addressed in the reviewed papers. The paper also discusses what direction future ICT research might go. As a guideline in the current review study, the PRISMA Statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) was employed. The review results extracted from our qualitative synthesis were presented and based on the results a generic model illustrating ICT related student, teacher and school conditions was proposed. Finally, a list of implications for future research was also provided for ICT practitioners and researchers.

Keywords: ICT use; Systematic review; ICT adoption, ICT framework

DOI: 10.29329/ijpe.2019.203.9

---

* The present manuscript is part of a PhD study "A Proposed Model Including the Factors Influencing ICT Use in Teaching and Learning Process".

[i] **M. Kemal Aydın**, Yildiz Technical University, Curriculum and Instruction Department.

Correspondence: kemal06@gmail.com

[ii] **Mehmet Gürol**, Prof. Dr., Yildiz Technical University, Educational Sciences.

INTRODUCTION

Information and Communication Technology (ICT) use in educational settings has gained a growing reputation and concern in both developed and developing countries (Law, et al. 2008). This increasing interest for integrating ICT into teaching practices is principally associated with modern educational systems' striving for providing students with more enhanced learning opportunities (Kalolo, 2018; Pérez-Sanagustín, et al. 2017). Another reason for this growing interest is students' demand for availability and accessibility of information technologies as part of their daily lives, along with connectivity and share of e-learning contents within school learning environment (Islam, & Grönlund, 2016). With this respect, ICT is regarded as both a learning tool and a facilitator of achieving national educational goals (Baser-Gulsoy, 2011). Thus, ICT adoption into educational settings have become prominent and challenging for today's education systems.

With an attempt to address this challenge, many countries-whether located in the developed or developing part of the world-including Korea, India, Peru, Sweden, Turkey, the UK, the US, Uruguay, etc. have allocated vast amount of budgets and initiated large scale ICT integration programs, such as OLPC in Peru, Uruguay, India, G1G1 in the US, and F@tih in Turkey. This sort of initiatives is usually called as one-to-one (1:1) programs since they offer one computing device (PC, Laptop, Tablet or PDA) per student (Aydin, Gurol, & Vanderlinde, 2016). Despite large-scale investment on improving schools' ICT infrastructure and on providing students with computing devices (PC, Laptop, Tablet or PDA), previous studies acknowledge that this sort of spending does not solely ensure effective integration of ICT into teaching practices (Tay, Nair, & Lim, 2017; Wang, 2008). However, the literature on educational ICT research strongly underlines that ICT integration into education is a complex and multifaceted phenomenon. It includes many interrelated system, school and teacher level factors (Aesaert, et al. 2015; Tondeur, et al. 2008; Vanderlinde, & van Braak, 2010). Hence, effective integration of ICT into teaching practices requires careful planning and informed decisions based on learnt experiences that can be drawn from previous ICT research context.

Although there is an established literature review on ICT research in education, it is imperative to conduct periodical review studies since ICT is constantly evolving and schools, teachers and students are demanding new technologies for instructional purposes (Harper, & Milman, 2016). Given this, the current review study makes the following contributions to the realm of educational ICT research. First, it provides an update of critical factors related with ICT use in education by reviewing the most recent studies. Second, derived from the review results, it also proposes a generic model in order to illustrate critical issues regarding ICT use. Finally, the present study also identifies the current research trends and gaps, providing meaningful insights for ICT researchers and practitioners as well as ICT policy makers.

BACKGROUND

ICT Use and Related Factors

A wide array of teacher, student and school level factors were identified in the previous studies situated in the ICT literature. From a teacher-centred perspective, most researchers attributed a pivotal role to teachers for an effective ICT adoption by specifically focusing on certain ICT related teacher level factors, including teachers' ICT skills (Demirli, 2013; Tezci, 2011), their attitude towards ICT (Aslan, & Zhu, 2017; Cakiroglu, 2015; Tezci, 2011), ICT training (Hismanoglu, 2012; Tondeur, et al. 2008), and pedagogical beliefs (Baser-Gulsoy, 2011). In a similar vein, some scholars focused on student's ICT use (Agbo, 2015; Semerci, 2018; Song, & Kang, 2012) and related factors, such as their attitude towards ICT (Agbo, 2015; Aslan, & Zhu, 2017; Demirli, 2013; Semerci, & Aydin 2018; So, et al. 2012), ICT competence (Aesaert, et al. 2015; Goodwin, et al. 2015) and ICT experience (Semerci, 2018; So, et al. 2012). In addition to considering teachers' critical role in integrating ICT in class, some ICT researchers have also paid heed to school level factors, such as schools' ICT policy (Tondeur, et al. 2008, Vanderlinde, et al. 2012), ICT planning (Gulbahar, 2007; Vanderlinde, et al.

2012), schools' ICT infrastructure (Goktaset, al. 2009; Vanderlinde, & van Braak 2010; Zhong, 2011), ICT support (Chisalita, & Cretu, 2015; Karaca, et al. 2013) and technology leadership (Flanagan, & Jacobsen, 2003).

All those aforementioned studies attempted to provide a better understanding of ICT adoption in teaching and learning and ICT related factors. Yet, there are still some research gaps that need to be addressed. First, although ICT use is regarded as the heart of ICT integration in many ICT studies (Vanderlinde, et al. 2014), there is no clear understanding of how ICT use is conceptualized and examined in the literature (Hew, & Brush 2007). For example, Van Braak et al. (2004) proposed two distinctive ICT use - supportive and class use of computers. In addition, Tondeur et al., (2008) identified three types of ICT use, namely use of ICT as an information tool, as a learning tool, and learning basic ICT skills. More recently, Vanderlinde et al. (2014) introduced institutionalized ICT use encompassing factors related to students and teachers' ICT use. Considering the differences in research contexts, participants and so forth, different terms and conceptualizations pertinent to ICT use might be seen as justifiable, yet there is a need for update review studies in order to identify research trends and gaps as to ICT use and related factors. Second, a number of previous ICT research studies mostly focused on identifying critical ICT related conditions; however, a limited number of previous studies adopted or presented a comprehensive ICT adoption framework or model to formulate what specific teacher conditions facilitate or impede their uptake of ICT. Third, although student-centred curricula are in use in many contemporary educational systems, most previous studies existing in the literature focused on teachers' or student-teachers' ICT use in educational settings from a teacher-centred perspective, yet ignoring the real students' use of ICT. Thus, there is a need for review studies in order to identify critical factors pertinent to students' ICT use in teaching and learning process. In view of aforementioned research gaps, in order to summarize current state and to identify research gaps regarding ICT use and related factors, there is a need for periodical review studies (Harper, & Milman 2016) since ICT is changing and new technologies might be offering alternative learning and teaching opportunities for students and teachers.

Previous Review Studies

Educational ICT research is a dynamic research area. Hence, there is a proliferation of educational ICT research studies, particularly with the increasing popularity and prevalence of ICT integration programs (Holcomb, 2009). However, comprehensive studies like systematic reviews reflecting wider perspectives on educational use of ICT are limited in number and coverage (Islam, & Grönlund, 2016). To our knowledge, there are four papers systematically reviewing critical factors related ICT use. Most of those studies put more emphasis on just one type of computing device (usually laptop) and mainly focus on factors related with the impact of ICT use rather than ICT adoption. For example, in their review studies, Fleischer (2012), Harper and Milman (2016), Perez-Sanagustin et al. (2017) and Islam and Grönlund (2016) focused on the impact of ICT use on student level factors such as students' academic achievement, motivation or engagement, ignoring how ICT use is defined and what critical factors enable or impede instructional use of ICT. Amongst those studies, only two studies Harper and Milman (2016) and Islam and Grönlund (2016) examined enablers and barriers of ICT use in educational settings. Building on the aforementioned review studies, the present study will update the current literature on ICT adoption and related factors with a wider empirical scope.

In addition, Islam and Grönlund (2016) asserted that most previous studies examining ICT use in educational settings were conducted in the developed part of the world- mainly in the US. On this account, little is known about the global scenario of ICT adoption, particularly about the current state of ICT related issues in the developing countries. Hence, there is a need for further review studies in order to provide a wider perspective of ICT related issues with regard to geographical coverage (Islam, & Grönlund, 2016). Given this, in our review we aimed to provide a wider perspective in terms of contextual coverage, variety of computing devices (Laptop, PC, Tablet Computer etc.), various types

of ICT use and a large number of ICT related factors. Table 1 below illustrates the details about the current review and previous review studies.

Table 1. The Present and Previous Systematic Review Studies of ICT Use in Education

Review Study	Coverage			Main focus
	Years	Papers	Database(s)	
Present review	2012-2016	65	ERIC	ICT use, Teacher, student and school related factors
Islam & Grönlund, 2016	2000-2013	145	ABI/Inform, EBSCO Host	Usage patterns, Impacts on students, teachers, learning and teaching, Challenges and factors
Perez-Sanagustin et al. 2017	2011-2015	352	Computers & Education	Impact on students
Harper & Milman, 2016	2004-2014	46	ERIC	Impact on students, ICT use, Challenges to integration
Fleischer, 2012	2005-2010	18	ERIC, ASE, TRC, CS, EBSCO, ISI Web of Science	Teacher, and student related factors

Significance of the Review Study

ICT research in educational settings is proliferating due to the growing public interest and large scale investment on ICT integration into education (Islam, & Grönlund, 2016; Law, et al. 2008). Given this research context, a growing body of research studies examining issues regarding educational use of ICT is conducted in many different settings. This not only contributes to a better understanding of ICT adoption at schools, but also accounts for certain problems for ICT practitioners, ICT policy makers and even for ICT scholars since it may not be always safe to take decisions based on the results of previous studies, to build up new research on existing literature, or to catch up with the trends in the realm of ICT research (Gough, & Thomas, 2016). Thus, compared with a few decades ago, what works for similar settings, what gaps exist in the literature and what direction ICT research should go remain uncertain and much more complicated in many contexts (Islam, & Grönlund, 2016). Similarly, the diversity of research context as well as the quantity of conflicting studies existing in the literature has given rise to the need for systematic review studies in educational ICT research (Fleischer, 2012).

A systematic review is a valuable tool in collecting the critical scientific evidence necessary for developing evidence-based guidelines, making programmatic decisions, and guiding future research. (Mullins, et al. 2014). In other words, a systematic review is an essential tool for researchers, practitioners and policy makers who want to remain current with the evidence in the field. In this regard, a systematic review must adhere to strict standards, as its results can provide a more objective appraisal of evidence for making scientific decisions (Gough, & Thomas, 2016). This is the case in the ICT research realm where ICT policy makers need to take informed decisions based on the previous research. However, this is not always easy and safe to take sound decisions since ICT is not a static area, but rapidly and constantly changing, so is ICT research evolving at a similar pace. This presents some challenges for ICT policy makers to take decisions based on sometimes conflicting research results and also for ICT researchers to identify existing research gaps and build on new research. On this account, systematic reviews can serve as a fundamental and safe research tool for ICT researchers and policy makers in order for them to keep up with the latest research trends, build up new research and take sound decisions.

Another major advantage of systematic reviews is that they follow strict guidelines so as to reduce bias. These guidelines provide essential elements to include in the review process and report in the final publication for complete transparency (Gough, & Thomas, 2016; Mullins, et al. 2014). Since

they follow strict guidelines, such as QUOROM, PRISMA or AMSTAR for ensuring adherence to full transparency and reproducibility, systematic reviews can disclose profound evidence that research community can benefit in framing what has been studied, how it has been studied, and what should be studied in the future (Mullins, et al. 2014). Thus, systematic literature reviews can serve as a reliable tool for ICT researchers and policy makers to remain current with the ICT related issues and build up new research based on the existing research gaps, which illustrates the significance of the present study, as well as justifying the rationale of the current review.

Purpose of the Review and Research Questions

The present review, although it doesn't claim to be comprehensive in its coverage, aims to summarize recent research results pertinent to educational use of ICT and to provide a clear picture of status, gaps and trends in current ICT research realm. To achieve this overarching aim, the following seven research questions (RQ) were addressed in this review:

1: In which country/region the research was carried out?

2: Which subject areas were addressed?

3: Which educational levels were addressed?

4: Who were the participants included in the study?

5: Which methods were employed in the study?

6: How ICT use was defined and measured in the study?

7: What factors related to ICT use in educational settings were addressed?

Prior to conducting the review, a review protocol was specified in order to minimize the potential bias. The protocol included review objective and search categories generated based on the components of SPIDER method of searching electronic databases (Methley, et al. 2014). These categories were namely, publication year, title, author, SPIDER (Sample, Phenomena of Interest, Design, Experience, Research category), and quality assessment. In order to ensure transparency and inter-rater reliability by reducing researcher based bias of review, we transferred the components of our protocol into a Google Form. It is available online on: https://docs.google.com/forms/d/e/1FAIpQLScHBnnHPcCI_lq0BoVS9n-gphLZJWWdurw-OBaR5l_ckcOocQ/viewform. The data collected through Google Form transferred into a spreadsheet and undergone quantitative and qualitative synthesis.

Table 2. Review Objective and Review Protocol

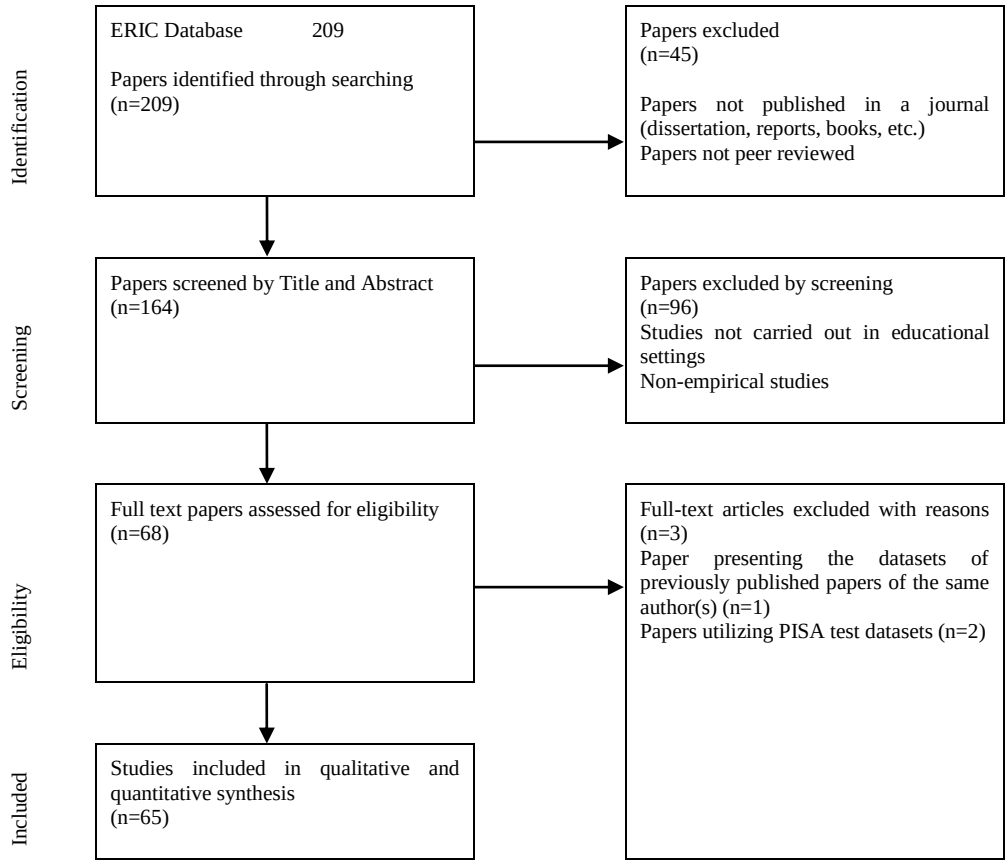
Objective	The objective of this review is to provide an overview of research on ICT use and related factors in educational settings.	
Research Questions	Review Categories	
	Pubyear	2012-2016
RQ1	Country	Affiliation of corresponding author
RQ2 RQ3 RQ4	**S**ample	Participants (Teachers/Students/School Administrators, Schools), Subject discipline (Mathematics, Science, Language, etc.), Educational level (Pre-school, Primary, Secondary, Tertiary)
RQ6 RQ7	**P**henomena of **I**nterest	Studies examining ICT use and/or related factors, Frameworks applied to explain ICT use in teaching and learning (TAM, TPACK etc.)
	Design	Study designs (survey, correlative, experimental, focus group, grounded theory, etc.)
RQ5	**E**xperience	N/A (Non-applicable in this review)
	Research category	Quantitative, Qualitative or Mixed Methods

Since the present study aimed at summarizing ICT adoption and related factors addressed in the reviewed studies and eventually proposing a generic ICT adoption model based on the results; hence, the experience category was omitted since it is more related with the impact of ICT use. And also the "Design" and "Research category" sections were merged into one category in the protocol since both are related with the methodological approach adopted in the studies.

METHOD

The present study is based on a systematic review of empirical studies focusing on ICT use in educational settings and of ICT related critical factors addressed in those studies. In order to ensure the rigor and quality of review process, the PRISMA Statement (Preferred reporting Items for Systematic Review and Meta-Analyses) was employed as a guideline (Moher, et al. 2009). Hence, the review process included identification, screening, eligibility, and included stages as proposed by the PRISMA guidelines. Table 3 provides an overview of review methodology by illustrating the PRISMA steps and procedures that we followed in the current review study.

Table 3. An Overview of Review Process



Source: Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., The PRISMA Group (2009). *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement*. PLoS Med *6*(7): e1000097. doi:10.1371/journal.pmed1000097

As clearly illustrated in Table 3, the steps proposed in the PRISMA statement were (1) Identification, (2) Screening, (3) Eligibility, (4) Included. Those steps were followed throughout the review process, which contributed to transparency and robustness of our review results.

In the data analysis process, we employed the constant comparative method (Glaser, & Strauss, 1999; Matavire, & Brown, 2013) in order to analyze the emergent themes. In the coding phases, open, axial and selective coding was performed iteratively on the papers included in the review (Strauss, & Corbin, 1998). Then, through further analyses, we identified properties of each category and created broad categories or themes.

Databases and Search Terms

The search strings run on the ERIC database respectively was as follows:

- "ICT use" pubyear:2012
- "ICT use" pubyear:2013
- "ICT use" pubyear:2014
- "ICT use" pubyear:2015
- "ICT use" pubyear:2016

In addition, some limiters were selected in order to eliminate the papers that wouldn't suit the research aim. These limiters were "Journal Articles" and peer reviewed only". Given the broad perspective of overall technology use, it was beyond the scope of the current paper to include all possible technology use papers in the review. In regard to this, we didn't place a query including search term "technology use", instead we utilized the term "ICT use" not "technology use" for practicality and feasibility means. Although this increased the transparency and reproducibility of our results, it posed a limitation regarding the coverage of our study. A few invaluable research papers might have been excluded due to this restriction.

Inclusion Criteria

In order for the inclusion of the proper studies in the review, some criteria were specified. These were:

- IC1.The study must be published between 2012 through 2016,
- IC2.The study must be an empirical study (qualitative and/or quantitative data must be collected through the study)
- IC3. The study must be carried out in formal educational settings (schools, universities etc.),
- IC4. The study should focus on exploring or explaining ICT adoption/use and/or ICT related factors (student level, teacher level or school level factors).

Quality of Studies

Since the quality of review studies is heavily dependent on the quality of the papers included, we categorized each study by rating them relevant, irrelevant or not clear. As a second round of screening, we rescreened all papers labeled as not clear in the first round. In the second round, another researcher was invited as an audit to screen all the papers. This ensured the inter-rater reliability of the included papers.

REPORTING THE REVIEW

Papers Meeting Inclusion Criteria

Prior to conducting the review, we decided to draw data from ERIC database. The rationale for choosing the ERIC database is that it is a solely educational database unlike many other multidisciplinary databases. In addition, it covers high quality journals that are also included in many other databases such as Scopus, Web of Science and Google Scholar. Another reason is its selection policy. Even if the database updates its selection policy in the future, the previously published journals are not excluded. As a consequence of this policy, the reliability and transparency of our results are safeguarded.

As a result of the preliminary query of our search terms, we identified 209 papers in the ERIC database. Table 4 below illustrates the distribution of those papers by publication years, and the number of papers meeting the inclusion criteria after screening.

Table 4. The Distribution of Papers by Years

Publication year	Papers identified	Papers screened by title and abstract	Eligible full-papers meeting inclusion criteria
2012	42	33	10
2013	42	23	6
2014	32	29	12
2015	46	38	21
2016	47	41	16
Total	209	164	65

Table 4 illustrates that there is a slightly growing interest of ICT research by years except for the year 2014. The number of ICT research studies in educational settings has shown a growth at a nearly steady pace. This can be a supporting evidence for the shared assumption in the literature that ICT use in education has gained an increasing reputation recently.

Review Results Illustrating Research Context by Regions and Countries (RQ1)

In order to answer the first review question, the country affiliation of corresponding author for each paper was reviewed. The results were given in the Table 5 and the Figure 1 below.

Table 5. The Distribution of Papers by Countries and Regions

Region	Country (f)	%
America (*n*=4)	Chile 2, Mexico 1, USA 1	6.05%
Asia (*n*=16)	China 1, India 1, Indonesia 1, Iran 2, Malaysia 4, Singapore 3, South Korea 2, Vietnam 2	24.61%
Africa (*n*=18)	Ethiopia 2, Ghana 5, Kenya 2, Malawi 1, Morocco 1, Nigeria 4, South Africa 1, Tanzania 1, Tunisia 1	27.69%
Europe (*n*=15)	Belgium 3, Finland 1, Greece 1, Ireland 1, Netherlands 1, Norway 1, Slovenia 1, Spain 2, Sweden 1, Switzerland 1, UK 2	23.07%
Middle-East (*n*=10)	Israel 3, Turkey 6, Yemen 1	15.38%
Oceania (*n*=2)	Australia 2	3.07%

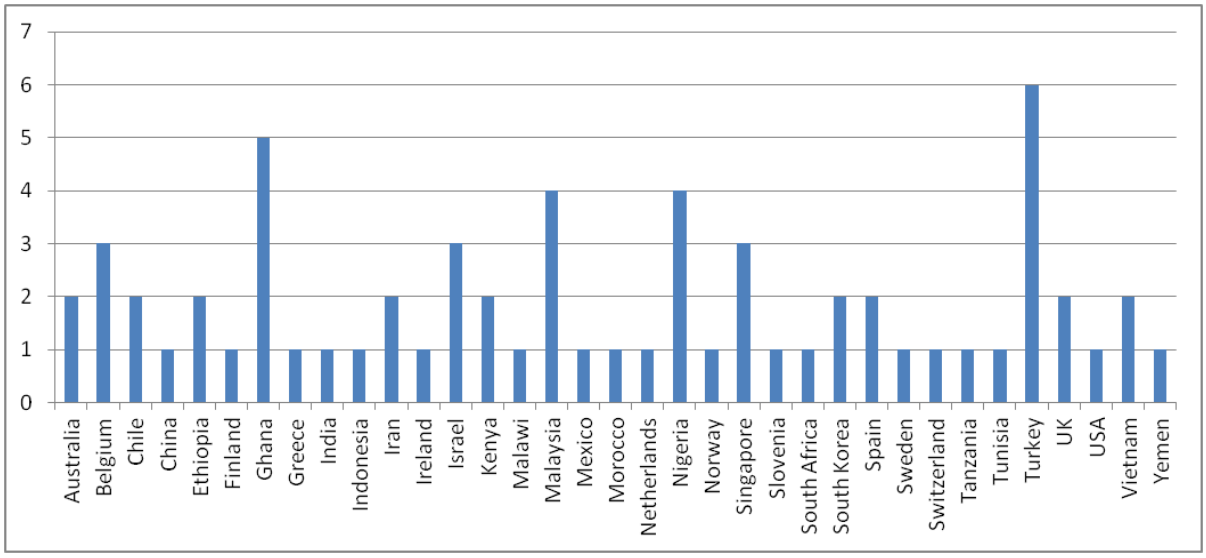


Figure 1. The Distribution of Papers by Countries.

With a closer look at the Figure 1 and Table 5, along with the limitation of inclusion and exclusion inherent to review studies, a number of countries such as Turkey, Ghana, Malaysia, Belgium, Nigeria, Israel and Singapore were the leading countries in terms of research context. Some of these countries have recently initiated their large scale ICT integration programs like Fatih in Turkey (Aydin, et al. 2016) and some others have overhauled their curricula such as Flanders in Belgium (Aesaert, et al. 2013). In line with these, this finding may resonate that ICT research community have invested some concern on the developments in the realm of educational technology in those countries. As a result, there is an increase in number of ICT studies in those countries. This may be signaling that there is a link between the presence of ICT integration programs and the volume of ICT research studies conducted in the same context.

Review Results on Subject Disciplines Addressed in the Study (RQ2)

Pertinent to the second review question, the subject discipline addressed in each paper was reviewed. The results were presented in the Table 6 below.

Table 6. The Distribution of Papers by Subject Disciplines

Subject Disciplines	(f)	%
Agriculture	1	1.49
Distance Education	1	1.49
Early Childhood Education	2	2.98
E-learning	1	1.49
Language Learning/Teaching	7	10.44
Mathematics	6	8.95
N/A	43	64.17
Science	5	7.46
Social Sciences	1	1.49
Total	67*	100

*Two papers addressed more than one subject disciple, resulting in 67 as a total.

Table 6 illustrates that in more than half of the reviewed studies (64%), the subject disciplines were not addressed or taken into consideration. In other words, those papers were not directly addressing to subject-specific use of ICT. Rather they focused on generic ICT use in teaching and

learning process than investigating subject specific use of ICT. On the other hand, the studies focusing on Language Learning/Teaching, Mathematics and Science subject areas account about 30% of overall studies included in the review. This can be an indicator of ICT use and concordantly ICT research particularly in the field of Language, Mathematics and Science is more prevalent compared with the other subject areas. This finding strongly supported the results of a previous study conducted by Tay, Nair and Lim (2017) in Singapore context. Results also illustrated that still there is a need for more research on subject specific use of ICT in educational settings.

Educational Levels and Participants in the Study (RQ3, RQ4)

The study participants were categorized as students, teachers, students and teachers, teachers and administrators and the schools. In addition, the educational levels were specified as pre-school, primary/elementary, secondary/middle, higher/tertiary education. The results were presented in Table 7.

Table 7 Study Participants and Educational Levels

	Students	Teachers	Students and Teachers	Teachers and Administrators	Schools
Pre-school	-	2	-	-	-
Primary	1	5	3	-	1
Secondary	4	15	1	1	-
Primary & Secondary	-	3	-	-	-
Tertiary	21	3	4	1	-
Total	26	28	8	2	1

In 43% of studies (N=28) included in the review, the study participants were solely teachers. Another major group of participants was students (N=26) comprising of 40% of the studies. However, the comparative analysis of the Table 7 illustrates that 80% of the student centred-studies was carried out in higher education context. A deeper investigation indicates that most of these studies targeted student teachers' ICT use along with their ICT attitude and perceptions, their ICT knowledge and skills. This also palpably illustrates that there is a research evolution towards the prospective teachers' ICT use and influencing factors on the contrary to the general consensus in the literature that teachers' ICT use is in the centre of ICT research (Vanderlinde, et al. 2014). Thus, it could be signaling that ICT research focus is shifting from a teacher-centred perspective to a more student-centred form. This finding mostly concurred with the results of a recent systematic review study (Pérez-Sanagustínet, al. 2017), supporting the sensitivity and robustness of our review results.

Review Results about Design of the Studies (RQ5)

The research design employed in each study was identified and coded based on Creswell's (2007; 2012) description of research methods. In the line of this, the distribution of research design employed in each study is presented in Table 8 below. Results illustrate that the vast majority of the papers (70%) utilized a quantitative approach to ICT research and respectively 14% of them adopted a qualitative methodology. Finally, 16% employed a mixed-methods design of inquiry.

Table 8. Design of the Studies by Publication Years

Publication Year	Quantitative	Qualitative	Mixed Methods
2012	7 (Survey 2, Correlational 5)	1 (Multiple Case 1)	2 (Exploratory 1, Explanatory 1)
2013	6 (Survey 3, Correlational 3)	-	-
2014	7 (Survey 2, Correlational 5)	1 (Single Case 1)	4 (Exploratory 1, Explanatory 2, Embedded experimental 1)
2015	15 (Survey 8, Correlational 7)	4 (Single Case 2, M*ultiple Case 2*)	2 (Explanatory 2)
2016	10 (Survey 3, Correlational 6, Experimental 1)	3 (Single Case 2, M*ultiple Case 1*)	3 (Explanatory 3)
Total	45	9	11

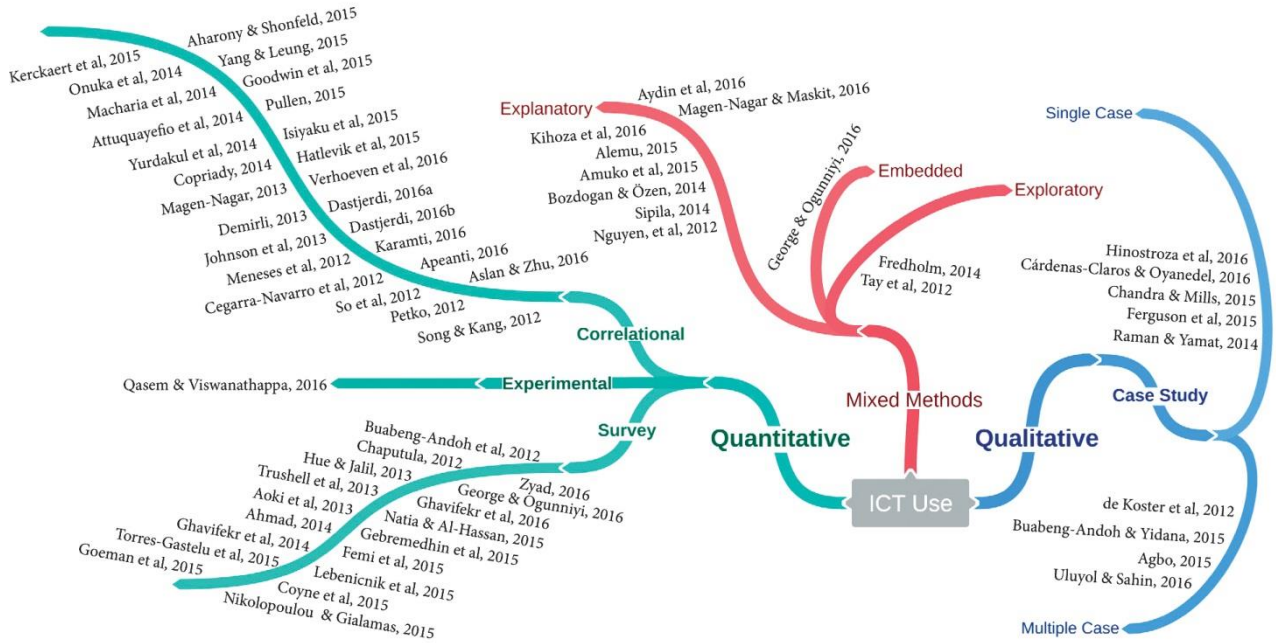


Figure 2. Illustration of Reviewed Studies by Research Design

As illustrated in Figure 2, there is a dominance of quantitative studies in the realm of ICT research. This finding overlapped with the results of a previous review study (Pérez-Sanagustín et al. 2017). Yet, most studies employed non-experimental designs of quantitative inquiry such as correlational and survey designs. In regard to experimental studies, there are only two study included in the review that utilized experimental design (one experimental paper labeled under mixed-methods since the authors). This result heralded that there is a need for more interventional studies in inquiry of ICT use and its influencing factors or its impact on students' learning. Likewise, the number of studies adopted a qualitative or mixed-methods design is limited in number compared with the quantitative studies. Pertaining to the balance between quantitative and qualitative research designs, review results purported that there is a need for more case studies and interventional designs in ICT research.

Review Results about Typology of ICT Use (RQ6)

Regarding the RQ6, the typology of ICT use and theoretical foundations adopted in the studies were coded and categorized. Table 9 below presents these categories and qualitative synthesis of them.

Table 9. The typology of ICT use and the theoretical underpinnings

Themes	Categories	Experiential Learning	Will, skill, tool	With, from	TPACK	**Others	TAM, UTAUT	Not Specified	Overall (f)
ICT Use Competence	Digital Competence	-	-	-	-	-	-	1	1
	ICT Literacy*	-	-	-	-	-	-	1	1
	ICT Competences*	1	-	-	-	-	-	-	1
	ICT Competence and Perceived Importance	-	-	-	-	-	-	1	1
	ICT Composite Index	-	-	-	-	-	-	1	1
	ICT Usage Phase (survival, mastery, impact and innovation)	-	-	-	1	-	-	-	1
	ICT Knowledge	-	-	-	-	-	-	1	1
	TPACK	-	-	-	1	-	-	-	1
ICT Use Context	Before, during, after class	-	-	-	-	-	-	1	1
	Frequency of Use of ICT tools (Classroom Use)*	-	1	1	-	-	-	1	3
	ICT Use inside and outside Classroom	-	-	-	-	-	-	1	1
ICT Use Frequency	Actual Use of ICT	-	-	-	-	1	-	-	1
	Application of ICT	-	-	-	-	-	-	1	1
	Behavioral Intention &Use Behavior	-	-	-	-	-	5	-	5
	Frequency of Use of ICT tools	-	-	-	1	1	2	13	17
	Frequency of Use of VLE and the Internet	-	-	-	-	-	-	1	1
	Frequency of Use of ICT tools (Classroom Use)*	-	1	1	-	-	-	1	3
	Frequency of Use of ICT tools and ICT literacy*	-	-	-	-	-	-	1	1
	Frequency of Use of ICT tools and ICT competences*	1	-	-	-	-	-	-	1
ICT Use Style	Functional Use	-	-	-	-	1	-	-	1
	ICT Tools, Goals, Activities	-	-	-	-	-	-	1	1
	Organizational & Informative	-	-	-	-	-	-	1	1
	Supporting basic ICT skills and attitudes & Supporting contents and individual learning needs	-	-	-	-	-	-	1	1
	Supporting teaching and learning	-	-	-	-	-	-	1	1
	Innovative use (instructional, communicative, organizational, evaluative, supportive)	-	-	-	-	-	-	1	1
	Professional Use	-	-	-	-	1	-	-	1
	Traditional & Constructivist Use	-	-	-	-	-	-	1	1
ICT Use Tools	ICT Use at the Micro Level: Social media & Digital games	-	-	-	-	1	-	-	1
	ICT Based Instructional Activities	-	-	-	1	-	-	-	1
	Use of E-learning Portals	-	-	-	-	-	-	1	1
	Use of ICT tools	-	-	-	-	-	1	13	14
	Use of ICT tools: assimilation, transformation	-	-	-	-	-	-	1	1
	Online interaction and Access and publishing content	-	-	-	-	-	-	1	1
Overall *(f)*		2	2	2	4	5	8	47	70

The thematic analysis of each ICT use category yielded five themes; namely, Frequency, Tools, Style, Competence and Context of ICT use. In most papers included in the review, ICT use was formulated as frequency of use of ICT tools (43%), and respectively as ICT use tools (28%). These two conceptualizations of ICT use account for the 71 % of ICT use studies included in the review. The other formulations of ICT use included ICT use competences (11%), ICT use style (11%), and ICT use context (7%). Regarding the innovative use of ICT, only two of the papers addressed the innovative use of ICT. In one of these papers, Buabeng-Andoh and Totimeh (2012) operationalized the innovative use of ICT as instructional, communicative, organizational, evaluative, supportive use of ICT. In the second paper, Yurdakul and Coklar (2014) defined ICT use as the highest level of ICT usage phase comprising of four levels of ICT use; namely, survival, mastery, impact and innovation. Although these two papers attempted to formulate innovative use of ICT, the former focused on investigating the secondary school teachers' innovative use of ICT, yet without utilizing any theoretical framework. Unlikely, framed by the TPACK, the latter focused on the relationship between prospective teachers' ICT competences and their ICT usage. Although both studies purported promising results, they didn't present clear guidelines to formulate what innovative use of ICT in educational context is.

After examining the overall results presented in Table 9, it can be noted that there is no consensus in the literature on the definition and conceptualization of ICT use and the conceptualization of innovative use of ICT is still in its infancy. Thus, there is a need for further studies to conceptualize and measure ICT use in schools; particularly the future research focus should turn into the innovative use of ICT.

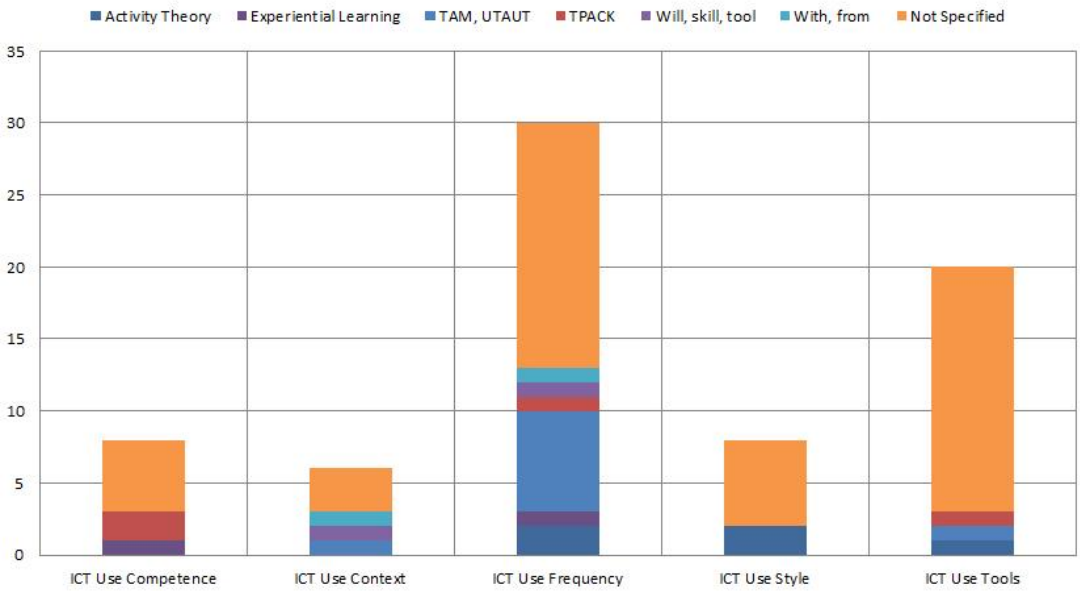


Figure 3. Typology of ICT Use and Frameworks Adopted in the Studies

Figure 3 above illustrates the theoretical foundations employed in the studies, as well as reporting the number of papers placed in each category formed as a result of thematic analysis. The Figure 3 illustrates that in most papers (66%) ICT use was not theoretically framed. Yet, a theory is an integrated set of hypotheses that has collective predictive and explanatory power (Thomas 2011). In addition, a theory helps to build up new research based on the principles and assumptions. This palpably illustrates that ICT research needs theoretical models that will guide and foreground the deeper understanding of ICT adoption phenomenon.

Amongst the studies framed by a theoretical approach to ICT adoption, Technology Acceptance Model (TAM) and Technological, Pedagogical and Content Knowledge (TPACK) were reviewed as the most frequently addressed frameworks. However, the number of these papers is not

enough in terms of representativeness. This illustrates that although TAM and TPACK are more popular frameworks in explaining ICT use in educational settings, they are limited in number, justifying that there is a need for a comprehensive theoretical framework to ICT use in teaching and learning.

Review Results about ICT Related Factors (RQ7)

As an answer to RQ7, the concepts and factors of ICT use addressed in the studies were reviewed and categorized as student level, teacher level and school level factors.

Student Level Factors

Table10 below presents the frequency and percentage of student level factors and concepts that were under scrutiny in the studies. The concepts that were not addressed in at least two or more studies were not taken into consideration.

Table 10. Student Level Factors Addressed in the Studies

Themes	Categories	Papers	f	%
Students' ICT Use	Use of ICT Tools	Song, & Kang, 2012, Yurdakul & Coklar, 2014, Agbo, 2015, Ferguson et al, 2015, Goeman et al, 2015, Gebremedhin et al, 2015, Karamti, 2016, Magen-Nagar & Maskit, 2016, Aslan & Zhu, 2016, Cegarra-Navarro et al, 2012, Johnson et al, 2013, Lebenicnik et al, 2015	12	18
	Frequency of Use of ICT Tools	Onuka et al, 2014, Tay et al, 2012, Aharony & Shonfeld, 2015, Femi et al, 2015, Verhoeven et al, 2016, Fredholm, 2014	6	9
Critical Factors Regarding Students' ICT Use	ICT Attitude	So et al, 2012, Demirli, 2013, Agbo, 2015, Isiyaku et al, 2015, Dastjerdi, 2016b, Karamti, 2016, Aslan & Zhu, 2016, Fredholm, 2014	8	12
	Academic Achievement	Song, & Kang, 2012, Onuka et al, 2014, Karamti, 2016, Cegarra-Navarro et al, 2012	4	6
	ICT competences	Torres-Gastelu et al, 2015, Goodwin et al, 2015, Hatlevik et al, 2015, Aslan & Zhu, 2016	4	6
	Behavioral intention / Use behavior	Attuquayefio et al, 2014, Isiyaku et al, 2015, Dastjerdi, 2016b,	3	5
	Gender	Song, & Kang, 2012, Hatlevik et al, 2015, Aslan & Zhu, 2016	3	5
	ICT experience	So et al, 2012, Verhoeven et al, 2016, Aslan & Zhu, 2016	3	5
	Pedagogical beliefs,	So et al, 2012, Yang & Leung, 2015, Aslan & Zhu, 2016	3	5
	Perceived usefulness	Dastjerdi, 2016b, Apeanti, 2016, Fredholm, 2014	3	5
	Subject Discipline	Aslan & Zhu, 2016, Aoki et al, 2013 (Not students but schools)	3	5
	TPACK variables	Nguyen, et al, 2012, Yurdakul & Coklar, 2014, Apeanti, 2016	3	5
	Home/School Use of ICT	Pullen, 2015, Hatlevik et al, 2015,	2	3
	ICT Knowledge	Demirli, 2013, Kharade & Peese, 2014	2	3
	ICT skills	Pullen, 2015, Verhoeven et al, 2016	2	3

With a closer look at Table 10, there is a wide array of concepts that were examined in the reviewed studies. Amongst them, students' use of ICT tools (18%) and frequency of their use of ICT

tools (9%) are scrutinized in 18 of the studies. Secondly, in regard to the influencing conditions, students' ICT attitude (12%) and ICT competences (6%) were the most frequently employed independent variables. In four of the studies the impact of students' ICT use on their academic achievement was examined (6%). In addition, regarding students' ICT use, reviewed studies also addressed students' gender (5%), ICT experience (5%), perceived usefulness (5%), subject disciplines (5%), home/school use of ICT (3%), and ICT knowledge (3%) and skills (3%). Moreover some studies focused on student teachers' behavioral intention and use behavior (5%), pedagogical beliefs (5%), and TPACK (5%) variables.

Teacher Level Factors

Regarding teachers' ICT use and related conditions, the teacher level factors addressed in the studies were presented in Table 11.

Table 11. Teacher level factors addressed in the studies

Themes	Categories	Papers	(f)	%
Teachers' ICT Use	Use of ICT Tools	Magen-Nagar, 2013, Buabeng-Andoh & Yidana, 2015, Agbo, 2015, Nikolopoulou & Gialamas, 2015, Coyne et al, 2015, Gebremedhin et al, 2015, Amuko et al, 2015, Chandra & Mills, 2015, Uluyol & Sahin, 2016, Zyad, 2016, Chaputula, 2012, Hue & Jalil, 2013, Johnson et al, 2013	13	20
	Frequency of Use of ICT Tools	Ghavifekr et al, 2014, Tay et al, 2012, Sipila, 2014, Bozdogan & Özen, 2014, Alemu, 2015, Kihoza et al, 2016, Dastjerdi, 2016a, Ghavifekr et al, 2016, Aydin et al, 2016	9	14
Critical Factors Regarding Teachers' ICT Use	ICT Attitude	Magen-Nagar, 2013, Ahmad, 2014, Meneses et al, 2012, Agbo, 2015, Nikolopoulou & Gialamas, 2015, Alemu, 2015, Dastjerdi, 2016a, Hue & Jalil, 2013	8	12
	ICT Skills	Magen-Nagar, 2013, Raman & Yamat, 2014, Ghavifekr et al, 2014, Petko, 2012, Kihoza et al, 2016, Dastjerdi, 2016a, Ghavifekr et al, 2016, Aydin et al, 2016	8	12
	ICT Training	Buabeng-Andoh & Yidana, 2015, Meneses et al, 2012, Agbo, 2015, Nikolopoulou & Gialamas, 2015, Alemu, 2015, Ghavifekr et al, 2016, Aydin et al, 2016	6	9
	Barriers to ICT use	Ahmad, 2014, Raman & Yamat, 2014, Gebremedhin et al, 2015, Alemu, 2015, Ghavifekr et al, 2016	5	8
	ICT competences	Kerckaert et al, 2015, Petko, 2012, Sipila, 2014, Alemu, 2015, Kihoza et al, 2016, Aydin et al, 2016	5	8
	Teaching Experience	Buabeng-Andoh & Totimeh, 2012, Raman & Yamat, 2014, Nikolopoulou & Gialamas, 2015, Ghavifekr et al, 2016	4	6
	Pedagogical beliefs	Petko, 2012, Cárdenas-Claros & Oyanedel, 2016, Ghavifekr et al, 2016, Chaputula, 2012	4	6
	Gender	Buabeng-Andoh & Totimeh, 2012, Natia & Al-Hassan, 2015, Ghavifekr et al, 2016	3	5
	Home/School Use of ICT	Alemu, 2015, Cárdenas-Claros & Oyanedel, 2016, Hinostroza et al, 2016	3	5
	Professional Development	Kerckaert et al, 2015, Hatlevik et al, 2015, Aydin et al, 2016	3	5
	Usage purpose/style	Natia & Al-Hassan, 2015, Hinostroza et al, 2016, de	3	5

	Koster et al, 2012		
Blended learning	Kihoza et al, 2016, Qasem & Viswanathappa, 2016	2	3
Education levels	Song, & Kang, 2012, Kihoza et al, 2016	2	3
ICT Knowledge	Ghavifekr et al, 2014, Kihoza et al, 2016	2	3
Innovativeness	Kerckaert et al, 2015, Coyne et al, 2015	2	3
Motivation	Copriady, 2014, Uluyol & Sahin, 2016	2	3
Perceptions to use ICT	Gebremedhin et al, 2015, Goeman et al, 2015,	2	3
Self-efficacy	Kerckaert et al, 2015, Bozdogan & Özen, 2014	2	3
Supportive use of ICT	Kerckaert et al, 2015, Qasem & Viswanathappa, 2016	2	3
Teaching Style	Song, & Kang, 2012, Petko, 2012	2	3

With regard to the teachers' ICT use and influencing factors, Table 11 shows the number of papers addressing teacher level variables. Similarly, with the student level factors, the most popular ICT related teacher level factors were teachers' use of ICT tools (20%) and the frequency of their use of ICT tools (14%). As to the ICT related variables, teachers' ICT attitude (12%), ICT skills (12%), ICT training (9%), barriers to ICT use (8%), ICT competences (8%), teaching experience (6%) and their pedagogical beliefs (6%) were the most popular variables examined in the studies. Gender (5%), home/school use of ICT (5%), professional development (5%), and usage purpose (5%) were amongst the other frequently addressed variables at teacher level.

School Level Factors

Table 12 illustrates the school level factors included in the reviewed studies. The most frequently addressed school level factor is ICT infrastructure (23%). Surprisingly, ICT infrastructure yielded the most popular variable included in the reviewed studies compared with all other factors at teacher and student level. This resonates that ICT infrastructure is a critical phenomenon addressed in ICT research, which may not be supporting the claim that teacher level variables have a central role in explaining ICT use process. Yet, it should be noted that we do not underestimate the role of teacher level factors as presented in Table 11, they were still addressed in quite a number of studies in our review.

Table 12. School Level Variables Addressed in the Studies

Themes	Categories	Papers	(f)	%
School Level Factors Regarding ICT Use	ICT infrastructure	Buabeng-Andoh & Yidana, 2015, Song, & Kang, 2012, Petko, 2012, Meneses et al, 2012, Agbo, 2015, Goeman et al, 2015, Femi et al, 2015, Natia & Al-Hassan, 2015, Chandra & Mills, 2015, Dastjerdi, 2016a, Ghavifekr et al, 2016, Aydin et al, 2016, Karamti, 2016, Aoki et al, 2013, Onuka et al, 2014	15	23
	School support	Ahmad, 2014, Buabeng-Andoh & Yidana, 2015, Song, & Kang, 2012, Sipila, 2014, Chandra & Mills, 2015, Ghavifekr et al, 2016, Aydin et al, 2016	7	11
	School type	Buabeng-Andoh & Totimeh, 2012, Aslan & Zhu, 2016, Aydin et al, 2016	3	5
	ICT policy	Goeman et al, 2015, Aydin et al, 2016	2	3

Further investigation of the Table 12 shows that school support (11%), school type (5%), and ICT policy (3%) were the other factors addressed in the reviewed papers. Our overall conclusion with regard to the ICT use influencing factors is that the results we present are helpful to keep up with the trends and identifying gaps. Thus, there is a wide array of teacher level variables, yet at student and school levels; there is a need for further periodical review studies to include more research studies addressing ICT related factors at these two levels.

DISCUSSION, CONCLUSION AND IMPLICATIONS

The current study presented a systematic review of empirical studies on ICT use in teaching and learning. Time frame for the review was from 2012 to 2016. In order to minimize bias and ensure review quality, the PRISMA Statement was employed as a theoretical foundation and guideline throughout the review process. In addition, SPIDER tool of searching electronic databases was utilized in our review protocol. The ERIC database was searched for empirical papers investigating ICT use in educational settings. The initial search results yielded 209 papers. After screening and eligibility stages 65 papers met the eligibility criteria and included in the review.

Prior to presenting our major results and concluding remarks, it should be noted that certain limitations, such as a shared limitation of coverage that all review studies may subject to, are inherent to the research design we employed. On the plus side, our review results are robust and transparent since our most major findings concurred with the previous review studies (Pérez-Sanagustín, et al. 2017; Tay, et al. 2017) conducted with different electronic databases, such as ISI web of Science, and/or Scopus. Since the results of which are robust and sensitive, our review study can provide invaluable repository of evidence for ICT researchers, ICT practitioners and ICT decision-makers as such it highlights the current ICT research trends, as well as identifying research gaps in the realm of ICT research.

After qualitative and quantitative synthesis of review data, we have extracted 6 major results and concurrently we proposed some recommendations based on the implications. These are as follows:

(1) **There is an increase in the volume of ICT research studies in the regions/countries that experience a large scale ICT integration program or a curriculum transformation regarding ICT adoption into teaching and learning practices.** This resonates with there is a link between the prevalence of ICT use and the number of ICT research in a specific context. In other words, the more investment on ICT projects or ICT curriculum we make, the more research study we get.

(2) **Most studies included in the review did not address subject specific ICT use. This may partly result from our review focus, since we put more emphasis on ICT use and influencing factors rather than its impact on students' outcomes.** On the other side, out of 24 papers investigating subject specific use of ICT, 7 papers were in the Language learning area, 6 papers in the Mathematics, and 5 papers addressed the Science subject specific ICT use. This finding mostly overlapped with the results of a previous study conducted in Singapore context (Tay, Nair, & Lim, 2017), which can be an indicator of the robustness of our review results. The results also heralded that there is a limited number of papers addressing subject specific use of ICT; hence, future research should pay more heed to use of ICT in subject disciplines.

(3) **Regarding educational levels addressed in the reviewed studies, there is a dominance of higher education institutions context.** Yet, just 2 studies out of 65 were carried out in preschool education context, 10 in primary school settings, and 21 in secondary school settings. However, the majority of studies (29) were conducted in higher education contexts. This may result from practical reasons that ICT scholars can collect data from their own students more easily by investing less effort compared with primary and secondary school settings. Another reason could be the increasing concern on prospective teachers' ICT use and their technological and pedagogical competences. Thus, this may have an effect on ICT research paying more attention to higher education institutes with teacher

training programs. Nevertheless, this illustrates that there is a need for more research in preschool, primary and secondary school contexts.

(4) **As to the research methodology adopted in the studies, there is a dominance of non-experimental quantitative research designs such as survey design and correlational design.** The result concurred with the previous results (Pérez-Sanagustín, et al. 2017). More specifically, the review results yielded that there are just two experimental studies, 11 mixed methods designs and 8 qualitative designs. In addition, considering the results regarding theoretical underpinnings of ICT studies, most studies (65%) didn't utilize any theoretical foundations. Given this, there is a need for qualitative and mixed method design studies. Particularly for developing theory based research, qualitative studies are more effective in identifying broad concepts and categories of ICT use, then disclosing their interaction with each other. As a result, more qualitative studies needed for theoretical model building. Yet, in order to blend the strengths and neutralize the weaknesses of both methods, there is a need for more mixed methods studies, as well.

(5) **Pertaining to the conceptualization of ICT use, results purported that there is no consensus on the definition of ICT use, resulting in a wide array of ICT use conceptualizations within the papers.** Accordingly, we ran a thematic analysis in order to identify broad categories of ICT use. Qualitative synthesis yielded that ICT use nested in five broad categories namely, frequency, tools, style, context and competence. Yet there is a tendency of utilizing frequency of ICT use tools as a dependent variable in most studies in the review (46%). Only 2 papers addressed the innovative use of ICT with a number of limitations in conceptualization. These results illustrate that it is imperative for ICT researchers to generate generic ICT use models and elaborate on innovative use of ICT as a concept and finally a variable.

(6) **With regard to critical factors regarding ICT use in schools, a broad spectrum of variables examined in the studies included in the review.** As a result of qualitative synthesis of the data, we grouped these variables into three as consistent with the literature. First group is related with student level variables that consisting of students' use of ICT tools, frequency of use of ICT tools, their attitude towards ICT, and ICT competences. Second group included teacher level variables such as teachers' ICT use frequency, use of ICT tools, ICT attitude, ICT skills & knowledge, ICT training, barriers to ICT use, ICT competences, teaching experience, pedagogical beliefs, gender, and professional development. Finally, the last group consisted of school level variables, such as ICT infrastructure, ICT support and ICT policy. These results heralded that a comprehensive ICT use model should include these variables. They are illustrated in Table13 below.

Table 13. A Generic ICT Use Model Based on the Review Results

School Level Factors	Student Level Factors	Teacher Level Factors	Teachers'/Students' ICT Use
ICT infrastructure	ICT attitude	ICT attitude	Frequency
School support	ICT competence	ICT skills & knowledge	Tools
School type	Gender	ICT training	Context
ICT policy	ICT experience	Barriers to ICT use	Style
	ICT skills & knowledge	ICT competences	Competence
		Teaching experience	
		Pedagogical beliefs	
		Gender	
		Professional development	

Despite the aforementioned limitations, our results are robust and they provide invaluable insights for ICT research community, ICT practitioners and ICT policy makers. Future research should focus on innovative use of ICT, other teacher, student or school level factors pertinent to ICT use and its impact on students' learning or other school level outcomes.

Acknowledgements

The present study is part of a PhD study supported by Yildiz Technical University, Scientific Research Projects Coordination Office (SRPCO) - Project ID:1074, Code: 2016-09-01-DOP01. The support and resources provided by the YTU SRPCO are gratefully acknowledged.

REFERENCES

Aesaert, K., Vanderlinde, R., Tondeur, J., & van Braak, J. (2013). The content of educational technology curricula: A cross-curricular state of the art. *Educational Technology Research and Development*, *61*(1), 131-151.

Aesaert, K., van Braak, J., van Nijlen, D., & Vanderlinde, R. (2015). Primary school pupils' ICT competences: extensive model and scale development. *Computers & Education*, *81*, 326–344. http://doi.org/10.1016/j.compedu.2014.10.021

Agbo, I. S. (2015). Factors Influencing the Use of Information and Communication Technology (ICT) in Teaching and Learning Computer Studies in Ohaukwu Local Government Area of Ebonyi State-Nigeria. *Journal of Education and Practice*, 17.

Aslan, A., & Zhu, C. (2017). Investigating variables predicting Turkish pre-service teachers' integration of ICT into teaching practices: Pre-service teachers' ICT integration. *British Journal of Educational Technology*, *48*(2), 552-570. https://doi.org/10.1111/bjet.12437

Aydin, M. K., Vanderlinde, R., & Gurol, M. (2016).Evaluating ICT integration in Turkish K-12 schools through teachers' views. *EURASIA Journal of Mathematics, Science & Technology Education*, *12*(4), 747–766. http://doi.org/10.12973/eurasia.2016.1227a

Baser-Gulsoy, V. G. (2011). *Elementary teachers' perceptions towards ICT integration in teaching and learning process: an explanatory mixed method* (Unpublished doctoral dissertation). METU, Ankara.

Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: a review of the literature. *International Journal of Education and Development using Information and Communication Technology*, *8*(1), 136–155.

Cakiroglu, O. (2015). Teachers' views on the use of interactive whiteboards in secondary schools. *EURASIA Journal of Mathematics, Science & Technology Education*, *11*(2), 251–259. http://doi.org/10.12973/eurasia.2015.1335a

Chisalita, O. A., & Cretu, C. (2015). ICT Support and ICT Use in Romanian Secondary Education. Presented in The 11th International Scientific Conference e-Learning and Software for Education Bucharest, April 23-24, 2015.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.

Creswell, J. W. (2012). *Educational research: planning, conducting, and evaluating quantitative and qualitative research*. Boston: Pearson.

Demirli, C. (2013). ICT usage of pre-service teachers: cultural comparison for Turkey and Bosnia and Herzegovina. *Educational Sciences: Theory and Practice*, *13*(2), 1095–1105.

Flanagan, L., & Jacobsen, M. (2003).Technology leadership for the twenty-first century principal. *Journal of Educational Administration*, *41*(2), 124-142. https://doi.org/10.1108/09578230310464648

Fleischer, H. (2012). What is our current understanding of one-to-one computer projects: A systematic narrative research review. *Educational Research Review*, *7*(2), 107-122. https://doi.org/10.1016/j.edurev.2011.11.004

Glaser, B., & Strauss, A. (1999). *The discovery of grounded theory: Strategies for qualitative research*. New Brunswick: Aldine Transaction.

Goodwin, A. L., Low, E. L., Ng, P. T., Yeung, A., & Cai, L. (2015). Enhancing playful teachers' perception of the importance of ICT use in the classroom: The role of risk taking as a mediator. *Australian Journal of Teacher Education*, *40*(40). https://doi.org/10.14221/ajte.2015v40n4.8

Goktas, Y., Yildirim, S., & Yildirim, Z. (2009). Main barriers and possible enablers of ICTs integration into pre-service teacher education programs. *Educational Technology & Society*, *12*(1), 193–204.

Gough, D., & Thomas, J. (2016). Systematic reviews of research in education: aims, myths and multiple methods. *Review of Education*, *4*(1), 84-102. DOI: 10.1002/rev3.3068

Gulbahar, Y. (2007). Technology planning: A roadmap to successful technology integration in schools. *Computers & Education*, *49*(4), 943–956. doi:10.1016/j.compedu.2005.12.002

Harper, B., & Milman, N. B. (2016). One-to-One Technology in K–12 Classrooms: A review of the literature from 2004 through 2014. *Journal of Research on Technology in Education*, *48*(2), 129-142. https://doi.org/10.1080/15391523.2016.1146564

Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: current knowledge gaps and recommendations for future research. *Educational Technology Research and Development*, *55*(3), 223-252. https://doi.org/10.1007/s11423-006-9022-5

Hismanoglu, M. (2012).The impact of a curricular innovation on prospective EFL teachers' attitudes towards ICT integration into language instruction. *International Journal of Instruction*, *5*(1), 183–202.

Holcomb, L. B. (2009). Results & lessons learned from 1:1 laptop initiatives: a collective review. *TechTrends*, *53*(6), 49-55. https://doi.org/10.1007/s11528-009-0343-1

Islam, M. S., & Grönlund, Å. (2016).An international literature review of 1:1 computing in schools. *Journal of Educational Change*, *17*(2), 191-222. https://doi.org/10.1007/s10833-016-9271-y

Karaca, F., Can, G., & Yildirim, S. (2013). A path model for technology integration into elementary school settings in Turkey. *Computers & Education*, *68*, 353-365. https://doi.org/10.1016/j.compedu.2013.05.017

Kalolo, J. F. (2018). Digital revolution and its impact on education systems in developing countries. *Education and Information Technologies*. https://doi.org/10.1007/s10639-018-9778-3

Law, N., Pelgrum, W. J., &Plomp, T. (Ed.).(2008). *Pedagogy and ICT Use*. Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-1-4020-8928-2

Matavire, R., & Brown, I. (2013). Profiling grounded theory approaches in information systems research. *European Journal of Information Systems*, *22*(1), 119-129. http://dx.doi.org.ezproxy.ulb.ac.be/10.1057/ejis.2011.35

Methley, A. M., Campbell, S., Chew-Graham, C., McNally, R., & Cheraghi-Sohi, S. (2014). PICO, PICOS and SPIDER: a comparison study of specificity and sensitivity in three search tools for qualitative systematic reviews. *BMC Health Services Research*, *14*(1). https://doi.org/10.1186/s12913-014-0579-0

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., The PRISMA Group. (2009). *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement*. PLoS Med *6*(7): e1000097. doi:10.1371/journal.pmed1000097

Mullins, M. M., De Luca, J. B., Crepaz, N., & Lyles, C. M. (2014). Reporting quality of search methods in systematic reviews of HIV behavioral interventions (2000-2010): Are the searches clearly explained, systematic and reproducible? Reporting Quality of Search Methods. *Research Synthesis Methods*, *5*(2), 116-130. https://doi.org/10.1002/jrsm.1098

Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: a review of the literature. *Journal of Information Technology for Teacher Education*, *9*(3), 319-342. https://doi.org/10.1080/14759390000200096

Pérez-Sanagustín, M., Nussbaum, M., Hilliger, I., Alario-Hoyos, C., Heller, R. S., Twining, P., & Tsai, C.-C. (2017). Research on ICT in K-12 schools – A review of experimental and survey-based studies in computers & education 2011 to 2015. *Computers & Education*, *104*, A1-A15.https://doi.org/10.1016/j.compedu.2016.09.006

Semerci, A. (2018). Students' views on theuse of tablet computers in education. *World Journal on Educational Technology: Current Issues*, *10*(2), 104-114.

Semerci, A., & Aydin, M. K. (2018). Examining high school teachers' attitudes towards ICT use in education. *International Journal of Progressive Education*, *14*(2), 93-105. https://doi.org/10.29329/ijpe.2018.139.7

So, H.-J., Choi, H., Lim, W. Y., &Xiong, Y. (2012). Little experience with ICT: Are they really the Net Generation student-teachers? *Computers & Education*, *59*(4), 1234-1245. https://doi.org/10.1016/j.compedu.2012.05.008

Song, H.-D., & Kang, T. (2012). Evaluating the impacts of ICT use: a multi-level analysis with hierarchical linear modeling. *The Turkish Online Journal of Educational Technology*, *11*(4), 9.

Tay, L. Y., Nair, S. S., & Lim, C. P. (2017). A regression analysis of elementary students' ICT usage vis-à-vis access to technology in Singapore. *Educational Media International*, *54*(1), 34-47. https://doi.org/10.1080/09523987.2017.1324362

Tezci, E. (2011). Turkish primary school teachers' perceptions of school culture regarding ICT integration. *Educational Technology Research and Development*, *59*(3), 429–443. doi:10.1007/s11423-011-9205-6

Thomas, M. K. (2011). The utility and efficacy of qualitative research software in grounded theory research. In (Eds.), Vivian B. Martin, Astrid Gynnild, Grounded Theory, The Philosophy, Method and Work of Barney Glaser, Boca Raton, FL: Brown Wal, Publisher: Brown Walker Press, pp.133-146

Tondeur, J., Valcke, M., & Van Braak, J. (2008). A multidimensional approach to determinants of computer use in primary education: teacher and school characteristics: Determinants of computer use. *Journal of Computer Assisted Learning*, *24*(6), 494–506. http://doi.org/10.1111/j.1365-2729.2008.00285.x

Tondeur, J, Van Keer, H., Van Braak, J., &Valcke, M. (2008). ICT integration in the classroom: challenging the potential of a school policy. *Computers & Education*, *51*(1), 212–223. doi:10.1016/j.compedu.2007.05.003

Van Braak, J., Tondeur, J., &Valcke, M. (2004).Explaining different types of computer use among primary school teachers.*European Journal of Psychology of Education*, *19*(4), 407–422. http://doi.org/http://dx.doi.org.ezproxy.ulb.ac.be/10.1007/BF03173218

Vanderlinde, R., & Van Braak, J. (2010). The e-capacity of primary schools: development of a conceptual model and scale construction from a school improvement perspective. *Computers & Education*, *55*(2), 541–553. doi:10.1016/j.compedu.2010.02.016

Vanderlinde, R., Van Braak, J., & Dexter, S. (2012). ICT policy planning in a context of curriculum reform: Disentanglement of ICT policy domains and artifacts. *Computers & Education*, *58*(4), 1339–1350. doi:10.1016/j.compedu.2011.12.007

Vanderlinde, R., Aesaert, K., & van Braak, J. (2014). Institutionalised ICT use in primary education: A multilevel analysis. *Computers & Education*, *72*, 1–10. http://doi.org/10.1016/j.compedu.2013.10.007

Wang, Q. (2008). A generic model for guiding the integration of ICT into teaching and learning. *Innovations in Education and Teaching International*, *45*(4), 411–419. http://doi.org/10.1080/14703290802377307

Yurdakul, I., & Coklar, A. N. (2014). Modeling preservice teachers' TPACK competencies based on ICT usage: Modeling preservice teachers' TPACK compentencies. *Journal of Computer Assisted Learning*, *30*(4), 363-376. https://doi.org/10.1111/jcal.12049

Zhong, Z.-J. (2011). From access to usage: The divide of self-reported digital skills among adolescents. *Computers & Education*, *56*(3), 736-746. https://doi.org/10.1016/j.compedu.2010.10.016

International Journal of Progressive Education, Volume 15 Number 4, 2019

Multicultural Children Literature in Preservice Teacher Education: Responses through Literature Circles

Nergiz Kardaş İşler [i]
Hacettepe University

Hakan Dedeoğlu [ii]
Hacettepe University

Abstract

This study aims to analyze pre-service teachers' opinions about children books through a literature circle (LC) approach in multicultural learning environments. The data of the present study were collected from the children literature course offered for preservice classroom teachers during the 2014-2015 and 2015-2016 spring semesters at Hacettepe University. The preservice teachers (PSTs) in children iterature course read and responded to Newbery Award winning books both individually and in literature circle groups within a framework of critical literacy and reader response theories. The results of the current study revealed the deficiencies of the pre-service teachers in the process of critical reading and actualization in spite of their satisfactory interpretations of the events. In this study, the PSTs expressed their opinions for the "gaining an understanding of different perspectives on life in the world" and "the cultures of specific groups, developing the skills needed to take social action to eliminate social injustice" categories in all four children books. However, they did not share their opinons related to gain an awareness of own cultures and cultural backgrounds and obtain a recognition an understanding of global issues, learning how to reduce stereotyping, prejudice and racism within ourselves and within society" categories. This study may contribute to a variety of research fields including pre-service teacher education, multicultural education and literary studies.

Keywords: Multicultural literature, literature circles, newbery award, preservice teachers, children books.

DOI: 10.29329/ijpe.2019.203.10

---

[i] **Nergiz Kardaş İşler**, Res. Assist. Dr., Hacettepe University, Primary Education.

Correspondence: nergiz.kardes@gmail.com

[ii] **Hakan Dedeoğlu**, Assoc. Prof. Dr., Hacettepe University, Elementary Education.

INTRODUCTION

Teachers need to utilize various strategies in order to involve multicultural education in the classrooms when they enable their students having different ethnic backgrounds, cultures, gender and languages to raise their understandings about the world. Has been growing numbers of the studies (e.g. Aerila, Soininen, and Merisuo-Storm, 2016; Arifin and Hermino, 2017; Artiles and McClafferty, 1998; Gay and Kirkland, 2003; Hosoya and Talib, 2013; Nieto, 2000; Sleeter, 1992; Solomon, 1995; Van Hook, 2002) related to the preparation of teachers to work with multicultural education in teacher education programmes. However, little attention has paid to the needs of the preservice teachers (PSTs) about their practices of the multicultural education as an ongoing topic of educational research. In the recent years, education scholars including researchers, teachers, and administrators have opened a new gateway for multicultural education on both the presercive education programs and K-12 settings (McElroy, 2005). Larkin (1995) stated "as teacher preparation programs attempt to respond to the increasing cultural diversity of our society, the traditional preservice teacher education curriculum is one of a number of areas that will need to be broadly reconsidered (p. 1)". In the same manner, Klassen-Endrizzi and Ruiz (1995) expressed "Proponents of multicultural education maintain that classroom teachers need occasions to consider the purpose and content of a multicultural approach to teachers is not adequate (p. 129)". In addition, schools have a significant role in establishing social integration by allowing the students to perceive the diversities as richness of the society (Arslan, 2013). Especially in the teacher-led classroom atmospheres, teachers have the dominant roles on the opinions and values of their students and this lead to increase the importance of multicultural education in teacher education. In this sense, Sleeter and Grant (1999) illuminated its significante through these words:

> "Theories of cultural transmission, social learning, and modeling provide guidance by alerting teachers to how children normally acquire society's values and beliefs. Teachers who want their students to learn values and bliefs for a multicultural society will need to change the content of what is usually transmitted to make it congruent with the ideology of Multicultural Education (p. 162)."

Theoretical Perspectives: Multicultural Education Connections to Literacy Education

Multicultural education is implemented to enhance tolerance, respect, understanding, awareness, and acceptance of self and others in the diversity of people's cultures (Irvine, Arment and Causey, 2011). Multicultural education usually linked to the original culture and traditions of various student groups as well as the school's goals and practices to meet the educational needs of the different groups (Hosoya and Talib, 2013). As the crucial teaching tool for multicultural education, literature education benefits from fictional and non-fictional works to support students' thinking skills, values, and understanding of social structure. Moreover, Nieto and Bode (2004) point out that multicultural education is inclusive and is for everyone regardless of one's background. According to Aerila, Soininen, Merisuo-Storm (2016), multicultural literature has many positive impacts upon the people coming from the different backgrounds such as including increasing cultural awareness, developing self awareness, and promoting intercultural understanding. The multicultural children's literature courses in primary schools allow children to understand one another's culture and reflect on their own culture. Dietrich and Ralph (1995) highlight that "when multicultural literature becomes an integral part of the curriculum and teachers act as models and guides, classrooms can become arenas for open exchange" (p. 1). In the scope of the multicultural literature, students can connect the experiences coming from other cultures with their own cultures by reading the literature texts and participating in the related discussions.

According to Dietrich and Ralph (1995), in the process of developing multicultural philosophy, cooperative and collaborative discussion should be particularly emphasized to enhance awareness of the literary works and create a true community of teacher-learners. As one of the most effective instructional approaches for multicultural reading programs, literature circles (LCs) can create discussion settings for creating learning communities to prepare students for living in

multicultural contexts through both fictional and non-fictional works in (LCs). In addition to the classroom environment created by teachers as the key factor in motivating students to read, teachers' modelling practices such as sharing their readings with the students also demonstrate the significance of the reading for the students (Decker, 1986). Effective teachers promote literature in their instructional programs, and one of the ways of these instructional approaches is designing Literature Circles. Klassen (1993) stated "Literature Circles were also a central vehicle for helping students consider multicultural issues (p. 132)." Literature Circles are discussion groups of students who have chosen to read the same text. To direct their attention in reading and ensure greater participation during group discussions, prompts called as "roles" direct the students' attention to the reading and ensure their increasing participation in group discussions (Daniels, 2002). Tompkins (2006) expresses that teachers organize a conversation based on the introduction of the books selected from five or six copies of each book. Furr (2004) underlines that successful literature circles lead to raising students' participations in "real life" meaningful discussions about the texts/stories that they've read; thus, it is important for the teacher to choose materials which promote reading fluency for use in literature circles. Tompkins (2006) describes the roles of group meetings as follows: one student ise the *Discussion Director* and he/she assumes the leadership role and directs the discussion. *Passage Master* focuses on the literary merits of the book; *Word Wizard* is responsible for vocabulary, *Connector* makes connections between the book and the student lives, *Summarizer* makes a summary of the reading to convey the big ideas to share with the group, *Illustrator* draws a picture or diagram related to the reading, *Investigator* finds some information about the book, author, or related topic to share with the group.

Teachers have crucial responsibility based on teaching other people's children. The values, beliefs, dispositios, and practices of the teachers influence their working ability with the students effectively in the classrooms (Jackson, 1995). Teachers may select children's book to initiate discussion of living in a multicultural environment among their students. Rosenblatt (1978) underlines that there are varying features enable the students to create the meaning from the text: past experiences with language, past experiences with text, the reader's present situation, the reader's interests, and the reader's cultural, personal, and social history. Futhermore, encouraging critical reader response is an important approach facilitating the appreciation of multicultural children's literature. In terms of Rosenblatt's (1978) Reader Response Theory children tend to interpret text using their own life experience as a guide Tracey and Morrow (2006) express that "Transactional Theory (Rosenblatt 1978) extends the application of Schema Theory by arguing that all readers have unique responses to reading texts due to the unique nature of their background schemas (p. 74)." Moving away from the traditional evaluation of the authors' intentions in a piece of literature, Rosenblatt (1978) focused on the experiences that the reader brings to the reading situation and how this plays a role in the construction of meaning. Moreover, prior knowledge, life experiences, and personal preferences affect a reader's interpretation of text. This theory is constructivist in nature because it emphasizes the active role of the reader in meaning making. Rosenblatt's work adds the distinction of two kinds of responses that all readers have to texts. Because of its emhphasis on the active role of the reader in meaning making, this constructivist theory adds the distinction of two kinds: "efferent responses" and "aesthetic responses" (Tracey and Morrow, 2006). Rosenblatt (1988) referred to these kind of responses in the following way:

> "In efferent reading, then, we focus attention mainly on the public "tip of the iceberg" of sense: The meaning results from an abstracting-out and analytic structuring of the ideas, information, directions, and conclusions to be retained, used, or acted on after the reading event. In aesthetic reading, the reader adopts an attitude of readiness to focus attention on what is being lived through during the reading event. (p. 7)

Rosenblatt (1991, 1995) emphasizes that every reading act is transactional involving the reader along with his/her past experiences and the text at a particular time and in a particular context. The meaning of what is being read is not already there on the page or in the reader's mind. The meaning occurs when the transaction takes place between the reader and the text. In other words, the text simply marks on a page until a reader transacts with it (Salisbury, 2010).

Children's literature classes are one of the first opportunities for (PSTs) to begin exploring their perspectives on; literature and reading, diversity and equity, and books and children. It is also important that these classes provide them an authentic resource that can be the foundation of a literacy program as well as a major resource for other curriculum areas. Klassen-Endrizzi and Ruiz (1995) mention that the PSTs are rarely active participants in the construction of a multicultural learning community in their university classrooms. Similarly, Dietrich and Ralph (1995) mention that "teachers need to make classrooms lively forums of open multicultural exchange. They must select materials that encourage a cultural revision so that the students can both understand another culture's point of view and see their own culture from an outsider's perspective (p. 6)". In this regard, this study attempts to explore the PSTs' opinions focuses on educating teachers in multicultural learning environments and analyzing their opinions in detail through a qualitative study, is considered to be an important contribution to the literature.

METHODOLOGY

As the representative instance of the case study, qualitative content analysis is carried out in this study. According to Cohen, Manion, and Morrison (2007), "Case study provides a unique example of real people in real situations, enabling readers to understand ideas more clearly than simply by presenting them with abstract theories or principles (p. 253)." Krippendorff (2004) also defines content analysis as "a research techniquie for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use (or other meaningful matter) to the contexts of their use (p. 18)".

Setting and Participants

The setting was a children literature course offered for preservice classroom teachers during the 2014-2015 and 2015-2016 spring semesters. Two separate sections of the children literature course were used in each semester. All of the students were at Hacettepe University in Turkey and they were proficient in Turkish. During the first session of the class, we asked our students sign up for a novel and provided them a guideline about how they need to respond the books. None of the PSTs has read these books before. They were free to choose any books. As a result, 66 students read "Number the Stars", 90 students read "The Giver", 51 students read "Holes" and 56 students read "The Graveyard Book" from four Children's Literature classrooms. Before reading the books, the students who would read the same books formed a group. In these groups, they also had the LC roles among themselves. For effective small-group discussion, group size need to be considered four to six role of LC, groups were allowed to have a maximum of four to six students. Each LC was composed four to six PSTs. As a result of the completion of each role, students had a greater understanding of the reading and much to share during discussions. After readings, they made a presentation about their readings and submitted their written responses.

The Books

Newbery award/honour winning children's books were selected for the study. The Newbery Medal was named for eighteenth-century British bookseller John Newbery. It is awarded annually by the Association for Library Service to Children, a division of the American Library Association, to the author of the most distinguished contribution to American literature for children. Since its founding in 1922, the Newbery Medal has been awarded annually by the American Library Association for the most distinguished American children's book published the previous year. "Newbery Award winning texts are worth looking at because they are among the most widely read titles in and out of school" (Friedman and Catalo, 2002, p. 102). There were fifteen Newbery award winner books translated into Turkish and some of them were hard to find in the bookstores because of single print. We connected with publishers and searched internet for used books to get them. We reached all, but purpose of the study we particularly emphasized on four of them which are shown on the Table 1.

Table 1. Children Books

Award Year	Title	Author	Publisher	Topic
1990	Number the Stars	Lois Lowry	Houghton Mifflin	It is about true-story of a 10-year-old girl who lived in Denmark during World War II, which was occupied by the Nazis.
1994	The Giver	Lois Lowry	Houghton Mifflin	A perfect society where a boy turns 12 receive special training from The Giver who holds the memories of the life.
1999	Holes	Louis Sachar	Bloomsbury	A boy who has been unjustly sent to a boys' detention center, must dig holes in the surface of a dry lake where he will explore his past and present.
2009	The Graveyard Book	Neil Gaiman	Harper Collins	A boy was a toddler when his family was murdered who grew up with the help of ghosts and ghouls.

Data Collection and Analysis

We investigated that how PSTs in children's literature classes read and respond to multicultural children's literature both individually and in LC groups within a framework of critical literacy and reader response theories. Using varied genres of Newberry awarded fictional books translated into Turkish such as realistic (*Holes by Louis Sachar),* historical *(Number the Stars by Lois Lowry)* and fantasy *(Graveyard Book by Neil Gaiman, The Giver by Lois Lowry*) multicultural children's books on a variety of issues will allow future teachers to explore many ways of looking at a given topic. The objectives of the LC activity are to the PSTs' literary understandings during discussions, use writing skill to respond to their readings, and complete each of the six literature discussion roles (Discussion Director, Word Wizard, Illustrator, Passage Master, Connector, and Summurizer). In general, we examined the responses of PSTs to describe how adult readers make sense of children's books? More specifically we tried to find answers to the following two questions;

- What meanings are constructed through Newbery award/honour winning books?
- How immersion in the children's literature of another culture, support the multicultural education for PSTs through literature circles?

It was observed that preservice teachers had different opinions for each book and some opinions overlapped after the analyzes made. The data were analyzed separately for each book, after holistic interpretations of the analytic findings. For ethical considerations, PSTs' names were anonymized.

Results

When the cover illustrations and names of these books were examined; there are some differences in the original version and Turkish translation of the books. When "Number the Stars" is examined, there is a hexagon necklace which is an integral symbol of the Jewish faith, this symbol was not given on the cover of the Turkish edition. Besides, the original name of the book "Number the Stars" is translated into Turkish word by word (direct) translation. When the cover illustration of the original and the Turkish translation of "The Giver" is examined, it is seen that there is no difference. Besides that, it is seen that the name of the book is translated by interpreting, not word by word (direct) translation. It is seen that the book name, which is originally called "The Giver", has been translated as "Chosen Person" in Turkish. When the "Holes" is examined, it is seen that there are differences in the illustrations. The most important difference is, in the original form of the book in the lower part of the cover, it is seen the head of the character, but in Turkish edition there isn't a character's picture on the cover. In addition, in the Turkish translation of the book, a letter in the name

of the book is depicted in the hole. There isn't such a detail on the original cover of the book. The original name of the book "Holes" is translated into Turkish word by word (direct) translation. When the cover illustration of the original and the Turkish translation of "The Graveyard Book" is examined, it is seen that the cover illustrations are exactly the same, but in the original case, there is a label on the cover showing the Newbery medal award, as well as an annotation for New York Times bestseller and the Hugo award at the top of the cover. While the Newbery label is not included in the Turkish translation; instead it is shown as an annotation that Newbery is received with a small font in the upper part and a label showing the Hugo award appears. New York Times bestseller information is not included in the Turkish translation. The original name of the book "The Graveyard Book" is translated into Turkish word by word (direct) translation.

The data of the study were analyzed on a basis through the PSTs' written responses and their participation in LC discussions. They used their written notes to discuss their reading in LCs. When the discussions were examined, it was seen that some roles of LCs were more active than other roles during the process. The active roles were discussion director, illustrator, passage master and connector. The analysis of students' writing was categorized and thereby themes emerged. All of the written notes used by the PSTs in the LC were collected and analyzed in the three main areas like the main concept of the book, personal response and critical/analytical comment and curriculum connections. One of the methods used to ensure the reliability of the analysis in such studies where qualitative data is included is peer confirmation. Within the scope of this study, all opinions of the PSTs were analyzed by both of the researchers. According to the findings obtained from the analyses, the subjects that have agreement/disagreement among the researchers were determined. The reliability formula (Miles & Huberman 1994) is calculated as 86% of the conformity. The findings of each book is presented in subheadings.

Number the Stars by Lois Lowry

The children's book, "Number The Stars", was read by 66 readers and discussed within the scope of group discussions in LC. Afher the students read the book, their written responses were closely examined. Therefore, some specific concepts including war", "historicity", "solidarity", "sacrifice", "living with difficulties", "prejudice", "friendship", "patriotism", "values" and "racism" were identified as the theme of the book by the readers. The investigation of the discussion groups' written answers indicated that the readers link the subject, character, and events of the book with themselves and so each criticism about the book is very different from each other. The readers reflected their personal views on concepts such as "racism" and "peace, love, integrity" (*The book is universal. Its message is about fighting aganist racism;* Peace, Love, Integrity: *I found the things we will need in the future in this book. These are brotherhood, common sense, courage, resistance, love, respect, peace…)*.

During the LC discussions, readers made comments on the book about their future career. In this regard, they shared their opinions about whether or not to use these books in their future classrooms, how they would use, and on what age /class level they might fit (*The subject of the book (war) is a subject to be faced. I think the 3rd and 4th grade students can read this book easily. Maybe the received message may vary according to the age group but it can still be read easily*). As a result of the analysis, most of the readers stated that the book could be suitable for children over 10 years of age (*I read the book in a snap, but my 10-year-old dreamer brother may not prefer to sit down and read a novel whose subject is taken from a real event*) and a few of them expressed that it could be suitable for 15 years old children (*I think this book is suitable for 15 years of age because it is about Nazi occupation. I mean, I think the children who are under 15, know very little/nothing about Nazis*).

The Giver by Lois Lowry

The children's book, "The Giver", was read by 90 readers and discussed within the scope of group discussions in LC. The concepts that come out of this book were "Diversity"-it was named it in

different forms as; Respect for diversity (*In the beginning of the book, I emulated to society. It was an honest, decent society. As I read it later, I realized what seen as unimportant is very important in life. I think this is also very important for children too. Love, care, colors, brotherhood, respect, freedom of choice…*), Importance of diversity (*This book taught me that, things that seem perfect is not what they actually look like. Life must also meet with troubles, we must also suffer and worry. I think the meaning of life at that time is understandable. An ideal book for those who want to look at life from different perspectives*), Effect of diversity (*This book tells us how important it is to be free to choose, to decide, and to be different. Maybe the writer is describing a world we can live in the future*; *I like this book more than other fictional works. Because, in many respects, it makes it realistic to reflect the past, present and future. We should be more careful and sensitive to our children who we entrust our future*), and Social order (*All in all, I think it is in a very different style and a very fascinating novel. Manipulating the genes of people, giving death to people by voluntarily, giving people a complete deprivation of choice, ignoring sexuality, and most of all not having colors, make the book very different*; *As I read this book, the first thing coming to my mind was socialism. At the beginning of the book, I thought how nice the layout was. However, the costs paid were heavy. People's mechanization of losing their emotions… are'nt there many mistakes already made because of wrong choices?)*.

During the LC discussions, PSTs made comments on the book about the use of the books in their future classrooms *(I think the book can be read easily by adults as well as children. I like the book. I think children should read this book to understand the value of what we have but that people in the book cannot have it. I think children should read this book so that they can understand the value of what we have.).*

They can also understand how bad it would be to have everything the same; I think it is a very successful work written for children. Jonas has a qualification for being a role model for children. With this book, children can learn to look at life from a different perspective. Because this book was designed in a different way and it tells about a different world; the author's open-ended final was beautiful in terms of expanding the imagination of children. A very exciting, fascinating, fluent, unique novel. I read it with pleasure. It helped me better examine the world I live in, see its beauty and love it more).

Regarding the previous comments, while some of the PSTs stated that the book is more appropriate for above the 4th grade level (*It is an important and qualified work that can add something to the reader. It is a book I can recommend from the 4th grade since it talks about abstract concepts that lead to think about it*), the rest of them have introduced that the book should be read by children who are above 13 years of age (*I think the book is for children 13 year aged and older because "being detached from the community" can affect children negatively*; *I like the book, but I don't think it's a book to be recommended to primary school students. Because I think that can be difficult for primary school students to understand the flow of the events and what the book is talking about. A book that can be applicable for higher levels. It ends with the obscurity*).

Holes by Lois Sachar

The children's book, "Holes", was read by 51 readers within the context of the LC group discussion. The concepts that came out of this book were "Universal values like friendship, cooperation, solidarity and self-belief", "reality", "Hope", "social problems", "fight with injustice", and "optimism". The particular focus of the PSTs on "Values" clearly showed the effectivity of this book in teaching value.

During the LC discussions, readers made comments on the book about their prospective classrooms. These statements illustrated that the book is more appropriate for the 10 years old and above (*The age range of children who read this book should be ten years and above. The plot is chaotic and intertwined times can be challenging for younger people*; *Children 11 years old and the older then 11 should read this book. In fact, in this book children can put themselves in character's*

shoes and so they can better understand the problems that the character suffered, they can try to find solutions to the problems faced by him).

The Graveyard Book by Neil Gaiman

The children's book, "The Graveyard Book", was read by 56 readers. The concepts that came out of this book were "death" (*One of the biggest reasons why the book draw my interest is the fictional expression of life and death concepts*), "cemetery" (*Since I read this book, my perspective on the graveyards really changed. I now see them as a mysterious place that contains many mysteries within them, not a scary place*, and "respect for diversity" (*When I finished this book, I perceived it as a liberation of a child, separation from family, stepping into adulthood. I thought the graveyard and dead people were all symbolic. In fact, I deduce that what was told in book was real life itself*).

In terms of their statements, almost half of the readers indicated that the book would be appropriate for the children above fourth grade level, three of the readers indicated that it would be appropriate for the third grade level. Some quotations containing these opinions are as follow: *The book may not be suitable for third grade primary school and younger children in terms of the type size, the narration and the subject.; I think it would be suitable for 4th grade and older children because of the some of the abstract concepts and scary components; It may draw interest of children, but it is necessary to explain that these are surreal things when suggesting such books to them. The child should be able to distinguish between real and fantastic elements.*

Discussion and Implications for Teacher Education

The findings obtained from the written responses of the 66 pre-service teachers related to "Number the stars" showed that most of them were about values such as "solidarity, sacrifice, prejudice, friendship etc." In this book where Lowry's emphasis on the differences of religious beliefs is mentioned, the problems experienced by the characters due to their religious beliefs are explained in a historical reality. However, it was observed that PSTs did not provide any opinions on this subject. Consequently, the pre-service teachers did not present any opinions about the subjects known as special issues in children's literature religious belief, refugee children, and freedom besides it was seen that some of the PSTs had opinions about these special issues might have negative effects on students. The preservice teachers did not comment on many cultural elements in the book. Lois Lowry's other book "The Giver" was the most preferred book by preservice teachers. The book, that 90 PSTs read, is the one of the book in the study that is fantastic. Findings of this book showed that the opinions are related to the themes of "difference and social order". It is seen that in interpreting the book, the readers compared their life style with the life style of the characters in the book. Lowry, emphasized the importance of questioning skills, while narrating the characters, however, none of the pre-service teachers stated any opinions about this situation.

The findings, obtained from the written responses of 51 PSTs related to "Holes" book, show that the book can adversely affect the psychology of children, but they also demonstrate that they think the events in the book have a suspensive development. In interpreting the book, readers emphasized that the cultural elements in the book were instructive, but they did not give any idea about the facts such as crime-punishment or the traits of other characters in the book. In addition, they stated that it would be challenging for children under 10 years of age by arguing that the time pattern in the book, such as past-future time, is complex. The Holes and The Giver were turned into a screenplay. Some of the PSTs also made comparison between books and movies in discussion groups since they watched these movies. Most of the PSTs explained that they viewed these movies after reading the books.

The findings obtained from the written responses of the 56 pre-service teachers related to "The Graveyard Book", while some of the readers thought that the unusual elements in the book might be frightening for the children, some readers expressed that these elements such as death, graveard give real-life information to the children. Some readers saw the book as a metaphor and they looked

positively to these unusual elements too. Readers stated that these subjects were not suitable for primary school children and were only appropriate for the final year of secondary school and older children. However, in the original version of the book, it was stated that they will be appropriate for the levels starting from the 4th grade in the original class. The factor behind that opinion can be shown as the PSTs have not previously taken any other courses based on children's books. Result of not taking such courses before, they could not see the books with special subjects. However, there are amount of researches (McBee, 1996; Cai and Bishop, 1994; Rochman, 1993) which suggested that these subjects would be appropriate for the primary school children.

Literature Circles reflect reader response theory because students have a discussion environment where they can express their unique opinion. In this direction, Klassen (1993) stated that, "Literature Circles were a place to explore the value and usefulness of diverse perspectives for the purpose of expanding one's own orientation toward multiculturalism (p. 138)." In a similar manner, Tompkins (2006), emphasized that "Literature Circles are an effective instructional approach because of the three key features-choice, literature and response. As students read and discuss books with classmates, they often become more engaged and motivated than in other more teacher-directed approaches (p. 391)." In this study, we conducted reading activities through LC and as a result of these activities, it was appeared that some of the LC roles (discussion director, illustrator, passage master and connector) were more active than others. In this case, when using this method in classrooms, taking the characteristics of these roles and some roles should not be left behind.

Based on the idea that every individual is unique with regard to what constitutes his/her schema in any particular area, Rosenblatt (1978) argued that every reading experience is therefore unique to each individual as well. The results obtained from the use of these books in the classroom environment have been found to be different from each reader in terms of Reader Response Theory. This situation reveals that they respect each others ideas, think from different perspectives and use their own ways to make sense of events because of their varying backgroundsThis difference clearly indicates itself in the age groups in which the book is recommended. It can be seen that the books contain a wide age range from the third grade of the primary school to the age of 15 years.

The concepts of the books were classified into four broad categories (Freeman and Lehman, 2001): gaining an understanding of different perspectives on life in the world; gaining an understanding of the cultures of specific groups, developing the skills needed to take social action to eliminate social injustice; gaining an awareness of own cultures and cultural backgrounds; gaining a recognition an understanding of global issues, learning how to reduce stereotyping, prejudice and racism within ourselves and within society. Our study offers findings for the first two categories. It was seen that the PSTs expressed their opinions for the first (gaining an understanding of different perspectives on life in the world) and second (gaining an understanding of the cultures of specific groups, developing the skills needed to take social action to eliminate social injustice) categories in all four children books. Although all books offer rich data on all of these categories, it was observed that PSTs could not express their opinions for third (gaining an awareness of own cultures and cultural backgrounds) and fourth (gaining a recognition an understanding of global issues, learning how to reduce stereotyping, prejudice and racism within ourselves and within society) categories. These results demonstrated that the PSTs' interpretations of the events in the texts were at good level but they were insufficient in the process of critical reading and actualisation. PSTs did not allocate time to other literary genres other than textbooks with the effect of the education system and did not improve their inquiry skills.

There have been a variety of multiculturalism studies in Turkey on scale development/adaptation (Acar Ciftci, 2017; Ozturk Akcaoglu and Arsal, 2018; Yazici, Basol, Toprak, 2009) and teachers'/students attitudes and competences (Akman and İmamoglu Akman, 2017; Aslan and Aybek, 2018; Bulut and Sarıcam, 2016; Gezer and Sahin, 2017; Ozdemir and Dil, 2013; Polat and Kılıc, 2013) related to multicultural issues. Most of these studies are theoretical and away from the implementation. In this regard, there is a need for studies that offer outcomes for the implementation of multicultural education such as using of literature, discussion method (LC). In view of Turkey's

multicultural society, teachers need to prepare for diverse classrooms. As a result of this study, we can say that; PSTs had opportunities to work with each other, they were motivated because of choosing the books they read, and they participated in authentic literacy experiences. Jackson (1995) stated that, "Preservice teachers must first confront themselves-their own views of others and the world. They must also engage in critical reflection about difference in terms of journeying to selfhood (p. 42)." One of the most important ways of achieving this is the placement of activities that will provide such opportunities in teacher education programme.

REFERENCES

Acar Ciftci, Y. A. (2017). Eleştirel Çokkültürlü Eğitim Öğretmen Yeterlikleri Ölçeği (Eçeöyö): Bir Ölçek Geliştirme Çalişmasi. *Journal of Suleyman Demirel University Institute of Social Sciences, 26*(1), 69-99.

Aerila, J. A., Soininen, M., & Merisuo-Storm, T. (2016). Literature as a Tool in Multicultural Education: Perceptions of Finnish Student Teachers on Reading Multicultural Literature in Finland. *Research & Reviews: Journal of Educational Studies, 2*(1), 53-62.

Akman, Y., & İmamoglu Akman, G. (2017). Öğretmenlerin çokkültürlü eğitim tutumunun sosyal zekâ algısına göre incelenmesi. *Sakarya University Journal of Education, 7*(1), 34-48.

Arifin, I., & Hermino, A. (2017). The Importance of Multicultural Education in Schools in the Era of ASEAN Economic Community. *Asian Social Science, 13*(4), 78-92.

Arslan, H. (2013). Multicultural education: Approaches, dimensions and principles. In H. Arslan & G. Raţă, (Eds.), *Multicultural education: From theory to practice (*pp. 15-34). *UK:* Cambridge Scholars Publishing.

Artiles, A. J., & McClafferty, K. (1998). Learning to teach culturally diverse learners: Charting change in preservice teachers' thinking about effective teaching. *The Elementary School Journal, 98*(3), 189-220.

Aslan, S., & Aybek, B. (2018). Ilkokul 4. sınıf ögrencilerinin çokkulturlu egitime dayalı olarak uygulanan etkinlikler ile ilgili görüslerinin incelenmesi. *Kuramsal Eğitimbilim Dergisi, 11*(1), 58-82.

Bulut, M., & Saricam, H. (2016). Okul öncesi öğretmen ve öğretmen adaylarinda çokkültürlü kişiliğin çokkültürlü eğitim tutumlari üzerindeki etkisinin incelenmesi. *Kırıkkale Üniversitesi Sosyal Bilimler Dergisi, 6*(1), 295-322.

Cai, M., & Bishop, R. (1994). Multicultural literature for children: Toward a clarification of concept. In A. Dyson & C. Genishi (Eds.), *The need for story: Cultural diversity in classroom and community* (pp.57-71). Urbana, IL: National Council of Teachers of English.

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education*. New York: Routledge.

Daniels, H. (2002) *Literature Circles: Voice and Choice in Book Clubs and Reading Groups.* Second Edition. Portland, Maine: Stenhouse.

Decker, B. C. (1986). Aliteracy: What teachers can do to keep Johnny reading. *Journal of Teacher Education, 37,* 55-58.

Dietrich, D., & Ralph, K. S. (1995). Crossing borders: Multicultural literature in the classroom. *The Journal of Educational Issues of Language Minority Students, 15,* 65-75.

Friedman, A. A., & Cataldo, C. (2002). Characters at crosswords: Reflective decision makers in contemporary Newbery books. *The Reading Teacher*, *56*(2), 102-112.

Freeman, E., & Lehman, B. (2001). *Global perspectives in children's literature*. Needham Heights, MA: Allyn & Bacon.

Furr, M. (2004). Literature circles for the EFL classroom. In Proceedings of the 2003 TESOL Arabia Conference. Dubai, United Arab Emirates: TESOL Arabia.

Gay, G., & Kirkland, K. (2003). Developing cultural critical consciousness and self-reflection in preservice teacher education. *Theory into practice*, *42*(3), 181-187.

Gezer, M., & Şahin, İ. F. (2017). Çokkültürlü Eğitime Yönelik Tutum ve Kültürel Zekâ Arasindaki İlişkinin YEM ile İncelenmesi. *Doğu Coğrafya Dergisi*, *22*(38), 173-188.

Hosoya, S., & Talib, M. T. (2013). Teacher Education in Preparing Student Teachers for Diverse Classrooms (pp. 205-224) in Multicultural education: From theory to practice (Hasan Arslan & Raţă, Georget, Eds.). UK: Cambridge Scholars Publishing.

Irvine, J. J., Armento, B. J., & Causey, V. E. (2001). *Culturally responsive teaching: Lesson planning for elementary and middle grades*. New York: McGraw-Hill.

Jackson, S. (1995). Autobiography: Pivot points for engaging lives in multicultural context. In M. J. Larkin & C. E. Sleeter (Eds.), *Developing multicultural teacher education curricula* (pp. 31-44). New York: State University of New York Press.

Klassen, C. R. (1993). *Teacher education that is multicultural: Expanding preservice teachers' orientation toward learning through children literature* (Unpublished doctoral dissertation). University of Arizona, Tucson.

Klassen-Endrizzi, C., & Ruiz, R. (1995). Constructing a multicultural orientation through children's literature. In M. Larkin & C. E. Sleeter (Eds.), *Developing multicultural teacher education curricula* (pp. 129-145). New York: State University of New York Press.

Krippendorff, K. (2004). Reliability in content analysis: Some common misconceptions and recommendations. *Human communication research*, *30*(3), 411-433.

Larkin, J. M. (1995). Curriculum themes and issues in multicultural teacher education programs. In M. Larkin & C. E. Sleeter (Eds.), *Developing multicultural teacher education curricula* (pp. 1-16). New York: State University of New York Press.

McBee, R. H. (1996). Can controversial topics be taught in the early grades? The answer is yes!. *Social Education*, *60*, 38–41.

McElroy, G. L. (2005). *Perceptions and Practices: Preservice Teachers' Multicultural Educational Perspectives* (Unpublished doctoral dissertation). Capella University, USA.

Miles, B., M., & Huberman, A. M. (1994). *An expanded sourcebook qualitative data analysis*. California: SAGE Publications.

Nieto. S. (2000). Placing equity front and center: Some thoughts on transforming teacher education for a new century. *Journal of Teacher Education*, *51*(3), 180-187.

Nieto, S., & Bode, P. (2004). *Affirming diversity: The socio-political context of multicultural education*. Amherst: University of Massachusetts.

Ozdemir M., & Dil, K. (2013). Öğretmenlerin çokkültürlü eğitime yönelik tutumları: Çankırı ili örneği. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi, 46*(2), 215-232.

Ozturk Akcaoglu, M., & Arsal, Z. (2018). Çokkültürlü Yeterlik Ölçeğinin Türkçe'ye Uyarlanması: Geçerlik ve Güvenirlik Çalışması. *Kastamonu Üniversitesi Kastamonu Eğitim Dergisi*, *26*(1), 261-270.

Polat, I., & Kilic, E. (2013). Multicultural education in Turkey and teachers' competencies in multicultural education. *YYÜ Eğitim Fakültesi Dergisi*, *5*(1), 352-372.

Rochman, H. (1993). *Against borders: Promoting books for a multicultural world*. Chicago: American Library Association.

Rosenblatt, L. M. (1978). *The reader, the text, the poem: The transactional theory of literary work.* Carbondale, IL: Southern Illinois University Press.

Rosenblatt, L. M. (1988). Writing and Reading: The Transactional Theory. Technical Report No. 416.

Salisbury, T. (2010). *Using Globally Significant Children's Literature to Increase Fourth-Grade Students" Global Attitudes and Intercultural Sensitivity* (Unpublished doctoral dissertation), Walden University.

Sleeter, C. E. (1992). *Keepers of the American dream*. Washington, DC: Falmer Press.

Sleeter, C. E., & Grant, C. A. (1999). Making choices for multicultural education: Five approaches to race, class, and gender. Ohio: MERRILL.

Solomon, R. P. (1995). Beyond prescriptive pedagogy: Teacher inservice education for cultural diversity. *Journal of Teacher Education*, *46*(4), 251-258.

Tompkins, G. E. (2006). Literacy for the 21st century: A Balanced Approach. New Jersey: Pearson Australia.

Tracey, D. H., & Morrow, L. M. (2006). *Lenses on reading: An introduction to theories and models*. USA: Guilford Publications

Hook, C. W. V. (2002). Preservice teachers perceived barriers to the implementation of a multicultural curriculum. *Journal of Instructional Psychology*, *29*(4), 254-264.

Yazici, S., Basol, G., & Toprak, G. (2009). Öğretmenlerin çokkültürlü eğitim tutumları: bir güvenirlik ve geçerlik çalışması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *37*(37), 229-242.

Children's Books References

Gaiman, N. (2009). *The graveyard book*. Harper Collins.

Lowry, L. (1989). *Number the stars*. Houghton Mifflin Harcourt.

Lowry, L. (1993). *The giver*. Houghton Mifflin Harcourt.

Sachar, L. (1998). *Holes*. Bloomsbury

International Journal of Progressive Education, Volume 15 Number 4, 2019

Four-Component Instructional Design (4C/ID) Model Approach for Teaching Programming Skills

Zafer Güney [i]
Istanbul Aydin University

Abstract

The need for methods, techniques and approaches that we can develop high-level thinking skills in important activities increases day by day in order to achieve effective use of technology and change in information and communication technologies. In particular, the diversity, complexity of technical skills and to gain technical skills required to be learned in schools and through applications in industry is important. Teaching the programming as a technical skill during instructional design process (ID) and how effective and meaningful teaching can be taught is an important problem. Thus, instructional design models have been developed for the solution of learning problems in systemic, systematic and appropriate learning conditions and especially for the development of technical skills (van Merriënboer (1997). The instructional design model (4C/ID) activity mentioned here can be used for teaching the importance of instructional and technological stages by combining and supporting another multimedia project design, development and evaluation model. This study presents technical skills only by pointing to the future developers and designers of programming that an instructional design approach can be used to develop other programming skills. In addition, through ten steps proposed for complex learning (van Merriënboer & Kirschner 2007) and steps in achieving complex cognitive, high-level, algorithm based limited coding, technical skills, it is to provide a new different approach to program developers, instructors and designers by planning and discussing the design of the process within a basic frame as to be in four stages (van Merriënboer & Kirschner 2007). The purpose of this study is to adapt the principles of the model for teaching technical skills by using four-component instructional design model (4C/ID) within software programming. In this study, theoretical framework for teaching complex technical skills, learning theories and problem solving in programming are given. The relationships between components of 4C/ID model presented for teaching programming skills. At the end of study, the ID model components and their applications for future programming skills were indicated.

Keywords: Instructional Design, Programming, Learning Technical Skills

DOI: 10.29329/ijpe.2019.203.11

---

[i] **Zafer GÜNEY,** Assist. Prof. Dr., Istanbul Aydin University, Department of Computer and Instructional Technologies

Correspondence: zaferguney@aydin.edu.tr

INTRODUCTION

The need for methods, techniques and approaches that we can develop high-level thinking skills in important activities increases day by day in order to achieve effective use of technology and change in information and communication technologies. In particular, the diversity, complexity of technical skills and to gain technical skills required to be learned in schools and through applications in industry is important. Teaching the programming as a technical skill during instructional design process (ID) and how effective and meaningful teaching can be taught is an important problem. For this reason, instructional design models have been developed for the solution of learning problems in systemic, systematic and appropriate learning conditions and especially for the development of technical skills (van Merriënboer, 1997). In addition to technical skills, there are several factors and skills that affect the effective learning of programming. These are; reading comprehension, critical reasoning, systemic thinking; have cognitive components in problem definition, planning and solution production, creativity and intellectual curiosity, mathematical skill, situational reasoning, process based (procedural) thinking and temporary reasoning, analytical and quantitative reasoning, benefitting from different sources, being flexible and creative in producing new solutions (Ambrosio et al ., 2011; Lau & Yuen, 2011). The value of having these skills has been the subject of many researches in terms of learning, and it is clearly stated in many of these studies that the above-mentioned skills need to be acquired by the students.

Problem:

In order to gain cognitive (technical) skills in programming teaching in accordance with the study here, it will be discussed how four-component instructional design (4C/ID) model can be used for teaching technical skill in programming (van Merriënboer, 1997). To make programming in the way, teaching procedures should include all stages of multimedia project design, production and evaluation. In this context, the steps taken for programming education can be provided to learn a chosen topic related to the course in the process of teaching program / software development in an instructional design and learning strategy in line with the ID model and multimedia project design, production and evaluation model in education.

In programming, planning should be made primarily within the framework of concept teaching based on ID model. After learning the concepts, coding in the desired language will be more practical (such as C, C ++, C #, Php etc.). Thus, the issue how the operation series requested in order to develop an efficient learning environment must be with the principles of instructional design (ID) approach of this process, is a learning problem which overlaps with the solution of waiting and technical skills.

Purpose of the study:

The purpose of this study is to adapt the principles of the model for teaching technical skills by using four-component instructional design model (4C/ID) within programming skills and limitations mentioned above and to discuss the differences in instructional planning for the software development process. In addition, through ten steps proposed for complex learning (van Merriënboer & Kirschner (2007) and steps in achieving complex cognitive, high-level, algorithm based limited coding, technical skills, it is to provide a new different approach to program developers, instructors and designers by planning and discussing the design of the process within a basic frame as to be in four stages (van Merriënboer & Kirschner 2007; Kirschner & van Merriënboer 2006, 2008).

Importance of Study:

In the studies on programming teaching, it is not mentioned much about learning strategies and teaching design models for teaching effective and meaningful programming with the difficulties experienced in teaching. Therefore, in this study, it is revealed that the contribution of instructional

design approach and models for the transfer of knowledge can contribute to programming education effectively.

The principles of instructional design create opportunities for learners and teachers in the development of technical skills as a process that advances in this process and makes learning more efficient (Merriënboer & Paas, 1990). Designing a new learning environment for the programming process with the Four Component Instructional Design Model (4C/ID) for the technical skills determined in line with these principles has a particular importance in terms of discussing a new teaching design for this instructional process in order to be effective, meaningful and efficient in acquiring different technical skills.

Limits of the Scope of the Study

The four-component teaching design (4C/ID) model and the four stages of these four steps as a result of horizontal and vertical intersections analysis, skills separation, limited coding, methods activities and model ten steps, the design stages in programming teaching should be considered in a step-by-step way. In cases where activities are needed, it can be used as a multimedia project and can be used as a multimedia project by integrating the teaching design approach in case of programming instruction and multimedia programming. These activities, together with an important point of view to gain instructional technical skills in the design, development and evaluation of programming, will be able to draw on more than one of the different ID models in terms of learning technical skills.

There are many difficulties in the process of programming teaching. While learning a concept of programming in individuals, factors such as processing differences and cognitive differences in knowledge need to be taken into account in programming processes; in most studies, it is observed that the approaches and principles of instructional design model are ignored. For this reason, programming design and the process of realization of it should be tried to be gained through instructional design and multimedia programs design model. The instructional design model (4C/ID) activity mentioned here can be used for teaching the importance of instructional and technological stages by combining and supporting another multimedia project design, development and evaluation model. This study presents technical skills only by pointing to the future developers and designers of programming that an instructional design approach can be used to develop other programming skills.

Theoretical Framework and Definitions

Algorithmic Thinking: It includes technical tasks and procedures that design the method in the process. Algorithm is the whole set of rules that convert procedures, methods, and rules into a set of instructions designed to achieve a particular result. Algorithmic thinking, many professional people in the working environment to comply with the rules specified and the specified process to execute automatically and the application of algorithmic thinking is a result (Amorim, 2005).

The conceptual comprehension and skill development process that we can evaluate in both numerical and verbal progressive cases is a very important instructional achievement in terms of realizing the students what they are doing. This will enable the discovery of ways to realize the effectiveness of the activity in terms of student-centered learning and the elimination of memorization. Beyond perceiving the concept at all levels, the student has gained the ability of problem solving with high level cognitive skills and perceived the importance of the structure of the algorithm and at the same time created with his own conceptual words. Planning algorithms can be designed based on the instructional design model strategies in this study process by effectively and efficiently demonstrating how and why algorithms are difficult and complex to achieve in calculation and conclusion.

Relationship between Critical Thinking and Programming

One of the leading goals of education; to learn how to live, to learn how to live lifestyle can eliminate the problems faced by creative thinking skills gained by people who can develop design-oriented design is able to develop. Critical thinking can be evaluated as the process of obtaining, comparing and evaluating the knowledge after the process. It is a philosophical view that cannot be effective and useful without critical thinking. In short, the source of the theory without thought, practice cannot be practice. For this reason, the definition of the field of educational technology has been defined within the scope of theory and practice within the half a century time-period (Seels & Richey, 1994; Januszewski, & Molenda, 2008a,b).

It can be said that critical thinking is the acceleration of knowledge since humanity can progress through creativity, problem solving and critical thinking. Critical thinking is one of the factors affecting the development of the scientific process. In terms of development, original and creative ideas can not be won by acknowledging or repeating. Therefore, the recruitment of new skills will be carried out, and according to new tasks to be learned or technical skills as an IT. Phased teaching based on the model can provide effective learning. Therefore, there is a need for a learning environment based on multimedia program development models with 4C/ID. It is seen that their examples are adapted to the teaching of different skills in learning theories and approaches. For example, three top-tier analysis, evaluation and creation are presented and shown in recent adaptations to Bloom's taxonomy; it is seen as a definition of higher-order thinking (Ennis, 1993).

In critical thinking, rather than negative judgment, it is necessary to convey the fact that events can have different approaches, and that the truths should be examined in accordance with the circumstances, and that the individual should believe and believe by researching, researching and practicing in the culture. By using instructional design models in programming, we must learn how to teach our students how to write code, and we need to design the students in a student-centered framework based on instructional design strategies, how to think and think more by teaching them how to think. In this way, creativity, innovation-based production and applications will increase. Most importantly, the understanding of the work done and the steps taken by the student and the instructor will be understood very well.

Problem Solving and Computational Thinking

High-level learning skills (Gagné high-level learning skills) suggest that mental processes, such as high-level and complex behavioral changes and the problem-solving result in a new learning outcome. In addition, we can define these skills as uncertainty, perseverance, honesty, good faith and open-minded problems, analytically and systematically analyzing, comparing and evaluating them logically, into action and behavior, and as a lifestyle (culture). Since higher-order thinking skills necessitate complex cognitive activities in individuals, it may be a cause of conflict for individuals as they require different learning outcomes and gains.

A high level of learning may not be possible for every learner, for example, a student who fails to learn at a cognitive (learning-problem solving) level has to be equipped with higher skills that require higher skills and complex problem-solving skills. These learning situations, as Gagne (1985) states, are described at five different levels as learning outcomes. These are intellectual skills and skills that require verbal, attitudes, dynamic, problem solving and high level learning skills. From this point of view, problem solving and algorithmic thinking reveal the importance of verbal and cognitive learning outcomes in terms of computational thinking. In other words, revealing, processing and re-using the information necessitates a whole set of skills. The concept of higher-order thinking skills is recognized as the common name of the skills that enable them to be reorganized and used beyond the recall and understanding of existing knowledge (Doğanay, 2007). When examined in this framework, it is defined as remembering and knowledge level skills in terms of staging relations, while application, evaluation and creativity are considered as high-level skills (Gagne, 1985; Ertürk, 1972).

In the same way, the concept of thinking is defined as the effectiveness of the mind by comparing the information about a subject, examining the connections between them and making a judgment or a decision (Turkish Language Society, 2018). In this approach, while assessment and implementation are high-level thinking skills, recall is defined as low-level thinking skill (Saygılı, 2010).

It is a term used to describe the processes that an individual realizes his own cognitive processes, for his monitoring, supervision, and solving problem. A study by Erdoğan (2005) is considered as an indicator of academic and general success on programming success. In addition to this, programming education is associated with many parameters such as general ability, general academic achievement, mathematics achievement, abstract thinking ability, focus on detail, concentration level. A high level of relationship was found between the success of the students and the general success of the students who studied programming (Newsted, 1975; Hostetler, 1983; Whipkey, 1984; Byrne & Lyons, 2001).

Clement and Gullo (1984) who analyzed the contribution of computer programming to small-age students in groups of seven years old, found that In addition, programming improves the student's ability to find solutions to a problem and the ability to analyze (Akpınar & Altun, 2014). Robins, Routree, & Routree (2003) reported that experts working with programming have advanced knowledge, problem-solving skills, and are very good in areas such as mathematics and chess. Those who are new to programming are less likely to have these characteristics than experts (Winslow, 1996). In a study by Gülmez (2009), it was stated that programming education is an important factor in computer literacy, and it is effective in cognitive processes such as analytical thinking and problem solving (Sleeman et al., 1984). He also stated that mathematics achievement is related to the ability to understand, to interpret, to interpret, to question and to analyze. In addition, Nowaczyk (1983), in his research revealed that there was a positive correlation between the academic achievement of students in English classes and their computer programming successes.

What is instructional design?

The concept of instructional design (ID) covers a process as a field and discipline. Therefore, as well as student-centered, the problem of the learning problem as well as the systematic and systemic approach to the solution of the problem identified is of special meaning. In this context, different definitions were made by different field experts. According to these, ID is a systematic and responsive process of transfer of learning and teaching principles for teaching materials, activities, information sources and evaluation plans (Smith and Ragan, 2005). In another definition, ID management is based on what we know about information systems system design, teaching and learning theories (Morrison, Kemp & Ross, 2001). According to the designers of another approach that is effective for both classroom teaching and project management, instructional design is defined as “the process of solving learning problems by systematic analysis of learning conditions “as discipline and process” (Seels & Glasgow, 1998).

Cognitive loading theory

ID theories are the guiding principles in which teaching method will be used. (Reigeluth, 1999). The aim of cognitive load theory is to develop instructional design steps based on human cognitive architecture model (van Merriënboer & Sweller, 2005). This architect approach accepts the existence of limited short-term memory (STM), the presence of cognitive schemas in non-limited long-term memory. Within this framework, learning is defined as a structure and automation within the scheme. The tasks that need to be carried out in the cognitive process are real as a direct function of the complex task that takes place and directly affect learning. In addition, as a result of the unnecessary process that does not affect learning, it can be mentioned that it does not contribute directly to learning, and it may be the healing dimension of true cognitive learning. Therefore, the programming process has to take advantage of the design principles and strategies in cognitive

processing theory. The diagrams defined in the 4C/ID model allow for the elaboration of complex thinking in the design of the programming process, and the ability to learn and implement the technical skills required for this and even offer the opportunity for automation. The operation of this software is indicated below.

Four-Element Instructional design model (4C/ ID) and complex skills in the programming process

The 4C/ID model, developed by Van Merriënboer (1997), is the recommended instructional design model for the development of technical skills. The basic assumption is that plans prepared for complex learning can always be identified by four basic components (Figure 1). Software skills also require technical and analytical skills such as thinking, analyzing, substituting values, calculating the necessary variables and establishing relationships between them. In addition, complex learning is a learning process that aims to integrate knowledge, skills, skills and attitudes that perform high-performing tasks. These complex skills are explored through four different components in the model as different learning activities in the programming process. These steps are used in the software (programming) process to eliminate some steps, even if not in order. For example, in programming, the subject of loops is based on the repetition of the necessary tasks, ie the repetition of the skill. For this reason, new loops are written and coded from simple to difficult variables. This also involves looping tasks and tasks, such as an automatic operation, and reinforces repetition. The supportive nature of the information for the programming process is effective in creating cognitive skills and mental model. Supporting knowledge creates a bridge during the design of learning tasks with the knowledge of the learners and provides the student with a clear understanding of the software that will be prepared to be equipped with these skills. As a methodological approach, the student repeats his/her technical knowledge and skills, proceeds step by step and continue with specialization. Methodological knowledge can provide the learning of the routine aspects of the learning tasks carried out by the learners, and the place and time should be presented when the student is in full need. Learners are expected to gain behavior as they become experts. Thus, it can make the technical skills functionally more easily by bringing analytical concepts to more easily. With partial task practice, it is necessary for ordinary learners to have a lot of practice in order to improve the habits of learners.

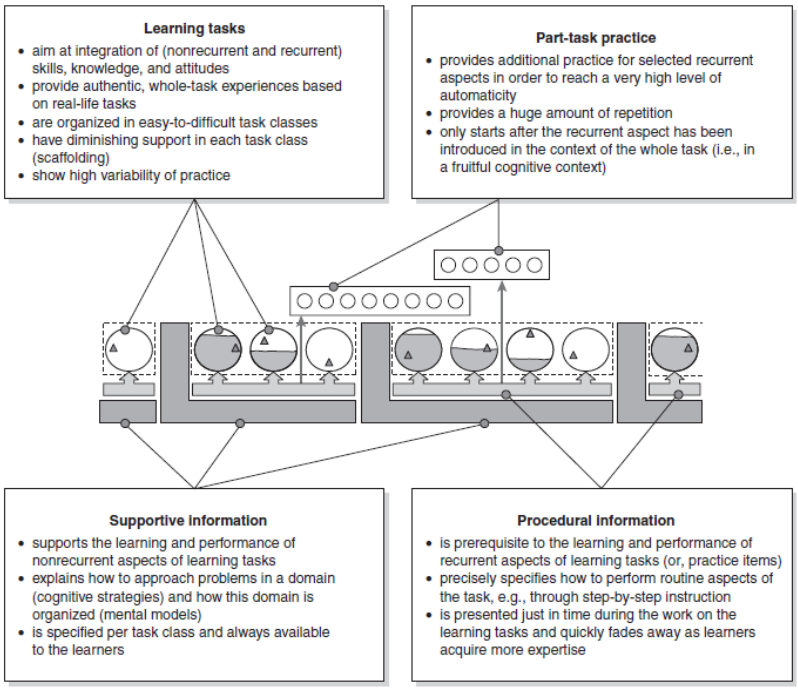


Figure 1. Basic Components in Four-Component Instructional Design (4C/ID) Model Schematic teaching design (Van Merriënboer & Kirschner, 2007)

Ten steps for Complex Learning (Van Merriënboer & Kirschner, 2007) is a practical and improved version of the four-component teaching design (4C/ID) model, recently made by van Merriënboer. The ten steps described here are mainly based on more rules, and teachers aim to provide practicality by practicing (4C/ID model) for field experts and less experienced instructional designers interested in education or training design. Learning the skills required for the subjects in each chapter can be designed within programming courses, learning a whole skill set based on these categories (Figure 2).

Basic Components of Four-Component Instructional Design (4C / ID) Model and Ten Steps for Complex Learning	
Basic Components of the Model	Ten Steps to Complex Learning
Learning Tasks	1. Learning Tasks for Design 2. Sequential Task Classes 3. Setting Performance Targets
Supporting Information	4. Supporting Information Design 5. Analyzing Cognitive Strategies 6. Analyzing Mental Models
Methodology	7. Methodical Information Design 8. Analysis of Cognitive Rules 9. Prerequisite to Analyze Information
Partial Task Applications	10. Partial Task Application Design

Figure 2. Steps in teaching programming skills with Four-Component Instructional Design (4C/ID) (van Merriënboer & Kirschner, 2007).

First, the task of learning is the experience of performing the original, complete task based on real-life tasks that focus on integrating skills, knowledge and attitudes. For this reason, using an instructional design model, defining the logical paths and technical skills in the programming process can be performed by analyzing the students by using algorithmic methods with the motivation of the students to the program software (Branch & Dousay, 2015).

The basic principle of ID theories, which aims to realize instructional design for complex learning, is to provide students with authentic-artistic tasks. Real missions are "tasks that are relevant and useful to the real world, which integrate these tasks in the curriculum, provide appropriate levels of complexity, and allow students to choose appropriate levels of difficulty or participation" (Jonassen, 1991). In order to design a directive, authentic tasks lead the student to solve complex real-world problems. The general assumption here is that such tasks help students integrate the knowledge, skills and attitudes necessary for effective task performance; it gives them the opportunity to learn to coordinate the founding skills that make up the complex task performance, and ultimately transfer them to their daily lives or work environments. The focus is on authentic and practical tasks such as project-based training, event methodology, problem-based learning and competency-based learning; In the process of programming and teaching of technical skills, the teacher can enable the use of scenario theory based on the goal of the course and the students can develop (van Merriënboer et al., 2003). A stream of software developed within this framework can serve to develop software skills in terms of learning, organizing, and analytical thinking.

LEARNING WITH 4C/ID MODEL

Instructional design diagrams for sample programming

Preparing teaching instruction in accordance with instructional design models will enable high-level thinking skills that will contribute to the effective, efficient and engaging of teaching. High-level thinking and learning skills; It is a process that determines the lifestyle (culture) and social interaction which constitute the process of problem solving and decision-making according to the purposes, which involves many mental processes based on inquiry. For this reason, design and design

of tasks and tasks in the instructional design model, design skills for the subject, ordering of supporting information, analysis of cognitive and mental paths, as well as access to methodological information, as well as solutions of cognitive rules, are designed with teacher partial applications in the software process. Thus, students can realize complex skills in adaptation and transformation behaviors at the stage of learning, for example, schemas and loops as concrete technical skills.

Many different skills in the process of gaining programming skills; logical thinking, algorithm formation, problem solving skills, analytical thinking skills can be gained. The identification, analysis and design of these stages are among the universal objectives of instructional design (IT) models. At the end of these processes, it provides the concrete solution of each programming step, the analytical solution of the processes in the software process, the strategies to be followed and the logical approach, in short, it contributes to the solution of the problem that the individual or the society needs and provides a solution for the solution. The student-centered instructional design process provides the opportunity to identify and systematically implement and evaluate solutions. In this context, the new generation requires individuals to use their high-level thinking skills, to think systematically, to look at the problems from different perspectives and to produce solutions, to create a cause-effect relation and to think creatively. Because it is the process of developing and implementing the algorithm that will serve to solve a problem due to its programming structure (Akçay & Çoklar, 2016). It also supports and technical skills as 21. The most effective way of developing computational thinking in the 20th century is defined as computer programming skills (Lye & Koh, 2014).

The assumptions followed in the process of programming and gaining technical skills, four-part instructional design (4C / ID) model in the dimension of theoretical approaches (van Merriënboer (1997), technical skills learning and ten steps for complex learning (Van Merriënboer & Kirschner, 2007; Kirschner & van Merriënboer, 2008) can be used for the software course . If we examine the model of these steps from top to bottom; It consists of 4 layers (Ipek, 2004). For example, it requires specifying the basic skill for the delivery of a software subject, that is, the hierarchical relationship of the basic cognitive skills in layer 1. 2nd. It includes the analysis of skills, the algorithm and related information, which is the totality of knowledge required for the software subject in step. In 3 steps, understanding of software subject, limited coding and repetition of related skills are selected in the course of software course. 4. It is the selection of the learning environment in which the labs and computers are used to teach the software course. Thus, the implementation of the software course in accordance with the teaching principles and steps in the course plan process will be provided by learning strategies for the software subject. As a four-element instructional design (4C/ID) model, it aims at organizing, teaching and developing knowledge for complex learning environments (van Merriënboer, Clark & De Croock, 2002). The general structure of the model, the layers discussed and the interrelations of the other sections are given in Figure 3.

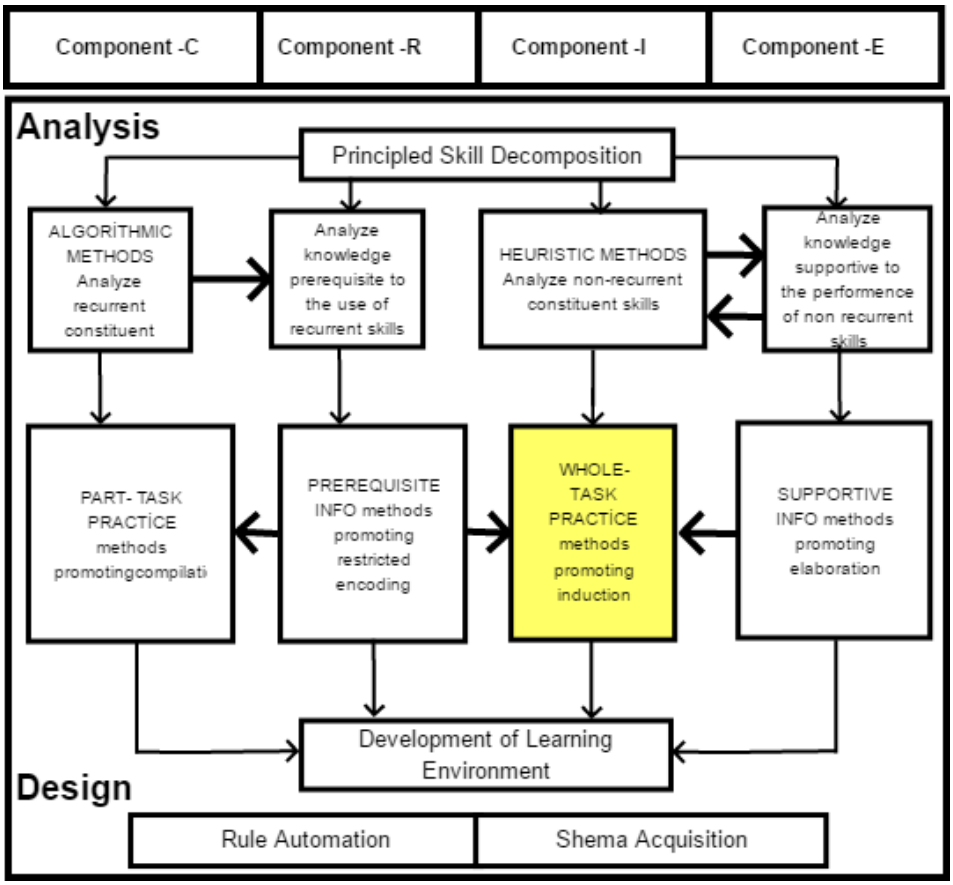


Figure 3. General structure of four-component instructional design model (4C/ID-Model) (Van Merriënboer & Kirschner, 2007)

The layers 1 and 2 of these layers express the analysis of complex cognitive skills. Likewise, layers 3 and 4 indicate the instructional strategy design or learning environment for this skill. Any skill can be separated or separated within the hierarchy of the skills that make up the whole. The activities performed in the analysis section are listed under part C (item-section). Part C, especially before the activities of the R segment. In the design part (layer 3), the activities are listed below the I part. The activities of the I part come particularly before all the other 3 parts. But there is no certainty in this order. The sections in Figure 3 refer to the main characteristics of the model (İpek, 2004).

- Compilation (C). Express the algorithmic task analysis in the second layer of the model. Here are the procedures and special rules. The programming process demonstrates the ability to use these rules. This information is classified as a continuum of all formed skills. Instructional process is designed to support and contribute to the functioning of procedures or the competence of ongoing skills through compilation of information.

- Restricted encoding (R). For the second layer, this section shows the analysis of the information. Here are facts, concepts, plans and principles. These skills are classified as continuing skills. In the third layer, it refers to the selection of teaching methods for all practical or practical tasks. The teaching process is designed to support and contribute to the automatic functioning of the ongoing skills and the limited coding of procedures. Teaching is a prerequisite for the ongoing aspects and appearance of skills.

- Elaboration (E). It refers to the analysis of information for the second layer. This analysis includes conceptual models, goal-plan hierarchy, cause-effect relationship, mental models. In the third layer, all task practice refers to the selection of teaching methods for its scope. With

the elaboration of the information, instructional design is planned to support the realization of the cognitive scheme.

- Induction (I). For the second layer, it discusses task analysis with heuristic learning and presentation with artistic discovery or experience. These are the results of artistic activities to solve problems, systematic approaches. These task analyzes are classified to determine the appearance and direction of complex cognitive skills. The third layer focuses on the selection of teaching methods for the practice of all tasks in the process. Instructional design is done to support the realization of cognitive schema through abstract problems or examples.

As described above, the C and R divisions relate to the category of learning processes. They are shown as rule automations. Parts E and I are related to the category of learning processes and are recognized as the realization of the scheme. This step is also the heart of the model. Based on this model, the learning program is developed as a problem-based, event-based or a scenario-based instruction. For this reason, this model has the feature and strength to be an instructional design model that can be used for the structural approach, especially for cognitive weight.

Complex learning and instructional design model (4C / ID Model)

Today's instructional designs are known to be linear, slow in progress and require a lot of energy. For this reason, design-oriented, creative technology-based designs (Driscoll & Dick, 1999; İpek, 2002)should be highlighted in the working life and especially in the industry with complex information in order to guide the rapid advancement in technology with creative ideas.

In line with the systematic design, by designing alternative project loops for the future by focusing on creative and instructional purposes towards creative and requirements, virtual simulations of possible cultural changes can be designed with prototype project loops. The scope of this process can then be transferred to active projects and implemented. As a result of the existing developments, complex information is required in the workplace (van Merriënboer, Clark & Crook, 2002). The systematic design research and development studies carried out over the last two decades have focused particularly on teaching principles.

Instructional Design approach for complex cognitive skills

Here, the design and creation of learning environments for complex cognitive skills is discussed. In the teaching system for teaching any skill, there are differences between the design of the presentation of information and the design of the application (practice). First, the information follows a ranking that has not been finalized for the application of skills. On the macro level, skills are related to the multiplication of holistic skills in the appropriate curriculum. The order at the “meso” level, which is the sorting of the event types, occurs at the macro level. In this sequence, the meso-level ordering is a set of examples of the problems and the expression of event types for each skill. The second step concerns the problem-solving process of systematic approaches. This performance is all complex skills or their meaningful perspectives. The heart of this model is the application design of all tasks. The samples studied in the design period, the problems in different formats are informed to the student for each case study in micro level. In this section, briefly, these issues come to the fore (İpek, 2004).

Part-task practice is supported and encouraged by the rule autonomy compilation time. These are briefly stated as follows.

- This task is not always required. This design rule saves automation and compilation appearance. This is exactly the same as in the operation of the flow diagram.

- For the complex algorithm, the application agents may be in the form of an example of different ordered-whole approaches sorted. For example, it can express a functional process in terms of fragmentation (segmentation), simplification and the ability to explain and apply the concepts of classifications such as decimal fractions. We can apply and demonstrate these concepts with the following examples.

- At the right time, the presentation supports the discovery of ongoing holistic skills with high-level information, which is the special rules. The purpose of this presentation is to apply complex skills to the ongoing appearance during limited coding. It introduces the special rules to the student and provides the student to gain this technical skill as a presentation in the process of introducing the variables to the variables and introducing the sample concepts. Just in time, the process consists mainly of processes and rules. Therefore; a) rules and processes define the accuracy of the performance of ongoing skills. b) There are also behaviors, concepts, plans and principles. These are prerequisites for learning. c) The process of rotation indicates the quality of the performance. If the instructional designer cannot control the problems of all tasks, the students' learning assistance systems should be developed. Demonstration and sampling should be used as teaching techniques. Just-in-time informational feedback provides information about correct and incorrect results. This process results in different types of misconceptions and values entered in the teaching of concepts. Even at this point, students continue to gain a technical skill. As a result, they can learn as a technical skill (non-working code) by experimenting with the knowledge that problem solving is not realized with these variables.

Another aspect of the model is to define instructional strategies and tactics for strategic information and supporting presentations. For this parsing and comprehension, the whole event-sample case, deductive-demonstration strategy, induction-case study and induction-demonstration strategy techniques are used. The aim of the strategic and supportive presentation is the elaboration of the materials shown by the student and the formation of schemes. These presentations consist of feedback on the quality of performance, modeling of event situations and instances. In the event that the desired tasks are not fulfilled, the Four-component instructional design model proposes the technique in which induction and models are presented as an approach. In addition to this, if students have high level of pre-knowledge and adequate teaching time, they can use the approach of developing and developing models. They can use the types of concepts to be taught (eg, loops, control, function, etc.) by applying them to gain the ability to learn to use. In this model, in general, case studies are used for different knowledge categories of teaching tactics. In addition, after the problems involving all tasks in elaboration-understanding, feedback is given for complex cognitive skills. The types of returns include functions such as motivation, the subject of the return and the time of return. In some cases, it is possible to see examples of the subject that is planned to be taught in a software process piece, to gain application technical skills, to gain knowledge and skills. These affect learning environments in digging skills using other variables in the software process. In the development of learning environments, steps such as the selection of teaching materials, the development of the learning environment, the transfer of effects and the dynamism of the systems are very important (van Merriënboer, 1997).

This model generally does not guide in the production of teaching materials in very detailed. Detailed instructional design models can be used for this (Dick & Carey, 1996; Ipek, 2001; Seels & Glasgow, 1998; Smith & Ragan, 1999). In order to access the desired learning, the choice of material is influenced by the process of the curriculum, the specific conditions and the contradictions in the characteristics of the target groups. The priority materials used in the implementation of all tasks are used in learning or in the learning environment where the tasks are based on simulation. Production and process-centered samples are combined based on simulation, problem, case study, or scenario-based environments. In this model, the interpretations and procedures obtained in the learning environment provide more performance transfer than traditional teaching as the transfer of information for teaching. This model has a systematic approach. Input and output (product) relationships are among the clusters of activities that are part of the model. The creation of the programming process

shows meaning and similarity with the realization of the input and output relationship. In addition, it supports systemic approaches to instructional design. Because this model allows changes between analysis and design parts and changes with various programming codes between activity clusters. The use of these processes in the programming reveals the function of this model.

CONCLUSIONS AND SUGGESTIONS

The model described in this study is based on experimental studies in the field of instructional technology. The 4C/ID model is the result of a prolonged study that began in the 1980s as a process of developing technical and complex skills. There are experimental evidence for many teaching strategies and tactics proposed by this model. This model is based on two basic procedures. One of them is the implementation of the model based on deep expertise and better performance. Secondly, model-based learning environments will be superior to traditional learning environments. This is due to the fact that the transfer duties of the advanced education are different from the tasks given by the training. This study shows that the basic functions included in the model overlap the technical in complex skills of the software-programming process. The characteristics of the model, which the numerical and mental thought contributes to the development of technical skills, such as analyzing, providing automation and creating schemas, are also important for concepts and mental skills that are essential in the learning and application of technical skills. The programming process therefore needs to develop complex and cognitive skills. At the end of this study, the instructional design model approach's teaching strategy steps are effective in teaching to develop software-programming skills.

As with information and task analysis in the second step of the model, mental models are crucial for the performance of complex cognitive skills. At another level, the selection and the tactics of teaching strategies are included in each of the four stages of the model. In the last step of the model, the development of learning environments seems to be a difficult task in terms of both time expenditure and difficulty in starting from a curriculum draft. It is feasible to implement instructional strategies and tactics with computer teaching models, gain programming skills, and analyze complex skills, and design and develop programming for different environments of learning in a software environment.

The 4C/ID Model gives designers the opportunity to solve problems and learn more about complex cognitive skills that do not continue as a teaching model approach. Some code in the programming is continuous and maintains the process. Some terminate the process for the given input and value. The basic element here is that all the desired tasks focus on the appropriate design in order to achieve the goals. For the complex learning process, this model explains the ease of use of many suitable models in terms of learning skills, learning problem solving function. The main thing is to design all of the tasks in learning all the ongoing or non-cognitive skills. One of them is the problem solving process in the realization of the programming of the individual. As mental models, what is the problem, how it is organized and how a job is done is important teaching questions. In this respect, the concepts of model and software development process discuss a new approach as a thought by revealing the importance of industrial institutions, businesses and organizations for the solution of problems that require complex cognitive skills as well as scientific techniques, tactics and suggestions for designing effective learning environments.

As a result, with an Instructional Design Model which can be used for gaining complex and cognitive skills, the operation, structure and techniques that can be used in vocational and technical education are explained with concepts. In this process, the ID Model discussed in this process is based on new technologies and the relationships between the programming system and behavioral-cognitive and structural teaching approaches (moderate-radical) was tried to explain as possible and possible relevance, thought development skills have been revealed. Thus, it has been pointed out how this model can be used to realize permanent, effective and interactive teaching in the field of programming. In addition to how the functions of new instructional designers can be realized for the future and the integration of other models and software development education can be more effective, the model

approach mentioned here in terms of gaining new complex, mental and cognitive skills has been put forward in terms of software development.

REFERENCES

Akçay, A., & Çoklar, A. N. (2016). Bilişsel becerilerin gelişimine yönelik bir öneri: Programlama eğitimi. *Eğitim Teknolojieri Okumaları*.

Akpınar, Y. & Altun, A. (2014). Bilgi toplumu okullarında programlama eğitimi gereksinimi. *Elementary Education Online, 13(1),* 1-4.

Ambrosio, A. P., Costa, F. M., Almeida, L., Franco, A., & Macedo, J. (2011). Identifying cognitive abilities to improve CS1 outcome. Paper presented at the Frontiers in Education Conference (FIE), 2011.

Amorim, C. (2005). Beyond Algorithmic Thinking: An Old New Challenge for Science Education, Eighth International History, Philosophy, Sociology & Science Teaching Conference, July 15 to July 18, 2005, University of Leeds, England

Branch, R. M.& Dousay, T. A. (2015). *Survey of instructional design models*, Fifth edition, Indiana, AECT.

Byrne, P. & Lyons, G. (2001). The effect of student attributes on success in programming. *ACM SIGCSE Bulletin, 33(3),* 49-52.

Clements, D. H. & Gullo, D. F. (1984). Effects of computer programmimg on young children's cognition. *Journal of Educational Psychology, 76(6),* 1051-1058.

Dick, W. & Carey, L. (1996). *The systematic design of instruction (4th Ed.).* New York: HarperCollins College Publishers..

Doğanay, A. (2007). Üst Düzey Düşünme Becerilerinin Öğretimi, A. Doğanay (Ed.) *Öğretim İlke ve Yöntemleri*, Ankara, Pegem Akademi. Yayı.

Driscoll, M. & Dick, W. (1999). New research paradigm in instructional technology: An inquiry. *Educational Technology Research and Development, 47(2),* 17-18.

Ennis, R. H. (1993). Critical thinking assessment. *Theory into Practice, 32(3),* 179-186.

Erdoğan, B. (2005). *Programlama başarısı ile akademik başarı, genel yetenek, bilgisayara karşı tutum, cinsiyet ve lise türü arasındaki ilişkilerin incelenmesi*. Yüksek Lisans Tezi, Marmara Üniversitesi Eğitim Bilimleri Enstitüsü, İstanbul.

Ertürk, S. (1972) *Eğitimde Program Geliştirme.* Ankara, Yelkentepe Yay.

Gagné, R. M. (1985). *The conditions of learning and theory of instruction.* New York: Holt, Rinehart and Winston.

Gülmez, I. (2009). *Programlama öğretiminde görselleştirme araçlarının kullanımının öğrenci başarı ve motivasyonuna etkisi*. Yüksek Lisans Tezi, Marmara Üniversitesi Eğitim Bilimleri Enstitüsü, İstanbul.

Hostetler, T. R. (1983). Predicting student success in an introductory programming course. *ACM SIGCSE Bulletin, 15(3),* 40-43.

İpek, İ. (2001). *Bilgisayarla öğretim: Tasarım, geliştirme ve Yöntemler*. Ankara: Tıp ve Teknik Kitapevi Yayınları.

İpek, İ. (2002). Öğretim Tasarımı Sistemlerinde Gelişmeler, Yaklaşımlar ve Öğretim Teknolojisinde İlerlemeler. XI. Eğitim Bilimleri Kongresi, 23-26 Ekim 2002 Yakın Doğu Üniversitesi, Lefkoşa, KKTC.

İpek, İ. (2004). Karmaşık Bilişsel Teknik Becerilerin Öğretilmesi Sürecinde Öğretim Programı Tasarımı: Dört Ögeli-Öğretim Tasarım Modeli. IV. International Educational Technologies Symposium. 24-26 November, 2004. Sakarya University. Sakarya.

Januszewski, A. & Molenda, M. (2008a). *Educational Technology, "A definition with Commentary",* New York: Lawrence Erlbaum Associates.

Januszewski, A. & Molenda, M. (2008b). Definition. In A.Januszewski & M. Molenda (Eds.), *Educational Technology: A definition with commentary*. New York: Lawrence Erlbaum Associates.

Jonassen, D.H. (1991). Objectivism vs. Constructivism. Do we need a philisophical paradigm shift? *Educational Technology Research and Development. 39(3),*5-14.

Kirschner, P. A., Sweller, J. & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist, 46(2),* 75–86.

Kirschner, P. A. & Van Merriënboer, J. J. G. (2008). Ten steps to complex learning: A new approach to instruction and instructional design. In T. L. Good (Ed.), *21st century education: A reference handbook (pp. 244-253).* Thousand Oaks, CA: Sage http://web.mit.edu/xtalks/TenStepsToComplexLearning-Kirschner-Van Merriënboer.pdf)

Lau, W. W. F. & Yuen, A. H. K. (2011). Modeling programming performance: Beyond the influence of learner characteristics. *Computers & Education, 571(1),* 1202-1213.

Lye, S. Y. & Koh, J. H. L. (2014). Review on teaching and learning of computational thinking through programming: What is next for K-12? *Computers in Human Behavior, 41,* 51-61.

Nelson.T.O. (1999). Cognition Versus Metacognition, in;P.J. Sternberg(Ed), *The Nature of Cognition, 625-641,* Cambridge,MaA:MIT Press.

Morrison, G. R. Ross S. M. & Kemp, J. E. (2001), *Designing Effective Instruction*. Michigan University, Wiley/Jossey-Bass education,

Newsted, P. R. (1975). Grade and ability predictions in an introductory programming course. *ACM SIGCSE Bulletin, 7(2),* 87-91.

Nowaczyk, R. H. (1983). Cognitive skills needed in computer programming. (ERIC Document Reproduction Service No. 236466).

Reigeluth, C.M. (1999). *Instructional design theories and models: A new paradigm of instructional design (vol.2)*. Mahvah, NJ: Lawrence Erlbaum Associates.

Robins, A. Rountree, J. & Rountree, N. (2003). Learning and teaching programming: A review and discussion. *Computer Science Education, 13(2),* 137-172.

Saygılı, G. (2010). *Öğretim teknolojilerinin fen ve teknoloji dersinde kullanımının ilköğretim Öğrencilerinin problem çözme becerilerine öğrenme ve ders çalışma stratejilerine üst düzey*

düşünme becerilerine fen ve teknoloji dersine yönelik tutumlarına ve ders başarısına etkisinin incelenmesi. Doktora Tezi, Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü, İzmir

Seels, B. & Glasgow, Z. (1998). *Making instructional design decisions (2nd Ed.)*. Upper Saddle River, NJ: Prentice Hall, Inc.

Seels, B., & Richey, R. (1994). *Instructional technology: The definition and domains of the field.* Washington DC: Association for Educational Communications and Technology.

Sleeman, D., Putham, R. Baxter, J. & Kuspa, L. (1984). Pascal and high-school students: A study of misconceptions. Technology panel study of stanford and the schools. (ERIC Document Reproduction Service No. ED258552).

Smith, P. L. & Ragan, T. J. (1999). *Instructional design. (2nd ed.)*. Upper Saddle River, NJ: Prentice Hall.

Smith P. L. & Ragan, T. J. (2005). *Instructional Design (3rd Ed.)* John Wiley & Sons, Inc.

Türk Dil Kurumu, (2018) (Turkish Language Society) Türkçe Sözlük. Retrieved January 2018, fromhttp://tdk.gov.tr/index.php?option=com_bilimsanat&view=bilimsanat&kategoriget=terim&kelimeget=d%C3%BC%C5%9F%C3%BCnme&hngget=md

Van Merrienboer, J. J. G., and Paas, F. G. W. C. (1990). Automation and schema acquisition in learning elementary compute programming: Implications for the design of practice. *Computers in human behavior 6.3* 273-289.

van Meriénboer, J.J.G. (1997). *Training complex cognitive skills: A four-component instructional design model for technical training.* Englewood Cliff, NJ: Educational Technology Publications.

van Meriénboer, J. J. G. ,Clarck, R. E. ve de Crook, M. B. M. (2002). Blueprints for complex learning: The 4C/ID-Model. *Educational Technology Research and Development.50(2),* 39-64.

van Merriënboer, J. J. G., Kirschner, P. A., & Kester, L. (2003). Taking the load of a learner's mind: Instructional design for complex learning. *Educational Psychologist, 38(1),* 5–13.

van Merriënboer, J. J. G. & Kirschner, P. A. K. (2007). *Ten steps to complex learning: A systematic approach to four-component instructional design*. NJ: Lawrence Erlbaum Associates, Inc.,

van Merriënboer, J. J. G., & Sweller, J. (2005). Cognitive load theory and complex learning: Recent developments and future directions. *Educational Psychology Review, 17,* 147–177.

Whipkey, K. L. (1984). Identifying predictors of programming skill. *ACM SIGCSE Bulletin, 16(4),* 36-42.

Winslow, L. E. (1996). Programming pedagogy – A psychological overview. *ACM SIGCSE Bulletin, 28(3),* 17-22.

International Journal of Progressive Education, Volume 15 Number 4, 2019

An Investigation of Pre-Service Preschool Teachers' Projects Using The Many-Facet Rasch Model *

Durmuş Özbaşı [i]
Çanakkale Onsekiz Mart University

Serdar Arcagök [ii]
Çanakkale Onsekiz Mart University

Abstract

The aim of this study was to evaluate project proposals prepared by pre-service preschool teachers' using ten criteria and thus determine the awareness of pre-service preschool teachers' toward the Research Project course. The survey method, a quantitative research type, was used for this research. The study group of the research constituted six different project proposals prepared by final year undergraduate students taking the Research Project I and Research Project II courses at the Faculty of Education, Department of Pre-school Education of Çanakkale Onsekiz Mart University, Turkey during the academic year 2018-2019. Twelve academic members of the Faculty of Education from six different universities assessed the projects. The data collection tool used was based on the research project assessment criteria of TÜBİTAK (Scientific and Technological Research Council of Turkey) along with the course's learning outcomes and content, and the theoretical frame of the research topic. The results were analyzed based on the Many-Facet Rasch Model. According to the data obtained, it was found that the projects and project criteria differed in terms of consistency and generosity. It was also observed that the pre-service teachers met some of the criteria while they had difficulties with other criteria.

Keywords: Many-facet rasch analysis, pre-service preschool teachers, research projects, survey method.

DOI: 10.29329/ijpe.2019.203.12

---

*This paper was presented as a summary paper at the 12th International Congress of Educational Research, 25-28 April. 2019, Rize, Turkey

[i] **Durmuş Özbaşı**, Assist. Prof. Dr., Canakkale Onsekiz Mart University, Faculty of Education, Measurement and Evaluation in Education. ORCID: https://orcid.org/0000-0001-5078-477X

Correspondence: dozbasi@gmail.com

[ii] **Serdar Arcagök**, Assist. Prof. Dr., Çanakkale Onsekiz Mart University, Faculty of Education. ORCID: https://orcid.org/0000-0002-4937-3268

INTRODUCTION

The flexible development of individuals is of great importance in our era where information and communication technologies are rapidly changing (Akgün, 2000). Individuals are expected to be equipped with the qualifications required by this era, which has been described the Digital Era; in other words, individuals need to possess the most recent knowledge and skills. The skills expected from such qualified individuals include being able to sense the problems they face and express them, to be able to hypothesize depending on the nature of the problem, to detect possible variables, to propose possible relations between variables and to be able to define relationships clearly and explicitly (Yaşar, 2014). From this point of view, it is necessary that individuals gain science processing skills, which is one of the thinking skills. Science process skills can be defined as a process comprising various stages such as observing qualities, measuring quantities, sorting, classifying, inferring, predicting, experimenting, communicating, modeling, changing variables and controlling them (Turkish Ministry of Education - MEB, 2005). The aforementioned process can be conducted functionally in the case of individuals who have a scientific attitude. Those having a scientific attitude should conduct their research in a systematical, skeptical and ethical manner. Systematicity signifies that the individual has the tendency to approach issues seriously and question what, how and why. Being skeptical means knowing the possibility that the idea put forward may not be verified. Taking into consideration individuals who undertake research, and their concerns and rewards, acting in compliance with the possibility that they may be affected by following or observing certain behavioral rules, denotes being ethical (Robson, 2015).

It is also essential that a research approach covers philosophical assumptions in addition to different methods and process steps. In other words, those preparing a research plan or proposal should possess broad philosophical views. These views generally consist of elements of post positivism, constructivism, transformativism and pragmatism. Post-positivists adopt a causal philosophy in which reasons determine possible results or products. Constructivism describes an individual's search for meaning about the world they live in or the world they experience. The transformative philosophical assumption is an assumption defended by those who consider that the structural rules and theories imposed by post-positivists in the 1980s and 1990s do not correspond to individuals marginalized in society or issues such as power and social justice, discrimination or pressure, which need to be investigated. On the other hand, adherents of pragmatism generally take into consideration actions, situations and results rather than initial circumstances (Creswell, 2014).

In the Digital Era in which we live, undergraduates' ability to gain adequate knowledge, skills and attitude in conducting studies will enable them to occupy positions in different business fields and to use efficiently the outcomes they have acquired (İlhan, Çelik and Aslan, 2016). Studies conducted while they are in the educational phase make a crucial contribution to acquiring the necessary knowledge, skills and attitudes.

Undergraduates need to have research literacy due to the importance of conducting research in education and society. Undergraduates will be able to find articles about their field and will be able to evaluate those articles and then suggest and conduct research studies at any time in their own career; leading to an improvement in the awareness of undergraduates of educational research (Johnson and Christensen, 2014). On the other hand, research in education will encourage students to follow closely the changes and developments in their own professional fields and to become a qualified researcher.

Although there is no consensus on differentiating the kinds of educational research among the experts and scientists, research conducted in this field has mostly been divided into four types. These can be listed as follows (Best and Kahn, 2017):

1. Historical Research compromises the examination of past events or incidents to research, record, analyze and evaluate where, when, with whom or which bodies they had happened (Demirel, 2008; Ekiz, 2009).

2. Quantitative Descriptive Research tests the accuracy of theories and examines the relations within a certain structure. These studies are based on numbers and symbols and the research results can be generalized (Büyüköztürk, Çakmak, Akgün, Karadeniz and Demirel, 2009).

3. Qualitative Descriptive Research enables a deep and comprehensive investigation of a subject or events. The researcher themselves is usually the data collection tool (Patton, 2014).

4. Experimental Research aims to explain the circumstances causing an event and affecting that event; in which the relations between one or more variables are scrutinized (Ary, Jacobs, Razahiev and Sorensen, 2006).

Studies in the educational field comprise processes enabling teachers to learn how to ask questions based on the studies they conduct, how to organize the research method, how to analyze data and report the results, and how to cooperate with other researchers. Thus, teachers and preservice teachers conduct accurate and objective research and follow a scientific path (Herman, Clough and Olson, 2013; Schwarz, Westerlund, Garcia and Taylor, 2010). These studies provide an understanding of the functionality and extent of different shareholders such as the learners, teachers and administrators. In this sense, these studies aim to describe, predict, organize and explain the mentioned shareholders (Gall, Gall and Borg, 2007). In other words, studies in education aim to keep alive the constant questioning skill, to produce new ideas, to develop theories related to the field of application, and to define the productivity and efficiency of curriculums (Mahoney, 2013).

Studies conducted on education also make several contributions for preservice teachers in various contexts. These include obtaining and giving feedback to preservice teachers about how to best apply and manage curriculums, evaluating pedagogical field knowledge, and assessing the functionality of curriculums (Zientek, Capraro and Capraro, 2008). Studies enable teachers and preservice teachers to acquire ethical and epistemological values. In addition, they are also encouraged to adopt an objective perspective by helping them to acquire democratic values (Murray, 2017).

The functionality of studies conducted about education can be achieved by increasing the awareness of preservice teachers towards these studies. Therefore, it is essential to ensure that preservice teachers assess studies conducted in the field with a questioning point of view and gain research experience in the field (Creswell and Plano-Clark, 2010).

It is pointed out by the Ministry of Education (MEB) that one of the field knowledge competencies that a teacher should have regarding the teaching profession should cover the questioning perspective so as to incorporate methodological knowledge as well as theoretical and factual information. This has also been shown to be the indicator of fundamental competence to categorize basic methods and techniques (MEB, 2017). Correspondingly, the Council of Higher Education (YÖK, 2007) emphasizes that one of the qualifications for lecturers teaching undergraduate programs is to train preservice teachers to conduct scientific research and to make use of the findings. Therefore, the one-semester “Research Project I” and “Research Project II” courses have each been included within the undergraduate programs of pre-school teaching so as to enable preservice teachers to acquire a questioning perspective, to follow studies conducted in education, and to carry out their own research studies in the field (YÖK, 2007). Via the Research Project II course, it is expected that the preservice teacher can define a research topic related to the field of education, compose research questions relating to the research, adopt a methodology appropriate to the topic and report the data collected. In addition, it is expected that the importance of the studies conducted in the field of education is adopted by the teacher as well. Indeed, YÖK included the Project Preparation course as an elective course within the curriculum as professional knowledge for pre-school teachers in the 2018-2019 academic year by stressing the importance of studies in the field of education (YÖK, 2018).

Importance of Research

When the related literature was examined, it was found that studies conducted with undergraduate students in the field of education were mostly related to scientific research methods (Akar, 2007; Akkanat, Abu, Çakır and Gökdere, 2017; Aksu, 2018; Bins, 2009; Ersoy, 2016; Garza, 2015; Hypolite, 2012; İlhan, 2016; Orçan, 2013; Spang, 2008; Yaşar, 2014). Nevertheless, studies examining undergraduate students' scientific process skills can also be seen (Aydoğdu, 2009; Çelik, 2013; Kaya and Yılmaz, 2016; Kefi, Çeliköz and Erişen, 2013; Kılıç, Haymana and Bozyılmaz, 2008). However, it was seen that the number of studies conducted with undergraduate students on the Research Project course was limited (Cengiz and Karataş, 2014; Eti and Gündoğdu, 2015) and that no study had been conducted using the Many-Facet Rasch model. Curriculums in Turkey have been based on the constructivist approach since 2005. The program, having a student-centered and a helical structure, supports the versatile development of students. One of the key components of this approach is supporting the creative and critical thinking and science process skills of students. This can only be achieved given that the preservice teachers whose aim is to train the next generation also acquire these skills. Therefore, the Research Project course considerably contributes to preservice teachers producing authentic ideas with a critical perspective. Besides this, preservice teachers receive knowledge and gain awareness regarding scientific research methods and develop their science process skills. Additionally, this course helps preservice teachers to learn the fundamental stages of research proposals by applying them. It is therefore believed that measuring the efficiency of this course using Many-Facet Rasch analysis will make a considerable contribution to the related literature.

Theoretical Framework

Item Response Theory and Many-Facet Rasch Model

The Item Response Theory (IRT) is a mathematical model proposed and developed as a reaction to the Classical Test Theory (CTT) to minimize its weaknesses (Hambleton, Swaminathon and Rogers, 1991). One of the most important advantages of IRT over the CTT is that IRT is able to make predictions by eliminating individual and group influence within the frame of the invariance principle (Hambleon, 1995). Consequently, according to IRT, while making predictions related to item difficulty and item differentiates, which are two psychometric qualities, it does not matter in which group the study is conducted. The IRT has four different models, namely, one-, two-, three- and four-parameter. Only the one-parameter logistic model constituting the basis of the Many-Facet Rasch model will be mentioned here as it is the most used within the scope of this study.

The one-parameter logistic model (1PLM) is a model that only covers one item of difficulty parameter. In this model, the item differentiate indexes of all items are considered to be equal. The item characteristic curves are also the same for all items in 1PLM. The one-parameter model is referred to by the name of its developer, George Rasch. Linacre (1989) developed the Rasch model by reducing the rater effect. This model compromises several variables such as the rater, scoring, items/features and is also known as the Many-Facet Rasch Model (MFRM) in the literature (Mulqueen, Baker and Dismukes, 2000; Chapman, Letourneau and Sheidow, 2013). MFRM is shown by the formula below:

$$\text{Log}\,(P_{nijk}/P_{nijk-1}) = \theta_n - D_i - C_j - F_k$$

P_{nijk} : Probability of examinee n receiving a rating of k on criterion i from rater j
θ_n : Proficiency of examinee n
D_i : Difficulty of criterion i
C_j : Severity of rater j
F_k : Difficulty of receiving a rating of k relative to a rating of k – 1

MFRM is a model including all sources of variability that are thought to influence the scores in the analysis and showing the interaction between these sources of variability (Kim, Park and Kang, 2012). According to this, there are many sources of variability or facets, such as "examinee x item", "item x rater", and "rater x examinee", etc. As the MFRM is an extension of IRT, the item difficulty, examinee's scores and assumptions regarding raters can be conducted independently of the group or separately, and then these can be degraded to a common criterion level (with the data calibration map) and all facets can be interpreted simultaneously (O'Neil and Lunz, 1996; Kim, Park and Kang, 2012). This aspect provides a great advantage for researchers. More specifically, the MFRM is a model that enables the comparison of potential interactions between facets, the severity/leniency of raters, the degree of rater consistency, and item difficulty levels by bringing examinees, skills, items and raters to a common measurement level (Sudweeks, Reeve and Bradshaw, 2004; Güler, 2008; Yue, 2011; Linacre, 2014)

Aim

The general aim of the study was to have the project proposals prepared by students assessed with 10 criteria by the judges and to examine the judges, criteria and project facets by means of the Many-Facet Rasch Model. Answers to the following questions were sought within the scope of the general aim.

1. What is the condition of the calibration map obtained for "rater, project and criterion" facets in the scoring carried out, as per the Project Evaluation Criteria?

2. What are the statistics regarding the measurement report of the project proposals?

3. What are the statistics of the measurement report of the criteria used in assessment of the project proposals?

4. How does the consistency/severity of the judge change during the scoring at the assessment stage of the project proposals?

5. Are there any biased interecation between projects and judges' in the scoring?

METHOD

Research Model

The survey model was used in the study. This model aims to collect data from a wide sample during a certain period (Best, 1998). Another aim of the survey model is to analyze a current situation by defining and explaining it (Ekiz, 2009).

Study Group

The study group of the research constituted six different project proposals prepared by final year pre-service preschool teachers taking the Research Project I and Research Project II courses at the Faculty of Education, Department of Preschool Education of Çanakkale Onsekiz Mart University, Turkey during the academic year 2018-2019. The assessors taking part in the study were 12 faculty members working at six different universities in Turkey, namely, Fırat University, Trakya University, Samsun Ondokuz Mayıs University, Süleyman Demirel University, Kilis 7 Aralık University and Çanakkale Onsekiz Mart University.

Data Collection Tool

The data collection tool used in the research was developed in consideration of TÜBİTAK's research project evaluation criteria along with the course's learning outcomes and content, and the theoretical frame of the research topic. The research project evaluation criteria (data collection tool) created were submitted for the approval of five academic members teaching the Research Project course as part of the undergraduate program and having realized a research project with their undergraduate students. Upon the evaluation of the five academic members by calculating the Content Validity Index (CVI), it was decided whether or not to use each item in the project proposal survey tool as criteria. The CVI was used in order to determine whether there was coherence among the experts (Yurdugül 2005; Lawshe, 1975). The CVI was calculated using the formula below:

$$KGO=\frac{UG}{N/2}-1$$

UG: number of experts sharing the "appropriate" view of the item

N: Total number of experts

The five academic members were asked to assess the evaluation criteria used within the scope of the study as "appropriate", "needs correction" or "not appropriate" regarding whether the mentioned criteria could be used as project proposal evaluation criteria or not. According to this, the CVI of the 10 criteria chosen in compliance with the views of the five academic members was calculated as 1. Consequently, the ten project proposal evaluation criteria were defined as: creating a project title, writing a project abstract, determining key words found in the project abstract, forming the theoretical frame of the project, revealing the authentic value of the project, defining an event calendar for the project, indicating the common effect expected from the project, creating a general budget for the project, and justifying the project budget.

Analysis of Data

Analysis of the data collected regarding the student projects was conducted within the frame of MFRM and realized with the FACETS program developed by Linacre (2014). MFRM is an extension of the Rasch model based on the IRT. The study was designed as a three-facet model compromising the judge, evaluation criteria and projects. According to this, the data calibration map and the three facets were evaluated with the same criteria. In addition, the scoring of the judge, criteria and projects was calculated to produce detailed findings on each facet. Detailed information about the judge and project interaction was also obtained by analyzing the severity and consistency of the judges.

It is also essential to test the assumptions before conducting analysis based on the Many-Facet Rasch Model, as the Rasch model is based on the IRT (Baker, 2001). These assumptions are (a) unidimensionality, (b) local independence, and (c) data-model fit.

a) Unidimensionality

The assumption of unidimensionality should be tested to perform the Many-Facet Rasch Model and to properly interpret the findings obtained. Unidimensionality can be described as measuring the target psychological feature under a mode factor (Hambleton, Swaminathon and Rogers, 1991). Exploratory Factor Analysis (EFA) was used to define whether the survey tool was unidimensional or not. EFA is an analysis technique used to define the latent sources of the variance and co-variance in the data obtained and to explain them (Jöreskop and Sörbom, 1993). The Kaiser Mayer Olkin value regarding the adequacy of the sample was found to be .63 and the Bartlett globality test also found it to be statistically meaningful ($\chi 2$ (45)=129,611; $p<.01$). Accordingly, it can be said that the data is in compliance with the factor analysis. The obtained EFA results are shown in Table 1.

Table 1 EFA Results For Project Evaluation Tool

Criterion no.	Factor Load	Criterion no.	Factor Load	Criterion no.	Factor Load
CRT1	.30	CRT5	.31	CRT9	.30
CRT2	.71	CRT6	.66	CRT10	.58
CRT3	.52	CRT7	.30		
CRT4	.57	CRT8	.69		
Attribute = 2.546, Announced Variance = 30%					

As per the EFA results given in Table 1.1, the criteria in the project evaluation tool explain 30% of the total variance under a single factor. The factor load values vary from .71 to .30. In this sense, it can be said that the project evaluation tool features unidimensionality.

b) Local Independence

Local independence indicates whether there is a relationship between the response to a survey tool and the response to another item, and is frequently associated with unidimensionality (Hambleton, Swaminathan and Rogers, 1991; de Ayala, 2009). The fact that the test meets the unidimensionality assumption is sufficient to assume local independence. Thus, in our study the unidimensionality assumption was met and no additional analysis for local independence was required.

c) Data-Model Fit

The data-model fit is related to how small the standardized residual value (StRes) is. It is also called the "unexpected value". According to this, for values outside a range of ±2 of the standardized residual value, it should not be more than 5% of the entire data to determine the data-model fit. This value should not be over 1% of the total data for values in the range of ±3 of the standardized residual value (Linacre, 2003). In the present study, the standardized residual values were examined to check whether the data-model fit was met. The residual ratio for values outside the range of ±2 was 2.9%, while the standardized residual ratio for values outside the range of ±3 was 2.9%. Consequently, it was concluded that the data-model fit was appropriate and the analysis could be continued.

RESULTS

The findings obtained in the study are discussed as per the sub-aims of the study.

Findings related to first sub-aim

The first sub-aim of the study was “What is the condition of the calibration map obtained for “rater, project and criterion” facets in the scoring carried out, as per the Project Evaluation Criteria?" Accordingly, 6 project reports were assessed by 12 different raters in terms of 10 criteria and scored. The scoring results were analyzed according to the Many-Facet Rasch Model.

As per the iteration results of the analysis, it was found that 18 iterations were conducted. The low number of iterations shows that it is easy to obtain a good prediction from the data (İlhan, 2015). A variable (calibration) map of the facet statistics based on the study’s data was formulated and is shown in Figure 1.

```
+-------------------------------------------------------------------------+
|Measr|+project|-crt          |+project|-judge                     |PROJE|
|-----+--------+--------------+--------+---------------------------+-----|
|   2 +        +              +        +                           + (4) |
|     |        |              |        |                           |     |
|     |        | crt8         |        |                           |     |
|     |        |              |        |                           | --- |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|   1 +        + crt5         +        +                           +     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |  3  |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     | 5      | crt4         | *      |                           |     |
|     |        | crt2         |        |                           |     |
|     | 2 4    |              | **     |                           |     |
*   0 * 6      * crt7         * *      *                           *     *
|     |        |              |        |                           | --- |
|     | 1 3    | crt6         | **     | judge3   judge4           |     |
|     |        | crt1   crt10 |        | judge5                    |     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     |        |              |        | judge1                    |     |
|     |        |              |        |                           |  2  |
|     |        |              |        | judge2   judge6   judge8  |     |
|  -1 +        +              +        + judge10  judge9           +     |
|     |        | crt9         |        | judge12  judge7           |     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     |        | crt3         |        |                           |     |
|     |        |              |        | judge11                   |     |
|     |        |              |        |                           | --- |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|     |        |              |        |                           |     |
|  -2 +        +              +        +                           + (1) |
|-----+--------+--------------+--------+---------------------------+-----|
|Measr|+project|-crt          | * = 1  |-judge                     |PROJE|
+-------------------------------------------------------------------------+
```

Figure 1. Data Calibration (variable) Map

When Figure 1 is examined, it can be said that the project with the highest proficiency level is Project 5 (0.30 logit), and the projects with the lowest proficiency levels are 1 and 3 (-0.20 logit, respectively). According to Figure 1, the criteria used in the project evaluation are easier from the top to the bottom and more difficult from the bottom to the top. Consequently, the hardest criterion for students while they were writing their projects was criteria 8 (1.8 logit). On the judge facet of the data calibration map, the judge located at the top was the most severe while the judge at the bottom was less severe in terms of scoring. According to the judge column in Figure 1.1, it can be said that the most severe judges were 3 and 4 (-0.2 logit). The most generous judge was judge 11 (logit = -1.5). It is necessary to examine the survey reports pertaining to the project, criterion and judge facets in order to examine each facet in more detail. Table 2 shows the results regarding the students' projects.

Table 2 Student projects measurement report

Project	Observed Average	Fair Average	Model Measure	Model Error	Infit Square Average	Infit Z	Outfit Square Average	Outfit Z
P5	3,17	3,26	.29	.13	1,16	-.3	1,13	.9
P2	3,07	3,15	.07	.13	,95	-.6	,95	-.3
P4	3,07	3,15	.07	.13	,91	.3	,95	-.3
P6	3,02	3,10	-.02	.13	1,04	-.2	1,13	.9
P3	2,92	3,01	-.19	.12	,96	-.5	1,00	.0
P1	2,91	2,99	-.22	.12	,93	-.3	,91	-.6
Average	3,03	3,11	.00	.13	,99	,0	1,01	,1
Standard Deviation	,09	,09	.19	.00	,09	,6	,1	,6

Model, Sample: RMSE .13 Adj (True) S.D. .14 Separation 1.14 Strata 1.85 Reliability .70
Model, Fixed (all same) chi-square: 11.3 d.f.: 5 significance (probability): .05

Table 2 gives details of the Many-Facet Rasch analysis results regarding the facets, including the students' project evaluations. When the RMSE values of the logit values were examined, it was calculated as 0.13. On the other hand, the standard deviation of the RMSE value is below 1 (0.14), which is a critical value. The relevance coefficient was calculated as 1.14, and the reliability index was calculated as 0.70. The reliability index regarding the facets in the Many-Facet Rasch analysis is not interpreted as in the CTT. The high value of the reliability index regarding facets in the Many-Facet Rasch analysis gives information about the difference between the raters in terms of severity/leniency (Haiyang, 2010). According to this, the fact that the reliability index is high does not mean that the raters display similarities but it indicates that the difference is reliable. In other words, the fact that this difference is large means that the projects are similar or different in terms of similarity and difference. If the reliability index is high, it indicates that the students' projects are similar; whereas if the reliability index is low, the students' projects are different. When the chi-square value obtained in the study is examined, it can be said that the difference is meaningful ($\chi 2=11.3$, sd=5, $p<.05$). Therefore, the absence hypothesis was rejected in the hypothesis that "there is a meaningful difference in students' projects" about the constant effect. In that case, it can be concluded that there is a statistically meaningful difference between the rater judges and the students' projects.

When the infit and outfit statistics of the facets are examined, it can be concluded that the reference range of all 6 projects was from 0.6 to 1.4 (Wright and Linacre, 1994: 375-380) and there is no facet exceeding those values.

Rater Analysis

It is necessary to examine separately each facet used in the project regarding the logit values for the criteria and judge facets in order to assess each facet in more detail. Thus, the facet statistics on the judges' evaluation, as the raters in the study, are given in Table 3.

Table 3 The Measurement report of judges

Judge	Observed Average	Fair Average	Model		Infit		Outfit	
			Measure	Error	Square Average	Z	Square Average	Z
judge4	2,68	2,73	-0,18	0,17	0,99	0	1,08	0,5
judge3	2,72	2,77	-0,24	0,17	0,52	-3,3	0,55	-3
judge5	2,75	2,81	-0,29	0,17	0,81	-1	0,9	-0,5
judge1	2,98	3,06	-0,7	0,18	0,63	-2,3	0,64	-2,2
judge6	3,07	3,14	-0,86	0,18	2,08	4,5	1,88	3,8
judge8	3,07	3,14	-0,86	0,18	0,87	-0,6	0,91	-0,4
judge2	3,08	3,16	-0,89	0,18	1,16	0,8	1,37	1,8
judge9	3,12	3,2	-0,96	0,18	1,1	0,5	1,05	0,3
judge10	3,15	3,23	-1,02	0,18	1,11	0,6	1,01	0,1
judge12	3,17	3,25	-1,06	0,19	0,96	-0,1	0,89	-0,5
judge7	3,18	3,26	-1,09	0,19	0,75	-1,3	0,69	-1,7
judge11	3,35	3,43	-1,47	0,2	1,04	0,2	1,16	0,8
Average	3,03	3,1	-0,8	0,18	1	-0,2	1,01	-0,1
Standard Deviation	0,2	0,21	0,37	0,01	0,38	1,9	0,34	1,7

Model, Sample: RMSE .18 Adj (True) S.D. .34 Separation 1.91 Strata 2.88 Reliability (not inter-rater) .78
Model, Fixed (all same) chi-square: 52.5 d.f.: 11 significance (probability): .00
Model, Random (normal) chi-square: 9.1 d.f.: 10 significance (probability): .52

The logit, infit, outfit values and reliability index of the rater facet are illustrated in Table 3.When the RMSE value indicating the standard error of the logit values in the table was examined, it was calculated as 0.18 and the standard deviationdevaition of the RMS value was calculated as under 1.00 (0.34), which is the critical value. The relevance coefficient was calculated as 1.80 and the reliability index as 0.76. The calculated reliability index gives information about the difference between raters in terms of severity/leniency (Haiyang, 2010). According to this, the fact that the reliability index is high does not mean that the raters feature similarities, but that the difference is reliable. It is essential to examine the chi-square results to conclude whether the difference is meaningful or not. When the chi-square value obtained in the study is examined, it can be said that the difference is meaningful ($\chi 2=52.5$, sd=11, $p<.01$). In other words, the absence hypothesis was rejected in the hypothesis that "there is a meaningful difference in students' projects" about the constant effect. In this case, it can be concluded that there is a statistically meaningful difference between the judge raters and the students' projects.

In addition, according to the facet analysis regarding judges given in Table 3, when the infit and outfit values of the 12 judges are examined, it was concluded that 11 of the judges' values were within the reference range proposed by Wright and Linacre (1994: 375-380), being 0.6 to 1.4, and only judge 1 was outside this reference value.

Analysis of criteria used in project evaluation

The survey findings regarding the Many-Facet Rasch analysis on the compliance of criteria used by judges to evaluate students' projects are given in detail in Table 4.

Table 4 The Measurement report results for evaluation criteria of projects

Criteria	Observed Average	Fair Average	Model		Infit		Outfit	
			Measure	Error	Square Average	Z	Square Average	Z
crt8	1,89	1,87	1,77	0,14	1,39	2,6	1,33	2,2
crt5	2,47	2,48	0,96	0,14	0,78	-1,7	0,78	-1,6
crt4	2,93	2,95	0,29	0,15	0,7	-2	0,7	-1,9
crt2	3	3,02	0,17	0,15	0,68	-2	0,68	-2
crt7	3,08	3,1	0,02	0,16	1,38	2	1,46	2,3
crt6	3,19	3,21	-0,19	0,17	0,6	-2,6	0,61	-2,5
crt1	3,24	3,25	-0,27	0,17	1,29	1,5	1,33	1,7
crt10	3,25	3,27	-0,3	0,17	0,96	-0,1	1,03	0,2
crt9	3,56	3,57	-1,06	0,21	1,1	0,5	1,09	0,5
crt3	3,65	3,66	-1,39	0,23	1,2	0,9	1,11	0,5
Average	3,03	3,04	0	0,17	1,01	-0,1	1,01	-0,1
Standard Deviation	0,49	0,5	0,86	0,03	0,29	1,8	0,29	1,8

Model, RMSE .17 Adj (True) S.D. .89 Separation 5.23 Strata 7.31 Reliability .96
Model, Fixed (all same) chi-square: 260.0 d.f.: 9 significance (probability): .00
Model, Random (normal) chi-square: 8.7 d.f.: 8 significance (probability): .37

According to Table 4, it is seen that the criteria which are the weakest points for students while preparing their projects were number 8 (defining the common effect expected from the project), number 5 (revealing the authentic value of the project) and number 4 (forming the theoretical frame of the project). The students were most comfortable with criteria 3 (determining key words found in the project abstract), 9 (creating the general budget of the project) and 10 (justifying the project budget).

From Table 4, it can be said that the findings are in compliance with the chi-square results testing whether "there is a meaningful difference between the difficulty of criteria used in the project evaluation" hypothesis about the constant effect and the separation index of 5.23 and the reliability index of 0.96 ($\chi 2 = 260.0$, $p < .05$). Thus, the absence hypothesis was rejected, and it can be concluded that there is a statistically meaningful difference in terms of the difficulty/easiness of the criteria used in evaluation of the students' projects.

Rater-Project Bias Analysis

The rater-project bias analysis results are given in Table 5 to examine the presence of bias in the project evaluation performed by raters. According to this, the fact that the t values are in the range of -2 and +2 indicates there is an interaction bias (Linacre, 2014). Hence, it can be said that the t values range is from -3.30 to 2.07 and that some of the judges were biased. According to the findings, judge 2 was generous with project 2 and gave 36 points instead of 31 points, yet the same judge gave 36 points instead of 32 points for project 5. Similarly, judge 12 was severe with project 3 and gave 26 points instead of 31 points, but judge 9 was severe and gave 24 points instead of 32 points for project 2.

Table 5 Judge-project bias analysis

Observed Score	Expected Score	Number of Observation	Observed-Expected Average	Bias Model Size	Bias Model Standard Error	Infit Squares Average	Outfit Squares Average	Judge	Project
24	31,53	10	-0,75	-1,3	0,39	0,4	0,4	judge9	p2
26	30,71	10	-0,47	-0,82	0,4	0,7	0,7	judge1	p3
36	32,26	10	0,37	1	0,59	1	1,4	judge2	p5
36	31,21	10	0,48	1,22	0,59	0,7	1,1	judge2	p2
30,3	30,25	10	0	0,03	0,45	1	1	Average	
3,0	2,17	0	0,21	0,43	0,05	0,5	0,5	Standard Deviation	

Fixed (all = 0) chi-square: 61.2 d.f.: 72 significance (probability): .81

It is necessary to examine in detail the reasons why the judges were severe or generous for some projects and not for others.

CONCLUSION AND DISCUSSION

In this study, scientific research projects prepared by pre-service preschool teachers were examined in terms of several criteria according to MFRM (Many-Facet Rasch Model). In this analysis, the projects of the students, severity/leniency of judges' scoring, and consistency of the criteria defined were examined using MFRM. According to the findings, out of P6 projects, project P5 was the most successful project. However, project P1 was considered as the least successful project. The total score obtained for project P5 was 381 while the total score for project P1 was 349. It was revealed that among the judges, the most generous scoring was given by judge J11, and the most severe scoring was that of judge J4.

Another result obtained from the research was whether the criteria were easy or not for the students. When the findings obtained according to MFRM are taken into consideration, it was concluded that the easiest was criteria 3, "Writing Key Words Found in the Project Abstract". Key words define the words used in the main title of the research project. In addition, key words are also defined as important words related to the topic selected for the project conducted by the researcher. Additionally, these key words also enable other researchers to access similar research projects (Bell, 2010; Lester and Lester, 2015). In our study, it can be said that in comparison with other criteria, the students did not have any difficulties in finding key words suitable for their projects during the preparation of their project proposal. Nevertheless, it was revealed that criteria 8, "Revealing the Common Effect Expected from the Project", was the most difficult criteria for students during preparation of the project proposal. It can be said that students had difficulties in expressing the common effect of the project proposal at the writing stage and that they could not convey the common effect successfully. The common effect of the project is an important component of the project proposal. The researcher should clearly express the proposed research project's originality, productivity, and contribution to society under the common effect heading (TÜBİTAK, 2014). In other words, the common effect is the researcher's consideration of the project's contribution to scientific knowledge, the economy and public welfare upon conducting the project (TÜBİTAK, 2018). Another important component in the common effect is to make a contribution to the project shareholders and projects to be realized in the future (TÜA, 2016). It is seen that students cannot enunciate the common effect of the research project at the targeted level. This may result from failings of the academic member teaching the course. On the other hand, this can also be due to the fact that students do not know what the common effect constitutes as a concept, and they did not conduct enough research to learn its meaning.

In studies conducted on the MFRM (Baştürk, 2009; Baştürk and Işıkoğlu, 2007; Batdı, 2017; Batdı and Elaldı, 2016; Köse, Usta and Yandı, 2016), rater bias emerged as a crucial factor and it is of great importance in terms of the reliability and validity of the results. According to the rater bias results obtained in this study, it was seen that the judge J2 gave 36 points instead of 31,21 and gave a generous scoring for project P2. On the other hand, judge J9 gave 24 points instead of 31,53 and severe scored project P2. When the reliability coefficients of the study were examined they were calculated as between 0.70 and -.0.96. It is possible to state that there was no problem in terms of the reliability of the analysis conducted and that it was reliable at a good level (Şencan, 2005).

RECOMMENDATIONS

Proposals based on the research results may be summed up as follows:

1. It was found that students have difficulties with some of the project preparation processes (e.g. expressing the common effect). Accordingly, every project preparation stage should be given more attention by the students in the project preparation process and the project proposal should be prepared by spending more time on its application.

2. According to the study's results, it was found that some judges were biased against some projects during the evaluation stage. Therefore, a short training course should be provided for judges to explain how the scoring should be conducted.

3. The study results were based on only quantitative data. The subjects which the students struggled with most, and the students' views, could be usefully examined after obtaining the quantitative results.

Proposals for future studies:

1. Only the facets regarding the criteria, project and judges were taken into consideration in the scope of the current study. Students could be added to the study as the fourth facet. Thus, the project preparation process of the students could also be investigated individually.

2. The prepared project proposals of the students could also be analyzed with different samples. Consequently, it would be possible to recognize whether there is any bias by the judges, using the same criteria with different samples.

ACKNOWLEDGEMENTS OR NOTES

This study is supported by Canakkale Onsekiz Mart Univesity Scientific Research Projects Unit (Project Number: SBA-2019-2920). We would like to thank Canakkale Onsekiz Mart Univesity Scientific Research Projects Unit for this support

REFERENCES

Akar, Ü. (2007). Ögretmen adaylarının bilimsel süreç becerileri ve elestirel düsünme beceri düzeyleri arasındaki ilişki, Yayımlanmamış Yüksek Lisans Tezi, Afyonkocatepe Üniversitesi Sosyal Bilimler Enstitüsü Sınıf Ögretmenliği Bilim Dalı, Afyon.

Akgün, S. (2000). Ögretmen ve ögretmen adaylarına fen bilgisi ögretimi. 6. Baskı. Pegem A Yayıncılık.

Akkanat, Ç., Abu, N.K., & Çakır, R. (2017). Öğretmen adaylarının bilimsel araştırma yöntemleri dersindeki motivasyonel inançları ve öğrenme stratejilerinin çeşitli değişkenler bakımından incelenmesi, Hasan Ali Yücel Eğitim Fakültesi Dergisi, 14 (27), 223-244.

Aksu, C. (2018). Müzik öğretmeni adaylarının 'bilimsel araştırma yöntemleri dersi'ne dönük görüşleri, Kastamonu Eğitim Fakültesi Dergisi, 26 (6), 2127-2138.

Ary, D., Jacobs, L.C., & Razavieh, A. (2006). Introduction to research in education (5th ed.). Fort Worth, TX: Harcourt Brace.

Aydoğdu, B. (2009). Fen ve teknoloji dersinde kullanılan farklı deney tekniklerinin öğrencilerin bilimsel süreç becerilerine, bilimin doğasına yönelik görüşlerine, laboratuvara yönelik tutumlarına öğrenme yaklaşımlarına etkileri, Yayımlanmamış Doktora Tezi, Dokuz Eylül Üniversitesi, Eğitim Bilimleri Enstitüsü, İlköğretim Anabilim Dalı Fen Bilgisi Öğretmenliği Programı, İzmir.

Bağcı-Kılıç, G., Haymana, F. & Bozyılmaz, B. (2008). İlköğretim fen ve teknoloji dersi öğretim programi'nin bilim okuryazarliği ve bilimsel süreç becerileri açisindan analizi. Eğitim ve Bilim, 33 (150), 52-63.

Baker, F.B. (2001). The basics of item response theory. ERIC Clearinghouse on Assessment and Evaluation, University of Maryland, College Park, MD.

Bastürk, R. & Işıkoglu, N. (2008). Analyzing process quality of early childhood education with many facet rash measurement model. Educational Sciences: Theory and Practice, 8(1), 25–32.

Baştürk, R. (2009). Applying the many–facet Rasch model to evaluate powerpoint presentation performance in higher education. Assessment and Evaluation In Higher Education, 33(4), 431–444.

Batdı, V. (2017). Comparing the high school english curriculum in turkey through multi-analysis. Educational Sciences: Theory and Practice 17(4), 1255-1290.

Batdı, V., & Elaldı, Ş. (2016). Analysis of high school english curriculum materials through rasch measurement model and maxqda. Educational Sciences: Theory & Practice, 16, 1325–1347.

Best, J.W. & Kahn, J.V. (2017) Eğitimde araştırma yöntemleri, nitel araştırma bölümü (Çeviren: Mustafa Durmuşçelebi), (Editör: Onur Köksal). Konya: Dizgi Ofset.

Bins, I.C. (2009). Representatıon of scientific methodology in secondary science textbooks, Doctoral dissertation, University of Virginia, USA.

Büyüköztürk, Ş., Kılıç-Çakmak, E., Akgün, Ö.E., Karadeniz, Ş., & Demirel, F. (2008). Scientific research method. Ankara: Pegem A Press.

Çelik, P. (2013). Probleme dayalı öğrenmenin öğretmen adaylarının fizik dersi başarısı, öğrenme yaklaşımları ve bilimsel süreç becerileri üzerindeki etkisi, Yayımlanmamış Doktora Tezi, T.C. Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü Ortaöğretim Fen ve Matematik Alanlar Eğitimi Anabilim Dalı Fizik Öğretmenliği Programı, İzmir.

Cengiz, C. & Karataş, F.Ö. (2014). Alan eğitiminde araştırma projesi dersi: biyoloji öğretmen adaylarının yansıtmaları [Introduction to Education Research Course: Reflections from Pre-service Biology Teachers]. Eğitim ve Öğretim Araştırmaları Dergisi, 3(4), 51-58.

Chapman, J.E., McCart, M.R., Letourneau, E.J., & Sheidow, A.J. (2013). Comparison of youth, caregiver, therapist, trained, and treatment expert raters of therapist adherence to a substance abuse treatment protocol. Journal of Consulting and Clinical Psychology, 81(4), 674.

Creswell, J.W. (2014). Nitel, nicel ve karma yöntem yaklaşımları araştırma deseni. (Çev. Ed. Demir, S. B.). Ankara: Eğiten Kitap.

De Ayala, R.J. (2009). The Theory and practise of item response theory. Series Editor Note By David. A. Kenny. The Guilford Press: New York, London.

Ekiz, D. (2009). Bilimsel araştırma yöntemleri (Genişletilmiş 2.Baskı). Ankara: Anı Yayıncılık.

Ersoy & İncebacak (2016). Okulöncesi öğretmen adaylarının bilimsel araştırmaya bakışları, Qualitative Studies (NWSAQS),11(4), 67-77.

Eti, İ. & Gündoğdu, S. (2016). Okul öncesi öğretmenliği dördüncü sınıf öğrencilerinin araştırma projesi dersine ilişkin görüş ve önerileri. Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 16 (1), ss:121-139.

Gall, M.D., Borg, W.R., & Gall, J.P. (2002). Educational research: an introduction (7th ed.). Old Tappan, NJ: Pearson Allyn & Bacon.

Garza, A.L. (2015). Revisioning scientific methodologies and epistemologies with feminism and indigenous understandings, Master Thesis, Department of Women's Studies, College of Arts And Sciences, Denton, Texas, USA.

Güler, N. (2008). Klasik test kuramı genellenebilirlik kuramı ve Rasch modeli üzerine bir araştırma. Doktora Tezi, Hacettepe Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.

Haiyang, S. (2010). An application of classical test theory and many facet Rasch measurement in analyzing the reliability of an English test for non-English major graduates. Chinese Journal of Applied Linguistics, 33(2), 87-102.

Hambleton, R.K. (1995). Meeting the measurement challenges of the 1990s and beyond: New assessment models and methods. In T. Oakland & R.K. Hambleton (Eds.), International perspectives on academic assessment (pp. 83-104). Boston, MA: Kluwer Academic Publishers.

Hambleton, R.K., Swaminathan, H., & Rogers, H.J. (1991). Fundamentals of item response theory. Newbury Park, CA: SAGE Publications, Inc.

Herman, B. C., Clough, M. P., & Olson, J. K. (2013). Teachers' nature of science implementation practices 2-5 years after having completed an intensive science education program. Science Education, 97(2), 271-309.

Hypolite, K.L. (2012). Understanding the views of the nature of science of undergraduate science, technology, engineering, and mathematics students, Doctoral dissertation, The faculty of the Graduate School Southern University and A & M College, United States.

İlhan, A, Çelik, H.C., & Aslan, A. (2016). Üniversite öğrencilerinin bilimsel araştırmaya yönelik tutumlarının incelenmesi. İnönü Üniversitesi Eğitim Fakültesi Dergisi, 17(2), 141-156. doi: 10.17679/iuefd.17218132.

İlhan, M. (2015). Standart ve solo taksonomisine dayalı rubrikler ile puanlanan açık uçlu matematik sorularında puanlayıcı etkilerinin çok yüzeyli rasch modeli ile incelenmesi. Doktora Tezi, Hacettepe Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.

İlhan, M. (2016). Açık uçlu sorularla yapılan ölçmelerde klasik test kuramı ve çok yüzeyli Rasch modeline göre hesaplanan yetenek kestirimlerinin karşılaştırılması. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 31(2), 346-368. doi:10.16986/HUJE.2016015182.

Johnson, B., & Chrıstensen, L. (2014). Eğitim araştırmaları: nicel, nitel ve karma yaklaşımlar. (Çev. edt: Demir, S.B.) Ankara: Eğiten Kitap.

Jöreskog, K.G. & Sörbom, D. (1993). Lisrel: User's reference Guide, Chicago: Scientific International Software.

Kaya, G., & Yılmaz, S. (2016). Açık sorgulamaya dayalı öğrenmenin öğrencilerin başarısına ve bilimsel süreç becerilerinin gelişimine etkisi. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 31 (2), 300-318.

Kefi, S., Çeliköz, N. & Erişen, Y. (2013). Ökulöncesi eğitim öğretmenlerinin temel bilimsel süreç becerilerini kullanım düzeyleri. Eğitim ve Öğretim Araştırmaları Dergisi, 2(2), 300-319.

Kim, Y., Park, I., & Kang, M. (2012). Examining rater effects of the TGMD-2 on child. Adapted Physical Activity Quarterly, 29, 346-365.

Köse, İ. A., Usta, H.G. & Yandı A. (2016). Sunum yapma becerilerinin çok yüzeyli rasch analizi ile değerlendirilmesi. Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 16(4), 1853-1864.

Lawshe, C.H. (1975). A quantitative approach to content validity. Personnel Psychology, 28, 563–575.

Linacre, J.M. (2003). Size vs. significance: Standardized chi-square fit statistic. Rasch Measurement Transactions, 17(1), 918.

Linacre, J.M. (1989). Many-facet Rasch measurement. Chicago: MESA Press.

Linacre, J.M. (2014). A user's guide to facets rasch-model computer programs. 30 Aralık 2014 tarihinde http://www.winsteps.com/a/facets-manual.pdf adresinden alınmıştır

Mahoney, S. (2013). educational research in the united states: a survey of pre-k-12 teachers' perceptions regarding the purpose, conceptions, use, impact, and dissemination. Doctoral dissertation, Arizona State University, Phoenix, Arizona, USA.

MEB (2017). Öğretmenlik mesleği genel yeterlilikleri. Ankara: Öğretmen Yetiştirme ve Geliştirme Genel Müdürlüğü.

MEB. (2015). Fen Bilimleri dersi öğretim programı (ilkokul ve ortaokul 3, 4, 5, 6, 7 ve 8. sınıflar). Ankara: Milli Eğitim Bakanlığı Yayınları.

Mulqueen C., Baker D., & Dismukes, R.K. (2000, April) Using multifacet Rasch analysis to examine the effectiveness of rater training. Presented at the 15th Annual Conference for the Society for Industrial and Organizational Psychology. New Orleans. 15 Mart 2017 tarihinde http://www.air.org/files/multifacet_Rasch.pdf adresinden alınmıştır.

Murray, K. (2017). The priorıty of democracy to education research, Doctoral dissertation, University of Colorado Boulder, USA.

O'Neill, T.R., & Lunz, M.E. (1996, April). Examining the invariance of rater and project calibrations using a multi-facet Rasch model. Paper Presented at the Annual Meeting of the American Educational Research Association, New York.

Orçan, B. (2013). Lisansüstü eğitim programlarında öğrenim gören öğrencilerin bilimsel araştırma sürecindeki kavram yanılgılarının belirlenmesi, Yayımlanmamış Yüksek Lisans Tezi, Ankara Üniversitesi, Eğitim Bilimleri Enstitüsü Ölçme ve Değerlendirme Anabilim Dalı, Ankara.

Patton, Q.M. (2014). Nitel araştırma ve değerlendirme yöntemleri. Mesut Butun & Selcuk Besir Demir (Trans.Eds.). Ankara: PegemA Publishing.

Plano Clark, V. L., & Creswell, J. W. (2010). Understanding research: A consumer's guide. Upper Saddle River, NJ: Pearson Education.

Robson, C. (2015). Bilimsel araştırma yöntemleri. (Ed. Ş. Çınkır & N. Demirkasımoğlu). Gerçek Dünya Araştırması (1. Basım). 97-134. Ankara: Anı Yayıncılık.

Schwartz, R.S., Westerlund, J., Garcia, D., & Taylor, T. (2010). The impact of full immersion scientific research experiences on teachers' views of the nature of science. Electronic Journal of Science Education, 14(1), 1–40.

Şencan, H. (2005). Sosyal ve davranışsal ölçümlerde güvenilirlik ve geçerlilik. Ankara: Seçkin Yayıncılık.

Spang, E. J. (2008). How does teacher education make a difference in our schools? beginning science teachers' and their students' and use of scientific inquiry, Doctoral dissertation, The School of Education of Stanford Unıversıty, USA.

Sudweeks, R.R., Reeve, S., & Bradshaw, W.S. (2005). A comparison of generalizability theory and many-facet Rasch measurement in an analysis of college sophomore writing. Assessing Writing, 9(3), 239-261.

TUA (2016). Türkiye Cumhuriyeti Avrupa Birliği Bakanlığı eğitim ve gençlik programları merkezi bakanlığı Türkiye ulusal ajansı, Adım Adım Proje Geliştirme Fikri El Kitabı, Ankara: Eurodesk Türkiye Eğitim Kitleri Seti.

TÜBİTAK (2014). Türkiye bilimsel ve teknolojik araştırma kurumu, 45. ortaöğretim öğrencileri araştırma projeleri yarışması, Proje Rehberi, Ankara: TÜBİTAK yayınları.

TÜBİTAK (2018). Türkiye bilimsel ve teknolojik araştırma kurumu 1001 – bilimsel ve teknolojik araştırma projelerini destekleme programı proje başvuru formu [http://tubitak.gov.tr/tr/destekler/akademik/ulusal-destek-programlari/1001/icerik-basvuru-formlari] web adresinden 5.3.2019 tarihinde indirildi.

Wright, B.D., & Linacre, J.M. (1994). Reasonable mean-square fit values. Rasch Measurement: Transactions of the Rasch Measurement SIG, 8(3), 370.

Yaşar, M. (2014). Bilimsel araştırma yöntemleri dersine yönelik tutum ölçeği geliştirme çalışması: geçerlik ve güvenirlik. Journal of Educational Sciences Research, 4(2), 109-129. http://dx.doi.org/10.12973/jesr.2014.42.7

YÖK (2007). Öğretmen yetiştirme ve eğitim fakülteleri, Ankara: T.C. Yüksek Öğretim Kurulu.

YÖK (2018). Yeni öğretmen yetiştirme lisans programları. [https://www.yok.gov.tr/kurumsal/idari-birimler/egitim-ogretim-dairesi/yeni-ogretmen-yetistirme-lisans-programlari] web adresinden 04.03. 2018 tarihinde indirildi.

Yue, X. (2011). Detecting rater centrality effect using simulation methods and Rasch measurement analysis. Unpublished Doctoral Thesis, Virginia State University, Petersburg.

Yurdugül, H. (2005, Eylül). Ölçek geliştirme çalışmalarında kapsam geçerliği için kapsam geçerlik indekslerinin kullanılması. XIV. Ulusal Eğitim Bilimleri Kongresi'nde sunulmuş bildiri, Pamukkale Üniversitesi, Denizli.

Zientek, L.R., Capraro, M. & Capraro, R. (2008). Reporting practices in quantitative teacher education research. Educational Researcher, 37(4), 208-216

International Journal of Progressive Education, Volume 15 Number 4, 2019

Investigating Differential Item Functioning in DINA Model

Seçil Ömür Sünbül [i]
Mersin University

Abstract

In this study, it is aimed to investigate the effects of various factors on the performance of the methods used in the determination of differential item functioning (DIF) in the DINA model included in the Cognitive Diagnosis Models. The current study is limited with Logistic Regression and Wald test methods which were used to determine the differential item functioning in DINA model. The Type I error and power rates of these methods in certain conditions were investigated to evaluate their performances. In the simulation study for the Type I error rates, four variables were manipulated: sample sizes, the number of attributes, correlations between attributes and reference group s and g parameter values. In the determination of the power rates of the methods, additionally, the variables that were manipulated in the Type I error study, DIF sizes and percentages of DIF items were manipulated, too. As a result, it was observed that especially in all cases where reference group' s and g parameter values are low, both methods yielded a good control of Type I error rates. In addition, according to the results, it was observed that both DIF size and sample size affect the power rates of both methods.

Keywords: DINA model, differential item functioning, Wald test, logistic regression

DOI: 10.29329/ijpe.2019.203.13

---

[i] **Seçil Ömür Sünbül,** Assist. Prof. Dr., Mersin University, Measurement and Evaluation in Education, Mersin/Turkey.

Correspondence: secilomur@gmail.com

INTRODUCTION

In recent years, Cognitive Diagnostic Models (CDMs) have been widely used in education and psychology. CDMs are models that provide information about the strengths and weaknesses of individuals in specific areas. CDMs are latent variable models developed primarily for assessing student mastery and non-mastery on a set of finer-grained skills (de la Torre, 2011). The results obtained from CDMs provides detailed feedback to the examinees or teacher, so they can make inferences about examinees' mastery of different cognitive skills.

Most CDMs applications require the construction of a Q-matrix (Embretson, 1984; Tatsuoka, 1985, de la Torre, 2009). The relationship between items and attributes is specified in the Q-matrix, which is a matrix with *j* rows and *k* columns of ones and zeros. q_{jk} is an element of Q matrix for *j* items and *k* attributes indicates whether mastery of attribute *k* is required by item *j*. q_{jk} = 1, if item *j* requires attribute *k*, and 0 otherwise.

When the related literature was investigated, several CDMs have been developed for assessing examinees' mastery or non-mastery of a set of cognitive attributes (Haertel, 1989; Dibello et al., 1995; Junker & Sijtsma, 2001; Hartz, 2002; de la Torre & Douglas, 2004; Templin & Henson, 2006; Templin, Henson & Douglas, 2006; Henson, Templin, & Willse, 2009). In this study, the deterministic, inputs, noisy "and" gate (DINA) model, which is one of the most widely used non-complementary models developed by Haertel (1989), was used. DINA model assumes examinees must have mastered a set of attributes required by an item in order to answer the item correctly. The DINA is a simple model that is easily estimated and the item response function is given by

$$P(X_{ij} = 1|\alpha_{ij}) = (1 - s_j)^{\eta_{ij}} g_j^{(1-\eta_{ij})} \quad (1)$$

where *P* denotes the probability of solving the item when examinees possess all of the required skills. *Xij* denotes the response of an examinee *i* to item *j*, where *Xij* = 1 is the correct response (*Xij* = 0 otherwise). *gj* denotes guessing parameter and *sj* denotes slipping parameters for the jth item. The slip parameter is interpreted as the probability that examinee who possesses all the required attributes for an item answers the item incorrectly (de la Torre ve Lee, 2010). The guessing parameter is the probability that examinee who lacks at least one of the required attributes for an item answers the item correctly (de la Torre ve Lee, 2010). When a slip parameter is low, the examinee has a higher probability of answering the item correctly. *ηij* is the deterministic latent response and it is given by

$$\eta_{ij} = \prod_{k=1}^{K} \alpha_{ik}^{q_{jk}} \quad (2)$$

qjk = assumes 1 or 0, *αik* = 1 or 0, represents if examinee i mastered attribute k. If *ηij* = 1, represents examinee *i* possesses all the attributes required for item *j*, and *ηij* = 0 represents examinee *i* lacks at least one of the attributes required for item *j*.

Differential Item Functioning

Analysis for detecting Differential Item Functioning (DIF) has been increasingly applied in test fairness studies. DIF occurs when individuals at the same ability level but in different subgroups differ in their probability of answering an item correctly (Zumbo, 1999; Hambleton, Swaminathan, & Rogers, 1991). In the DIF analysis, the group which is thought to be disadvantagous is called focal group while the advantageous group compared with the performance of this group is called the reference group. DIF can occur in two different ways and the first is the uniform DIF. Uniform DIF indicates that the difference in the probability of answering an item correctly is consistent at all levels of ability. The second is the non-uniform DIF and implies that the difference in the probability of responding correctly is different for all ability level range (Camilli & Shepard, 1994; Zumbo, 1999). In order to determine DIF many methods have been developed within the context of both Classical Test Theory (CTT) and Item Response Theory (IRT). While methods such as Mantel-Haenszel (MH),

Logistic Regression (LR) and the simultaneous item bias test (SIBTEST) are investigated under CCT, the methods such as likelihood ratio test, Lord $\chi 2$ and Raju's area measurements are investigated under IRT (Raju, 1988; Hambleton, Swaminathan & Rogers, 1991; Rogers & Swaminathan, 1993; Camilli & Shepard, 1994; Osterlind, 1983).

In CDMs, DIF occurs when individuals with different groups but with the same attribute mastery profile differ in their probability of responding correctly to the item. For the DINA model, DIF occurs when different estimates obtained for the slip and guess parameters for the individuals in the focal and reference groups. Uniform DIF occurs in item *j* when Δ_{sj} and Δ_{gj} have the same signs (Hou et al., 2014);

$$\begin{aligned} \Delta_{sj} &> 0 \quad \text{or } s_{Fj} - s_{Rj} < 0 \\ \Delta_{gj} &> 0 \quad \text{or } g_{Fj} - g_{Rj} > 0 \end{aligned} \tag{3}$$

$$\begin{aligned} \Delta_{sj} &< 0 \quad \text{or } s_{Fj} - s_{Rj} > 0 \\ \Delta_{gj} &< 0 \quad \text{or } g_{Fj} - g_{Rj} < 0 \end{aligned} \tag{4}$$

When Equation 3 is investigated, uniform DIF in item *j* occurs when the slip parameter in the focal group is smaller than the slip parameter in the reference group and the guessing parameter in the focal group is larger than the guessing parameter in the reference group. When Equation 4 is investigated, uniform DIF in item *j* occurs when the slip parameter in the focal group is larger than the slip parameter in the reference group, and the guessing parameter is smaller than the guessing parameter in the reference group.

Nonuniform DIF occurs in item j when $\Delta_{sj}$and Δ_{gj} have different signs (Hou et al., 2014);

$$\begin{aligned} \Delta_{sj} &> 0 \quad \text{or } s_{Fj} - s_{Rj} < 0 \\ \Delta_{gj} &< 0 \quad \text{or } g_{Fj} - g_{Rj} < 0 \end{aligned} \tag{5}$$

$$\begin{aligned} \Delta_{sj} &< 0 \quad \text{or } s_{Fj} - s_{Rj} > 0 \\ \Delta_{gj} &> 0 \quad \text{or } g_{Fj} - g_{Rj} > 0 \end{aligned} \tag{6}$$

When Equation 5 and 6 are investigated, nonuniform DIF in item j occurs when both the slip and guess parameters in the focal group are smaller than the reference group or when both the slip and guess parameters in the focal group are larger than the reference group.

When the relevant literature is investigated, it was observed that there is a limited study on DIF in CDM framework (Zhang, 2006; Li, 2008; Hou et al., 2014; Li and Wang, 2015). Zhang (2006) studied DIF in the DINA model using Mantel-Haenszel and SIBTEST methods in both real and simulation data. Four variables were manipulated in the simulation study: sample sizes, types of DIF, levels of DIF amount, and correlations between skill attributes. It was observed that attribute pattern matching had lower Type I error rates and higher power rates than the traditional total test score matching under the comparable test conditions. Li (2008) used a modified higher order DINA model to investigate DIF and differential attribute functioning (DAF). Five factors were manipulated in the simulation study: Q-matrix structure, attribute discrimination parameters, sample size, ability distribution difference, scenarios of DIF and DAF combination. For DIF detection, the model-based method was also compared with the MH method using a total score as the matching criterion and an attribute profile as the matching criterion. It was observed that the recovery of item parameters was generally better than the recovery of attribute parameters. In addition, it was observed that, model-based method had better Type I error rates and had higher power rates than the Mantel–Haenszel. Hou

et al. (2014) used a DINA model to investigate the effectiveness of the Wald test in detecting DIF. They compare the Wald test with both Mantel–Haenszel and SIBTEST procedures. The sample size, reference item parameters, DIF size, and DIF type were manipulated in the simulation study. They found that the performance of the Wald test was not affected by the proportion of DIF items in the test and both for small and large sample sizes the Wald test has Type I error rates close to the nominal level. Li and Wang (2015), developed a general CDM-based method for DIF assessment. They were compared performance of LCDM-DIF and Wald methods. When two groups were investigated, they found that when tests were clean, both methods yielded a good control of Type I error rates When all items were DIF, the power rates of the LCDM-DIF method were higher than the power rates of the Wald method with two groups. When three groups were investigated, they found that, the LCDM-DIF method had a good control of Type I error rates under all conditions, however, even if the tests were clean, the Type I error rates of the Wald test were higher.

In this study, it is aimed to investigate the effect of various factors on the performance of the methods used in the determination of differential item functioning in the DINA model. When the related literature is investigated, it is considered that this study will contribute to the field since it has investigated different factors and factors' levels.

METHOD

Simulation Design

Sample Size: Zhang (2006) used the equal sample sizes of 400 and 800 for focal and reference groups in his simulation study. Other than this study, Li (2008), Hou et al. (2014), Li and Wang (2015) simulated equal sample sizes (500 and 1000) for focal and reference groups. In this study, three sample sizes, 500, 1000 and 2000 were used for each group, in order to compare the results of the current study with the related literature.

Correlation Between Attributes: When the studies about CDM and DIF are investigated, it was observed that in some studies the correlation between the attributes were kept constant (e.g. Hou et al. 2014; Li and Wang, 2015), and in some studies this factor is manipulated in various ways (e.g. Zhang, 2006). In this study, correlations between attributes were manipulated as low (0.2), medium (0.5) and high (0.8).

Number of Attribute and Item: Zhang (2006) and Li (2008) used a test which contains 5 attributes and 25 items in their study. However, Hou et al. (2014) used a test of 5 attributes and 30 items, Li and Wang (2015) used 5 attributes, 30 and 50 items in their studies. In this study, the number of items was fixed to 30, and the number of attributes was manipulated as 4 and 5. Q matrices were generated according to the number of attributes. Q matrices were generated in such a way that a maximum of three attributes is observed in an item.The generated Q matrices are shown in Table 1.

s and g parameter Values of the Reference group: In this study, s and g parameter values of the reference group were manipulated as three levels: 0.1, 0.2 and 0.3.

DIF type and size: Magnitude of DIF varies according to the models used in the studies. DIF size levels of this study is similar to Zhang's (2006)**,** and Hou et al.'s (2014) studies such as (Δ_{sj}or Δ_{gj} = .05) for small DIF size and (Δ_{sj}or Δ_{gj} = .10) for large DIF size.

Percentage of DIF Items: Related studies indicate that the percentage of DIF items in an overall test, affects the performance of DIF detection methods (Zhang, 2007; Hou et al., 2014). In this study, the percentage of DIF items in the test was manipulated as 10% and 20%.

DIF Detection Methods: In this study, DIF was limited by using LR and Wald methods.

Table 1: Q-Matrices for the Simulated Data

Q1				
Attribute				
Item	1	2	3	4
1	1	0	0	0
2	1	0	0	0
3	1	0	0	0
4	0	1	0	0
5	0	1	0	0
6	0	1	0	0
7	0	0	1	0
8	0	0	1	0
9	0	0	0	1
10	0	0	0	1
11	1	1	0	0
12	1	1	0	0
13	1	0	1	0
14	1	0	1	0
15	1	0	0	1
16	1	0	0	1
17	0	1	1	0
18	0	1	1	0
19	0	1	0	1
20	0	1	0	1
21	0	0	1	1
22	1	1	1	0
23	1	1	1	0
24	1	1	0	1
25	1	1	0	1
26	1	0	1	1
27	1	0	1	1
28	0	1	1	1
29	0	1	1	1
30	1	1	1	0

Q2					
Attribute					
Item	1	2	3	4	5
1	1	0	0	0	0
2	0	1	0	0	0
3	0	0	1	0	0
4	0	0	0	1	0
5	0	0	0	0	1
6	1	0	0	0	0
7	0	1	0	0	0
8	0	0	1	0	0
9	0	0	0	1	0
10	0	0	0	0	1
11	1	1	0	0	0
12	1	0	1	0	0
13	1	0	0	1	0
14	1	0	0	0	1
15	0	1	1	0	0
16	0	1	0	1	0
17	0	1	0	0	1
18	0	0	1	1	0
19	0	0	1	0	1
20	0	0	0	1	1
21	1	1	1	0	0
22	1	1	0	1	0
23	1	1	0	0	1
24	1	0	1	1	0
25	1	0	1	0	1
26	1	0	0	1	1
27	0	1	1	1	0
28	0	1	1	0	1
29	0	1	0	1	1
30	0	0	1	1	1

Data Generation and Analysis

In this study, data were generated according to DINA model. To generate data, the number of items was set to 30, and Q matrices were formed with the number of attributes which is 4 and 5. s and g parameter values of the reference and focal groups were manipulated into three levels such as 0.1, 0.2 and 0.3. To determine the Type I error rates of the methods, three sample sizes (500, 1000 and 2000), two number of attributes (4 and 5), three correlation between attribute levels (0.2, 0.5 and 0.8) and three reference group item parameters (0.1, 0.2 and 0.3) were manipulated. The sample sizes were formed as equal in the reference and focal groups. In the determination of the power rates of the methods, in addition to the variables that were manipulated in the Type I error study, two DIF sizes (0.05 and 0.1) and two DIF item percentages (10% and 20%) were manipulated, too. The slip and the guessing parameter values for the focal group were manipulated according to the DIF size. DIF items were generated according to the percentage of DIF. While forming DIF items, the number of attributes**,** which is required for that item**,** was also considered for balancing. For example, 3 DIF items were generated for 10% condition. One of them was requiring 1 attribute, the other one was requiring 2 attributes and the last one was requiring 3 attributes. For 20% condition, the number of items were doubled for each requirement case. In this study, only uniform DIF type has been investigated and the summary of DIF conditions is shown in Table 2. 100 replications were conducted for each crossing

condition. R 3.5.1 was used as the programming language and *CDM*, *GDINA* and *difR* package were used for data generation and data analysis.

For Type I error rates, the false positive rates for items, which were detected incorrectly as DIF items, were reported over 100 replications. However, in power study the true positive rates were obtained for determining items, which perform differently on different groups of examinees.

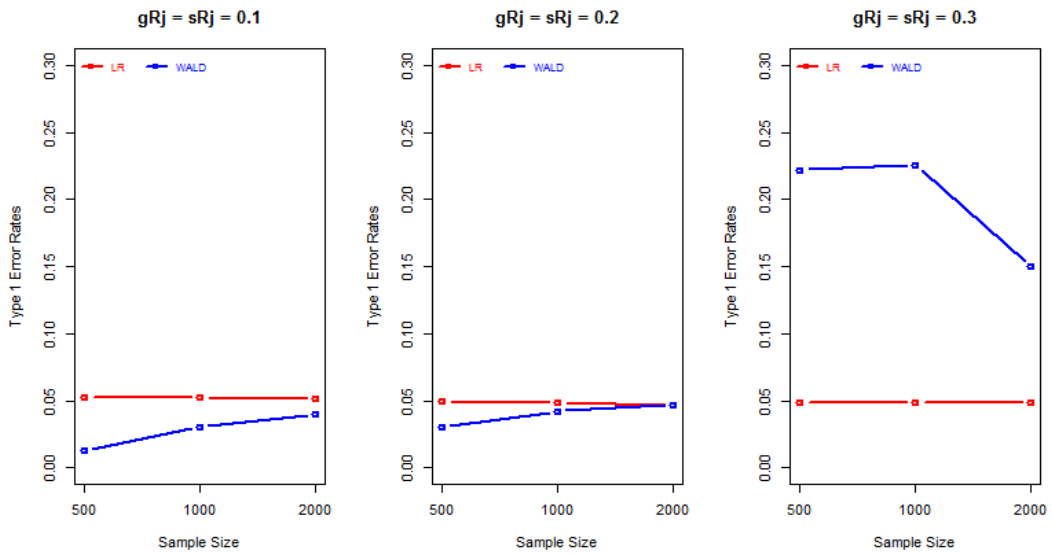
Table 2: Summary of DIF Conditions

DIF Type	DIF Size	Δ_{sj} (s_{Fj} - s_{Rj})	Δ_{gj} (g_{Fj} - g_{Rj})
Non- DIF	-	0	0
Uniform	Small	+0.05	+0.05
		-0.05	-0.05
	Large	+0.1	+0.1
		-0.1	-0.1

FINDINGS

Type I Error Study

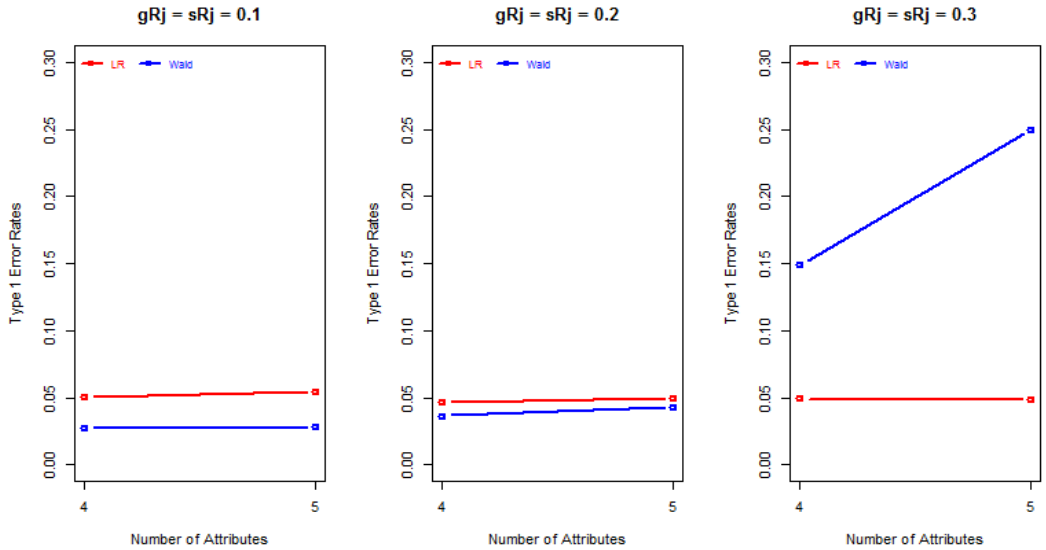
The results of the effects of various sample sizes on the Type I error rates of methods are shown in Graph 1. When Graph 1 was investigated, it was observed that the Type I error rates of the Logistic Regression method were not affected by the increase in sample size for all s and g parameter values. However, in cases where s and g parameter values were 0.1 and 0.2, the Type I error rates of the Wald test method were not effected with the increase in sample size. When the s and g parameter value was 0.3, it was observed that the Type I error rates of the Wald test method decreased dramatically with the increasing sample size. Also, when the s and g parameter values were 0.1 and 0.2, the Type I error rates of the Wald test method were lower than the Type I error rates of the LR method in all sample sizes. However, when the s and g parameter value was 0.3, the Type I error rates of Wald test were larger than the Type I error rates of the LR method.



Graph I: The Effect of the Sample Sizes on Type I Error Rates of Methods

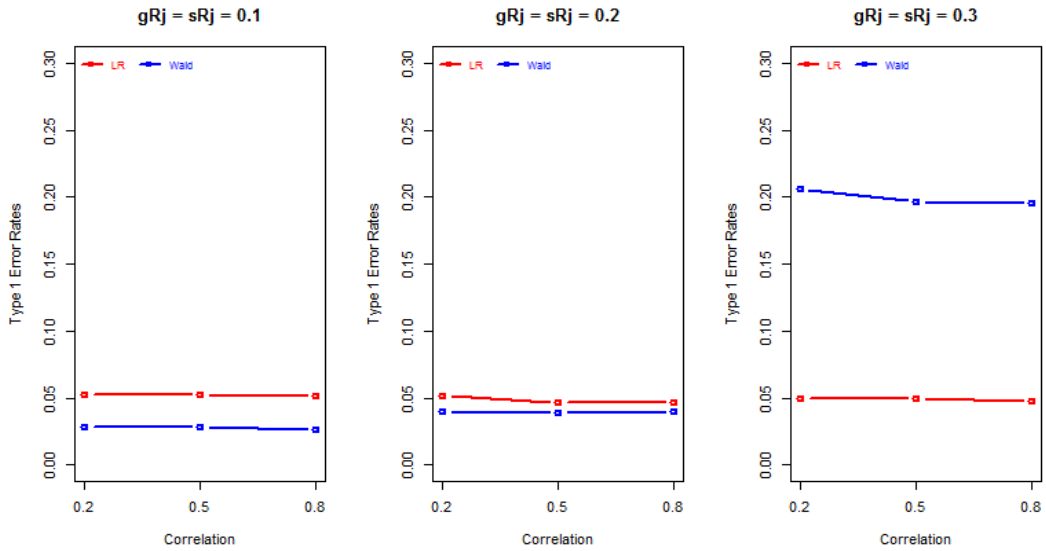
The results of the effects of the number of attributes on the Type I error rates of methods are shown in Graph 2. According to Graph 2, especially when the s and g parameter values were 0.1 and 0.2, it was observed that the Type I error rates of the methods did not change much with the increase in the number of attributes. However, when the s and g parameter value was 0.3, the Type I error rates of the Wald test method increased with the increase in the numbers of attributes. In the case where s

and g parameter values were 0.1 and 0.2 for both numbers of attributes (4 and 5), the Type I error rates of the Wald test method were smaller than the Type I error rates of the LR method.



Graph 2: The Effect of the Number of Attributes on Type I Error Rates of Methods

The results of the effects of the correlation between attributes on the Type I error rates of methods are shown in Graph 3. When Graph 3 was investigated, it was observed that the Type I error rates of the methods did not change much with the increase in correlation levels between the attributes. However, when the s and g parameter values were 0.1 and 0.2, the Type I error rates of the Wald test method were lower than the Type I error rates of the LR method for all correlation levels. In the case where s and g parameter value was 0.3, a significant increase was observed for the Type I error rates of the Wald test method in this case the Type I error rates of the Wald test method were higher than the Type I error rates of the LR method.



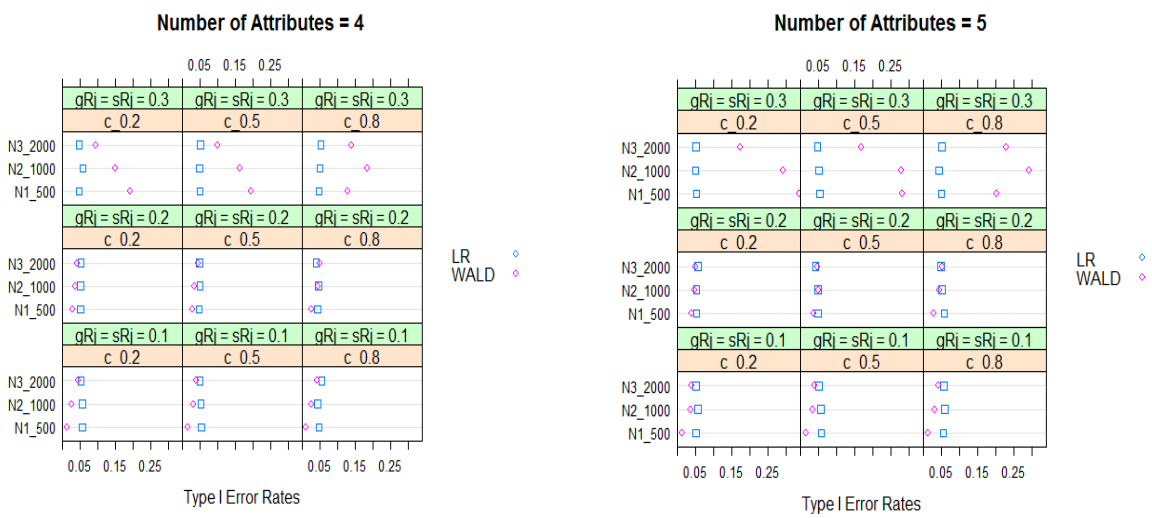
Grafik 3: The Effect of the Correlation between Attributes on Type I Error Rates of Methods

Results of the Type I error rates of the methods according to all the manipulated factors shown in Table 3 and Graph 4. When Graph 4 was investigated, it was observed that the s and g parameter values were effective for Type I error rates of the Wald test method. According to Graph 4, especially in cases where the s and g parameter values were 0.1 and 0.2, the Type I error rates of the Wald test

method were lower than the Type I error rates of the LR method for all conditions. In contrast, in the case where s and g parameter value was 0.3, it was observed that the Type I error rates of the LR method were lower than the Type I error rates of the Wald test method. When the s and g parameter value was 0.3, it was observed that the Type I error rates of the Wald test method increased with the increase in the number of attributes and the decrease in the sample size. In addition to that, the Type I error rates of the LR method did not change much with the increase in the sample size.

Tablo 3: Type I Error Rates

			DIF Detection Method					
			Sample Size					
			LR			Wald		
Reference Item Parameter Values	**Number of Attribute**	**Correlation**	***NR* = 500 *NF* = 500**	***NR* = 1,000 *NF* = 1,000**	***NR* = 2,000 *NF* = 2,000**	***NR* = 500 *NF* = 500**	***NR* = 1,000 *NF* = 1,000**	***NR* = 2,000 *NF* = 2,000**
g_{Rj}= s_{Rj}= **0.1**	**4**	0.2	0.055	0.055	0.051	0.013	0.026	0.044
		0.5	0.053	0.051	0.049	0.016	0.030	0.038
		0.8	0.047	0.042	0.054	0.009	0.026	0.041
	5	0.2	0.050	0.056	0.050	0.013	0.037	0.038
		0.5	0.057	0.056	0.050	0.015	0.033	0.038
		0.8	0.055	0.058	0.056	0.012	0.031	0.042
g_{Rj}= s_{Rj}= **0.2**	**4**	0.2	0.050	0.050	0.052	0.028	0.037	0.041
		0.5	0.047	0.049	0.048	0.027	0.033	0.045
		0.8	0.043	0.045	0.038	0.025	0.043	0.050
	5	0.2	0.051	0.051	0.055	0.039	0.046	0.050
		0.5	0.048	0.048	0.041	0.035	0.050	0.046
		0.8	0.057	0.050	0.048	0.027	0.045	0.051
g_{Rj}= s_{Rj}= **0.3**	**4**	0.2	0.046	0.057	0.046	0.192	0.148	0.094
		0.5	0.049	0.048	0.050	0.195	0.162	0.098
		0.8	0.046	0.049	0.052	0.128	0.183	0.139
	5	0.2	0.051	0.049	0.050	0.336	0.291	0.174
		0.5	0.053	0.050	0.047	0.280	0.278	0.168
		0.8	0.049	0.042	0.050	0.201	0.291	0.229

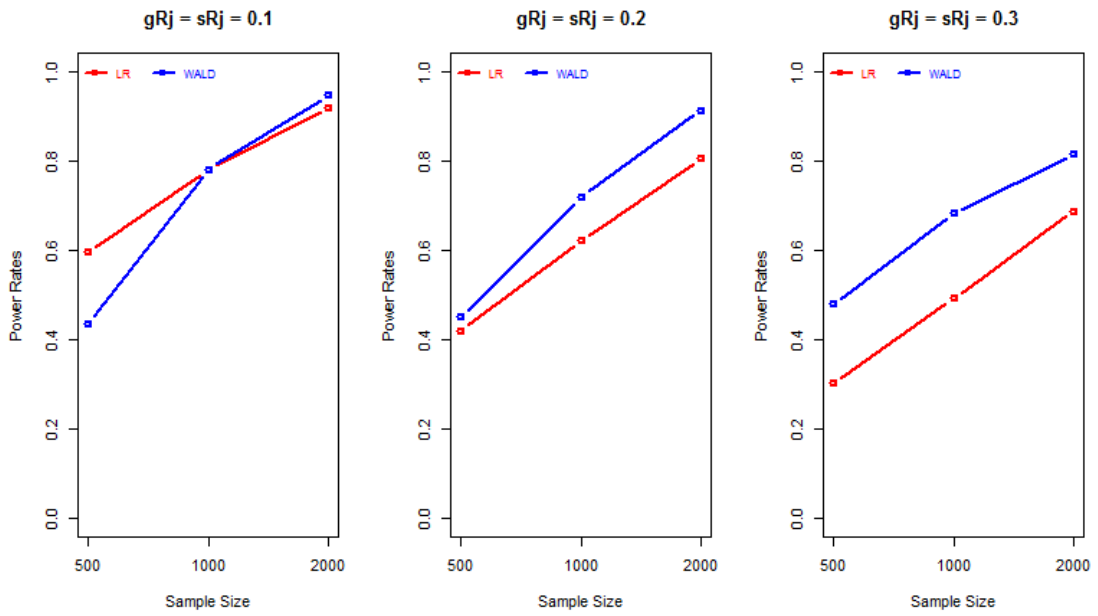


Graph 4: The Interaction Effect of Factors on Type I Error Rates of Methods

Power Study

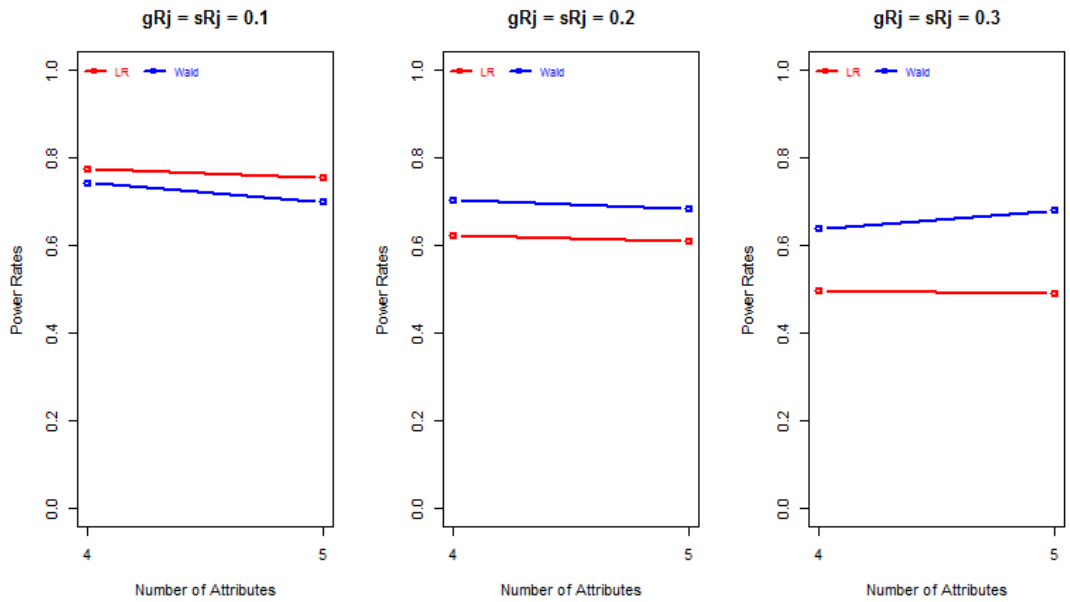
The results of various sample sizes on the power rates of the methods are shown in Graph 5. According to Graph 5, it was observed that, the power ratios of both methods were increasing with the increase in sample size. When the s and g parameter values increase, there is a decrease in the power rates of the LR method. For the condition in which s and g parameter value was 0.1 and the sample size was 500, it was observed that, the power rates of the Wald test method were lower than the power rates of the LR method. However, when the sample size was 1000, it was observed that the power

rates of the methods were similar, whereas when the sample size was 2000, it was observed that the power rates of the Wald test method were higher than the power rates of the LR method. Also, when the s and g parameter values were 0.2 and 0.3, it was observed that, the power rates of the Wald test were higher than the LR method for all sample sizes.



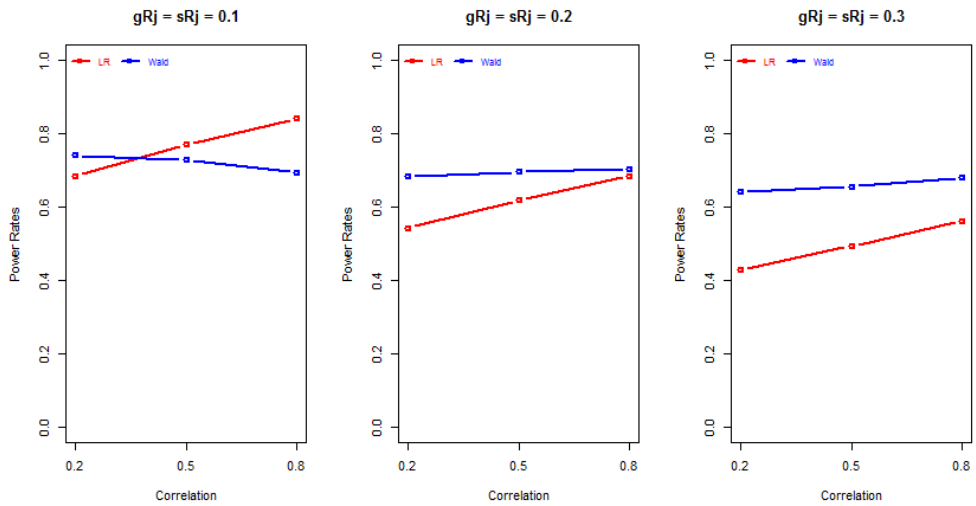
Graph 5: The Effect of the Sample Sizes on Power Rates of Methods

The results of the power rates of the methods with the different number of attributes were shown in Graph 6. According to Graph 6, it was observed that, the power rates of the Wald test method did not change much with the increase in the number of attributes, but the power rates of the LR method decreased. When the s and g parameter value was 0.1, it was observed that, the Type I error rates of the Wald test method was lower than the Type I error rates of the LR method for all number of attributes, but the s and g parameter values were 0.2 and 0.3, the Type I error rates of the Wald test method was higher than the Type I error rates of the LR method for all number of attributes.



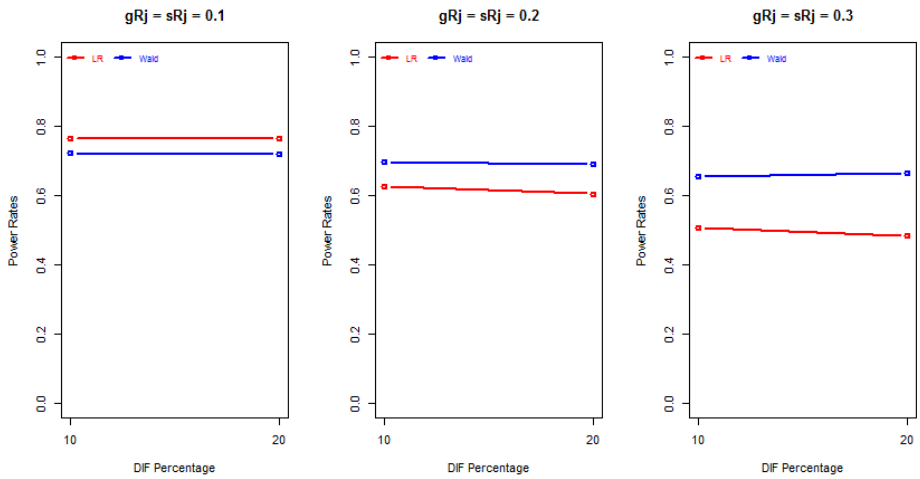
Graph 6: The Effect of the Number of Attributes on Power Rates of Methods

The results of the effects of the correlation between attributes on the power rates of methods were shown in Graph 7. According to Graph 7, the correlation levels between the attributes did not change the power rates of the Wald test. However, the power rates of the LR method increased with the increase in the correlation between the attributes. When the s and g parameter value was 0.1 and the correlation level between attributes were 0.2, the power rates of the Wald test method seem to be higher than the LR method. On the contrary, in cases where the correlation between the attributes were 0.5 and 0.8, the power rates of the LR method were higher than the power rates of the Wald test method. When s and g parameter values were 0.2 and 0.3, the power rates of the Wald test method were higher than the power rates of the LR method for all correlation levels between attributes. For all correlation levels between attributes, the power rates of LR method decreased with the increase of s and g parameter values.



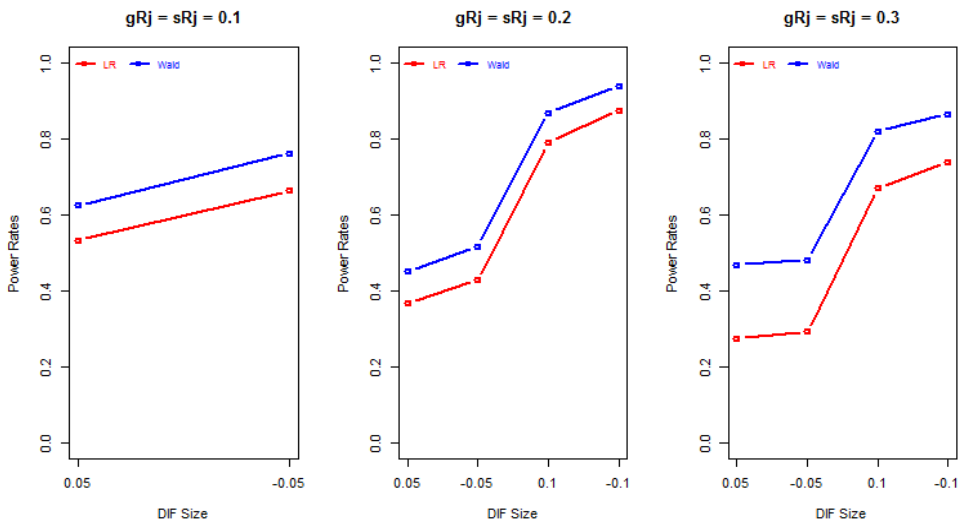
Graph 7: The Effect of the Correlation between Attributes on Power Rates of Methods

The results of the effects of the percentage of DIF items on the power rates of methods were shown in Graph 8. According to the Graph 8, when the s and g parameter value was 0.1, the power rates of the Wald test method were lower than the power rates of the LR method for both percentages of DIF items. When the s and g parameter values were 0.2 and 0.3, the power rates of the Wald test method were higher than the power rates of the LR method for both percentages of DIF items. For all percentage of DIF items, when the s and g parameter values increased, there was a decrease in the power rates of the LR method while there were slight differences in the power rates of the Wald test method.



Graph 8: The Effect of the Percentage of DIF Items on Power Rates of Methods

The results of the effects of the DIF sizes on the power rates of methods were shown in Graph 9. When the Graph 9 was investigated, it was observed that the power rates of the methods increased as DIF sizes increased for all the s and g parameters values. In addition to that, for all s and g parameters values and DIF sizes, the power rates of the Wald test method were higher than the LR method.



Grafik 9: The Effect of the DIF Size on Power Rates of Methods

CONCLUSION AND DISCUSSION

In this study, it was aimed to investigate the effects of various factors on the performance of the methods used in the determination of DIF in the DINA model. For this purpose, invariance of slip and guess parameters for focal and reference subgroups needed to be investigated. In order to determine DIF in the DINA model, several methods exist in the literature. Usability of these methods may vary according to several conditions and performance of these methods also need to be investigated accross these conditions.

In the DINA model, Logistic Regression and Wald test methods were the common methods which were used to determine the differential item functioning, and the Type I error and power rates of these methods in certain conditions needed to be investigated. In determining the Type I error rates of the methods, three sample sizes (500, 1000 and 2000), two number of attributes (4 and 5), three correlation between attributes levels (0.2, 0.5 and 0.8) and three reference group item parameters (0.1, 0.2 and 0.3) were manipulated. When the results obtained from the Type I error rates of the methods were investigated, it was observed that especially the s and g parameter values were effective factors on the Type I error rates of the methods. When the s and g parameter value was 0.3, it was observed that the Type I error rates of the Wald test method increased. It is consistent with the results of Hou et al. (2014). When the s and g parameter values were 0.1 and 0.2, it was observed that both the LR and the Wald test Type I error rates were close to each other. It was observed that the Type I error rates of the Logistic Regression method were not affected by the increase in sample size. However, when the s and g parameter value was 0.3, it was observed that the Type I error rates of Wald test method decreased dramatically with the increase in sample size and increased dramatically with the increase in the number of attributes. In addition to these, it was observed that the correlation between the attributes did not cause much change in the Type I error rates of the methods.

When the results of the power rates of the methods were investigated, it was observed that especially the sample sizes, DIF sizes and the s and g parameter values were effective factors. It is consistent with the results of Hou et al. (2014). The power rates of both methods increased with increasing sample size. It was observed that the increase in the percentage of DIF items did not change the power ratios of both methods. As the number of attributes increased, the power rates of the Wald

test method did not change much, but the power rates of the LR method decreased. While the level of correlation between attributes did not change the power rates of the Wald test method much, the power rates of the LR method increased with the increase in the correlation between the attributes.

In conclusion, it can be said that the Wald test method showed satisfactory results to detect DIF in many different conditions in the Cognitive Diagnostic Models. However, when the Wald test method is compared with the LR method, under some simulation conditions (i.e., when the s and g parameter values are high) the Wald test has inflated Type I error rates but in many conditions**,** it shows high power rates.

In this study, only the DINA model was used to simulate DIF conditions, differential item functioning can be investigated in further studies, by using other CDM models (DINO, GDINA etc.). In further studies, different DIF detection techniques can be used and the performances of these methods can be compared. In addition, further studies will be conducted with different factors or factor levels.

REFERENCES

Camilli, G. ve Shepard, L. A. (1994). *Methods for identifying biased test items*. London: Sage Publications.

de la Torre, J. (2009). DINA model and parameter estimation: A didactic. *Journal of Educational and Behavioral Statistics*, 34, 115-130.

de la Torre, J. (2011). The generalized DINA model framework. *Psychometrika*, 76, 179–199

de la Torre, J., & Douglas, J. (2004). Higher-order latent trait models for cognitive diagnosis. *Psychometrika*, 69, 333-353.

de la Torre, J., & Lee, Y. S. (2010). A note on the invariance of the DINA model parameters. *Journal of Educational Measurement*, *47*, 115–127.

DiBello, L. V., Stout, W. F., & Roussos, L. A. (1995). Unified cognitive/psychometric diagnostic assessment likelihood-based classification techniques. In P. Nichol, S. Chipman, & R. Brennan (Eds.), *Cognitive diagnostic assessment* (pp. 361-389). Hillsdale, NJ: Lawrence Erlbaum.

Embretson, S. E. (1984). A general latent trait model for response processes. Psychometrika, 49, 175–186.

Haertel, E. H. (1989). Using restricted latent class models to map the skill structure of achievement items. *Journal of Educational Measurement*, 26, 333-352.

Hambleton, R K., Swaminathan, H. ve Rogers, H. J. (1991). *Fundamentals of item response theory*. London: Sage Publication

Hartz, S. (2002). Skills diagnosis: Theory and practice. User Manual for Arpeggio software. Princeton, NJ: ETS.

Henson, R. A., Templin, J. L., & Willse, J. T. (2009). Defining a family of cognitive diagnosis models using log-linear models with latent variables. *Psychometrika*, *74*(2), 191.

Hou, L., de la Torre, J. D., and Nandakumar, R. (2014). Differential item functioning assessment in cognitive diagnostic modeling: application of the Wald test to investigate DIF in the DINA model. *Journal of Educational Measurement*, 51, 98–125.

Junker, B. W., & Sijtsma, K. (2001). Cognitive assessment models with few assumptions and connections with nonparametric item response theory. *Applied Psychological Measurement*, 25, 258-272.

Li, F. (2008). *A modified higher-order DINA model for detecting differential item functioning and differential attribute functioning* (Doctoral dissertation). University of Georgia, Athens.

Li, X., and Wang, W. C. (2015). Assessment of differential item functioning under cognitive diagnosis models: the DINA model example. *Journal of Educational Measurement*, 52, 28–54.

Osterlind, S. (1983). *Test item bias*. Newbury Park: Sage Publications.

Raju, N. S. (1988). The area between two item characteristic curves. *Psychometrika*, 53, 495-502.

Rogers, S. J., & Swaminathan, H. (1993). A comparison of logistic regression and MH procedures for detecting differential item functioning. *Applied Psychological Measurement*, *17*, 105–116.

Tatsuoka, K. (1985). A probabilistic model for diagnosing misconceptions in the pattern classification approach. *Journal of Educational Statistics*, 12, 55-73.

Templin, J. L., & Henson, R. A. (2006). Measurement of psychological disorders using cognitive diagnosis models. *Psychological Methods, 11(3)*, 287-305.

Templin, J. L., Henson, R. A., & Douglas, J. (2006). General theory and estimation of cognitive diagnosis models: Using Mplus to derive model estimates. Manuscript under review.

Zhang, W. (2006). *Detecting Differential Item Functioning Using the DINA Model*. Doctoral dissertations, University of North Carolina at Greensboro, Greensboro, NC.

Zumbo, D. B. (1999). *A Handbook on the Theory and Methods of Differential Item Functioning (DIF): Logistic regression modeling as a unitary framework for binary and likert-type item scores*. Ottowa: Directorate of Human Resources Research and Evaluation, Department of National Defense.

International Journal of Progressive Education, Volume 15 Number 4, 2019

Modeling the Relationship between Motivation, Learning Approach, and Academic Achievement of Middle School Students in Turkey

Pınar Karaman [i]
Sinop University

İbrahim Demirci [ii]
Sinop University

Atilla Özdemir [iii]
Sinop University

Abstract

This study examines the structural relationship among motivation, deep learning approach, and academic achievement of middle school students in Turkey. Participants were 746 seventh grade and eighth grade students enrolled in public middle schools in Sinop and Ankara, Turkey. Motivated Strategies for Learning Questionnaire, Study Process Questionnaire (R-SPQ-2F) and GPA scores of participants were used in the study. Data were analyzed by Structural Equation Modeling. The results of the study revealed that motivational variables are related with the use of deep learning approach which is related with higher GPA. Path analyses demonstrated that deep learning approach fully mediated the relationship between students' motivational variables and academic achievement. Self-efficacy, task value, and intrinsic goal orientation as the indirect effects through deep learning approach on academic achievement were strong predictors in the model.

Keywords: Academic achievement; motivation; deep learning approach; structural equation modeling

DOI: 10.29329/ijpe.2019.203.14

---

[i] **Pınar Karaman,** Assist. Prof. Dr., Sinop University, Education Sciences.

Correspondence: pkaraman1626@gmail.com

[ii] **İbrahim Demirci,** Assist. Prof. Dr., Sinop University, Education Sciences.
[iii] **Atilla Özdemir,** Assist. Prof. Dr., Sinop University, Maths Education.

INTRODUCTION

Academic achievement in preparing students for future is one of the most important indicators for quality of education. Academic achievement is defined as students' attainment of educational goals, to gain knowledge, skills, and competencies of educational outcomes (York, Gibson, & Rankin, 2015). Achieving success requires patience and brings students a lot of satisfaction. Students need to have will and also skill for success (Meece, Blumenfeld, & Hoyle, 1988; Pintrich & De Groot, 1990). Academic achievement mostly is measured with grades and GPA (Grade Point Average) (Aksoy, Aras, Çankaya, & Karakul, 2011; York, Gibson ve Rankin, 2015). But assessment of academic achievement is always a complex process. There are several factors which may affect student achievement such as school-based factors, family-based factors, student-based factors, peer-based factors (Arıcı, 2007; Crosnoe, Johnson, & Elder, 2004; Demirtaş, 2010; Gelbal, 2008; Howie & Pieterson, 2001; Şevik, 2014). These factors are categorized as internal and external factors that contribute student achivement (Jones, 2012; MoNE, 2006; MoNE, 2007).

Many studies have examined the factors that influence academic achievement. A review of the research studies investigating the relationship between school factors and academic achievement indicates that they usually focus on school environment (Aydoğan, 2012), qualifications of teachers (Kavak, Aydın, & Akbaba-Altun, 2007), school management (Leithwood & Jantzi, 2000; Şahin, 2011), school culture (Demirtaş, 2010). The studies about the family effect on student success especially focused on socio-economic factors (Anıl, 2009; Aslan, 2017; Barr, 2015; Coleman, 1998; Gelbal, 2008; McNeal, 1999). And also an important factor influencing achievement is students' characteristics (Buluş, Duru, Balkıs, & Duru, 2011; Özgüngör, 2006). Students' self efficacy, motivation, self respects, learning approaches, intelligence, personal features are good examples of student characteristics. According to Buluş et al. (2011), academic achievement is related with students' abilities to demonstrate their existing characteristics effectively. One of the meta-analysis study with 62 studies focused on the factors affecting student achievement (Sarıer, 2016). It has been found that the most important factors on student achievement are respectively student characteristics, family factors, and school factors. The meta-analysis study revealed that students' self-efficacy, motivation, self-respect, and study habits are impartant factors explaining academic achievement. Similar studies also found that motivation, learning strategies, self-efficacy, personal features (Akyol, Sungur, & Tekkaya, 2010; Buluş, Duru, Balkıs, & Duru, 2011; Nartgün & Çakır, 2014; Pokay & Blumenfeld, 1990; Schunk & Zimmerman, 1994; Zimmerman, 1989; Zimmerman & Martinez-Pans, 1990; Yıldırım, 2000), learning approaches (Goh, Wong, & Osman, 2012; Heikkila & Lonka, 2006; Onwuegbuize, Slate, & Swartz, 2001; Yıldız, Akpınar, & Ergin, 2006), and test anxiety (Akın, 2008; Birenbaum & Nasser, 1994) are important variables affecting student academic achievement. However, the studies conducted to examine the influence of student factor on academic achievement has been limited. Therefore, more research is needed to be conducted to examine student factor that contribute to explaining and understanding of the academic achievement. Besides, most studies about the effect of student factor such as motivation, self-efficacy, test anxiety on student achievement have been examined seperately. It has been seen that research studies to explore relationship between self-efficacy, motivation, learning approaches, test anxiety, and academic achievement are very limited (Fadlelmula, Çakıoğlu, & Sungur, 2013; Heikkila & Lonka, 2006; Kesici & Aşılıoğlu, 2017; Kusurkar et al., 2012; Yıldırım, 2011).

Theoretical Framework

According to Bandura's social cognitive learning theory, students who are motivated and able to use learning strategies effectively through self-regulated learning model are more likely to show better performance and achievement (Pintrich, 2000; Virtanen & Nevgi, 2010; Zimmerman, 1989). Self-reguated learners are behaviourally, metacognitively, motivationally active in their own learning (Zimmerman, 1989). Self-regulation has three cyclical interrelated phases; (1) planning and setting goals, (2) action, (3) self-reflection (Zimmerman, 1998). There are two components which are motivation and learning strategies for this learning model. Motivation is one of the most important

components of self-regulated learning. The model has three motivational behaviors. These components; (1) students' beliefs and self-efficacy to perform a task, (2) students' goals about the learning task, (3) students' emotion to the task (Pintrich & De Groot, 1990). Students' motivation is directly related with their self-management skills. Self-regulated learning related with students' self-determination which focus on intrinsic motivation of learning task. Student motivation towards learning task promotes high quality of learning (Ryan & Deci, 2000). Students' approaches to learning as motivational-strategic behaviors (Biggs, 2001) are also interdependent with self-regulation of learning (Heikkila & Lonka, 2006). Surface approach or deep approach to learning depends on students' perception of learning task and their motivation (Biggs, 1993). Students adopting deep learning approaches to learning are highly motivated and more aware of the learning task (Saljo, 1979). Research studies indicated that relationship has been established between motivation to learn, learning approaches, and academic achievement (Herrmann, McCune, & Bager-Elsborg, 2017; Kusurkar et al., 2013, Trigwell, Ashwin, & Millan, 2013).

Education System in Turkey

Academic achievement is one of the most important issues in the Turkish education system and policies. Ministry of National Education (MoNE) has the responsibility to plan, implement, and revise school curricula. Decisions and implemantations about national testing is also made by MoNE. Many changes and arrangements have been made in Turkish School System since 1997. Compulsory schooling was increased from 5 years to 8 years in 1997. Compulsory schooling was 8 years without break, secondary education was 4 years in that period. In 2012, compulsory schooling was extended to 12 years with 4+4+4 education system. Therefore, compulsory education period was increased as 4 years for primary education, 4 years for middle school education, and 4 years for high school education. During these changes in the Turkish education system, different methods were used for transitioning from middle school to high school. Currently, National High School Placement Exam and middle school GPA have become effective factors for transitioning from middle school to high school in Turkey.

TIMSS-R, PIRLS, PISA are important research projects used to assess international student achievement. The most comphrehensive of these projects is PISA (the program for international student assessment). The PISA is used to assess 15 year-old students' reading, mathematics, and science literacy. And also the contries participating in PISA have the oppurtunity to evaluate their education system by comparison with other countries. It has been seen that the students' average scores in Turkey taken in PISA 2006, 2009, 2012, and 2015 were lower than the students'scores in OECD countries. The PISA results revealed that there is a big difference between the secondery school students' academic achievement levels in Turkey. National testing (high school entrance exam) in Turkey also generally showed that secondary students' achievement levels are not at expected levels (Topçu, 2014). Academic achievement levels are not at expected level in Turkish Education System because of several reasons such as quality differences between schools, nationwide competitive examinations, socioeconomic differences, teacher-centered teaching etc. (Börkan & Bakış, 2016; Gelbal, 2008; Topçu, 2014). Several solutions have been taken to eliminate these problems. Reducing inequality between schools, increasing school enrollment rates for girls, adopting constructivist curriculum reform are important attempts in Turkish Education Sytem. Student-centered learning approach in constructivist curriculum is very important since it improves deep learning and academic achievement.

The purpose of this study was to investigate the structural relationships among motivation, deep learning approach, and academic achievement of middle school students in Turkey. The hypothesis model established with the theoretical structure was aimed to examine student factor influencing their academic achievement in detail. Due to lack of studies focusing on structural relationship among motivation, deep learning approach, and academic achievement, there is a need for further research. Therefore, this study was conducted in an attempt to explain the relationships among these variables based on the theoretical model.

Research Questions

1. What is the structural equation model explaining the relationships among motivation, deep learning approach, and academic achivement?

2. Does motivation influence academic achievement directly or indirectly through deep learning approach variable?

METHOD

Participants

The sample of the research consisted of 746 voluntary middle school students in Turkey. In total, 370 participants (49.6%) were female and 376 participants (50.4%) were male. Participants' ages ranged from 12 to 15. The average age of the participants was 13.48 (SD = 0.6). Participants were 7th grade [370; (49.6%)], and 8th grade [376; (50.4%)] students attending different public middle schools in Turkey. The study group was determined by convenience sampling. The data were collected in a manner consistent with ethical standards for use of human subjects in research.

Instruments

Data were collected via Motivated Strategies for Learning Questionnaire, Study Process Questionnaire (R-SPQ-2F), and Personal Information Form.

Motivated Strategies for Learning Questionnaire: Motivated Strategies for Learning Questionnaire was developed by Pintrich, Smith, Garcia and McKeachie (1993) and adapted to Turkish culture for 12-18 years old students by Karadeniz et al. (2008). The scale having 71 items with 7-point Likert type consists of two subscales: motivation and learning strategies. Motivation subscale was used from the Motivated Strategies for Learning Questionnaire in this study. Motivation subscale is composed of six factors: intrinsic goal orientation, extrinsic goal orientation, task value, self-efficacy, control beliefs, and test anxiety. The Cronbach alpha value was calculated for the motivation subscale in the present study (Cronbach alpha=.82). Study Process Questionnaire (R-SPQ-2F): The Study Process Questionnaire developed by Biggs, Kember, and Leung (2004) was adapted to Turkish culture for middle school students by Çolak and Fer (2007). The scale was composed of 22 items in 5-point Likert-type scale. It consists of two subscales: Deep learning approach and Surface learning approach. The deep learning approach subscale was used in the present study. The deep learning approach subscale consists of two factors: deep strategy and deep motivation. The deep learning approach subscale reliability was also calculated in the present study (Cronbach alpha= .77).

Information Form: In the personal information form, demographic information such as gender, age and grade point average were asked to the students.

Procedure and Data Analysis

The data obtained in the study were collected in a classroom environment at the schools. Descriptive statistics and structural equation model were used in the study. First, data were examined whether it is available for structural equation modeling (SEM) analyses. Multicollinearity and normality were examined for SEM analysis (Teo, Tsai, & Yang, 2013). The VIF values were below 10. This finding indicates that there is no multicollinearity in the data set (Kline, 2015). Skewness and kurtosis values were calculated for the assumption of normality. Skewness and kurtosis values between –2 and +2 are considered acceptable for normal distribution (George & Mallery, 2010). The skewness values of the variables vary between -.992 and .214, the kurtosis values vary between .517 and .864. The results indicated that the data were suitable for SEM analyses. According to Kline's

(2015) recommendation, χ^2/df ratio, SRMR, RMSEA, CFI, and TLI were calculated for evaluating the adequacy of the structural model. To support the significance of the indirect and direct effect of the variables included in SEM, a 95% confidence interval was selected and the Bootstrap analysis was applied through 10000 re-sampling (Preacher & Hayes 2008).

To investigate direct and indirect effects of motivational strategies through deep learning approach, mediation model was used. SEM analysis is used for testing mediation model. With mediation model, the effects of independent variables to dependent variable, and also the effect of mediator variable that explain the relationship between independent variables and dependent variables are investigated (Baron & Kenny, 1986; Koğar, 2015).

Baron & Kenny (1986) proposed three conditions to test mediation model: (1) significant relationship between the independent variable and the mediation variable is needed, (2) significant relationship between the mediation variable and dependent variable is needed, (3) relationship of independent variable to dependent variable diminishes when mediation model is added to the model.

RESULTS

Correlation analysis and descriptive statistics

Findings showing correlation coefficients and descriptive statistics between the scales and sub-scales were given in Table 1. As seen in Table 1, all variables significantly correlated, except for the relationship between test anxiety and intrinsic goal orientation (r = -.014, p = .693), task value (r = -.036, p = .324), self-efficacy (r = .059, p = .105), and academic achievment (r = .05, p = 0.185). As seen in Table 1, academic achievement was positively correlated with deep learning approach (r = .155, p <0.01), deep motivation (r = .146, p <0.01), deep strategy (r = .129, p <0.01), intrinsic goal orientation (r = .197, p <0.01), extrinsic goal orientation (r = .078, p <0.05), task value (r = .208, p <0.01), control beliefs (r = .173, p <0.01), self-efficacy (r = .334, p <0.01).

Table 1. Descriptive statistics and correlation analysis of variables

		1	2	3	4	5	6	7	8	9	10
1	Intrinsic goal orientation	1									
2	Extrinsic goal orientation	,258**	1								
3	Task value	,643**	,319**	1							
4	Control beliefs	,423**	,237**	,484**	1						
5	Self-efficacy	,624**	,321**	,633**	,437**	1					
6	Test anxiety	-,014	-,250**	-,036	-,075*	,059	1				
7	Deep learning approach	,561**	,225**	,566**	,307**	,563**	-,122**	1			
8	Deep motivation	,495**	,224**	,498**	,285**	,499**	-,130**	,919**	1		
9	Deep strategies	,506**	,170**	,514**	,259**	,506**	-,081*	,854**	,580**	1	
10	Academic achievement	,197**	,078*	,208**	,173**	,334**	,049	,155**	,146**	,129**	1
	Minimum	4,00	3,00	5,00	3,00	5,00	5,00	11,00	7,00	4,00	40,00
	Maximum	28,00	21,00	35,00	21,00	35,00	35,00	55,00	35,00	20,00	99,70
	Mean	20,55	16,51	27,38	16,73	25,30	18,22	36,56	23,39	13,17	84,24
	SD	4,73	3,67	5,53	3,14	6,22	6,30	7,60	4,86	3,67	11,69
	Skewness	-,515	-,815	-,773	-,817	-,638	,214	-,197	-,244	-,199	-,992
	Kurtosis	,042	,268	,327	,864	,175	-,268	-,023	,197	-,517	,476

Note. N= 746, ** p < 0.01; * p < 0.05

As seen in the Table1, significant relationship between independent variables (motivational strategies) and mediation variable (deep learning approach), and dependent variable (academic achievement), and also significant relationship between mediation variable (deep learning approach)

and dependent variable (academic achievement) exist. Since 14 out of 15 relationships between variables significantly exist, mediation model can be established between these variable. Therefore, indirect and direct paths from motivational variable through learning approach to academic performance were tested. In the first model, the full mediating role of deep learning approach in the relationship between motivation and academic achievement were tested. Indirect path coefficients from motivation through deep learning approach to academic achievement were examined. The tested model adequately fitted with the data ($\chi^2_{(12, N = 746)} = 60.996$, χ^2 / df = 5.083, $p < .001$; CFI = .98; TLI = .93; SRMR = .034; RMSEA = .074 CI (.056 - .093). And also with the addition of direct path from motivational variables to academic achievement, the modified model was tested. The tested model perfectly fitted with the data ($\chi^2_{(6, N = 746)} = 6.091$, χ^2 / df = 1,015, $p = .413$; CFI = 1.00; TLI = 1.00; SRMR = .009; RMSEA = .005 CI (.000 - .048). However, there were no statistically significant path coefficient between motivation strategies and academic achievement except the path from self-efficacy to achievement ($\beta = .34$, $p < .001$). The addition of direct path did not improve the hypothesized model. Therefore, the full mediating model was preferred because of the insignificant paths in the partial mediating model. These results generally showed that motivation strategies predicted indirectly academic achievement through learning approach. The standardized path coefficients for the model were presented in Figure 1.

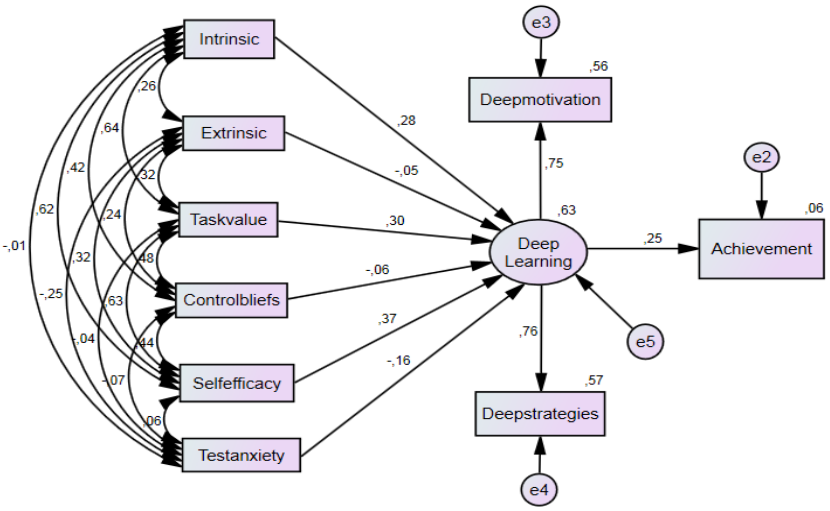


Figure 1. Standardized path coefficients for the model

To support the significance of the indirect effects of the motivation strategies to academic achievement, a 95% confidence interval was selected and the bootstrap analysis was applied through 10000 re-sampling. According to the SEM results, intrinsic goal orientation ($\beta = .28$, $p < .001$, 95% CI = .19, .37), task value ($\beta = .30$, $p < .001$, 95% CI = .20, .40), self-efficacy ($\beta = .37$, $p < .001$, 95% CI = .26, .48), test anxiety ($\beta = -.16$, $p < .001$, 95% CI = -.22, -.09) significantly predicted deep learning approach. Also deep learning approach ($\beta = .25$, $p < .001$, 95% CI = .16, .33) significantly predicted academic achievement. The results of the study generally imlpy that the indirect effect of intrinsic goal orientation ($\beta = .07$, $p < .001$, 95% CI = .04, .11), task value ($\beta = .08$, $p < .001$, 95% CI = .05, .12), self-efficacy ($\beta = .09$, $p < .001$, 95% CI = .05, .15), and test anxiety ($\beta = -.04$, $p < .001$, 95% CI = -.06, -.02) on academic achievement through deep learning approach were statistically significant. The standardized path coefficients for the Model are provided in Table 2.

Table 2 Standardized path coefficients and 95% CIs for the Model

					%95	
Direct Paths				Estimated	Lower	Upper
Intrinsic goal orientation	→	Deep learning		,279***	,188	,366
Extrinsic goal orientation	→	Deep learning		-,050	-,126	,026
Task value	→	Deep learning		,300***	,207	,398
Self-efficacy	→	Deep learning		,370***	,264	,481
Control beliefs	→	Deep learning		-,056	-,134	,021
Test anxiety	→	Deep learning		-,155***	-,224	-,087
Deep learning	→	Achievement		,249***	,159	,334
Indirect Paths						
Intrinsic goal orientation	→	Deep learning →	Achievement	,069***	041	,105
Task value	→	Deep learning →	Achievement	,075***	,045	,115
Self-efficacy	→	Deep learning →	Achievement	,092***	,050	,150
Test anxiety	→	Deep learning →	Achievement	-,039***	-,062	-,021

Note: *** $p < 0.001$

Motivation strategies explained 63% of variance in deep learning approach. However, deep learning approach explained 6% of variance in academic achievement. The independent variables (motivational strategies) were explained more variance than mediation variable (deep learning approach) on academic achievement. Therefore, the results showed that mediating relationship exist among these variables.

DISCUSSION AND CONCLUSION

This research examined the relationships among middle school students' motivation, deep learning approach, and academic achievement. It was found that motivational variables are related with the use of deep learning approach which is related with higher GPA. The results showed that deep learning fully mediated the relationship between students' motivational variables and academic achievement. Self-efficacy, task value, and intrinsic goal orientation (motivational variables) as the indirect effects through deep learning approach on academic achievement were strong predictors in the model. Deep learning approach as mediating the relationship between motivation strategies and academic achievement was also significant predictor on academic achievement. This is in line with theoretical model that self-determined students tending to demonstrate a high level of self efficacy, intrinsic motivation, task value and tending to have less academic anxiety (Deci & Ryan, 2000; Garcia & Pintrich, 1996; Gottfried, 1982, 1985) are more likely to adopt deep learning approach (Entwistle & Ramsden, 1983; Heikkila & Lonka, 2006; Rozendaal, Minnaert, & Boekaerts, 2005) and to have higher academic achievement. Similar studies have been done by using multi-variable analysis (e.g., structural equation modelling) to predict academic achievement (Drew & Watkins, 1998; Kusurkar et al., 2012; Lizzio, Wilson, & Simons, 2002; Zeegers, 2004). Findings of these studies were consistent with the present study that a positive relationship exists between deep learning approach and academic achivement. Trigwell, Aswin, and Millan (2013) also used multi-variable analysis to predict university students' academic achivement in UK. However, relationship between deep learning and academic achievement was not significant in the path analysis. They found that the effect of student motivation on their academic achievement were mediated with surface approach to learning. They generally found that among the strong predictors of academic achievement were surface approach to learning, self-efficacy, and motivation respectively. The present study indicated that self-efficacy which was mediated by deep learning approach has a stronger effect than other motivational variables. Similar studies also found that the effect of self-efficacy on academic achievement was mediated with deep learning approach (Fenollar, Roman, & Cuestas, 2007; Honicke, & Broadbent, 2016; Phan, 2009, 2010). Students with strong self-efficacy beliefs have higher goals, make a great effort to perform an academic task (Bandura, 1997). The students having high self-efficacy beliefs are more likely to adopt deep learning approach, to use learning strategies to perform a task succesfully (Heikkilä & Lonka, 2006; Zimmerman, 2000). The results of the study is parallel with prior studies that self-efficacy is one

of the most powerful motivational variable to predict academic achievement (Al-Harthy, Was, & Isaacson, 2010; Richardson, Abraham, & Bond, 2012).

This study has investigated the impact of some factors, specifically motivation and learning approach on middle school students' academic success. Since learning is a complex concept, using causal model (structural equation modelling) in the present study is important to represent this complexity of learning outcome. However, this study has some limitations. Other factors such as self-regulatory learning strategies, personality traits, demographic factors that may affect on academic achievement were not investigated in the present study. Therefore, there is a need for further research to determine the role of variables on student academic achievement. Besides, high academic achievement does not always reflect high quality of learning outcome (Scouller & Prosser, 1994). Students with high academic achievement may be assessed by using surface approach learning in education system. Therefore, developing a suitable learning environment is important to promote students' deep learning and motivation.

Acknowledgements

This study supported by Sinop University Scientific Research Project (BAP). Project number is EĞTF-1901-18-09.

This study was presented at the International Congress of Eurasian Educational Researches held in Ankara on June 19–22, 2019.

REFERENCES

Akın, A. (2008). Self-efficacy, achievement goals and depression, anxiety and stress: A structural equation modeling. *Word Applied Sciences Journal, 3(5),* 725-732.

Aksoy, H. H., Aras, H. Ö., Çankaya, D., & Karakul, A. K. (2011). Eğitimde nitelik: Eğitim ekonomisi kuramlarının eğitim niteliklerine ilişkin kurgusunun eleştirel analizi. *Eğitim Bilim Toplum Dergisi, 9*(33), 60-69.

Akyol, G., Sungur, S., & Tekkaya, C. (2010). The contribution of cognitive and metacognitive strategy use to students' science achievement. *Educational Research and Evaluation, 16,* 1–21.

Al-Harthy, I. S., Was, C. A., & Isaacson, R.M. (2010). Goals, efficacy and metacognitive self-regulation: A path analysis. *International Journal of Education, 2*(1), 1-20.

Anıl, D. (2009). Uluslararası öğrenci başarılarını değerlendirme programı (PISA)'nda Türkiye'deki öğrencilerin fen bilimleri başarılarını etkileyen faktörler. *Eğitim ve Bilim, 34* (152), 81-100.

Arıcı, İ. (2007). İlköğretim din kültürü ve ahlak bilgisi dersinde öğrenci başarısını etkileyen faktörler (Ankara örneği). Yayımlanmamış doktora tezi, Ankara Üniversitesi, Ankara.

Aslan, G. (2017). Determinants of student successes in transition from basic education to secondary Education (TEOG) Examination: An Analysis Related to Non-School Variables, *Education and Science, 42* (190), 211-236.

Aydoğan, İ. (2012). Okul binalarının özellikleri ve öğrenciler üzerine etkileri. *Milli Eğitim Dergisi, 193,* 29-43.

Bandura, A. (1997). *Self-efficacy: The exercise of control. New York*, NY: Freeman.

Barr, A. B. (2015). Family socioeconomic status, family health, and changes in students' math achievement across high school: A mediational model. *Social Science & Medicine, 140*, 27-34.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Biggs, J. (1993). What do inventories of students' learning processes really measure? A theoretical review and clarification. *British Journal of Educational Psychology, 63*, 3-19.

Biggs, J. (2001). The reflective institution: Assuring and enhancing the quality of teaching and learning. *Higher Education, 14*, 221-238.

Biggs, J., Kember, D., & Leung, D.Y.P. (2001). The revised two-factor study process questionnaire: R-SPQ-2F. *British Journal of Educational Psychology,* 71, 133-149.

Birenbaum, M., & Nasser, F. (1994). On the relationship between test anxiety and test performance. *Measurement and Evaluation in Counseling and Development, 27*, 293-302.

Börkan, B., & Bakış, O. (2016). Determinants of academic achievement of middle schoolers in Turkey. *Educational Sciences: Theory & Practice, 16*, 2193–2217.

Buluş, M., Duru, E. Balkıs, M. ve Duru, S. (2011). Öğrenme stratejileri ve bireysel özelliklerin akademik başarıyı öngörmedeki rolü. *Eğitim ve Bilim Dergisi*, *36*(161), 186-198.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94*, 95-120.

Crosnoe, R., Johnson, M. K., & Elder, G. H. (2004). School size and the interpersonal side of education: An examination of race/ethnicity and organizational context. *Social Science Quarterly, 85*(5), 1259-1774.

Çolak, E. ve Fer, S. (2007). Öğrenme yaklaşımları envanterinin dilsel eşdeğerlik, güvenirlik ve geçerlik çalışması. *Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi, 16 (1),* 197-212.

Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227–268.

Demirtaş, Z. (2010). Okul kültürü ile öğrenci başarısı arasında ilişki. *Eğitim ve Bilim, 35* (158), 1-13.

Drew, P. Y., & Watkins, D. (1998). Affective variables, learning approaches and academic achievement: A causal modelling investigation with Hong Kong tertiary students. *British Journal of Educational Psychology, 68*, 173–188.

Entwistle, N. & Ramsden, P. (1983).*Understanding student learning.* London, Croom Helm.

Fadlelmula, K. F., Cakigoglu, E., & Sungur, S. (2013). Developing a structural model on the relationship among motivational beliefs, self-regulated learning strategies, and achievement in mathematics. *International Journal of Science and Mathematics Education, 13*, 1355–1375.

Fenollar, P., Rom an, S., & Cuestas, P. J. (2007). University students' academic performance: an integrative conceptual framework and empirical analysis. *British Journal of Educational Psychology, 77*, 873-891.

Garcia, T. & Pintrich, P. (1996) The effects of autonomy on motivation and performance in the college classroom, *Contemporary Educational Psychology,* 21, 477–487.

Gelbal, S. (2008). Sekizinci sınıf öğrencilerinin sosyoekonomik özelliklerinin türkçe başarısı üzerinde etkisi. *Eğitim ve Bilim,* 33 (150): 1-13.

George, D., & Mallery, M. (2010). *SPSS for Windows step by step: A simple guide and reference, 17.0 update*. Boston: Pearson

Goh, P.S.C., Wong, K.T., & Osman, R. (2012). Student-teachers' approaches to learning, academic performance and teaching efficacy. *Malaysian Journal of Learning and Instruction, 9,* 31-46.

Gottfried, A.E. (1982). Relationships between academic intrinsic motivation and anxiety in children and young adolescents. *J. School Psychol*., 20, 205-315.

Gottfried, A.E. (1985). Academic intrinsic motivation in elementary and junior high school students. *J. Educ. Psychol*., 77:631-645.

Heikkila, A., & Lonka, K. (2006). Studying in higher education: students' approaches to learning, self-regulation and cognitive strategies. *Studies in Higher Education, 31*(1), 99-117.

Herrmann, K. J., McCune, V., & Bager-Elsborg, A. (2017). Approaches to learning as predictors of academic achievement: Results from a large scale, multi-level analysis. *Högre Utbildning, 7*(1), 29–42.

Honicke, T., & Broadbent, J. (2016). The influence of academic self-efficacy on academic performance: A systematic review. *Educational Research Review, 17, 63–84.*

Howie, S. J., & Pietersen, J. J. (2001). Mathematics literacy of final year students: South African realities. *Studies in Educational Evaluation, 27,* 7-25.

Jones, J. (2012). *The external and internal educational factors that contribute to student achievement and self-perceptions of urban middle school Title I students. Theses and Dissertations,* 240, Rowan University.

Karadeniz, Ş., Büyüköztürk, Ş., Akgün, Ö.E., Çakmak, E.K., & Demirel, F. (2008). The Turkish adaptation study of motivated strategies for learning questionnaire (mslq) for 12–18 years old children: Results of confirmatory factor analysis. *The Turkish Online Journal of Educational Technology, 7 (4),* 108-117.

Kavak, Y., Aydın, A., & Akbaba-Altun, S. (2007). *Öğretmen yetiştirme ve eğitim fakülteleri (1982-2007).* Ankara: Yüksek Öğretim Kurulu.

Kesici, A., & Aşılıoğlu, B. (2017). Ortaokul öğrencilerinin matematiğe yönelik duyuşsal özellikleri ile temel eğitimden ortaöğretime geçiş (TEOG) sınavları öncesi yaşadıkları stresin matematik başarısına etkisi. *KEFAD, 18 (3),* 394-414.

Kline, R. B. (2015). *Principles and practice of structural equation modeling*. New York: Guilford publications.

Koğar, H. (2015) Matematik okuryazarlığını etkileyen faktörlerin aracılık modeli ile incelenmesi. *Education and Science, 40 (179),* 45-55.

Kusurkar, R.A., Ten Cate, T.J., Vos C.M.P., Westers P., & Croiset, G. (2012). How motivation affects academic performance: A structural equation modelling analysis. *Adv Health Sci Educ Theory Pract,* 1–13.

Leithwood, K., & Jantzi, D. (2000). The effects of transformational leadership on organizational conditions and student engagement, *Journal of Educational Administration, 38* (2), 112–129.

Lizzio, A., Wilson, K., & Simons, R. (2002). University students' perceptions of the learning environment and academic outcomes. *Studies in Higher Education, 27*, 27–52.

McNeal, R. B. (1999). Parental involvement associal capital: Differential effectiveness in science achievement, truancy and drop out. *Social Forces, 78*(1), 117-144.

Meece, J., Blumenfeld, P., & Hoyle, R. (1988). Students' goal orientations and cognitive engagement in classroom activities. *Journal of Educational Psychology, 80*, 514-52.

MoNE (2006). ÖBBS 2004- İlköğretim öğrencilerinin başarılarının belirlenmesi: İngilizce bilgisayar okuryazarlığı. Ankara: MEB Basımevi.

MoNE (2007). ÖBBS 2005- İlköğretim öğrencilerinin başarılarının belirlenmesi: Türkçe raporu, Ankara: MEB Basımevi.

Nartgün, Ş., & Çakır, M. (2014). Lise öğrencilerinin akademik başarılarının akademik güdülenme ve akademik erteleme eğilimleri açısından incelenmesi. *Eğitim ve Öğretim Araştırmaları Dergisi, 3*(3), 379-391.

Onwuegbuize, A. J., Slate, J. R. & Swartz, R. A. (2001). Role of study skills in graduate-level, educational research sources. *Journal of Educational Research, 94*, 4-15.

Özgüngör, S. (2006). Üniversite öğrencilerinin amaç tarzlarının ve öğretmenin öz yeterlik destekleyici davranışlarına ilişkin algılarının öğrencinin motivasyon ve akademik davranışlarıyla ilişkisi. *Türk Rehberlik ve Psikolojik Danışmanlık Dergisi, 25*, 27-36.

Phan, H. P. (2009). Relations between goals, self-efficacy, critical thinking and deep processing strategies: a path analysis. *Educational Psychology, 29*(7), 777-799.

Phan, H. P. (2010). Students' academic performance and various cognitive processes of learning: an integrative framework and empirical analysis. *Educational Psychology, 30*, 297-322.

Pokay, P., & Blumenfeld, P.C. (1990). Predicting achievement early and late in the semester: The role of motivation and use of learning strategies. *Journal of Educational Psychology, 82*, 41-50.

Pintrich, R. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self- regulation* (pp. 451-501). San Diego, CA: Academic Press.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*, 33–40.

Pintrich, P.R., Smith, D.A.F., Garcia, T. & McKeachie, W.J. (1993). Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educational and Psychological Measurement, 53* (3), 801-814.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior research methods, 40*(3), 879-891.

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin, 138 (2),* 353-387.

Rozendaal, J. S., Minnaert, A., & Boekaerts, M. (2005). The influence of teacher perceived administration of self-regulated learning on students' motivation and information-processing. *Learning and Instruction, 15*(2), 141-160.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68–78.

Säljö, R. (1979). Learning about learning. *Higher Education, 8*(4), 443–451.

Sarıer, Y. (2016). Türkiye'de Öğrencilerin Akademik Başarısını Etkileyen Faktörler: Bir Meta-analiz Çalışması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 31*(3), 609-627.

Scouller, K.M., & Prosser, M. (1994). Students' experiences in studying for multiple choice question examinations. *Studies in Higher Education 19*(3), 267-279.

Schunk, D. H., & Zimmerman, B. J. (1994). *Self regulation of learning and performance: Issues and educational implications.* Hillsdale, NJ: Erlbaum.

Şahin, S. (2011). Instructional leadership in Turkey and the United States: Teachers' perspectives. *Problems of Education in the 21st Century, 34*(34), 122-137.

Şevik, Y. (2014). *İlköğretim müdür ve müdür yardımcılarının öğrencilerin akademik başarısını etkileyen faktörlere ilişkin görüşleri ile akademik başarısına katkıları*. Yayınlanmamış yüksek lisans tezi, Mehmet Akif Üniversitesi, Burdur.

Teo, T., Tsai, T., & Yang, C. (2013). Applying structural equation modeling (SEM) in educational research: An introduction. In M. Khine (Ed.), *Application of structural equation modeling in educational research and practice* (pp. 3–21). Rotterdam, The Netherlands: Sense Publishers.

Topçu, M. S. (2014). The Achievement Gap in Science and Mathematics: A Turkish Perspective. In Clark, J. V. *Closing the Achievement Gap from an International Perspective. Transforming STEM for Effective Education.* (pp. 193-213). Springer.

Trigwell, K., Ashwin, P., & Millan, E. S. (2013). Evoked prior learning experience and approach to learning as predictors of academic achievement. *British Journal of Educational Psychology, 83*, 363–378.

Virtanen, P., & Nevgi, A. (2010). Disciplinary and gender differences among higher education students in self-regulated learning strategies. *Educational Psychology, 30*, 323–347.

Yıldırım, İ. (2000). Akademik başarının yordayıcısı olarak yalnızlık, sınav kaygısı ve sosyal destek. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 18,* 167-176.

Yıldırım, S. (2011). Öz-yeterlik, İçe Yönelik Motivasyon, Kaygı ve Matematik Başarısı: Türkiye, Japonya ve Finlandiya'dan Bulgular. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi, 5(1),* 277-291.

Yıldız, E., Akpınar, E. ve Ergin, Ö. (2006). *Fen bilgisi öğretmen adaylarının bilişüstü algılarını etkileyen faktörler ve bilişüstü algılarının öğrenme yaklaşımlarıyla ve akademik başarılarıyla ilişkisi.* VII. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi, Gazi Üniversitesi, Gazi Eğitim Fakültesi, Ankara.

York, T.T., Gibson, C. & Rankin, S. (2015). Defining and measuring academic success. *Practical Assessment, Research & Evaluation, 20*(5), 1-20.

Zeegers, P. (2004). Student learning in higher education: A path analysis of academic achievement in science. *Higher Education Research and Development*, 23, 35–56.

Zimmerman, B. J. (1989). A social cognitive view of self regulated academic learning. *Journal of Educational Psychology, 81*, 329-339.

Zimmerman, B. J. (1998). Academic studying and the development of personal skill: a self-regulatory perspective. *Educational Psychologist, 5*(2/3), 73-86.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), Handbook of self-regulation (pp. 13–39). San Diego, CA: Academic Press.

Zimmerman, B. J. & Martinez-Pons, (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology, 82*(1), 51-59.

International Journal of Progressive Education, Volume 15 Number 4, 2019

A corpus Study on Narrative Texts in Turkish Language*

İlker Aydın [i]
Ordu University

Abstract

This study aiming to determine the frequency of use of words in the narrative texts in which the best examples of standard language use are displayed ranks 268 stories compiled from the prominent names of Turkish story-writing. Frequency analyses were made on a corpus of approximately 450 thousand words and the frequency of use of words were tried to be listed according to their lexical categories. The words ranking at a certain percentage (about 2%-4%) were scored. It was observed that general words and grammatically functional words had higher frequencies, and the words were used with their antonyms. In terms of Turkish, categorization of words according to their positions in the sentence and their affixations, possible categorization of words in more than one lexical category, and variable meanings which homonyms gain in context were found as the most significant problems in frequency analysis and corpus formation.

Keywords: Turkish, corpus, narrative text, vocabulary teaching.

DOI: 10.29329/ijpe.2019.203.15

* This paper was extended from the oral declaration presented at the 4th International Contemporary Educational Research Congress, “Education, Youth and Future” October 4-7 2018, in Muğla

[i] **İlker Aydın,** Assoc. Prof. Dr., Ordu University, Faculty of Education.

Correspondence: ilkaydin67@hotmail.com

INTRODUCTION

It is an important problem that how many words are there in the language and how many of them should be learned or taught. It's almost impossible to say exactly how many words there are in a natural language. This is counted as approximately one million for English (McCarten, 2007). In the *Turkish Dictionary*, it is emphasized that there is a total of 616,767 words, including words, idioms, terms and names (http://www.tdk.gov.tr).

Counting words is hard work and this depends primarily on what we understand from the word. For example, words derived from the same root, such as *koş*- 'run', *koşma* 'running', *koşu* 'running', *koşucu* 'runner', *koştur*- 'rush' should be counted as one word or 5 words? Is the verb *koş*- 'run', in the same sense as *maraton koş*- 'run a marathon', *şart koş*- 'stipulate', *işin peşinde koş*- 'pursue' or *atı arabaya koş*- 'harness to'? The same complexity is in question for the homonymic words such as *yüz* ('swim' IMP, 'hundred', 'face'), *yaz* ('write' IMP, 'summer'), *kaz* ('dig' IMP, 'goose'). New words are being added to the language all the time; especially via the internet and information technologies new words such as *yonga* 'chip', *genel ağ* 'internet', *blog* 'blog', *blogcu blogger*, *özçekim* 'selfie', *ağda gezinmek* 'surf the web', *ağ yöneticisi* 'webmaster' etc. are added to Turkish. Despite such difficulties, researchers have tried to estimate how many words native speakers know in order to assess the number of words learners need to learn. Estimates for native speakers vary between 12,000 and 20,000 depending on their level of education. One estimate is that a native speaker graduated from university knows for about 20,000 words (Goulden, Nation, and Read, 1990).

It is difficult to determine which and how many words should be taught to students not only in native language but also in foreign language teaching. According to McCarten (2007), it is possible to get along in English with fewer than 20,000 words and the way of deciding the number of words learners need is to count how many different words are used in an average spoken or written text. Because some high-frequency words are repeated, learners can understand a large proportion of texts with a relatively small vocabulary. McCarten (2007) cites that learners who know the most frequent 2,000 words should be able to understand almost 80 percent of the words in an average text, and a knowledge of 5,000 words increases learners' understanding to 88.7 percent (Francis and Kucera 1982), and for spoken language, the news is even better since about 1,800 words form over 80 percent of the spoken corpus (McCarthy 2004; O'Keeffe, McCarthy, and Carter 2007). It seems important to identify what are the most frequent 2,000 to 5,000 vocabulary items are in target language and to give them priority in teaching.

When the subject is approached from the Turkish, as it is understood from the Turkish Teaching Program, Turkish textbooks, school dictionaries and children's books, the development of the vocabulary cannot actualise incrementally, conspiratorially, and regularly. It is not certain which words will be taught as a priority (Keklik, 2011).

Corpus and vocabulary

In the current *TDK Turkish Dictionary*, the concept of corpus, which corresponds to the term 'derlem', is defined as a combined cluster of the samples compiled from various kinds of language usage area to be used in the grammar and theoretical linguistic studies, in a way to be read by the computer (http://www.tdk.gov.tr). The term corpus is derived from the Latin word corpus that means "body". Within the domain of modern corpus linguistics, the term 'corpus' refers to "a large collection of linguistic data, either written texts or a transcription of recorded speech, which can be used as a starting point of linguistic description or as a means of verifying hypotheses about a language" (Crystal 1995). A corpus is a collection of texts, written or spoken, usually stored in a computer database. Written texts in corpus might be drawn from books, newspapers, or magazines that have been scanned or downloaded electronically. Other written corpus might contain works of literature, or all the writings of one author (e.g., Peyami Safa). Such corpus helps us to see how language is used in contemporary society, how our use of language has changed over time, and how language is used in different situations. Spoken corpus, on the other hand, contains transcripts of spoken language. Such

transcripts may be of ordinary conversations recorded in people's homes and workplaces, or of phone calls, business meetings, radio broadcasts, or TV shows. Such written or spoken corpus shows us how a language is used in real life and in many different contexts (McCarthy, 2007).

A corpus stored in a database can tell us about (McCarten, 2007):

Frequency: Which words and expressions are most frequent and which ones are rare;

Differences in speaking and writing: Which vocabulary is the most spoken and which one is the most written;

Contexts of use: The situations in which people use certain vocabulary;

Collocation: Which words are often used together;

Grammatical patterns: How words and grammatical rules are combined to form patterns;

Strategic use of vocabulary: Which words and expressions are used to organize and manage discourse.

Corpus is collected for different purposes. Learner's dictionaries, grammar reference materials, vocabulary learning materials, and course books all benefit from the information in corpus. Materials developed through the corpus can be more reliable and can illustrate language as it is really used. Briefly, a corpus is a large collection of texts that we can analyze using computer software. It is not a theory of language learning or a teaching methodology, but it does influence our way of thinking about language and the kinds of texts and examples we use in language teaching (McCarthy, 2007).

Words are more than just symbols or signs of something in the real world. They carry with them special connotations evolving from the individual, personal experience of each speaker as well as from the society of which he/she is a part. And frequency of a word in a language means the number of occurrence of a linguistic item in a written or spoken form (Richards & Theodore, 2001). Frequency is to know the degree of probability of encountering the word in speech or in print. It is noticeable that frequency also differs in speech and in writing (Elyas & Alfaki, 2014).

Purpose of the Study

The aim of this study is to create a corpus based on narrative texts in which the most beautiful examples of the language are exhibited and to make some comments on the vocabulary of Turkish language by identifying the words with the highest frequency of use.

METHOD

This study, which aims to identify the words with a certain rate of usage over a corpus based on narrative texts, is designed and conducted according to qualitative research paradigm. Qualitative research is defined as a way where qualitative data gathering methods such as observation, interview and document analysis are used (Karasar, 2010).

Research Pattern

This study based on corpus linguistics, has a descriptive pattern. A descriptive design seeks to describe the current status of a variable or phenomenon. The researcher does not begin with a hypothesis, but typically develops one after the data is collected. Data collection is mostly observational in nature.

Data Collection

The data that is subject to the study, which was carried out as a result of a long struggle, was obtained from a corpus of approximately 450 thousand words, including 268 stories of well-known Turkish storytellers such as Ömer Seyfettin, R. Halit Karay, M. Şevket Esendal, S. Faik Abasıyanık, Orhan Kemal, Kemal Tahir, Adalet Ağaoğlu, Pınar Kür, Ferit Edgü, Firuzan, etc.

Data Analysis

In the analysis of the data, it was benefited from the software of analysis named as "word counter 2.10-41" and from the web sites which can make text analysis such as "https://www.browserling.com" and "http://www.csgnetwork.com". Words can be considered as the smallest independent elements in language and communication. Based on their use and functions, words are categorized into several types or parts of speech. The parts of speech, also known as word classes, explain how a word is used in a sentence. In the Turkish language, words can be classified under 8 major word types or parts of speech namely, nouns, pronouns, adjectives, verbs, adverbs, conjunctions, prepositions, and interjections. In this study, the classification of words is based on *Turkish Dictionary* (TDK, 2018). The data from data collection tools were analyzed using descriptive statistics. According to parts of speech, frequency percentage tables are arranged. The words ranking at a certain percentage (about 2%-4%) is scored. The interjection was not included in this study.

FINDINGS AND COMMENTS

In this section, according to corpus analysis, word frequency and percentage values are given. On the basis of their frequencies, the first few words are interpreted from each table.

According to software, the first 200 words with the highest frequency of use are given in Table 1:

Table 1: Top 200 words with the highest frequency of use

Rank	Word	Frequency	%	Rank	Word	Frequency	%
1	bir	15696	3,46	26	onu	877	0,19
2	ve	4790	1,06	27	içinde	872	0,19
3	bu	4779	1,05	28	zaman	872	0,19
4	de	3729	0,82	29	gün	865	0,19
5	o	3293	0,73	30	var	846	0,19
6	da	3191	0,70	31	onun	830	0,18
7	gibi	2826	0,62	32	en	787	0,17
8	ne	2646	0,58	33	mı	776	0,17
9	sonra	2070	0,46	34	bana	776	0,17
10	daha	1892	0,42	35	beni	769	0,17
11	için	1779	0,39	36	değil	760	0,17
12	kadar	1694	0,37	37	doğru	750	0,17
13	dedi	1691	0,37	38	böyle	741	0,16
14	her	1580	0,35	39	artık	738	0,16
15	diye	1500	0,33	40	şimdi	736	0,16
16	ben	1465	0,32	41	ile	733	0,16
17	çok	1431	0,32	42	ya	722	0,16
18	ama	1396	0,31	43	vardı	668	0,15
19	iki	1239	0,27	44	başka	667	0,15
20	ki	1201	0,27	45	fakat	654	0,14
21	hiç	1052	0,23	46	benim	649	0,14
22	şey	976	0,22	47	biraz	649	0,14
23	bile	935	0,21	48	ona	624	0,14
24	bütün	927	0,20	49	nasıl	621	0,14
25	mi	923	0,20	50	sen	621	0,14

51	büyük	617	0,14	101	biri	329	0,07
52	öyle	610	0,13	102	başını	316	0,07
53	adam	607	0,13	103	kız	311	0,07
54	kadın	606	0,13	104	az	310	0,07
55	yok	596	0,13	105	birden	310	0,07
56	yine	591	0,13	106	ağır	305	0,07
57	uzun	590	0,13	107	şeyler	304	0,07
58	hep	568	0,13	108	gene	304	0,07
59	kendi	564	0,12	109	beyaz	304	0,07
60	belki	531	0,12	110	altında	302	0,07
61	küçük	528	0,12	111	mu	299	0,07
62	sanki	509	0,11	112	üstüne	298	0,07
63	dedim	504	0,11	113	tam	298	0,07
64	olan	481	0,11	114	baktı	296	0,07
65	şu	481	0,11	115	yavaş	295	0,07
66	oldu	481	0,11	116	senin	294	0,06
67	gece	475	0,10	117	yoktu	286	0,06
68	iyi	474	0,10	118	Ali	283	0,06
69	eski	470	0,10	119	sana	280	0,06
70	güzel	460	0,10	120	gelen	279	0,06
71	yeni	452	0,10	121	babam	279	0,06
72	pek	449	0,10	122	yer	278	0,06
73	hemen	434	0,10	123	olsun	276	0,06
74	hem	410	0,09	124	eve	276	0,06
75	ilk	401	0,09	125	olarak	273	0,06
76	üç	397	0,09	126	su	272	0,06
77	genç	395	0,09	127	karşı	271	0,06
78	yalnız	393	0,09	128	aynı	268	0,06
79	bizim	386	0,09	129	gözlerini	267	0,06
80	tek	386	0,09	130	akşam	266	0,06
81	beş	386	0,09	131	içine	264	0,06
82	önce	377	0,08	132	seni	264	0,06
83	bey	377	0,08	133	yerde	262	0,06
84	gözleri	376	0,08	134	kendini	261	0,06
85	olduğunu	376	0,08	135	sabah	258	0,06
86	çocuk	370	0,08	136	kim	258	0,06
87	hiçbir	362	0,08	137	tekrar	258	0,06
88	işte	360	0,08	138	diyor	257	0,06
89	arkadaş	357	0,08	139	yeniden	256	0,06
90	son	354	0,08	140	önünde	255	0,06
91	geldi	350	0,08	141	annem	254	0,06
92	on	349	0,08	142	üzerine	254	0,06
93	başladı	347	0,08	143	kez	253	0,06
94	bunu	345	0,08	144	olsa	252	0,06
95	arasında	343	0,08	145	türlü	250	0,06
96	biz	340	0,08	146	dört	250	0,06
97	birkaç	338	0,07	147	insan	250	0,06
98	olduğu	333	0,07	148	çünkü	249	0,05
99	olur	330	0,07	149	olacak	248	0,05
100	yere	330	0,07	150	ev	247	0,05

151	zaten	243	0,05	176	üstünde	212	0,05
152	sesi	242	0,05	177	evin	206	0,05
153	gitti	240	0,05	178	yıl	204	0,05
154	iş	239	0,05	179	onları	201	0,04
155	göz	238	0,05	180	beri	201	0,04
156	birlikte	235	0,05	181	etti	201	0,04
157	elini	234	0,05	182	yoksa	201	0,04
158	saat	230	0,05	183	alıp	200	0,04
159	para	229	0,05	184	kendine	199	0,04
160	yol	229	0,05	185	işte	198	0,04
161	üzerinde	228	0,05	186	burada	197	0,04
162	yanına	227	0,05	187	dolu	196	0,04
163	bize	225	0,05	188	adamın	195	0,04
164	birer	224	0,05	189	aldı	194	0,04
165	belli	224	0,05	190	çıktı	194	0,04
166	ince	223	0,05	191	geçen	192	0,04
167	orada	222	0,05	192	sarı	192	0,04
168	yüz	221	0,05	193	ise	191	0,04
169	demek	218	0,05	194	önüne	191	0,04
170	geri	218	0,05	195	koca	190	0,04
171	başına	217	0,05	196	an	190	0,04
172	ses	217	0,05	197	değildi	190	0,04
173	kara	213	0,05	198	şöyle	189	0,04
174	el	213	0,05	199	açık	189	0,04
175	yana	213	0,05	200	onlar	188	0,04

In Table 1, the values obtained are directly reflected without going to any classification. When Table 1 is examined, it is seen that in terms of frequency of occurrence, among the first 15 words, functional words such as conjunctions (*ve* ‘and’, *de*/*da* ‘also’, *ne* ‘neither’), prepositions (*gibi* ‘as’, *için* ‘for’, *kadar* ‘until’), adverbs (*sonra* ‘after’, *daha* ‘more’) and multifunctional words such as *bir* ‘one’, *bu* ‘this’ are mainly observed. Since functional words form a limited list in the language, their frequency of use is higher. The language item *dedi* ‘s/he said’ is an expression of direct/indirect speech based on dialogue in the narrative texts. Therefore, it has been the first finite verb with the highest usage frequency. On the other hand, nouns with high frequency of use are general words, and adjectives are ranked with their opposites. According to Holliday & Hassan (1976) “general noun is itself a borderline case between a lexical item (member of an open set) and a grammatical item (member of closed system). The class of general noun is a small set of nouns having generalised reference within the major noun classes, those such as ‘human noun’, ‘place noun’, ‘fact noun’ and the like.”

According to software, the first 50 nouns with the highest frequency of use are given in Table 2:

Table 2: Top 50 nouns with the highest frequency of use

Rank	Noun	Frequency	%	Frequency Distribution (in the first 50 noun)
1	bir	15696	3,46	
2	şey	1463	0,32	şey (976), şeyler (304), şeyi (183)
3	iki	1239	0,27	
4	göz	881	0,19	gözleri (376), gözlerini (267), göz (238)
5	zaman	872	0,19	
6	yer	870	0,19	yere (330), yer (278), yerde (262)
7	gün	865	0,19	
8	adam	802	0,18	adam (607), adamın (195)
9	ev	729	0,16	eve (276), ev (247), evin (206)
10	kadın	606	0,13	
11	baş	533	0,12	başını (316), başına (217), baş (0)
12	gece	475	0,10	
13	ses	459	0,10	sesi (242), ses (217)
14	el	447	0,10	elini (234), el (213)
15	ön	446	0,10	önünde (255), önüne (191), ön (0)
16	yan	440	0,10	yanına (227), yana (213), yan (0)
17	üç	397	0,09	
18	yüz	394	0,09	yüz (221), yüzüne (173)
19	beş	386	0,09	
20	bey	377	0,08	
21	çocuk	370	0,08	
22	arkadaş	357	0,08	
23	on	349	0,08	
24	kız	311	0,07	
25	beyaz	304	0,07	
26	Ali	283	0,06	
27	babam	279	0,06	
28	su	272	0,06	
29	karşı	271	0,06	
30	akşam	266	0,06	
31	içine	264	0,06	
32	sabah	258	0,06	
33	annem	254	0,06	
34	insan	250	0,06	
35	dört	250	0,06	
36	iş	239	0,05	
37	saat	230	0,05	
38	para	229	0,05	
39	yol	229	0,05	
40	kara	213	0,05	
41	yıl	204	0,05	
42	sarı	192	0,04	
43	koca	190	0,04	
44	an	190	0,04	
45	siyah	188	0,04	
46	hanım	184	0,04	
47	ay	181	0,04	
48	erkek	181	0,04	
49	İstanbul	178	0,04	
50	taş	172	0,04	

The noun refers to words that are used to name persons, things, animals, places, ideas, or events. When Table 2 is examined, it is seen that the word *bir* 'one' which is used as definite numeral adjective and indefinite numeral adjective is as the word with the highest frequency of use. The word *şey* 'thing' in the second order is a multifunctional word and indicates uncertainty. In the narrative texts, the words *bir* 'one' and *şey* 'thing' are statements of uncertainty that facilitate narration. The word *iki* 'two' is seen the most commonly used numerical adjective. The terms *zaman* 'time' and *gün* 'day' are mainly associated with structures that function as adverb (*o zaman* 'then, at the time', *o gün* 'that day') rather than noun. The word *yer* 'place' completes mainly the meaning of the predicate with the interest of space, by taking the dative suffix (*yer**e*** 'to the place') or locative suffix (*yer**de*** 'in the place') and it is a general word. The word *göz* 'eye' which is in the fourth order is the most important organ of human being. It is much used in the narrative and descriptive texts. The word *ev* 'house' is the ninth order and, it is used as the most important shelter for people. On the other hand, the general words *kadın* 'woman' and *adam* 'man' are taken place in the first ten ranks, with a close frequency to each other. As to other family members, the frequency of the words *baba* 'father', *anne* 'mother' and *insan* 'human' is close to each other. As to proper nouns, names of city and person, it is noticed that the first proper noun is *Ali* and the first city name is *Istanbul*. It is also seen that the first color name is *beyaz* 'white' and the second organ name is *el* 'hand'.

According to software, the first 15 pronouns with the highest frequency of use are given in Table 3:

Table 3: Top 15 pronouns with the highest frequency of use

Rank	Pronoun	Frequency	%	Frequency Distribution (in the first 15 pronuns)
1	o	5792	1,28	o (3293), onu (877), onun (830), ona (624), ondan (168)
2	bu	5454	1,20	bu (4779), bunu (345), bunun (168), buna (162)
3	ben	3659	0,81	ben (1465), bana (776), beni (769), benim (649)
4	kendi	1566	0,35	kendi (564), kendini (261), kendine (199), kendisine (150), kendisi (144), kendisini (132), kendimi (116)
5	sen	1459	0,32	sen (621), senin (294), sana (280), seni (264)
6	biz	951	0,21	bizim (386), biz (340), bize (225)
7	onlar	646	0,14	onları (201), onlar (188), onların (127), onlara (130)
8	şu	481	0,11	
9	kim	376	0,08	kim (258), kimi (118)
10	bunlar	332	0,07	bunları (182), bunlar (150)
11	biri	320	0,07	
12	siz	177	0,04	
13	herkes	169	0,04	
14	kimse	164	0,04	
15	hepsi	156	0,03	

A pronoun is a part of a speech which functions as a replacement for a noun. Considering the pronoun analysis, *o* 's/he, it' and *bu* 'this' which are in the first two ranks are also used as 'demonstrative adjective' and 'demonstrative pronoun'. Therefore, the frequency of the words *o* 's/he, it' and *bu* 'this' is very close to each other. In addition, the narrative texts tend to use *o* 's/he, it' rather than *ben* 'I'. Thus, the first-person singular pronoun *ben* 'I' has been at the third order, yet it is logically expected to be in the first order. The reflexive pronoun *kendi* 'him/herself' with the highest frequency of use is used in place of all the personnel pronouns by taking suffixes. Besides, the personal pronouns attract attention mainly with their suffixed forms. Indefinite pronouns such as *herkes* 'everyone', *kimse* 'nobody', *hepsi* 'all' usually do not take suffixes and their frequency of use is low.

According to software, the first 50 adjectives with the highest frequency of use are given in Table 4:

Table 4: Top 50 adjectives with the highest frequency of use

Rank	Adjective	Frequency	%	Frequency Distribution (in the first 50 adjectives)
1	bu	4779	1,05	
2	her	1580	0,35	
3	var	1468	0,32	var (846), vardı (622)
4	çok	1431	0,32	
5	bütün	927	0,20	
6	yok	882	0,19	yok (596), yoktu (286)
7	doğru	750	0,17	
8	böyle	741	0,16	
9	başka	667	0,15	
10	biraz	649	0,14	
11	büyük	617	0,14	
12	öyle	610	0,13	
13	uzun	590	0,13	
14	küçük	528	0,12	
15	şu	481	0,11	
16	iyi	474	0,10	
17	eski	470	0,10	
18	güzel	460	0,10	
19	yeni	452	0,10	
20	pek	449	0,10	
21	ilk	401	0,09	
22	genç	395	0,09	
23	hiçbir	362	0,08	
24	son	354	0,08	
25	birkaç	338	0,07	
26	az	310	0,07	
27	ağır	305	0,07	
28	tam	298	0,07	
29	yavaş	295	0,07	
30	aynı	268	0,06	
31	türlü	250	0,06	
32	belli	224	0,05	
33	birer	224	0,05	
34	ince	223	0,05	
35	dolu	196	0,04	
36	açık	189	0,04	
37	fazla	177	0,04	
38	derin	175	0,04	
39	deli	164	0,04	
40	tatlı	158	0,03	
41	sıcak	150	0,03	
42	yaşlı	148	0,03	
43	kötü	137	0,03	
44	boş	137	0,03	
45	kısa	137	0,03	
46	garip	135	0,03	
47	yarı	130	0,03	
48	hafif	128	0,03	
49	sık	127	0,03	
50	sağ	121	0,03	

Adjective as a part of a speech is used to describe and determine a noun or a pronoun. Adjectives can specify the quality, the size, and the number of nouns or pronouns. In Turkish language, adjectives are multifunctional words of noun origin. When an adjective comes before the noun, it qualifies the noun in the function of adjective and when it is used alone, it takes over all the tasks that the noun can undertake in the sentence. When used with the predicate, its function is adverb.

Güzel kız '*beautiful* girl' (adjective)

Güzel dışarı çıktı. '*Beautiful* vent out.' (noun)

Kız *güzel* konuştu. 'Girl spoke *beautifully*.' (adverb)

When Table 4 is examined, it is seen that the demonstrative adjective *bu* 'this' is at the top of the list. This adjective serves also as the demonstrative pronoun.

Bu ayakkabı güzel. '*This* shoe is beautiful.' (demonstrative adjective)

Bu sana yakıştı. '*This* is good for you.' (demonstrative pronoun)

The same situation is valid for the word *şu* 'that' which has taken place in the fifteenth order:

Şu çocuk kazandı. '*That* boy won.' (demonstrative adjective)

Şunu beğendim. 'I liked *that*.' (demonstrative pronoun)

The most striking point in the adjectives is that they are used with their opposites such as *var/yok* 'present/absent', *büyük/küçük* 'big/little', *eski/yeni* 'old/new', *ilk/son* 'first/last' and their frequency of occurrence is similar. The words *her* 'every', *çok* 'much', *öyle* 'so', *böyle* 'such' whose frequency of use is very high are also used as adverb in the sentence.

According to software, the first 20 verbs with the highest frequency of use are given in Table 5:

Table 5: Top 20 verbs with the highest frequency of use

Rank	Verb	Frequency	%	Frequency Distribution (in the first 20 verbs)
1	ol-	4107	0,91	olan (481), oldu (481), olduğunu (376), olduğu (333), olur (330), olsun (276), olarak (273), olsa (252), olacak (248), olmuştu (143), olurdu (139), olmuş (136), oluyor (131), olmaz (131), olmak (129), oluyor (131), olup (117)
2	de-	2966	0,65	dedi (1691), dedim (504), diyor (257), demek (218), diyordu (174), derdi (122)
3	gel-	1299	0,29	geldi (350), gelen (279), geliyor (167), gelip (166), gelir (137), gelmiş (112), geliyordu (111)
4	et-	736	0,16	etti (201), eden (159), ediyordu (134), etmek (122), eder (120)
5	bak-	728	0,16	baktı (296), bak (171), bakıyordu (127), baktım (118)
6	al-	394	0,09	alıp (200), aldı (194)
7	git-	383	0,08	gitti (240), gidip (143)
8	geç-	375	0,08	geçen (192), geçti (183)
9	başla-	347	0,08	başladı (347)
10	dön-	273	0,06	döndü (154), dönüp (119)
11	dur-	261	0,06	duran (131), durdu (130)
12	kal-	258	0,06	kaldı (148), kalmış (110)
13	gör-	220	0,05	gördü (111), görünce (109)
14	çık-	194	0,04	çıktı (194)
15	bil-	152	0,03	bilir (152)
16	sor-	127	0,03	sordu (127)
17	kalk-	123	0,03	kalktı (123)
18	gir-	116	0,03	girdi (116)
19	ver-	114	0,03	verdi (114)
20	iste-	109	0,02	ister (109)

Verb is the most important part of a speech. A sentence is not existed without verb. Simply put, this is a word that shows an action (physical or mental) or state of being of the subject in a sentence. When Table 5 is examined, it is seen that the verb *ol-* 'to be' which is often used as an auxiliary verb has taken in the first order. It was followed by the verb *de-* 'to say'. When the verb *gel-* 'to come' is placed in the third order, the auxiliary verb *et-* 'to do', which forms a compound verb by merging with the noun, is placed in the fourth order. As seen in the table, the verb *ol-* 'to be' is conjugated in almost all modes and tenses. The fact that the verb *de-* 'to say' takes in second order is due to the nature of the narrative texts. The verbs are mostly conjugated in the past tense mode with the 3rd person singular suffix. It is also observed that the use of participles is quite high depending on the descriptions.

According to software, the first 30 adverbs with the highest frequency of use are given in Table 6:

Table 6: Top 30 adverbs with the highest frequency of use

Rank	Adverb	Frequency	%
1	sonra	2070	0,46
2	daha	1892	0,42
3	hiç	1052	0,23
4	içinde	872	0,19
5	en	787	0,17
6	artık	738	0,16
7	şimdi	736	0,16
8	nasıl	621	0,14
9	yine	591	0,13
10	hep	568	0,13
11	belki	531	0,12
12	hemen	434	0,10
13	önce	377	0,08
14	birden	310	0,07
15	üstüne	298	0,07
16	yeniden	256	0,06
17	üzerine	254	0,06
18	zaten	243	0,05
19	birlikte	235	0,05
20	üzerinde	228	0,05
21	orada	222	0,05
22	geri	218	0,05
23	üstünde	212	0,05
24	burada	197	0,04
25	şöyle	189	0,04
26	neden	186	0,04
27	beraber	167	0,04
28	iyice	162	0,04
29	sadece	160	0,04
30	birdenbire	154	0,03

Just like adjectives, adverbs are also used to describe words, but the difference is that adverbs describe adjectives, verbs, or another adverb. If a word is associated with the verb and qualifies the verb, it is adverb; it is associated with the noun and qualifies the noun, it is adjective.

Arkadaşım, İngilizce'yi *hızlı* öğrendi. (My friend learned English *fast*.) (adverb)

Arkadaşım, *hızlı* arabaları çok seviyor. (My friend loves *fast* cars.) (adjective)

When Table 6 is examined, it is seen that the word with the highest frequency of use is the word *sonra* 'after' which is adverb of time. It is an adverb that describes when the action of a verb is carried out. Since the narrative texts are texts formed within the event frame, it is common for the adverb *sonra* 'after' to be in the first place. The word *daha* 'more' in the second order and the word *en* 'very' in the fifth order are adverbs of degree that express intensity of the action. They create adverb group such as *daha sonra* 'later', *en çok* 'at most', *daha erken* 'earlier', *en geç* 'the latest'. The word *hiç* 'any' in the third order strengthens the meaning of the action in the negative sentences and indicates uncertain, any time in question sentences. The word *içinde* 'in/within' in the fourth order completes the meaning of the action with the interest of time and space.

According to software, the first 20 prepositions with the highest frequency of use are given in Table 7:

Table 7: Top 20 prepositions with the highest frequency of use

Rank	Preposition	Frequency	%	Frequency Distribution (in the first 20 preposition)
1	gibi	2826	0,62	
2	mi	1998	0,44	mi (923), mı (776), mu (299)
3	için	1779	0,39	
4	kadar	1694	0,37	
5	diye	1500	0,33	
6	değil	950	0,21	değil (760), değildi (190)
7	ile	733	0,16	
8	sanki	509	0,11	
9	yalnız	393	0,09	
10	tek	386	0,09	
11	işte	360	0,08	
12	beri	212	0,05	
13	evet	227	0,05	
14	ancak	183	0,04	
15	sadece	160	0,04	
16	hayır	123	0,03	
17	üzere	107	0,02	
18	acaba	98	0,02	
19	göre	94	0,02	
20	rağmen	83	0,02	

A preposition shows the relationship of a noun or pronoun to another word. They can indicate time, place, or relationship. When Table 7 is examined, it is seen that the preposition with the highest frequency of use is the preposition *gibi* 'as'. It adds to the sentence the meanings of equality and

analogy. The question marker *mi* with its allomorph *mı* and *mu* is ranked in the second order. It reinforces the meaning, and establishes interest of time. The preposition *için* 'for' in the third order establishes a variety of meaning interests, in particular the purpose and the cause in the sentence. As to the preposition *kadar* 'until' in the fourth order establishes interests such as equality, similarity, approximation through the comparison. The preposition *diye* 'so, that' in the fifth order adds the sentence a meaning of purpose and cause. This language item is also related to the reported speech in the narrative texts. The word *değil* 'isn't' is a preposition of negativity. It negates the predicate of nominal sentence. As to the word *evet* 'yes' it establishes interest of affirmation and verification.

According to software, the first 20 conjunctions with the highest frequency of use are given in Table 8:

Table 8: Top 20 conjunctions with the highest frequency of use

Rank	Conjunction	Frequency	%
1	ve	4790	1,06
2	de	3729	0,82
3	da	3191	0,70
4	ne	2646	0,58
5	ama	1396	0,31
6	ki	1201	0,27
7	bile	935	0,21
8	ile	733	0,16
9	ya	722	0,16
10	fakat	654	0,14
11	hem	410	0,09
12	gene	304	0,07
13	çünkü	249	0,05
14	yoksa	201	0,04
15	ise	191	0,04
16	ancak	183	0,04
17	hatta	182	0,04
18	hele	156	0,03
19	oysa	150	0,03
20	yani	136	0,03

A conjunction joins words, phrases, or clauses, and indicates the relationship between the elements joined. When Table 7 is examined, it is seen that the most common ones are *ve* 'and', *veya/ya da* 'or', and *ama/fakat* 'but'. All these words have nuances and they all help to build up meaningful relationships within a sentence. In terms of frequency of use, the conjunction in the first order is the coordinating conjunction *ve* 'and'. The conjunction in the second and third order is *de/da* 'as well'. The language item *da* is allomorph of *de*. The conjunction *de/da* that strengthens the meaning of the word to which it is attached is defined as the conjunction of reinforcement. In the fourth order, the language item *ne* 'what' is a conjunction that enters different combinations such as *ne…ne* 'neither…nor', *ne…ne de* 'neither…nor', *ne var ki* 'however'. The conjunction *ama/fakat* 'but' connects the sentences and judgments that have a contrast between them.

CONCLUSION AND RECOMMENDATION

Corpus research, methodology, and application are closely related and corpora are not only of use in linguistics but in a variety of fields that are concerned with language, e.g. language teaching, translation studies, social sciences, etc. But, counting words of a language is a hard work because of the words derived from the same root, homonymic words and compound words. At the same time, new words included in native language from other languages makes it more difficult. Exposure to different languages is an important factor in the addition of new words to a language. For example, via the internet and information technologies many words are added to Turkish. The parts of speech explain how a word is used in a sentence. Type of word in Turkish; is determined according to the place where the word is found in the sentence, the suffix it receives and the meaning it has in the sentence context. Since some words can sometimes be in more than one part of speech, in Turkish these multifunctional words, like homonymic words, cause problems in composing corpus.

Words with high frequency of use are mainly functional words and general words. According to Mahlberg (2005) "Two assumptions about general nouns are put forward: general nouns are nouns that are used frequently, and they are characterized by local textual functions that will be defined as functions that account for the integration of lexical items in patterns of texts." The part of speech indicates how the word functions in meaning as well as grammatically within the sentence. An individual word can function as more than one part of speech when used in different circumstances. Subjects and objects are often realized by noun or noun phrase, in this case the nouns have a central role and figure prominently in the narrative texts.

In the narrative texts, there are many antonyms as cohesive elements, such as *beyaz-kara/siyah* 'white-black', *kadın-erkek* 'woman-man', *anne-baba* 'mother-father', *sabah-akşam* 'morning-evening', *gelmek-gitmek* 'to come-to go', *üstünde-altında* 'above-under' etc. Since the repetition of the nouns leads to a boring text, pronouns are used very much in the narrative text. The pronouns are words that dominate the task rather than the meaning. The pronouns, *bu* 'this', *o* 's/he, it, that', *ben* 'I/me', taking suffix are used in the function of object and complement. This increases the frequency of use of these words. Otherwise, since the pronoun *kendi* 'him/herself' can replace all the personal pronouns by taking suffixes, its frequency of use is high. Indefinite pronouns such as *hepsi* 'all', *herkes* 'everybody', *kimse* 'anyone' are pronouns with the lowest frequency of use. These pronouns are remarkable by their appearance without suffixes in the narrative texts. In the narrative texts, if it is not a narration of the first-person singular, there are more third person singular and plural pronouns such as *o* 's/he', *bu* 'this' and *onlar* 'they/them'. All types of pronouns are priority words in the language teaching. Adjectives such as *bu* 'this', *her* 'every', *var* 'there is/are', *çok* 'many'; conjunctions *de/da* 'also', *ve* 'and' with the highest frequency of use are in the first places.

This study, based on narrative texts, should be also done for other text types and verbal language. In addition, in a such study, collocated words which tend to occur in the same textual context can be examined. Furthermore, the high frequency of functional words should be evaluated in terms of grammar teaching. And in the teaching of Turkish as both a mother tongue and as a foreign language, the obtained data should be used. Because vocabulary is central to language teaching and without sufficient vocabulary students cannot understand or express their own ideas. Wilkins (1972) states that "While without grammar very little can be conveyed without vocabulary nothing can be conveyed."

REFERENCES

Crystal, D. (1995). *The Cambridge Encyclopaedia of the English Language*. Cambridge: Cambridge University Press.

Elyas T, and Alfaki, I. (2014). Teaching Vocabulary: The Relationship between Techniques of Teaching and Strategies of Learning New Vocabulary Items. *English Language Teaching, 7* (10), 40-56.

Francis, W. N., and Kucera, H. (1982). *Frequency analysis of English Usage*. Boston: Houghton Mifflin Company.

Goulden, R., Nation, N. and Read, J. (1990). How large can a receptive vocabulary be? *Applied Linguistics, 11* (4), 41-63.

Halliday, M.A.K., Hasan, R. (1976). *Cohesion in English*. London: Longman.

Karasar, N. (2010). *Bilimsel Araştırma Yöntemi*. Ankara: Nobel.

Keklik, S. (2011). Türkçede On Bir Yaşına Kadar Çocuklara Öğretilmesi Gereken, Birleşim Gücü Yüksek İlk Bin Kelime. *ODU Sosyal Bilimler Enstitüsü Sosyal Bilimler Araştırmaları Dergisi, 2* (4), 80-95.

McCarten J. (2007). *Teaching Vocabulary, Lessons from the Corpus Lessons for the Classroom*. New York: Cambridge University Press.

McCarthy M. (2007). *Touchstone, From Corpus to Course Book*. New York: Cambridge University Press.

Mahlberg M. (2005). *English General Nouns: A Corpus Theoretical Approach.* Philadelphia: John Benjamins Publishing.

Richards, J. C., and Theodore, R. (2001). *Approaches and Methods in Language Teaching*. US: CUP.

TDK, (2018). *Türkçe Sözlük.* Ankara: Türk Dil Kurumu Yayınarı. (http://www.tdk.gov.tr).

Wilkins, D. A. (1972). *Linguistics in Language Teaching*. Hodder & Stoughton Educational.

International Journal of Progressive Education, Volume 15 Number 4, 2019

Teaching Materials Developed Using QR Code Technology in Science Classes

Esra Uçak [i]
Pamukkale University

Abstract

The present study aims to investigate the opinions of prospective science teachers about the use of QR codes in the teaching materials that they prepared in the "Instructional Technologies and Material Development" course. The study group consists of 38 (32 female, 6 male) 3rd-year prospective science teachers who attended the "Instructional Technologies and Material Development" course in the fall semester of the 2018-2019 academic year, and who chose to use QR codes academic year, and who chose to use QR codes in the teaching materials. In this case study, the data were collected through semi-structured interviews. The data were analyzed by the content analysis method. The study revealed the perspectives of prospective science teachers on the use of QR codes in the teaching materials they prepared, in the learning process, its advantages, disadvantages, and effects of QR codes on the materials prepared.

Keywords: QR codes, science education, prospective teachers, instructional technologies and material development.

DOI: 10.29329/ijpe.2019.203.16

---
[i] **Esra Uçak,** Assist. Prof. Dr., Pamukkale University, Science Education.

Correspondence: eucak@pau.edu.tr

INTRODUCTION

In today's world, there have been great developments in the field of informatics. Information technology provides communication between people and ensures that information is transmitted without any restrictions. The introduction of the Internet, wireless internet networks, and mobile devices into social life has accelerated the progress in technology. Digital cameras, smartphones, tablets and other mobile devices have become influential actors in the changing global world (Taskesenlioglu, 2010: 14).

In the informatics world, the use of QR codes increased in parallel with the development of smartphones. QR codes now appear in many areas of life (Virtual 2017). QR codes were first developed in 1994 by a Japanese company as a symbol that can be easily read through the scanner for tracking of production processesin the automotive industry. The most widely used and highest capacity QR codes are 2D barcodes, which can store information both horizontally and vertically. Therefore, they have more capacity than linear barcodes that encode information horizontally (Akin, 2014). The use of QR codes is also quite simple. QR codes can be scanned through barcode scanner applications on smartphones. The user only needs to hold the camera on the QR code. In this way, the desired information is obtained (Insights, 2011).

QR codes have become widespread in all areas, especially with the use of mobile technology tools. Furthermore, there is a growing interest in the use of QR codes in the education and learning process (Ramsden and Jordan, 2009). Cataloglu and Ateskan (2014) stated that QR codes could be used in educational activities in two ways. First, QR codes help the student reach online applications, and second, after QR codes are scanned, the student may have the desired information without any need for the Internet connection.

The use of QR codes increases efficiency in learning environments because they prevent students from wasting time on search engines and being exposed to irrelevant information. With the QR codes on printed materials, educators can enable students to access more resources related to the subject. This both prevents paper wastage and helps students access more resources. QR codes support mobile education and enrich the learning process (Aktas and Cayci, 2013).

Considering the last five years when mobile devices have spread more rapidly in everyday life, we can see that the resources that replace printed materials (e.g. e-books), and the use of printed learning resources in conjunction with online information, have begun to stand out. In other words, it is unlikely that the printed resources will be completely replaced by electronic resources (it is unlikely that the printed books will disappear in the near future and only e-books will be available). In this regard, not the replacement of printed materials by online information resources but the combined use of them has the potential to enhance the learning potential of students (Ozdemir, 2010).

QR codes can be used for different purposes in the science education. For example, videos of experiments and periodic table podcasts (describing the elements) embedded in QR codes can be used as an alternative to traditional periodic tables in science education (Bonifacio, 2012). Similarly, QR codes may draw student's interest concerning topics that they have difficulty in understanding and have misconceptions about (Yilmaz and Canbazoglu Bilici, 2017). Furthermore, students can enrich their lab reports with QR codes and present them as posters (Canbazoglu Bilici, Tekin and Karahan, 2016).

The importance of the study

Although QR codes have a vast use potential in education, studies on the use of QR codes in science education in Turkey have only recently begun (Karahan and Canbazoglu Bilici, 2017; Yilmaz and Canbazoglu Bilici, 2017; Canbazoglu Bilici, Tekin and Karahan, 2016). However, there is a clear need for further studies on the use of QR codes in education. The tablets distributed within the scope of the 'Movement of Enhancing Opportunities and Improving Technology' (FATIH project) enabled

teachers and students access to mobile devices and diversified the educational process through mobile applications such as QR codes. Karahan and Canbazoglu Bilici (2017) aimed to examine the opinions of science teachers about the use of QR codes in their classes. In addition to exploring the positive and negative opinions of teachers with various levels of professional experience, they aimed to investigate the participant teachers' recommendations about the use of these technologies in science classes. On the other hand, the present study aimed to highlight the opinions of 3 rd-year prospective science teachers about the use of QR codes in the science education. In this context, the problem statement of the present study is as follows:

1. What are the opinions of the prospective science teachers on the use of QR codes in science education?

METHOD

Research Design

This study was conducted according to the principles of the case study, which is one of the patterns of qualitative research methodology. A case study includes an in-depth analysis of one or more events, setting, program, social group, community, or a restricted system. The case refers to a holistic system. A teacher, a student or a newly implemented program can be the case. The case study is defined as the investigation of the actual context of a current case (Stake, 1995: 2; Yin, 2003: 13). In this study, which aims to determine the opinions of the prospective science teachers about the QR codes used in the materials they prepared, the case study approach was used for descriptive purposes, and a holistic single case design was used.

Study Group

The study group consists of 38 (32 female, 6 male) 3rd-year prospective science teachers who attended the "Instructional Technologies and Material Development" course in the fall semester of the 2018-2019 academic year, and who chose to use QR codes in the teaching materials. Semi-structured interviews were conducted in 16 groups. This is because the prospective teachers had prepared their teaching materials in groups of two, three, or four; so they were interviewed in groups.

Research Process and Data Collection Tool

The study was carried out within the scope of "Instructional Technologies and Material Development" course of 3rd-year of Science Teaching Department. During the course, the instructor provided information about QR codes and how to make QR codes and provided the students with the option to use QR codes when preparing teaching materials. The students were completely free to choose whether to use QR codes in their materials. The prospective teachers had no previous knowledge of QR codes and had not encountered any sample teaching materials containing QR codes. They only made sample QR codes during their course with the instructor. The prospective teachers then developed their materials in groups, and 38 prospective teachers (16 materials-16 groups) preferred to use QR codes. The QR codes were put on display in the teaching materials exhibition held at the end of the semester for other prospective teachers, faculty members, and secondary school students from various secondary schools, and their science teachers. This exhibition enabled the prospective teachers to observe the opinions of other prospective teachers, secondary school students from various secondary schools, and science teachers working in these schools on the use of QR codes in teaching materials. Following the exhibition, the researcher conducted semi-structured interviews in groups with the prospective teachers who chose to use QR codes in their teaching materials.

Once the interview questions were prepared, an interview was conducted with three prospective teachers who were not included in the study to test the comprehensibility of the interview

questions. Then, the questions were edited according to the opinions of a faculty member with expertise in the field.

Data analysis

For the analysis of the data, content analysis, one of the qualitative data analysis techniques, was used. The content analysis includes an in-depth analysis of the data, and in this way, themes and dimensions that are not previously pronounced are revealed. The content analysis aims to bring together similar data within the framework of certain concepts and themes and to organize and interpret them in a way that the reader can understand. Therefore, the inductive approach is followed when conducting the content analysis. By inductive analysis, it is aimed to reveal the underlying concepts of data through coding and the relationships between these concepts. The resulting codes (subcodes) and the relationships between these codes (categories) function as the foundation stones used to explain the phenomenon or theory underlying the data (Yildirim & Simsek, 2011).

The data obtained from the interviews with the groups were written in word files under the titles of 'interview 1', 'interview 2', 'interview 3', 'interview 4', 'interview 5', 'interview 6' etc. Subsequently, sub-codes were created based on the data of each prospective teacher and categories were formed based on the sub-codes. Then, the data were analyzed by content analysis. The data were compared with the data of the second researcher in terms of consistency. The second researcher analyzed the interview data of a randomly selected group. Reliability was calculated based on the analysis of the findings of the same group, and the reliability coefficient was found to be 89.25%. In the calculation of the inter-rater reliability, the formula; P= [Na/Na+Nd] x 100 (Miles and Huberman, 1994: 69) was used. Then, in order to conduct an agreement analysis between the evaluations of the two researchers, they came together and the agreement on different codings was reached through discussion. Besides, during the data collection process, the case study report was read to the prospective teachers, and their opinions were taken.

FINDINGS

The Findings from the Interviews with the Prospective Teachers

Semi-structured interviews were conducted to investigate the opinions of prospective science teachers about the use of QR codes in the teaching materials that they prepared in the "Instructional Technologies and Material Development" course. Based on the findings of the interviews, categories and sub-codes were formed. These categories and sub-codes are presented in Table 1.

Table 1. Categories and Sub-codes obtained from the Interviews with Prospective Science Teachers

Categories	Sub-codes
Opinions about the use of QR codes in science education	Attracting attention- arousing interest Fun Integration of science with technology Integration of science with life Enables permanent learning Supports learning
The use of QR codes in learning process	Game-based learning Laboratory Assessment of classes Assignments Classroom boards School corridors
Advantages	Short preparation time Easy preparation

	Portability Updateable Time-saving Prevents paper wastage Direct access to targeted information
Disadvantages	Internet connection problem Requires tablets or smart phones QR code preparation in paid applications
Effects on the materials prepared	Simplifies Enables individual learning

The findings obtained from the interviews with the prospective teachers were presented under five main categories.

Category 1: Opinions about the use of QR codes in the science education

Attracting attention- arousing interest

On the use of QR codes in science education, the prospective teachers interviewed usually stated that they think that this technology will arouse interest in students. The majority of the prospective teachers (32 people) stated that students regarded the cryptography contained in the QR codes something mysterious, which aroused interest in them. For example, one participant stated their opinions on the use of QR codes in the teaching materials as follows: *"For example, some of my friends designed a game about the reproduction in animals. The game contained QR codes, and there were moments of birth hidden in them. For example, a whale giving birth, a turtle covering its eggs after leaving them… Even we were quite* curious about the codes, and *when we came to the parts containing the codes in the game, we watched these videos with pleasure. I think it attracts the attention of children too. Children are very open to technology. When computers or phones are involved, children are more interested. We heard the secondary school students say 'wow' at the exhibition many times when they scanned the QR codes" (P.T.7). (P.T.- Prospective teacher).* Another pre-service teacher stated opinions in this direction as follows: "*There was a material about bone types and joint. With a bingo play constituted by QR codes. The students selected and read a QR code from the bag and when they performed the matching on the material then the bulb lighted and when the bulb lighted they used to stick a QR code on bingo cards. It was very interesting for them and they wondered what was in QR codes. In my opinion, QR codes are incredibly interesting and as far as I could see in the exhibition, they aroused a great interest on the part of the students" (P.T.4).*

1.1. Fun

Another aspect that the prospective teachers addressed in the interviews is that the use of QR codes in science education will be fun for students. One of the prospective teachers expressed their opinions on this subject as follows: *"We have designed a game about physical and chemical changes. Rather, we have adapted this subject into a popular game. On the game platform, there are sample images on the right for physical changes and on the left side for chemical changes. These visuals consist of examples that children often have difficulty understanding. For example, the formation of a rainbow, bees making honey... In this game, the children had much fun. There were students who wanted to play the same game three times. We were happy that they had fun playing. They used QR codes when they had difficulty in the games." (P.T.11).* Another pre-service teacher stated opinions in this direction as follows: *"The games designed by using QR codes entertained them a lot. It was really good to see them enjoying" (P.T.4)"*

1.1. Integration of science with technology

Another aspect that the prospective teachers addressed related to the use of QR codes in the teaching materials used in science education is that this technology integrates science course with

technology. One of the prospective teachers expressed their opinions on this as follows:*"We combine science and technology. Before I used QR codes, I didn't think I could integrate the technology with science. QR codes function as a bridge that combines the model with reality. For example fetal development stages model... In the model, we showed fetal development stages using felt. One of the sperm was magnetized. The magnetized sperm was fertilizing the egg. The QR code in the model enabled the students to watch a video showing the fetal development in the womb. I think QR codes integrated science and technology. The name of the course "Science and Technology" literally happened"(P.T.20).* Another pre-service teacher stated opinions in this direction as follows: *"For example, there is an activity book which was prepared by my friends. There are examples of mutation, modification and adaptation. For example, in a page of the book, they modelled the environment-dependent colour change of a chameleon. There was a QR code next to it. When this QR code was read, a 20-second video showing the colour change of a chameleon was started. The use of QR codes in this material can combine science and technology" (P.T.12).*

1.2. Integration of the science with life

Another aspect that the prospective teachers addressed related to the use of QR codes in the teaching materials used in science education is that this technology integrates science course with life. One of the prospective teachers expressed their opinions on this as follows: *"For example, we have designed a material on mitosis and meiosis. When the student matches the shapes correctly with the stages, the bulb will be on. Otherwise, it will not. We used a QR code to enable the students to see actual mitosis and meiosis under a microscope. It was a video showing cell division. That video aroused great interest in the children. Even the science teachers at the exhibition were interested. The videos lasted 25-30 seconds. Some of the prospective teachers were amazed at that video, saying they did not know such videos of mitosis and meiosis existed or that they saw such videos for the first time. Even I was so impressed by the video showing cell division under a microscope when I was preparing the material. After all, you see what is going on in your cells. Thanks to QR codes, science gets integrated with life"(P.T.27).* Another pre-service teacher stated opinions in this direction as follows: *"Except for a few materials prepared with QR codes, the science course reflected what is happening in our life. We could not see this only in materials where questions were written in QR codes because when we read them, there were questions in them. However, apart from them, all the materials showed that the science course actually exists in the real life, through QR codes" (P.T.15).*

1.3. Permanent learning:

Another aspect that the prospective teachers addressed related to the use of QR codes in the teaching materials used in science education is that this technology enables permanent learning in students. One of the prospective teachers expressed their opinions on this as follows: *"For example, we have designed an activity book. There were examples of mutation, modification, and adaptation. On one page of the book, we modelled chameleons' ability to change colors. Next to it was a QR code. When this QR code was scanned, a 20-second video showing a chameleon changing its color was played. This video attracted a lot of interest in the children. On each page of the activity book, we put QR codes next to models made of felts. This definitely increased memorability. The students watched the video very carefully. Some of them were so amazed that they downloaded QR code scanner application on their phones. They were happy to watch the video on their own phones. It certainly increases the permanency of learning." (P.T.2).* Another pre-service teachers stated opinions in this direction as follows: *"These materials present students with visuals. That is, when something is told we tend to forget it easily, but if something is shown to us, we do not forget it easily. When this visual is combined with a QR code, then the learning becomes more permanent (P.T.16)"*

1.4. Supports learning

Another aspect that the prospective teachers addressed related to the use of QR codes in the teaching materials used in science education is that this technology supports learning. One of the prospective teachers expressed their opinions on this as follows: "*For example, we have designed two teaching materials about organelles. QR codes contained songs, poems and visuals about organelles. We put QR codes for students with different intelligence area. For example, a child with musical intelligence can learn organelles by song, or a child with verbal intelligence can learn organelles with poetry. The model contained images of organelles. These visuals were for students with visual intelligence. QR codes facilitated students' learning. We then prepared a game on the same material. We did all this to support learning." (P.T.15)* Another pre-service teacher stated opinions in this direction as follows: *"In some of the games, like physical and chemical change game, the student plays the game but when he/she gets stuck then he/she looks at the samples of physical and chemical changes presented through the QR codes then he/she can answer the questions more easily. That is, the student can set his/her own path of learning. If these QR codes were not there, then the students would go on without answering. But, it did not happen so. With just one click, they were able to get help from QR codes" (P.T.2).*

Category 2. The use of QR codes in the learning process

One of the aspects that the prospective teachers addressed related to the use of QR codes in the teaching materials used in science education is that QR codes can often be used in different areas in science classes.

2.1. Game-based learning

Prospective teachers stated that QR codes could be used frequently in game-based learning in science education. One of the prospective teachers expressed their opinions on this as follows:*"I will definitely use this technology when I am a teacher. Especially in game-based learning... The game will not include evaluation questions, but students will learn the topic while playing the game. Like the periodic street game. Some of the friends modelled the elements using felts. From this model, the students picked non-metals from the non-metals pouch. They had QR codes on them. The QR codes contained videos showing the use of the non-metals in daily life. Students try to find out where the elements are on the periodic street by scanning the QR codes. They learn by playing games" (P.T.19).* Another pre-service teacher stated opinions in this direction as follows: *"Play is a part of child nature. No matter how old they are, children enjoy playing. I will absolutely use it in plays when I become a teacher" (P.T.13).*

2.2. Laboratory

Another aspect that the prospective teachers addressed related to the use of QR codes in science education is that this technology can be frequently used in laboratories. One of the prospective teachers expressed their opinions on this as follows: *"We can use this technology in laboratories as well. I think this technology will function as a second teacher. Last year, for example, we used to ask our teacher in the laboratory if the screening was correct or incorrect. We didn't know what to see, so we didn't know if the screening we had found was correct. The teacher could have put QR-coded instructions. We could have checked if the screenings were correct. Similarly, we work in groups of two in the physics laboratory. From time to time, the teacher sometimes has difficulty in answering to*

us all. Too many groups... So, teachers can support their classes with QR codes in group work. Moreover, students can progress in the laboratory at their own learning pace. The fact that QR codes progress step by step is quite useful" (P.T.31). Another pre-service teacher stated opinions in this direction as follows: *"They can be used in a laboratory. For example, the teacher prepares scenarios. There are scenarios in QR codes. Then students read the QR codes in groups and then attempt to solve the problems in the scenarios. Each group can read the QR codes separately and then try to solve the problems in different ways and then present their findings to each other" (P.T.23).*

2.3. Assessment of the classes

Another aspect that the prospective teachers addressed related to the use of QR codes in science education is that this technology can be frequently used in the assessment of classes. One of the prospective teachers expressed their opinions on this as follows: *"Our material was for the assessment of classes. We have designed a bingo game. First, a student draws a card. QR codes contained questions. Then the student scans the QR code, sees the questions and answers them on the model. If, for example, the answer to the question is 'long bone', when the student places the pencil on the place on the model with the 'long bone' words, the bulb is on. Otherwise, it is not on. If the bulb is on, the student puts his/her card on the bingo card. When all the cards are completed, the student shouts "Bingo". Thus, students assess themselves and the class of that day, or teachers assess whether the lesson is learned or not" (P.T.13).* Another pre-service teacher stated opinions in this direction as follows*: "It can be absolutely understood whether the student has achieved the objective, when used for evaluative purposes. In the case of the organelles material, the teacher explains the organelles from the three-dimensional model. Then, there are questions in the QR codes about the organelles presented in the form "Let's guess who I am". If the student knows it, then this organelle is stuck onto its place. If he/she does not know, he/she cannot stick. In this way, we can understand whether he/she has learned the subject or not. Has the objective been accomplished or not?" (P.T.33).*

2.4. Assignments

Another aspect that the prospective teachers addressed related to the use of QR codes in science education is that this technology can be used in assignments. One of the prospective teachers expressed their opinions on this as follows: *"This technology can also be used in assignments. Teachers often assign tests as homework. But children are fed up with solving tests. So, teachers can assign QR-coded assignments. Students don't know what their homework is or how to do their homework until they go home and start doing it. I think QR codes should contain original questions. Students can also submit their assignments with QR code. Or students can send their QR coded assignments to their teachers via e-mail" (P.T.18).* Another pre-service teacher stated opinions in this direction as follows: *"The teacher can assign experiments that last long as homework. For example, plant germination experiment can be given as homework and students can be asked to germinate the beans at home. After students have completed the germination experiment, they can add QR codes on the plant. When they read the QR code in the class, an animation from YouTube can start showing how a plant germinates. In this way, this would be very good. I will want my prospective students to prepare their homework with QR codes" (P.T.1).*

2.5. Classroom boards

Another aspect that the prospective teachers addressed related to the use of QR codes in science education is that this technology can be used on classroom boards. One of the prospective teachers expressed their opinions on this as follows: "*If I were a teacher, I would use this technology frequently on classroom boards. Every week, I would put different QR codes on classroom boards. If the topic of that week is, for example, constellation, I would put constellations in QR codes. Or, I would put the life story of the man who invented the first telescope. Moreover, I would ask my students to do research on the topic and put related QR codes on classroom boards." (P.T.23). Another pre-service teacher stated opinions in this direction as follows: "They can be placed on classroom boards.*

They can be placed by either the teacher or students. Something can be put in relation to the unit having been studied. Even project works can be placed on classroom boards at the end of the term with QR codes" (P.T.34).

2.6. School corridors

Another aspect that the prospective teachers addressed related to the use of QR codes in science education is that this technology can be used in school corridors. One of the prospective teachers expressed their opinions on this as follows*: "I would design my material in a way that my students can use it in school corridors during breaks. I think school corridors can also be used for learning. I designed a big carpet and the twister game on that carpet. It is a game which students can play with their hands and feet. I created questions about acids and bases. On the carpet, I would put QR codes related to the properties of acids and bases and about which substances are acid or which are bases. Even the students who do not know anything about this subject can play the game in the corridor. Students first scan QR codes. Then they play the game" (P.T.23).* Another pre-service teacher stated his/her opinions as follows: "*As you know there is a Tubitak science fair organized at schools. For example, projects developed by students can be video-recorded and these videos can be placed into QR codes and then they can be displayed in the corridors of schools. In this way, all the projects having been conducted can be archived in QR codes hung on the corridors of schools. I will do it like this, when I become a teacher" (P.T.4).*

Category 3. Advantages

The prospective teachers listed the advantages of QR codes as short preparation time, easy preparation, portability, updateable, time-saving, preventing paper wastage and providing direct access to targeted information. One of the prospective teachers expressed their opinions on this as follows*: "I think its advantages include that it can be prepared easily in a short time and that it is portable. Also, the contents of QR codes can be updateable. The fact that we can change the contents makes QR codes updateable. It is quite a useful feature. By changing QR codes, we can even diversify children's learning on the same material. I think QR codes enhance the efficiency of teaching materials (P.T.35)".* Another prospective teacher stated their opinions as follows: *"I think this technology reduced wasted time and saved paper. Especially in games… The prospective teachers in the Department of Social Studies Teaching did not use QR codes at the exhibition as they did not know how to use QR codes. So, they printed a word file containing 120 questions and cut each of the questions. We, on the other hand, had written our questions in QR codes. We printed the QR codes and put them in a bingo pouch. When they saw that, they said 'We wish we had known how to use QR codes as it took a lot of time and paper to prepare the question sheets (P.T.14)."* Another prospective teacher stated their opinions as follows: *"The children may not want to read a piece of paper, but they find it very interesting to scan that paper by their phones. Next generation is the technology generation. So we have to keep up with them. Because children are not playing in the streets any more. They have tablets and everything virtual. QR codes can be a bridge to reach them; thus we can provide them with whatever information we want (P.T.9)".*

Category 4. Disadvantages

The prospective teachers listed the disadvantages of QR codes as Internet connection problems, requiring tablets or smartphones, and QR code preparation in paid applications. One of the prospective teachers stated their opinions as follows: "*If teachers and students do not have tablets or smartphones... if, for example, in a village school, there is no internet connection, how will they use this technology? I think it is a disadvantage that this technology requires tablets and internet connection (P.T.16)."* Another prospective teacher stated their opinions on this as follows: "Children may not always have the opportunity to scan QR codes as not all of the schools have tablets. Also, tablets may pose cost-related problems in education. I think there are no other disadvantages. The new generation is more open to innovations than us. They learn technology very quickly (P.T.4)."

Similarly, another prospective teacher stated their opinions as follows: "*The page where I made QR codes had a trial period. It was over some time later. So, all I did was in vain. We need to pay attention to this. There are free applications. It's better to use them (P.T.8).*"

Category 5. Effects of the use of QR codes on the teaching materials prepared

The prospective teachers stressed only two effects of QR codes on the materials prepared. Firstly they simplify the teaching materials, and secondly, they enable individual learning. One of the prospective teachers who highlighted the simplification feature of QR codes stated their opinions as follows: *"The materials prepared are simpler in this way. The hidden information in the material makes the materials simpler (P.T.1)"*. Also, one of the prospective teachers stated that QR codes enable individual learning: *"In some of the games, students first get information from QR codes, then, when they have difficulty in understanding something, they look at the examples in QR codes and continue. I think it supports individual learning. Or, QR codes on the organelle models contained songs and poetry about organelles. I think in this way, students have the opportunity to learn a subject individually whenever they want (P.T.24)"*.

DISCUSSION

The present study investigated the opinions of prospective science teachers about the use of QR codes in the teaching materials that they prepared in the "Instructional Technologies and Material Development" course.

The study revealed the opinions of prospective science teachers about the use of QR codes in science education, about its use in the learning process, its advantages and disadvantages, and its effects on the teaching materials. The majority of the prospective teachers stated that QR codes in the teaching materials aroused interest in students. They also stated that the use of QR code in games entertained the students. Yilmaz and Canbazoglu Bilici (2017) stated that the games designed with QR codes aroused interest in children and entertained them. Furthermore, some of the prospective teachers stated that QR codes in paper-based materials integrated science with both technology and life. OR codes can be embedded on educational materials such as notebooks, books and papers used in the traditional education process and can be scanned by mobile communication technologies used in the learning process (Aktas and Cayci, 2013). Thus, QR codes can direct students to the online environment from printed materials via mobile devices (Chen, Teng, Lee and Kinshuk, 2011). In this respect, QR codes form a bridge between teachers or students and information. Students can access the content on the mobile web pages directly and quickly. Thus, as prospective teachers indicated, science and technology are integrated. Some prospective teachers stated that QR code embedded materials provide permanent learning while others thought that they support the learning process. Akin (2014) examined the effect of QR code application on permanent learning to support students' learning in the context of mobile learning, regardless of time and place. Although there was no significant difference between the groups, permanent learning averages were found to be higher in QR-supported learning environments. Yilmaz and Canbazoglu Bilici (2017) also concluded their study that QR code embedded games, models etc. can contribute to the efficiency of classes where smart boards and mobile devices are used.

The prospective science teachers stated that QR codes could be used in game-based learning, laboratories, assessment of the class, assignments, classroom boards, and school corridors. Yilmaz and Bilici (2017) designed QR code embedded four games for the learning outcomes targeted in the "Solar System and Beyond; Space Puzzle" unit at the 7th grade and aimed to contribute to the literature on the use of this technology in science education. In this context, QR codes form a bridge between teachers or students and information. Similarly, in their study with prospective science teachers, Canbazoglu Bilici, Tekin and Karahan (2016) asked the participants to prepare experiment reports in the form of posters enriched with QR codes. Prospective teachers embedded videos and photos of the experiments and YouTube links of videos in QR codes on the posters. The participants stated that the

videos that they made or the photos that they took for the contents of QR codes helped them better understand the subject. Karahan and Canbazoglu Bilici (2017) stated that QR codes containing informative videos and texts about scientists can be embedded in QR codes, which can be placed on classroom boards chronologically, and that questions and answers can be embedded in QR codes in the assessment and evaluation phase of the teaching process.

The prospective teachers listed the advantages of QR codes as short preparation time, easy preparation, portability, updateable, time-saving, preventing paper wastage and providing direct access to targeted information. According to Law and So (2010), one of the reasons why QR codes are used in education is ease of use. Making and scanning QR codes are easy for both students and teachers. This enhances the use of QR codes in education. Akin (2014) listed the opportunities provided by QR codes as access to information, time-saving, rapid access to information, access to desired information without being connected to the Internet and facilitating access to online resources. Aktas and Cayci (2013) listed the advantages of QR codes as time-saving, preventing exposure to irrelevant information, access to more resources on the subject, and preventing paper wastage. According to Law and So (2010), Aktas, (2012) and Hau et al. (2013), with QR codes, it is possible to access information quickly and directly. According to Polat (2014), QR codes are becoming more and more popular due to their practical usage and low cost.

The prospective teachers listed the disadvantages of QR codes as Internet connection problems, requiring tablets or smartphones, and QR code preparation in paid applications. Akin (2014) also stated that the disadvantages of QR codes could be grouped under three headings as problems arising from devices, problems related to deformation of QR codes and user-related problems. Besides, with regards to the effects of QR codes on the teaching materials prepared, the prospective teachers stated that QR codes simplify teaching materials and enable individual learning. Leone and Leo (2011) stated that with the flexibility and personalization that QR codes introduce to the learning process, mobile devices might be more widely used in education.

According to Cataloglu and Ateskan (2014) and Akin (2014), the use of mobile technologies in the classroom environment will be of interest to today's student profile and can be considered as a step that will meet their expectations. Moreover, QR codes serve as a bridge for access to information and enable students to reach the information they need without being exposed to irrelevant information. Therefore, teachers can direct students to the resources they want by QR codes. Observations and reflections from tutors and students are positive, suggesting that QR codes have the potential to be used in the teaching and learning process (Saprudin, Goolamally, Abdol Latif, 2014).

Recommendations

QR codes can support the learning process in science education. Similarly, the use of QR codes in games may arouse interest in students. Therefore, as the participants of this study indicated, QR codes can be used in laboratories, on classroom boards, in the assessment of classes, assignments, and in school corridors to enrich and support the teaching process. Studies can be conducted to put forward further recommendations on how this technology can be used by teachers and students in the learning and teaching process. We recommend further scientific studies to examine the opinions of students and teachers on the use of QR codes to be prepared in different ways in science education. Classroom applications can reveal the effects of QR codes on students' achievements in science classes, their motivations and self-efficacy. Furthermore, further studies can be conducted to find out what to pay attention to when using QR codes in education.

REFERENCES

Akın, T. (2014). *Karekod Destekli Öğrenme Materyalinin Erişi ve Kalıcılığa Etkisi* [*The Effect of QR Code Supported Learning Material on Achievement and Retention]*. Hacettepe Üniversitesi. Bilgisayar ve Öğretim Teknolojileri Eğitimi Anabilim Dalı. Yüksek Lisans Tezi, Ankara.

Aktaş, C., & Çaycı, B. (2013). QR Kodun Mobil eğitimde yeni eğitim yöntemlerinin geliştirilmesine katkısı [The Contribution of the QR Code in the Development of New Education Methods in Mobile Education]. *Global Media Journal*, 4(7), 1-19.

Bonifacio, V.D.B. (2012). QR-coded audio periodic table of the elements: A mobile-learning tool. *Journal of Chemical Education*, 89(4), 552-554.

Canbazoğlu Bilici, S., Tekin, N., & Karahan, E. (2016). Öğretmen adaylarının fen laboratuarında QR kodlarla zenginleştirilmiş poster kullanımları [The use of posters enriched with QR codes in the science laboratory of prospective teachers]. 3. Uluslararası Avrasya Eğitim Araştırmaları Kongresi, 31 Mayıs-3 Haziran, Muğla.

Chen, Teng, Lee & Kinshuk (2011). Augmenting papaer-based reading activity with direct access to digital material and scaf-folded questioning. Computers & Education, 57, 1705-1715. Doi: 10.1016/j.compedu.201103.013.

Çataloğlu, E. & Ateşkan, A. (2014). QR (Quick Response) Kodunun Eğitim ve Öğretimde Kullanımının Örneklenmesi [Use of QR Codes in Education With Examples]. *İlköğretim Online*, 13(1), 5-14.

Hau, G., B., Siraj, S., Alias, N., Rauf, R., Zakaria, R. & Darusalam, G. (2013). A Content Analysis of Quick Response Code (QR-code) and Its Application in Selected Studies. *The Malaysian Online Journal of Education Technology*, 1(1), 54-72.

Insights (2011). Barcodes Reach a New Dimension, Customer Relationship Management. www.destination.CRM.com

Karahan, E. & Canbazoğlu Bilici, S. (2017). Use of QR Codes in Science Education: Science Teachers' Opinions and Suggestions. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education*, 11 (1). 433-457.

Law, C. Y., & So, S. (2010). QR Codes in Education. *Journal of Educational Technology Development & Exchange*, 3(1), 85-100.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook (2th Ed)*. California: Sage Publications.

Özdemir, S. (2010). Supporting Printed Books with Multimedia: A New Way to Use Mobile Technology for Learning. *British Journal of Educational Technology*, 41(6): E135E138.

Polat, Z. A. (2014). *Karekod Teknolojisinin Mesleğimizdeki Olası Kullanımları Üzerine Düşünceler [Thoughts on Possible Uses of or Code Technology In Our Profession]*. V. Uzaktan Algılama-Cbs Sempozyumu, 14-17 Ekim 2014, İstanbul.

Ramsden, A. & Jordan, L. (2009). Are students ready for QR codes? Findings from a student survey at the University of Bath. https://purehost.bath.ac.uk/

Saprudin, A. A., Goolamally, N., & Latif, L. A. (2014). Embedding QR Codes In The Teaching And Learning Process. Seminar Kebangsaan Pembelajaran Sepanjang Hayat. Open University Malaysia. http://library.oum.edu.my/repository/986/1/library-document-986.pdf

Stake, R. E. (1995). *The Art of Case Study Research*. Thousand Oaks: Sage Publications.

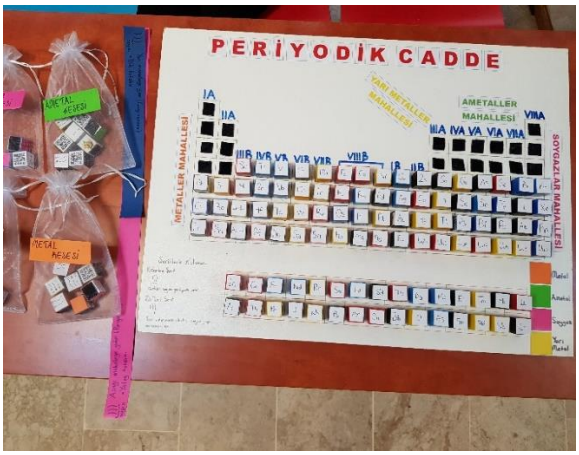
Taşkesenlioğlu, Z. (2010). Araştırma Raporları MÜSİAD: 2009 Hizmet Sektörü Raporu, 63 (2), 1-48.

Yıldırım, A., & Şimşek, H. (2011). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri* (8th ed.) [*Qualitative research methods in the social sciences*]. Ankara: Seçkin.

Yılmaz, B. & Canbazoğlu Bilici, S. (2017). QR Kodlar ile Tasarlanmış Güneş Sistemi ve Ötesi, Uzay Bilmecesi Etkinliği [Solar System and Beyond-A Space Puzzle: An Activity Designed With or Code]. *Anadolu Öğretmen Dergisi*, 1(2), 75-82.

Yin, R. K. (2003). *Case Study Research: Design and Methods. (3rd ed.).* Thousand Oaks: Sage Publications.

Sample materials



International Journal of Progressive Education, Volume 15 Number 4, 2019

The Comparison of Item Parameters Estimated From Parametric and Nonparametric Item Response Theory Models in Case of The Violance of Local Independence Assumption

Ezgi Mor Dirlik [i]
Kastamonu University

Abstract

Item response theory(IRT) has so many advantages than its precedent Classical Test Theory(CTT) such as non-changing item parameters, ability parameter estimations free from the items. However, in order to get these advantages, some assumptions should be met and they are; unidimensionality, normality and local independence. However, it is not always so easy to be met these assumptions by datasets. Especially when the normality of data is not provided, another approach for IRT can be applied, which is Non-Parametric Item Response Theory (NIRT). NIRT provides more flexible methods to scale datasets and it is used when the assumptions of Parametric Item Response Theory (PIRT) are not met at a satisfactory level. The assumption of local independence, is one of the situations in which NIRT can be used more effectively than PIRT. In this study, by using a real dataset, taken from TIMSS 2011, the effect of local dependence on the item parameters was investigated. With this goal, a dataset composed of 1,000 students was formed randomly from the TIMSS 2011 eight grade Mathematic test. Firstly, the item parameters were calculated from data set according to the two approaches without any manipulation. After that, two items were arranged as local dependent by changing the response patterns completely the same and the item parameters have been estimated from each sample by using R program, *ltm* and *mokken* packages. Two sets of item parameters estimated from data set were compared and the differences of the parameters were analyzed with statistical test. By this way, the effect of local independence has been analyzed on the item parameters have been decided.

Keywords: Local Independence, Item Parameters, Parametric Item Response Theory, Non-Parametric Item Response Theory.

DOI: 10.29329/ijpe.2019.203.17

---

[i] **Esra Uçak,** Assist. Prof. Dr., Kastamonu University, Measurement and Evaluatıon.

Correspondence: ezgimor@gmail.com

INTRODUCTION

Theories and models in the educational testing field try to explain and anticipate relationships among test items and examinee abilities. The theories provide a framework for deeper understanding among these variables. One of the important mission of these theories and models is to find out the errors in measurement and control them. Classical Test Theory(CTT) and Item Response Theory(IRT) are the most known theories in educational assessment. The former's much of concern is on the estimation and controlling of errors in the process of testing. It assumes a linear relation among test score (X-observed score), true score (T, which is a hypothetical value) and error(E) and the relationship between these components is shown with a basic equation as $X=T+E$. In this equation, the error is assumed to be randomly distributed and its mean is accepted as 0 across the population of examinees. The other feature of errors is that they are to be uncorrelated with error scores on parallel test administration. Thanks to this assumption, reliability in CTT is defined as the correlation between the parallel tests. In summary, for CTT, all features have relied on this linear relationship and by means of this reasonable linear model, this theory has long been used to guide test development, evaluation and interpretation of the test scores (Crocker and Algina, 1986; Gulliksen, 1950; Lord and Novick, 1968).

Despite the simplicity and wide usage in educational psychological testing, CTT has several important shortcomings. One of them is that the item parameters (difficulty and discrimination) depend on the ability of the sample of examinees. Also the mean and standard deviation of the sample affect the parameters' values, for this reason, the item parameters are not stable from sample to sample. The sample dependent parameters are only valid when the samples of examinees are similar with regards to ability distribution. Consequently, for different samples, item parameters are required to be calculated again, and this issue creates the test equation problems. The other important drawback of the theory is another dependence issue that examinees' scores are largely a function of the difficulty level of items administered to them. Because of that, test scores of examinees cannot be compared when several forms of tests varying in difficulty are used. In other words, it is not possible to compare test scores of examinees unless the forms are not parallel to each other. Developing parallel forms is another challenging issue, too and as before mentioned, the reliability of the test scores is based on the parallel test assumption. Another shortcoming of CTT is that the most preferred classical test model requires the assumption of equal errors of measurement for all participants. According to the Lord (1980), violation of this assumption is the rule most of the time. For instance, guessing creates violation of this assumption and low- ability examinees use their chance in response process more while the average and high-ability examinees prefer guessing less. So the error of measurement changes according to the group of examinees and this is a violation of the assumption. However, these violations may not be a threat for all over the theory, another model can be used, but this feature does not address the other drawbacks of the theory.

In an effort to bring solutions to the shortcomings of CTT, another test theory known as Item Response Theory (IRT) has been developed (Hambleton and Swaminathan, 1985; Lord, 1980). In this theory, models have been developed for use with discrete or continuous item responses which are dichotomously or polytomously scored. Also if the assumptions of models which are local independence, normality of the test scores, unidimensionality, are met, most of the CTT drawbacks' can be solved in this theory. Group independent item parameters, examinee ability estimates independent from item difficulty levels can be obtained thanks to the IRT models. Thanks to IRT models, it is so easy to develop computer adaptive tests, test equation and detecting the differentiating items. However, in order to get these advantages of IRT models, model requirements should be met by the data sets. Common requirements of general unidimensional parametric IRT models are; unidimensionality, local independence, and model-data fit. In unidimensionality, it is assumed that the test principally measures a single or unitary trait. This assumption can be analyzed several techniques and the most known is the factor analysis methods. The other important assumption is local independence. According to this assumption, one's answering probability of an item should be totally independent of his/her response to another item in the same test. Local independence is in the focus of this study, so it is required to be analyzed in detail here.

Local Independence Assumption

Local independence has been considered to be the principal axiom of test theory (Lazarsfeld, 1958; Lord and Novick, 1968; Jannarone, 1988). This concept was first discussed in its general form by Lazarsfeld(1958), and later Anderson(1956) and McDonald(1962) studied on it (cited in Henning, 1989) . It is widely represented as the basic assumption underlying the latent trait models and IRT models require this assumption, too. The standard unidimensional IRT models such as one, two and three-parameter models, require the local independence assumption (Embretson & Reise, 2000; Hambleton and Swaminathan, 1985; Lord & Novick, 1968). According to this assumption, an examinee's answering probability of an item should be totally independent of his/her response to another item in the same test. In these models, the probabilities that an examinee will provide a specific response to an item are a function of two components and they are just like that:

1. The examinee's ability; and,

2. Item parameters affecting examinee's answers to the items such as difficulty and discrimination parameters, pseudo-chance parameter.

Thanks to these two components, unidimensional IRT models define one's success probability only using his/her ability and item characteristics'. It means that the response to any item is unrelated to any other item for the specific latent trait level. Local independence means that one's answering an item only depends on his or her ability even the items are highly correlated with each other. If a dataset meets this assumption, when the trait level is controlled, local independence implies that there is no relationship remains between the items (Embretson & Reise, 2000). When this assumption is violated, items become local dependent and this situation will affect the estimations of item and ability parameters. This violation may create substantial consequences such as misleading item discrimination parameters. Many studies have shown that statistical analysis conducted on local dependent data sets is misleading and create different results from the real estimations (Chen and Thissen 1997; Chen and Wang, 2007; Junker, 1991, Sireci, Thissen and Wainer, 1991). The results of Tuerlinckx and De Boeck,(1998) research showed that if negative local dependence is not included into model estimations, the item discrimination parameters of the locally dependent items are underestimated. Moreover, they showed that the value of item discrimination parameter depends on the difficulty parameter of the item it interacts with. Because of the underestimated discrimination parameters of the items, test information function is calculated less than its real values, so the standard error of measurement is underestimated, too. In addition to the deviations from the item parameters, Junker (1991) showed that in case of local dependence, ability parameters are estimated biased strongly.

As for the reasons for occurring the local dependence between the items, there are several potential causes (Yen, 1993). According to the Yen (1993), the violations can be grouped as two major causes; the first group of causes is not related with item content, they can bring on from external reasons, such as, assistance from a teacher, fatigue which means that items at the end tend to be more challenging. Practice effect and speediness can be the other external causes of local dependence and this type of causes has been named as "surface local dependence". The other type of causes of local dependence has been named as" underlying local dependence" by Chen and Thissen (1997). In this type of causes, violation from the local independence can generally occur due to the item content. Item chaining can be one of these reasons and in this situation, items are organized as steps, so their answers will affect each other. In this group of causes, the reasons are assumed as minor dimensions besides the unique essential latent dimension which is tested.

As noted earlier, local independence is an essential requirement for an accurate item and ability parameters, so this assumption should be checked via analysis before starting estimation of abilities or item parameters in IRT models. There are several statistics that can be used in order to detect the local dependence in datasets. Chen and Thissen(1997) proposed four statistics to be used so as to detect item pair dependence. These statistics are the *Pearson's* X^2, *the* G^2 *statistic*, the *Standardized Phi Coefficient Difference*, and *the Standardized Log-Odds Ratio Difference*. With these

statistics, the covariance is examined by using two-way contingency tables and these tables are composed on expected and observed values. For this reason, when the observed value is 0, the standardized phi coefficient difference and the standardized log-odds ratio difference may not be calculated. Yen (1984) proposed Q_3 *coefficient* in order to detect local item dependence and this coefficient is based on pairwise index of correlation of the residuals from the IRT model. Chen and Thissen (1997) compared Yen's Q_3 *coefficient*, the *Pearson's* X^2 and the G^2 *statistic* and they found that X^2 and G^2 *statistic* indices appear less powerful than Yen's Q_3 *coefficient* for detecting underlying local dependence. As for surface local dependence, it was determined that all of them appear equally powerful. In addition to these coefficients, *DETECT*, which is a statistical tool developed to estimate features of multidimensional latent space, can also be used in an attempt to analyze underlying local dependence. It works like Yen's Q_3 *coefficient* and can be used to explore the homogenous items subsets as a separate dimension (Balazs and De Boeck, 2006; Stout, 2000).

After detecting local dependence, researchers should handle this matter before going on estimation. There are several ways to cope with local dependence issue. The first one is creating "testlets" with the dependent items (Wainer and Kiely, 1987). In this method, instead of item scoring, testlet scoring is used and the scores in a testlet are summed and each score represents a category of polytomous item, and this method is used in the Graded Response Model of Samejima(1969), the Partial Credit Model and the Rating Scale Model(Andrich, 1985; Wright and Masters, 1982; cited in Monseur, Baye, Lafontaine and Quittre, 2011). The second way of modeling local dependence is including this effect to the IRT model estimations. According to this approach, the response patterns of testlet are modeled by including additional fixed item interaction parameters in addition to item parameters. By this way, total item information is preserved and local dependence is viewed as an item characteristic. In the third approach, it can be named as random-effects models, local dependence is modeled as a variable of examinee and depends on the abilities of examinees. There are lots of random-effects models and Bayesian random effects model, the random weights linear logistic model, the random-effects two-facet model are some of them which are used commonly with this goal (Monseur, Baye, Lafontaine and Quittre, 2011).

In addition to the models developed for handling local dependence, using Non-Parametric Item Response Models is another new way of solving this issue. Non-parametric Item Response Theory (NIRT) is a non-parametric approach of parametric IRT and has some advantages as parametric models. One of these advantages is that the non-parametric models can be applied more datasets than the parametric ones thanks to the limited assumptions. In NIRT models, it is available to analyze the datasets composed of fewer people, like 50 or 100 and fewer items such as 10-15 items than the parametric models. Also the other advantage is that this approach allows making ability and item estimations by lightening the assumptions of IRT. It can be applied when the normality is not met by the dataset and it is possible to get the more accurate item and ability estimations when the local independence assumption is not met totally (Junker, 1991, Sijtsma and Molenaar , 2002; Sijtsma and Meijer, 2007). So when the local independence is violated for few numbers of item, non-parametric item response theory models can be preferred instead of modeling the dependence with different techniques. NIRT is a newly developed approach, so it is under research for many issues and local independence is one of the matters that have to be investigated according to this approach.

Local independence is one of the important underlying assumptions of not only all item response models but also all latent trait models such as factor analysis, latent trait analysis, latent class analysis and latent profile analysis (Vermunt and Magidson, 2004). It requires that the response to an item on a test not be influenced by the response to any other items. This assumption is often taken for granted and it is paid little or no attention to determine if the process of responding to one item affect the response to other item/s. Also this assumption can be easily violated when several items are embedded in the same passage, or when items composes of multiple parts. According to Ackerman (1987), this assumption is violated whenever the response process of one item provides the necessary cognitive schema to trigger a response to a subsequent item. Many techniques and modelling have proposed in order to investigate this assumption and NIRT models may be the new alternatives to deal with the violation of this assumption. As stated before, NIRT is a relatively new domain in

psychometrics literature and new studies should be conducted in order to reveal the real performance of NIRT approach especially in the issues in which PIRT models do not allow to scale the tests and violation of local independence assumption is one of these issues. For this reason, in the concept of this study, it is aimed to investigate the item parameter estimations of NIRT and PIRT in case that the local independence assumption is violated for the data set. The implicit objective of the study is to demonstrate the usability of NIRT models as alternatives to PIRT models especially for item parameter estimations in cognitive assessment, which is generally used in typical performance and health sciences.

Research Questions

The research questions guiding the study are as follows:

1. How are the item parameters estimated from PIRT and NIRT change in case of local dependence violation?

2. Is there any significant relationship between the item parameters estimated from PIRT and NIRT both local dependent and independent data sets?

METHOD

This study was designed as a fundamental research because the main purpose of the study is to analyze the differences and similarities of parametric and non-parametric IRT model item parameter estimations in case of local independence violation. In accordance with this goal, the NIRT models' features have been explored when the local independence assumption is not met by the data set. Comparing the estimations from two different approaches composes the basic goal of the study, hence it is thought that the results of the study will be beneficial in determining the features and usages of models. For these reasons, this research has been classified as a fundamental study.

Composing Data Set

When the studies on the NIRT approach are analyzed, it is seen that most of them have been aimed to figure out the features of this new approach and have used the simulative data sets in order to analyze the features of the approach. The ones that used real data sets are about much more health science, psychology. Hence there is not enough study analyzing the suitability of NIRT approach on educational settings. For this reason, in the concept of the study, it was aimed to use a real data set in order to create an example of NIRT usage and explore the NIRT features in educational settings.

In order to achieve the goal of the study, initial data set was composed by using from the whole data set of Trends in International Mathematics and Science Study (TIMSS) 2011. While composing the data set, general IRT assumptions, such as unidimensionality, local dependence, and normality were taken into consideration. All of Mathematics and Science booklets were examined at 8th-grade level and the one which meets the unidimensionality assumption at most was selected to be analyzed. The reason of choosing only the 8th-grade booklets for dimensionality analysis is that at this grade level, there are more items than the 4th-grade level booklets, and as stated before, parametric IRT models require as many items as possible in order to get an accurate estimation of parameters. According to the unidimensionality analysis results, it has been found that the booklets of Mathematics met unidimensionality assumption higher level than the Science booklets. After checking the level of unidimensionality in all of the 8th-grade Mathematics booklets, it was found that this assumption was met at most in the 11th booklet of Mathematics composed of 30 dichotomous items and the analyses were gone through on the items of this booklet.

In addition to test length and unidimensionality assumption, the sample size is another regarded factor while composing the study's data set. Like longer tests, parametric IRT approach

needs a larger sample size than the non-parametric one to get an accurate estimation (Embretson and Reise, 2000; Junker, 2001). In order to decide the required sample size, previous studies results were investigated and it was found that the sample composed of 1000 people is suitable for both parametric and non-parametric IRT models. In selecting 1000 people from the whole TIMSS 2011 data set, the success rating of the countries was taken into account and the top 20 countries according to the Mathematics success at 8th grade level in TIMSS 2011 were included into data set. The reason of incorporating the highest Mathematics score countries to the data set is that previous research have shown that parametric IRT models may provide lower standard error of measurement when the examinees' abilities are at high levels.

After composing a basic data set by using TIMSS 2011 database, the whole data set was transformed into two data sets, by changing the response pattern of an item in order to create local dependent test. One of the items were selected randomly from the test and its response pattern was made same with the item following it. Hence a new data set was created violating the local independence assumption. The estimates from the original and local dependent data sets were compared.

Data Analysis

After composing data set, the item parameters were estimated according to the parametric and non-parametric approach. For the parameter estimations from both approaches, R Studio program was used. In R Studio, non-parametric analysis was done with "mokken" package and parametric analysis were done with "ltm" and "irtoys" packages. The data analyses were made in two phases; 1. checking the assumptions and finding the suitable model for data, and 2. item parameters estimation according to the both approaches.

At the first phase of the study, the general IRT assumptions were tested. While checking the unidimensionality assumption, explanatory and confirmatory factor analysis was used. In order to apply explanatory factor analysis, tetrachoric correlation matrix was composed by using STATA program. After obtaining the matrix, the explanatory factor analysis was conducted via SPSS 22.0. While determining the dimensional structure of the test, the scree-plot and explained variance ratios were taken into account. It was found that the dominant factor of the test explains 58% of total variance and other two factors of which eigenvalues are higher than 1 explain little amount of total variance, 9% and 5% respectively. Also the item loadings changes between 0.52 and 0.86 as a unidimensional structure, hence the test was accepted as unidimensional. After explanatory factor analysis, the decided factor structure was tested by using confirmatory factor analysis via LISREL program. The model was composed as unidimensional and it was found that all of the items have significant t-values for the proposed model. The standardized factor loadings of the items change between 0.56 and 0.84. As for the model- level fit statistics, several indexes were analyzed. The first one is X^2/df which was found as 3,42, and this value indicates a moderate level fit (Kline, 2005). Then the RMSEA value was analyzed and it was found as 0.06 which shows a good fit (Jöreskog and Sörbom, 1993). The other fit indexes analyzed are GFI, NNFI and AGFI. All of them are found higher than 0.90 and these values mean that model-data fit is at good level (Brown, 2006). Considering the results of explanatory and confirmatory factor analyses, it was decided that the test has a unidimensional structure and the examination of the other assumptions of IRT was continued.

The data analysis process was continued with the other IRT assumption; local independence was investigated in detail with three methods. Yen's Q_3 *coefficient* and G^2 *coefficient* were calculated and no violation of local independence was detected for the data set. Also the DETECT was applied in order to define any other dimension which may affect students' performance, but it was found that the test is composed of a homogenous structure. Hence it was decided that the test meets the local independence assumption.

Subsequently checking the assumptions, item parameters were estimated according to the parametric and non-parametric models. These parameters were accepted as the precise ones. Then the

data set was manipulated by changing the response pattern of two items. One item was selected randomly from the dataset then the following item's response pattern was totally changed with the first one. In this way, these items were made artificially local dependent and the assumption of local independence is violated with these items. It means that if the examinee answers the first item true, the second one is also true and if the first answer is false, the second one is false, too. The modified data set was accepted as a new and local dependent data set and again the assumptions of IRT were checked. At this time, as planned, it was found that the local independence assumption is violated and the second item parameters were estimated through this data set.

In the last phase of the data analysis process, item parameters estimated according to two approaches from the both data sets were analyzed by using statistical tests and correlation analyses. The mean differences between the parameters were analyzed by Related Sample T-test and Wilcoxon Rank Order Test. Also the relationship between the parameters were investigated by calculating both parametric and non-parametric correlation coefficients.

FINDINGS

The first analysis in the research is the investigation of the model data fit of the composed data sets to the parametric and non-parametric IRT models. For parametric IRT approach, one, two and three-parameter logistic models, were tested. In model-data fit analysis, item level chi-square and -2 loglikelihood values were taken into consideration. The model-data fit statistics are presented in Table 1 below.

Table 1. Model-Data Fit Statistics for PIRT Models

Model Comparison	**Original Data Set**			**Modified Data Set**		
	-2LL	df	p	-2LL	Df	p
1 PLM-2PLM	100.33	29	<0,001	167,65	29	<0,001
2 PLM-3PLM	57,64	30	>0,001	56,49	30	>0,001
1 PLM-3 PLM	62,49	59	<0,001	142,14	59	<0,001

When the results of model data fit statistics given in Table 1 were analyzed, it is clear that the highest improvement of the model-data fit occurred between one and two parameter logistic model for both data sets. Also while the difference between the likelihood values between one and two parameter models were significant, the values computed for three parameter logistic model were not significant. Hence for both data sets, it was decided that the model-data fit was provided at most for two parameter logistic model, so the parameter estimations were conducted according to this model.

Like PIRT, model-data fit analyses were conducted for NIRT. The process of determining the suitable model in the non-parametric approach is different from the parametric one. There are several steps to be followed and in first, the item popularities, which is the percent of correct answer, and the item difficulty value in Classical Test Theory, are calculated for each item. Then item scalability coefficients, which is shown as *H* coefficients, are calculated and they give information about item discrimination levels. After this step, the assumptions of the models are checked with specific methods. While the unidimensionality assumption is tested with Automated Item Selection Procedure(AISP), monotonicity of the item characteristic curves can be analyzed with rest-group methods, and both of these methods are specific to NIRT models. When these two assumptions are met for the data set, it is possible to scale the data set with Monotone Homogeneity Model, which is the basic model of the NIRT. In addition to these assumptions, invariant item ordering is the last assumption of NIRT's strict model, Double Homogenity Model and in the concept of this assumption, item popularities are expected to be invariant across different ability groups. The invariant item ordering makes possible to estimate abilities of examinees at interval level and this feature is only provided with the Rasch model in parametric IRT models. This feature is the strongest point of this model and can be checked with several techniques, which are composing p matrixes, rest-group analysis and H^T coefficients (Junker, 2000; Meijer, Tenderio and Wanders, 2015; Van Schuur, 2011).

These steps were followed in order to define the applicable model for the datasets and it was found that while the unidimensionality and monotonicity assumptions were met for the data sets, invariant item ordering was not met, so the Monotone Homogeneity Model was used in order to estimate item parameters from both data sets. After determining the applicable models for the data sets according to the approaches, item parameters were estimated and the descriptive statistics of the parameters are given in Table 2.

Table 2. Descriptive Statistics Calculated from the Item Parameters Being Estimated with PIRT and NIRT

IRT Approach	Data Sets	Parameters	Minimum	Maximum	Mean	Standard Deviation	Skewness	Kurtosis
PIRT	LocalDependent	b	-1,17	1,20	-,121	,665	,457	-,736
	LocalIndependent	b	-1,18	1,17	-,093	,654	,313	-,795
	LocalDependent	a	,79	2,70	1,558	,406	,658	1,388
	LocalIndependent	a	,00	2,78	1,495	,495	-,259	3,090
NIRT	LocalDependent	b	,18	,73	,527	,160	-,485	-,797
	LocalIndependent	b	,18	,73	,515	,157	-,379	-,882
	LocalDependent	a	,23	,67	,385	,081	1,815	5,122
	LocalIndependent	a	,24	,67	,386	,080	1,765	5,068

Table 1 includes the descriptive statistics of the estimated item parameters. The item difficulty and discrimination parameters are shown as b and a sequentially. When the values of PIRT are examined, it is clear that b parameter values are so close to each other in the datasets. Especially the minimum and maximum values of b parameters are nearly the same. Also, the mean values are so similar to each other. In the NIRT approach, both parameters values are nearly the same and the descriptive statistics of b are closer than the ones estimated from the PIRT approach. As for item discrimination, a parameters, nearly the same values are obtained from the non-parametric approach. However, a parameters estimated from the parametric approach are so different from each other. In the local independent dataset, the minimum value of a parameter is calculated as ,00 while in the local dependent, it is estimated as ,79. This finding shows that violation of the local independence assumption increases the values of a parameters and it affects a parameters rather than b parameters. Though, the mean value of a parameter is so close in the both data sets, so this increase doesn't affect the other items and doesn't create any change in the mean value. But there is a big change in the skewness and kurtosis values in the local dependent data set, therefore it can be said that the form of the distribution of a parameters is changing in case there is a violation of local independence assumption. In short, it is clear that in case of local dependency, the item discrimination parameters estimated from PIRT are open to change while the difficulty parameters don't change so much.

After the first analyses with the descriptive statistics, in order to investigate the differences among the parameters deeply, the significance of the mean values was tested. Before conducting the significance tests, the assumptions of the tests are tested. Firstly, the normality of the parameters is tested by using the skewness, kurtosis values, histograms and normality tests. According to the results of normality analyses, it was found that, T-test is applicable for b parameters in all the data sets and two approaches. As for a parameters, Related Sample T-test was used for the parameter estimations obtained from PIRT and Wilcoxon Ranked Order Test was used for the parameters taken from NIRT. According to the test results, it was found that there is no significant difference between the parameters' means calculated from two approaches. Also, the differences between the means calculated from the local dependent and independent data sets were found insignificant, too. After the difference of the means analyses, the data analyses process was retained with the investigation of the relationships among the parameters estimated from different datasets and two approaches. The relationships between the parameters were investigated by calculating the correlation coefficients. Due to the normality of the b parameters, Pearson Moment Correlation Coefficient was calculated for item difficulty parameters. As for item discrimination parameters, the Spearman Brown Correlation Coefficient was used and the results are given Table 3 and 4 below.

Table 3. Pearson Correlation Coefficients Between the Item Difficulty Parameters Estimated from PIRT and NIRT

		PIRT		NIRT	
IRT approach		LocalDependent	LocalIndependent	LocalDependent	LocalIndependent
PIRT	LocalDependent	1			
	LocalIndependent	,933**	1		
NIRT	LocalDependent	-,981**	-,906**	1	
	LocalIndependent	-,909**	-,981**	,919**	1

**. p< 0.01

Table 4. Spearman-Brown Correlation Coefficient Between the Item Discrimination Parameters Estimated from PIRT and NIRT

		PIRT		NIRT	
IRT approach		LocalDependent	LocalIndependent	LocalDependent	LocalIndependent
PIRT	LocalDependent	1			
	LocalIndependent	,793**	1		
NIRT	LocalDependent	,921**	,766**	1	
	LocalIndependent	,918**	,791**	,968**	1

**. p< 0.01

In Table 3, there are Pearson Correlation Coefficients calculated from the item difficulty parameters estimated from PIRT and NIRT. When the correlation coefficients calculated in PIRT analyzed, it can be seen that the item difficulties estimated from the local dependent and independent data sets are so close to each other and the correlation between them is calculated as ,933, which is so high value for a correlation coefficient of which maximum value is 1.00. As for the non-parametric approach, the correlation coefficient of b parameters calculated from different sets was found so high again. Considering the relationship between the parameters estimated from two different approaches, it can be seen that the b parameters estimated from the same data set are highly correlated with each other. For example, the correlation coefficient of b parameters estimated from the local dependent data sets is calculated as -,981 which shows a negative but nearly a perfect correlation. In a short, the correlation coefficients in Table 3, show that b parameters are highly related with each other even if the local independence assumption is violated or not.

In Table 4, the Spearman-Brown Correlation Coefficients calculated between the item discrimination parameters are taken place. Starting with the parametric approach, one can say that there is a high-level correlation between a parameters in case of local dependence. However, the correlation coefficient is calculated as ,793 and it is lower than the one calculated for b parameters shown in Table 3. In respect to the non-parametric approach, the correlation coefficient calculated from the local dependent and independent data set is,968 and it was found as significant at 0,01 level. Considering this finding, it is possible to say that the item discrimination parameters estimated from NIRT are affected less than the parameters estimated from PIRT, in case of local independence violation. Comparing coefficients calculated from two approaches, it was found that a parameters estimated from the local dependent data set according to the PIRT are correlated higher than the ones estimated from the NIRT. It shows that whether or not there is a violation of the local independence assumption, item discrimination parameters estimated according to the NIRT are open to change less than the PIRT. In summary, it is clear that, item discrimination parameter is more sensitive to the violations of local independence assumption than the item difficulty parameters in the parametric approach and in PIRT, there is much more change in the values of this parameter than NIRT.

DISCUSSION

In the concept of this study, the effects of the local independence assumption on the item parameter estimations are analyzed by using two different IRT approaches, which are parametric and non-parametric approaches. First of all, two data sets were composed and one of them is prepared as a

local dependent. Then the item parameters, difficulty, and discrimination, are estimated both parametric and non-parametric IRT models. After the estimations of parameters, the descriptive statistics of them, the relationships and differences among them are investigated by using tests. When the findings are examined, all in all, it is clear that there are differences in the parameters estimated from the approaches but these differences are not at the significant level. The reason for the differences between the parameters being insignificance may be the limited number of local dependent items in the dataset, which may affect the whole data set at low-level. In different researches, the number of items violating the assumptions may be increased and the effects of the increment in the numbers of violating items can be analyzed.

Also, the other finding is that item difficulty parameters estimated the different approaches are highly and negatively correlated with each other whether local independence assumption is met or not. The reason for the negativity of this coefficient is the difference in the definition of item difficulty in the parametric and non-parametric approach. In PIRT, the b values change in -2 and +2 and the higher value means the harder item. However, the situation is totally contrasted in non-parametric IRT. In this approach, item difficulty is the popularity of the item, like in Classical Test Theory. It is calculated as the percent of the correct, so increase in the p value means easier items. Due to the stated difference in the definition the item difficulty parameters, the direction of the correlation coefficient is negative.

Despite of the high and significant correlation between item difficulties estimated from both approaches, it is not valid for item discrimination parameters, and as stated in the previous researches, item discrimination parameters are highly affected from local independence violation in parametric approach. Moreover, the other finding of the study is that item discrimination parameters are inflated artificially in case of local independence violation in PIRT approach. As for NIRT, just like in item difficulty parameters, item discrimination parameters are not influenced by the violation of the assumption. Hence as in the related studies, it is found that NIRT models do not require the IRT assumption as the same level as PIRT. As stated in the basic sources about NIRT, such as Sijtsma and Molenaar (2002), Van Schuur (2011) and Junker (2001), etc., non-parametric IRT is free from traditional IRT assumptions. This finding is consistent with the other researches and it can be said that in case of the possibility of local independence violation, one should prefer NIRT rather than PIRT especially in the estimation of item discrimination parameters, because the item discrimination parameters estimated from NIRT is more accurate than the ones estimated from PIRT in case of local dependence. Moreover, the high correlation coefficients computed between the parameters estimated from original data sets can be interpreted that the usage of the NIRT models should not be limited only when the requirements of PIRT are not provided. The findings of the study have made clear that the item parameters obtained from both parametric and non-parametric approaches are so similar to each other and this finding is consistent with the similar studies (Mor Dirlik, 2017; Meijer, Sijtsma and Smidt, 1990). Hence it is clear that when the basic goal is to scale and determine the item parameters, especially in the small samples and few items, NIRT models will provide so similar item parameters with the PIRT models, so they can be preferred. As for recommendations for the new researches, the number of items can be changed and this effect can be analyzed in detail. Also, in the other researches, the change in the ability parameters can be investigated in case of local independence violation.

REFERENCES

Balazs, K., & De Boeck, P. (2006). Detecting local item dependence stemming from minor dimensions: Interuniversity Attraction Pole statistics network [technical report].

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. (First Edition). NY: Guilford Publications, Inc.

Chen, W. H., & Thissen, D. (1997). Local dependence indexes for item pairs using item response theory. *Journal of Educational and Behavioral Statistics*, *22*(3), 265-289.

Chen, C. T., & Wang, W. C. (2007). Effects of ignoring item interaction on item parameter estimation and detection of interacting items. *Applied Psychological Measurement*, *31*(5), 388-411.

Crocker, L., & Algina, J. (1986). *Introduction to classical and modern test theory*. Holt, Rinehart and Winston, 6277 Sea Harbor Drive, Orlando, FL 32887.

Embretson, S. E., & Reise, S. P. (2013). Item response theory. Psychology Press.

Gulliksen. H. (1950). *Theory of mental tests*. New York: Wiley.

Hambleton, R. K., Swaminathan, H., & Rogers, H. J. (1991). *Fundamentals of item response theory* (Vol. 2). Sage.

Hambleton, R. K., & Swaminathan, H. (1985). 1985: Item response theory: principles and applications. Boston, MA: Kluwer-Nijhoff.

Henning, G. (1989). Meanings and implications of the principle of local independence. *Language Testing*, *6*(1), 95-108.

Junker, B. W. (1991). Essential independence and likelihood-based ability estimation for polytomous items. *Psychometrika*, 56(2), 255-278.

Junker, B. W. (2001). On the interplay between nonparametric and parametric IRT, with some thoughts about the future. In Boomsma A., et al. (Eds.) Essays on Item Response Theory. New York: Springer-Verlag.

Jöreskog, K. G., & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language*. Scientific Software International.

Kline, R. B. (2005). *Principles and practice of structural equation modelling*. (Second Edition). NY:Guilford Publications, Inc.

Lord, F. M. (1980). *Applications of item response theory to practical testing problems*. Hillsdale NJ: Erlbaum.

Lord, F. M.& Novick, M.R. (1968). *Statistical theories of mental test scores*. Reading, MA: Addison-Wesley.

Meijer, R. R., Tendeiro, J. N., & Wanders, R. B. (2014). The use of nonparametric item response theory to explore data quality. In *Handbook of Item Response Theory Modeling* (pp. 103-128). Routledge.

Meijer, R. R.. Sijtsma, K and Smidt, N. G. (1990). Theoretical and empirical comparison of the Mokken and the Rasch approach to IRT. Applied Psychological Measurement. 14. 283–298

Mor Dirlik, E. (2017). The Comparison of Item and Ability Estimations Calculated From The Parametric And Non-Parametric Item Response Theory According To The Several Factors. Unpublished Doctoral Dissertion. Institute of Educational Sciences, Ankara University.

Sireci, S. G., Thissen, D., & Wainer, H. (1991). On the reliability of testlet-based tests. *Journal of Educational Measurement*, *28*(3), 237-247.

Sijtsma, K., & Meijer, R. R. (2007). Nonparametric item response theory and related topics. In C. R. Rao & S. Sinharay (Eds.), Handbook of statistics, vol. 26: Psychometrics (pp. 719–746). Amsterdam: Elsevier, North Holland.

Sijtsma, K., & Molenaar, I. W. (2002). *Introduction to nonparametric item response theory* (Vol. 5). Sage.

Sijtsma K, Molenaar IW (2002). Introduction to Nonparametric Item Response Theory. Sage, Thousand Oaks, CA.

Stout, W. (1990). A new item response theory modeling approach with applications to unidimensionality assessment and ability estimation. Psychometrika, 55,293-325.

Tuerlinckx, F., De Boeck, P., & Lens, W. (2002). Measuring needs with the Thematic Apperception Test: A psychometric study. *Journal of Personality and Social Psychology,* 82(3), 448.

Van Der Linden, W. J., & Hambleton, R. K. (1997). Item response theory: Brief history, common models, and extensions. In *Handbook of modern item response theory* (pp. 1-28). Springer, New York, NY.

Van Schuur, W. H. (2011). *Ordinal item response theory: Mokken scale analysis* (Vol. 169). Sage.

Vermunt, J. K., & Magidson, J. (2004). Local independence. *Encyclopedia of social sciences research methods*, 732-733.

Yen, W. M. (1984). Effects of local item dependence on the fit and equating performance of the three-parameter logistic model. *Applied Psychological Measurement*, *8*(2), 125-145.

Yen, W. M. (1993). Scaling performance assessments: Strategies for managing local item dependence. *Journal of educational measurement*, *30*(3), 187-213.

International Journal of Progressive Education, Volume 15 Number 4, 2019

Secondary School Students' Academic Risk-Taking Levels In Turkish Lesson

Behice Varışoğlu[i]
Gaziosmanpaşa University

Esra Ekinci Çelikpazu[ii]
Recep Tayyip Erdoğan University

Abstract

The aim of this study is to find out academic risk-taking levels among secondary school students in Turkish lesson and determine if there is a relationship between their success in that lesson and risk levels. The study was carried out with blended method which combines qualitative and quantitative research patterns. Study data were collected from 450 secondary schoolers with convenience sampling. Data were collected by using the Risk of Academic Risk and Personal Information Form. Study data were analysed with descriptive and relational analysis techniques.As a result, a statistically significant relationship was found between academic risk-taking and achievement levels of students in the context of Turkish lesson. As their success level increases, their level of risk-taking also increases; and as success level decreases, the other decreases, too. It was found out that students' academic risk-taking is at medium level in Turkish lessons. This finding is supported by the rate of those hesitating to take academic risk and the rate of the positive views regarding Turkish lesson. Yet, no significant relationship was found between gender and academic risk-taking levels of students. However, the relationship between risk-taking behaviour and grade level was found to be significant.

Keywords: Academic risk, Turkish lesson, academic success.

DOI: 10.29329/ijpe.2019.203.18

---

[i] **Behice Varışoğlu,** Assoc. Prof. Dr., Gaziosmanpaşa University, Faculty of Education, Department of Turkish and Social Sciences

[ii] **Esra Ekinci Çelikpazu,** Assist. Prof. Dr., Recep Tayyip Erdoğan University, Faculty of Education, Department of Turkish and Social Sciences

Correspondence: esracelikpazu@hotmail.com

INTRODUCTION

One of the human-related concepts related to human as well as the cognitive domain in the learning-teaching process is the affective domain, which is related to the value that the individual carries/attaches on the cognitive learning process. One of the notions of affective domain, which have an impact on the learning process of individuals and entail taking responsibility and making efforts, is academic risk-taking behaviour.

Academic risk-taking behaviour, though described in various forms of in the literature, is often defined as the responsibility taken by students and their desire to learn something new in uncertain situations that can lead to success or failure. Strum (1971: 6-8) defines academic risk-taking as a tendency to make predictions and take chances, even in the presence of a penalty/failure in the classroom environment. Students' risk taking is also a measure of their creativity. Clifford (1991) sees risk-taking as a means of increasing students' learning and motivation and thinks that risk-taking is the choice of different academic tasks depending on their success or failure expectancy. According to Cliffordet al. (1990), it is the choice of varying academic tasks depending on success possibility anddifficulty level. Young defines risk-taking as "feeling the desire to go into the unknown, to try new and different things without focusing on success or failure. Learning is the reward of risk-taking behaviour" (1991, p. 8). According to Farley (1991), risk-taking is the basis of human creativity and creative productive risk-taking is one of the greatest lessons that education and the family should give to the child (as cited by Baş, 2012: 37). Arnett (1992: 340) argues that risk can be used for actions that cause serious potential consequences, as well as volunteering to try new things.

Academic risk-taking refers to decision-making by students in cases such as harder or easier assignments, known or unknown tasks, or sharing or not sharing their ideas in academic settings, and it occurs when students choose one of several possible options (Tan et al., 2016: 1). While choosing any of the options, students do not know what the result will be. Neihart (1999: 289) describes risk-taking as "the chance of doing something also when the consequences are not clear and trying dangerous things from children's point ofview." He believes that people who do not take risks can prevent pain, disdain, fear and sadness, but they can not learn, change, love, grow up, or live. All children benefit from learning to take risks and risk-taking is an important skill in the learning of talented children because they can seriously compromise their high success and strong leadership potential if they do not take risks. Robinson (2012: 1) discusses risk-taking from this point of view and states that risk-taking implies "students' evaluating both known and unknown consequences of a learning activity and making choices about their participations based on possible benefits and outcomes."Richards and Schmidt (2002: 460) argue that risk-taking has a significant influence in learning a foreign language and learners are willing to take risks to experience the new language, and risk-taking can be defined as the willingness to take risky actions. In particular context of learning a second language, risk-taking is one of the most important phenomena that affect success.

Academic risk-taking, which "could have an impact on the ability of individuals to question and think about their views and decisions", (Freeman and Rossignol, 2010) can also be defined as students' assessment of the known or unknown learning aspects of a learning activity or those that may result in success or failure. As can be seen, academic risk-taking behaviour includes "a complex process involving the willingness of a student to take an academic step with an uncertain outcome" (House, 2002: 6). Apart from the foregoing, it "describes the students' courage and willingness/unwillingness in quarrelling against difficulties in their learning situations" (Korkmaz, 2002: 82), "refers to the individuals' predicting or reacting in situations where they cannot foresee the consequences, they have never performed on, or they are not aware of the alternatives" (Çakır and Yaman, 2015: 166), or "in general, feeling the desire to make mistakes, defend cases contrary to the traditions or popular items, or deal with problems for which definite solutions are not available" (Çiftçi, 2006: 81).

Looking at the definitions above, it is seen that risk-taking behaviour is generally associated with the concept of success. Clifford (1991) also discusses academic risk-taking as preference of tasks

by students according to their expectations of success or failure. “Risk-taking behaviour, while giving a chance to receive awards, involves the potential to cause danger or damage. Fear of failure, others' thoughts, fear of rejection by others, and fear of uncertainty all play an important role in demonstrating the behaviour of risk-taking” (Yselande, 2015: 2). According to Atkinson's (1957) Theory of Success Motivation, success affects motivation or avoidance from failure affects risk-taking behaviour. While individuals who focus on success tend to directly prefer risk-taking behaviours, those motivated to avoid failure are expected to prefer easier tasks. Atkinson (1957) points out that individuals find it more valuable to succeed in difficult tasks than easier tasks. Kogan and Wallach (1967), who emphasize success and high motivation and risk-taking behaviours, argue that those who have high motivation to achieve take moderate rather than extremerisks and they avoid situations where they can not win (as cited by Majidifard et al, 2014: 1086). According to motivational theorists, prudent risk taking behaviour helps to ensure satisfaction and have knowledge about skills, increases intrinsic motivation, brings cognitive development progress, and helps to give constructive responses to failure (House, 2002: 13). “The student takes on the responsibility of her/his success or failure by demonstrating academic risk-taking behaviour” (Tay et al., 2009: 1104). Thus, academic risk-taking behaviour is also performed in case of “possible gains despite involving possible losses” (Parker and Stanworth, 2005: 319) and “future adverse outcomes are reduced” (Hill and Thomson Ross, 1997: 288).

Young (1991: 8-10) discusses risk-taking at five levels. Risk-taking behaviour varies with levels; nevertheless, a developmental process can not be mentioned in which one starts at the lowest level and proceeds through subsequent levels until the highest level is reached. The levels are not assigned age-appropriateness; rather, the levels indicate the varying degrees of risk-taking behaviour. The first level is *theuninhibited risk-taker*. The risk-taker displays the highest level of risk-taking behaviour. This behaviour is very common in the first stages of early childhood and it may not be sustained unless an emotionally healthy learning environment is provided. For example, pressures to comply toschool and peer norms and inappropriate educational practices may contribute to the decrease in uninhibited risk-taking behaviour. The second highest level of risk-taking behaviour is *the analytical risk-taker*. The risk-taker is eager to experience new things and takes this as a reward for her/himself. It is the most tempting level of risk taking behaviour. The third level of risk taking behaviour is *the cautious risk-taker*. The individual shows unwillingness to take more risks in the learning process but is willing to observe others take risks. This learner takes more into consideration the importance of success and failure and cares how others perceive her/his performances. The fourth level is *the inhibited risk-taker*.This type of risk-taking is common during late childhood. The inhibited risk-taker wants guarantees regarding the result of the risk-taking behaviour. As long as s/he receives enough encouragement, the student may exhibit this behaviour in entering a new learning experience. The fifth and the lowest level is *the non-risk taker*. At this level, new learning experiences are avoided. The attitude ‘You can't make me do anything’is evident. Like at the previous level, it is very difficult to change the non-risk taker's learning behaviour.

In the learning process; since behaviours such as asking questions, sharing each other's ideas and trying new things could lead to unintended consequences, they are considered to be risky behaviours (Beghetto, 2009). Academic risk-taking behaviours that students can exhibit have been identified as generally expressing an opinion that is different from peers' or the teachers' related to the topic taught in the classroom, asking questions to teachers or friends, showing tendency to answer questions they do not know the answer, participating in various discussions, willingness to take responsibility for situations with uncertain consequences, solving a problem through different paths, lack of avoidance from making mistakes, and trying new things (Clifford et al., 1990; Beghetto, 2009, Çakır and Yaman, 2015; Korkmaz, 2002; HenriksenandMishra, 2013; House, 2002).

Exhibition of the risk taking behaviours in the literature also depends on the classroom environment the teacher creates. Teachers should encourage their students to take risks because academic risk-taking behaviour is also a phenomenon related to classroom participation which is "one of the important variables in increasing the quality of teaching services" within classroom (Demirel, 2007, p. 134). It goes without saying that the teacher has an important role on risk-taking behaviour

when the student participates in the class. It is easier for students to "take risks, experiment and try out unusual things" in a classroom setting prepared by the teacher (Budge and Clarke, 2012: 64) so students can "demonstrate risk-taking behaviour if they gain/develop self-confidence in the classroom environment" (Yselande, 2015). Teachers can encourage students to take risks by using appropriate teaching techniques. If they avoid taking risks, they will hamper criticisms to be made by other students in the class or students' self-criticism (Majidifard et al., 2014: 1091). For example, storytelling in Turkish lessons is a technique that encourages both teachers and students to take risks. Students are nervous about this activity as it requires an unrestricted narration. However, the teacher gives a valuable and exciting learning experience for the students by making storytelling but also becomes a good role model for risk taking behaviour. At the same time, the activities such as drama, games, creative writing, poetry writing activities, critical thinking activities, etc. may pose examples for risk-taking behaviour (Young, 1991, s. 56).

In the literature, studies are available which deals with academic risk taking behaviours from several aspects. Most of those studies are seen to develop instruments to measure academic risk-taking behaviours of students in a certain field (Gezer et al., 2014; İlhan and Çetin, 2013), to examine the relationship between risk taking behaviours and academic achievement in any school subject (Bozpolat and Koç, 2016; Erricker, 2014; Gündoğdu et al., 2005; İlhan et al., 2013), to investigate the effect of certain situations (cognitive development levels of learners, grade level, age, gender, peer relationship, competitiveness, parental education and income level etc.) on academic risk-taking behaviour (Beghetto, 2009; Byrnes et al., 1999; Clifford et al., 1989; Daşçı and Yaman, 2014; Majidifard et al., 2014; Miller andByrnes, 1997; Panno et al., 2013; RamosandLambating, 1996), the effect of instructional approaches on academic risk-taking behaviours (Çiftçi, 2006; Korkmaz, 2002), to examine the relationship betweenstudents' creative skills / abilities, self-efficacy and self-belief perceptions, excellence properties, meta cognitive awareness levels, motivation, and problem solving skills, etc. and academic risk-taking (Baş, 2012; Beghetto, 2009; Çakır and Yaman, 2015; Erbaş and Baş, 2015; Goodwin et al., 2015; Gullone ve Moore, 2000; Öner Sünkür et al., 2013; Strum, 1971; Tay et al., 2009), and activities are arranged which promote academic risk-taking by students (Devonshire et al, 2014).

Also the samples studying the relationship between language learning and risk-taking behaviour grab attention. For example, Ely (1986) suggests that students who are willing to take risk-taking behaviour in the classroom environment are better at participating in the class. FarahaniandHivechi (2013) investigated the relationship between risk-taking and self-assessment skills of learners of English as a foreign language in the context of writing skills. Liuand Jackson (2008: 73-81) reported that students who showed more risk-taking behaviours while learning the target language were more likely to communicate with others in the classroom. TavakoliandGhoorchaei (2009) examined the relationship between self-evaluation and risk-taking behaviours in speaking ability. It was found out that there is no significant relationship between students' risk taking behaviours and self-assessment in speaking skills; yet, high-risk students are more likely to assess their speaking abilities than those at medium and low level of risk-taking. In a study researching the relationship between risk-taking behaviour and vocabulary learning strategies (MaftoonandAfroukhteh, 2013), no significant relationship was found between participants' vocabulary learning strategies and levels of risk taking. Only there is a negative relationship between risk taking behaviour and coding as a vocabulary learning activity. It is accounted for by the fact that low risk takers are cautious in learning a language and thus they prefer to memorize new words by coding rather than taking the risk of using other strategies.

It is seen that existing studies in general examinethe relationship between any of the language skills and academic risk-taking in the context of foreign language learning or language courses. The Turkish examples provide no research studying the relationship between Turkish or language skills with academic risk behaviour. While there are studies examining the academic achievement and academic risk taking levels of students in Mathematics, Social Sciences and Natural Science courses, no such study has been found in Turkish language. Therefore, the present study is thought to be unique. Our study aims at finding out the academic risk-taking level of middle school students' in

Turkish language course and whether there is a relationship between their academic achievement levels and risk taking behaviours. For this purpose, the following research questions were asked:

1. What is the academic risk-taking level of secondary school students?

2. Is there a significant relationship between academic risk-taking levels of secondary school students and their gender, grade level, family's educational status, and emotional and social perceptions of students?

3. Is there a significant relationship between academic achievement levels and risk taking behaviours of secondary school students' in Turkish lessons?

4. What are the opinions of secondary school students about taking academic risk in Turkish lesson?

METHOD

Research Design

This study was implemented with mixed method of qualitative and quantitative research models. Mixed method surveys are a type of research that handles quantitative and qualitative data sources together and provides a multidimensional evaluation of acquired data (Johnson and Onwuegbuzi, 2004). In this study, mixed method was preferred because quantitative data were supported with student opinions.

Study Group

The study group consists of 450 secondary school students covering all years, grades 5, 6, 7, and 8, during the 2015-2016 academic year. The participants were selected from secondary schools located in central and peripheral districts of Gaziantep, Rize, Erzurum and Şanlıurfa provinces situated in different geographical regions of Turkey. Convenience sampling was used because this sampling technique is known to be facilitating for researchers in terms of time, cost and labour.

Data Collection Tools

The data were collected by using the Personal Information Form prepared by the researchers and the Scale of Academic Risk-Taking developed by Clifford (1991) and translated into Turkish by Korkmaz (2002). The Scale of Academic Risk-Taking is a 5-point Likert-type rating scale consisting of 36 items. Although the original scale comprises of 3 sub-dimensions, the Turkish adaptation includes 4 sub-dimensions as a result of an extra sub-dimension. In the version of Korkmaz, the reliability coefficient was found to be 0,90as a result of the application with students.

In this study, the items falling under the scale sub-dimensions in the original version included in the application and overall reliability coefficient was calculated as 0,81.

Data Analysis

Analysis of the quantitative data was performed with the aid of descriptive (frequency, percentage, mean, and standard deviation) and relational (chi square $\chi 2$) statistical techniques. The data were analysed with SPSS 20 and then presented in tables. For analysis of the qualitative data, content analysis technique was used. The topics were classified on the basis of content and grouped with similar characteristics, then each group was named accordingly.

RESULTS

In this study, which investigates the level of academic risk-taking by secondary school students in Turkish lessons, the quantitative and qualitative findings answering the research questions are given in order.

Results related to the level of academic risk-taking

Table 1: Mean and standard deviation scores of academic risk-taking levels of students

Behaviours of academic risk-taking	Mean	S.D.	Low	Medium	High
			1-2,3	2,4-3,6	3,7-5
I enjoy doing homework for a lesson that I find difficult.	2,57	,843			
I feel bad when I make a mistake at school.	3,51	1,252			
I like asking questions at school because I learn by asking questions.	4,04	1,451			
If I fail in my studies at school, I do not let anyone know it.	3,84	1,269			
When I encounter problems that require thinking about more, I prefer the problems that I can do quickly.	3,15	1,505			
If I can not succeed in a new task at school, I give up immediately.	3,39	1,556			
A low grade on school assignments upsets me a lot.	2,34	1,573			
Even if I make some mistakes, I enjoy working hard.	4,07	1,421			
The first thing I think when I start something new at school is that I will fail.	3,66	1,416			
I do almost nothing to get rid of a problem at school.	2,38	1,513			
When I make mistakes in schoolwork, I keep trying to find out the truth.	2,48	1,506			
I am concerned about making mistakes in schoolwork.	3,95	1,397			
Whenever I get a bad grade at school, I need to hide.	3,45	1,416			
The school work that I do by really thinking, is fun.	2,82	1,561			
I do not like setting goals for my studies at school because I can not reach them and then I feel bad.	4,10	1,327			
If I make a lot of mistakes in school, I feel very pessimistic or angry.	2,66	1,533			
Difficult tasks are more fun than easy ones.	3,26	1,530			
I do not enjoy working with my classmates because if I do not know something, they might think I'm stupid.	3,42	1,552			
I prefer studying a hard lesson to studying an easy lesson.	2,31	1,534			
When I fail at school, I do not enjoy eating, playing games, talking or doing anything else.	3,20	1,496			
When I have a chance to choose assignments, I choose the hard ones.	3,16	1,571			
If my school assignment is hard, I try to pass without doing it.	3,16	1,377			
If I do not understand a topic, I ask my teacher.	2,38	1,532			
If I make a mistake in a topic I try to learn, I feel downhearted.	3,93	1,389			
I would rather make mistakes and estimates on any topic than asking a ridiculous question.	2,78	1,453			
I always learn something from mistakes I make at school.	3,19	1,553			
If I get a low grade, I reflect on my mistakes and re-examine them.	3,87	1,394			
It is fun to try to answer difficult and challenging questions.	3,91	1,364			

Even if I have to, I usually try to correct my mistakes in lessons.	3,76	1,389
The easier the assignments are for me, the more I enjoy doing them.	3,85	1,328
I usually do not like lessons for which I make mistakes in homework.	3,50	1,487
I enjoy studying with my friends who like to study hard lessons.	2,58	1,412
I do not like setting goals for homework; I just do my homework and forget about it.	3,77	1,436
I feel bad if I give wrong answer for the teacher's question.	2,42	1,541
I prefer making mistakes on a difficult assignment to getting an excellent grade from an easy but boring assignment.	3,23	1,518
If I get a low grade, I usually take it seriously, collect my thoughts, and study harder.	3,01	1,588
Negative feelings following failure	2,80	,803
Tendency to prefer difficultoperations	3,34	,671
Resilience after failure	3,48	,697
Overall scale	3,33	,590

It is seen in Table 1 that mean and standard deviation values for the overall scale are 3,33 and ,590, respectively. For the sub-scales, the mean and standard deviation values were found as following: 2,80 and ,803for *negative feelings following failure*; 3,34 and ,671 for *tendency to prefer difficult operations*; and lastly, 3,48 and ,697 in *resilience after failure*. It was found out that students' levels of academic risk-taking are moderate in both all over the scale and sub-scales. When the scale items are examined one by one, low and high-value items are found; still, they do not affect the overallmean of the scale and sub-scales.

Findings related to the relationship between academic risk-taking levels of students and their gender, grade level, family' educational status, and emotional and social perceptions

Table 2: The relationship between academic risk-taking levels of students and their gender, grade level, family' educational status, and emotional and social perceptions

Independent Variables		Academic risk-taking behaviour and sub-dimensions							
		Overall scale		Negative feelings following failure		Tendency to prefer difficult operations		Resilience after failure	
		χ^2	p<0,05	χ^2	p<0,05	χ^2	p<0,05	χ^2	p<0,05
Gender		6,403	0,171	5,763	0,218	7,285	0,122	6,797	0,147
Grade level		15,104	0,057	15,954	0,043	14,766	0,064	14,323	0,074
Family's education	Mother	13,234	0,656	13,317	0,649	10,054	0,864	10,837	0,819
	Father	67,293	0,000	69,090	0,000	47,391	0,000	70,168	0,000
Emotional perception about knowledge	Trust the other sex	9,953	0,041	9,169	0,057	8,132	0,087	10,128	0,038
	Trust friends	10,525	0,032	5,646	0,227	14,062	0,007	5,463	0,243
	Being loved	3,082	0,544	2,143	0,710	1,191	0,880	2,215	0,696
	Being envied	0,227	0,994	0,394	0,983	0,520	0,972	0,103	0,999
Social perception about knowledge	Relationship	10,636	0,031	9,730	0,045	6,710	0,152	12,487	0,014
	Communication	4,886	0,299	0,363	0,363	2,532	0,639	5,936	0,204
	Supervision	1,871	0,759	2,891	0,576	1,624	0,804	2,228	0,694
	Sharing	2,364	0,669	2,328	0,676	2,229	0,694	2,339	0,674
	Support	9,690	0,046	8,679	0,070	5,648	0,227	11,388	0,023
	Freedom	16,442	0,002	15,310	0,004	7,844	0,097	17,080	0,002
	Ban	11,521	0,021	10,714	0,030	6,565	0,161	10,530	0,032

The findings in Table 2 reveal no significant relationship between academic risk-taking behaviours and gender, grade level, mother's educational status, and perceived love or envy by majority in class,good communication with classmates,constant supervision by parents, and perceptions regarding sharing everything or not with parents in the entire scale. However, a significant relationship was found between the sub-scale negative feelings following failure and grade level.

Apart from that, a significant relationship was found between *father's educational status* and academic risk-taking behaviour of students as χ^2 =67,293 at significance level of $p_{(,000)}$<0,05;

a significant relationship was found between *perceived trust for the other sex about lesson, exams, and knowledge* andacademic risk-taking behaviour of students as χ^2 =9,953 at significance level of $p_{(,041)}$<0,05;

a significant relationship was found between *perceived trust for close friends about lesson, exams, and knowledge about lesson, exams, and knowledge* and academic risk-taking behaviour of students as χ^2 =10,525 at significance level of $p_{(,032)}$<0,05;

a significant relationship was found between *perceived excellent communication with those in class* and academic risk-taking behaviour of students as χ^2 =10,636 at significance level of $p_{(,031)}$<0,05;

a significant relationship was found between *perceived support received from parents in all conditions* and academic risk-taking behaviour of students as χ^2 =9,690 atsignificance level of $p_{(,046)}$<0,05;

a significant relationship was found between *perceived freedom by parents in all conditions* and academic risk-taking behaviour of students as χ^2 =16,442at significance level of $p_{(,002)}$<0,05;

a significant relationship was found between *perceived ban by parents* and academic risk-taking behaviour of students as χ^2 =11,521 at significance level of $p_{(,021)}$<0,05.

Findings related to the relationship between academic achievement and risk taking behaviours in Turkish lesson

Table 3: Relationship between students' academic risk taking behaviours and achievement in Turkish lesson

Academic risk level	Grade in Turkish lesson (1)unsuccessful	(2)passed	(3)medium	(4)good	(5)very good	Total
(1)never	1	7	0	2	3	13
(2)rarely	7	12	6	11	10	46
(3) not sure	14	49	86	59	28	236
(4) often	5	18	29	35	55	142
(5) always	1	3	0	3	6	13
Total	28	89	121	110	102	450
	χ^2	df	p<0,05			
Overall scale	53,285	16	,000			
Sub-scale 1	44,355	16	,000			
Sub-scale 2	40,105	16	,001			
Sub-scale 3	47,028	16	,000			

It is understood from Table 3 that there is a significant relationship between *grades obtained from Turkish lesson* and academic risk taking behaviours of students in the whole scale ($\chi2$ = 53,285

and $p_{(,000)}$<0,05 significance level) and also in all of the sub-scales. It can be said that students' success level in the lesson is parallel with their academic risk-taking levels.

Frequency values also show that success in the lesson seems parallel with risk-taking behaviour. The number of those who are *not sure* about taking academic risk (f = 236) is higher than the others. It can be inferred that academic risk-taking is at moderate level in Turkish lesson.

Findings related to students' views regarding academic risk-taking in Turkish lesson

Table 4: Students' perception of 'a good lesson'

1. What do you think a good lesson should be like?	**f**	***Examples***
Should listen to the teacher quietly, should do not talk in during lesson	63	*Ö30. I think a good lesson is that when the teacher is fully productive and teaching, the people in the class are listening to the lesson with no contact with each other.* *Ö37. A good lesson begins with being silent. Because all our teachers complain.* *Ö254. A lesson which is quiet, calm and full until the last minute.*
Should be fun and amusing	28	*Ö2. I want it to be a fun, open-minded, exciting and beautiful lesson.* *Ö431. It should be a lesson that does not overwhelm or bore the student, is fun when required and is engaging, and everyone attends.*
Teacher should teach topics in a clear and beautiful way	23	*Ö389. It is beautifully taught lesson enjoyed by students, so we feel curious to learn.* *Ö75. It should be taught well so that it can be understood, occasional activities would make it a good lesson.*
Activities should be organized for everyone to participate in lesson	12	*Ö25. I think a good lesson should be quiet and especially a lesson that I participate a lot.*
It should not be boring	11	*Ö92. It must be humorous, laughable, fun and relaxing. It certainly should not be advising.* *Ö6. It should not be too boring. We should not write too much and be bored.*
Should be exciting and engaging	7	*Ö22. Quiet, impressive, gripping, cheerful.* *Ö38. It should be interesting with activities, everyone should be given the right to say, regularly.*
Students should comply with rules	6	*Ö44. Listening to the teacher and obeying the rules.* *Ö150. Shuld not talk without permission, should be careful.*
Lesson should be completed in time	5	*Ö426. A good lesson should be timely and well detailed.*
Topics should be exemplified	4	*Ö192. I think a good lesson would be fun and exemplified.*
It should be intriguing	2	*Ö7. It should be fun and intriguing.*
The class should be peaceful	1	*Ö10. It should be a lsson listened without anyone disturbing the class peace.*
Teacher should not be angry when you make a mistake	1	*Ö19. They should not be angry when we do wrong. It needs to be listened to well and taught well. It should be taught in a quiet environment, we should participate in the lesson.*
Classroom size should be small	1	*Ö27. First, classroom size needs to be small*
Teacher should be disciplined/fair	1	*Ö11. I think a good lesson should be fun, nice, disciplined.* *Ö51. The teacher is in good communication with the students and the student is responsible and the teacher is fair.*
Teacher should manage time well	1	*Ö103. (...) the teacher should not speak fast.*
Teacher should not make us write too much	1	*Ö6. It should not be too boring. We should not write too much and be bored.*
Teacher should make us write what s/he has taught	1	*Ö112. Teacher should make us write what s/he has taught. In addition, it should not contain extracurricular subjects (life philosophy).*
Teacher should be a good teacher	1	*Ö8. There should be a good teacher to have a good lesson.*
Visual presentation should be made	1	*Ö13. I think visual expression should be made after the topic is explained. Then there should be an activity.*
Assignments should be given by level	1	*Ö123. (...)Homework should be done according to level*
Should be difficult	1	*Ö214. A good lesson should challenge and take time.*
It should be in a setting with no computer or technology	1	*Ö428. Studying in a setting where computersor technology doesn't exist.*
Class should be nice, clean and tidy	1	*Ö401. The class setting should be nice and clean There should not be conversation. If both of these exist, it is a good lesson.*
Teacher should make eye contact with the student	1	*Ö145. (...) we should come eye to eye while out teacher is telling*

Teacher should communicate well with the student	1	*Ö339. The teacher should see everyone in the class and have good communication*
Should not be advising	1	*Ö236. When we are naughty, our teacher always gives advice. Very boring.*
S/he should not be a trainee teacher	1	*Ö18 (...)it shouldn't be a trainee teacher.*

The data in Table 4 were collected as a response to the question "What do you think a good lesson should be like?" addressed to the students. The collected data were subjected to content analysis and grouped accordingly. It is seen that studentsbelieve *it is necessary to listen to the teacher quietly and not to talk during the lesson* (f = 63). It is followed by the idea that *the lesson should be fun and amusing* (f = 28) and that *teacher should teach topics in a clear and beautiful way* (f=23).

On the other hand, frequency values were found to be low for the items underlining student participation such as *activities should be organized for everyone to participate in lesson* (f=12), *it should be intriguing* (f=2), and*teacher should make eye contact with the student*(f=1).

Table 5: Students' perceptions of "achievement in the lesson"

2. What should be done to achieve in lessons?	f	Examples
Studying in a regular and planned way	104	Ö10. We should revise our lessons, have a regular studying system.
Answering tests	97	Ö202. (…) we can be successful in lesson by answering tests.
Revising topics	31	Ö7. Revising topics.
Listening to the teacher well in lesson	27	Ö29. First, we should listening to the lesson well.
Doing homework	25	Ö377. It is necessary to do the homework.
Reading books	6	Ö167. We need to read a lot of books.
Communicating well with the teacher	4	Ö170. (…) to communicate nicely and well.
Asking to the teacher things that are not understood	2	Ö35. (…) we need to ask the teacher what we do not understand.
Attending paid evening classes	1	Ö8. Studying harder and attending a paid evening class.
Making efforts	1	Ö5. It is necessary to study lessons, listen to lessons and make efforts
Choosing a good opponent	1	Ö21. We can be more successful in lessons by choosing an opponent and trying to be better than her/him in every area.
Cooperating	1	Ö428. We can study with our hard-working friends.
Getting help from the family	1	Ö295. We can ask our mothers and elders while studying.
Studying on time	1	Ö195. We need to study lessons on a daily basis and listen to lessons.

The data in Table 5 were obtained as a response to the question "What should be done to achieve in lessons?" According to the respondents, the most importantcriteria of success in lesson are *studying in a regular and planned way* (f= 104), *answering tests* (f = 97), and *revising topics* (f = 31). They are followed by *listening to the teacher in lesson* (f = 27) and *doing homework* (f = 25).

On the other hand, the opinions with low frequency were found as attending paid evening classes (f = 1), making efforts (f = 1), choosing a good opponent (f = 1), cooperating (f=1), getting help from the family (f=1), and studying on time(f=1).

Table 6: Students' perceptions of "the favourite lesson "

3. What lessons do you enjoy studying for? Why?	f	%
Mathematics	192	38,17
Natural Sciences	112	22,27
Turkish	84	16,70
English	58	11,53
Social Sciences	25	4,97
Physical Education	8	1,59
Religious Culture and Moral Knowledge	6	1,19
Art	6	1,19
All	12	2,39

Students' responses to the question "What lessons do you enjoy studying for?" were analysed and given in Table 6. The frequency values reveal that mathematics (f = 192) comes at the beginning of the courses that students like most. It is followed by *Natural Sciences* (f = 112), and *Turkish* (f = 84). It can be inferred that study participants enjoy numerical lessons more than verbal lessons. Also the proportion of students who enjoy Turkish language course seems to support themoderate relationship between success and risk taking behavior in Turkish class.

CONCLUSION AND DISCUSSION

This study was carried out to investigate the level of academic risk-taking inTurkish class by secondary school students and also the relationship between academic achievement and academic risk taking behaviours. The following results were reached in the study:

1. Academic risk-taking level was graded as low, medium, and high based on mean and standard deviation scores in this study. So, the participants were found to have medium level of academic risk-taking according to the whole scale and the sub-scales. Success level increases as academic risk level increases. To exemplify, Bozpolat and Koç (2016) examined the extent at which mathematics-oriented risk-taking behaviours of 8th graders are predicted by variables such as self-efficacy towards mathematics lesson, gender, TEOG (Transition from Primary to Secondary Education) score, duration of mathematical study outside school, parental educational status, family income level, and private tutoring. They found out thatstudents with a high tendency to prefer difficult operations showed willingness to take academic risks. The level of students' awareness of their behaviours in mathematical topics is also thought to accountfor their choice of difficult operations in mathematics. It is thought that increased awareness of students about their behaviours in mathematics also led to an increase in their mathematics-oriented academic risk-taking behaviors. It is thought that the students shunned academic risk to save negative impressions. As another result of the abovementioned research, it was found out that students who can transfer mathematics into life skills, using mathematics effectively in their daily life namely, are able to recover more easily in case of failure(p. 14-16).

In another study investigating the relationship between risk taking behavior and gender and verbal expression competence was examined (Majidifard et al., 2014), it was found that there was no significant relationship between the risk taking behaviors of Iranian students and verbal expression competences.

2. Our study results reported no statistically significant relationship between students' academic risk taking behaviors and the variable of gender. This is a similar finding compared to Clifford et al. (1989) examining the developmental and cultural patterns that affect academic risk-taking behaviours. It reported that gender does not change academic risk-taking or tolerance for failure significantly. Likewise, in the study by Korkmaz (2002: 173) developing an implementing the science teaching project centered around the project-based learning approach, no significant relation was

found between academic risk-taking and gender in relation with average scores in the sub-scales as reflecting the tendency to take negative feelings after failure, reflecting the tendency to perfer difficult operations, reflecting the tendency to rebound and be effective after failure, and reflecting the tendency not to do homework.

Yet, there are studies with opposite findings concerning the effect of gender variable on students' academic risk taking behaviour. Mostly they report findings in favour of male students. For example, Strum's (1971) research on the relationship between creativity and risk taking revealed that male students are more likely to take risks than their female peers. In a study investigating the relationship between risk taking behaviours and mathematical performances of learners and whether gender affects risk taking behaviours (Ramos and Lambating, 1996); it was found that students displaying more risk taking behaviours achieve betterin mathematics lessons and male students take more risks than females. In other words, in mathematics tests where risk taking behaviours plays an important role, boys performed better. Miller and Byrnes (1997) found out that risk-taking behaviours vary by gender, special variables such as age or gender do not increase likeliness to take risks; still, the variables such as overconfidence, competitiveness, indifference to possible outcomes, and seeking excitement were reported to increase the likelihood of risk taking among students of both sexes. Byrnes et al. (1999), in their meta-analysis of 150 studies comparing the risk taking tendencies of male and female participants, found out that male participants are more inclined to exhibit risk-taking behaviours. In summary, male students show higher risk taking behaviours than girls and those who have higher achievement levels display more risk taking behaviours than others(Gündoğdu et al., 2005).

3. Another finding is that there is no statistically significant relationship between students' academic risk-taking behaviors and grade level. Clifford et al. (1990) studied academic risk-taking behaviors in the form of choosing assignments ranked by difficulty likelihood of success. In the study carried out on students attending the 4th, 6th, and 8th grades, it was found out that risk taking behaviors increased with development. Beghetto (2009) conducted a study on the relationship between students' personal characteristics such as gender, ethnicity, grade level and proficiency in natural sciences course, their interest in natural sciences course, and their creative self-efficacy beliefs and mental risk taking behaviors. They found out that students become less willing to take risks as their age increaess. Similar results were also reported by Daşçı and Yaman (2014) investigating the effects of cognitive development periods of learners and learning stages on mental risk taking skills. They found out that mental risk taking skills of students go downas the educational grade progresses; the students' cognitive development period has no effect on mental risk taking ability; and the students at the first grade exhibited higher levels of mental risk taking than those at the second grade. It is thought that as education grade increases, students go through the teaching process for the sake of achieving in the central exams so academic risk taking behaviours tend to fall. This result byDaşçı and Yaman (2014) seems to comply with the findings by Beghetto (2009). Beghetto (2009: 217) found out that students showed less risk-taking behaviours as their age increased as a result of measuring their skills, self-beliefs and perceptions. On this aspect of the findings, researchers broughtvarious explanations such as more competitive classification policies, increased social comparisons, flawless learning, and higher scores in exams.

4. There is a statistically significant relationship between academic risk taking behaviors of the students and father's education level. It can be suggested that parental education level is one of the reasons affecting academic risk taking behaviors of students. This result may be due to the patriarchal structure of Turkish families with father perceived as a dominant figure in the family. On the other hand, no statistically significant relationship was found between academic risk taking behaviors of the students and mother's education level. It is a remarkable result that father's education level rather than mother's is related to risk taking behaviour although the mother usually takes care of the children in the family and helps them do their homework. In this regard, Avcı and Özenir (2016) carried out a study dealing with mathematics-oriented risk taking behaviors. Their findings concerning the variable of mother's educational status revealed that students whose mothers have different educational levels differ in mathematics-oriented risk taking behaviours.

5. Moreover, no significant relationship was found between students' academic risk-taking behaviors and their perception of being loved and envied by the majority in their classes, good communication with classmates, constant supervision by parents, and perceptions regarding sharing everything or not with parents, perceptions of being constantly controlled by their families, and perception of sharing everything with their families. It can be inferred that academic risk-taking by students in Turkish class is not affected from variables such as being loved or envied by someone, communicating well with others, being controlled by the family, or sharing everything with the family. Contrary to this result, Çetin et al. (2014) pointed out that academic risk-taking behaviours of students are affected by the viewpoint of the classmates and the teacher, and positive or negative judgement of others. the fear of negative evaluation increases, academic risk taking behavior decreases. The findings in the study by Çetin and others also indirectly refer to the relationship between academic risk taking and in-class communication, and puts forward a contrasting view to our finding.

6. There is a statistically significant relationship between students' academic risk taking behaviours and perceived trust for the other sex and close friends about lesson, exams, and knowledge. In other words, as students' perceptions of trusting others for knowledge increase, risk taking behaviours also increase.Özbek(2008) argues that trusting someone else means taking risks. If a person trusts someone else, s/he fact has high self-confidence and such people can always take risks. In this context, it can be said that students who choose to trust their friends or the opposite sex in Turkish lesson are more willing to take academic risks than those who do not trust.

Miller and Byrnes (1997: 814) reported that risk-taking behaviors are affected by five variables as self-efficacy, preference for a new experience, peer relationship, competitiveness and interest. They added that as probability of failure increaess, risk-taking reaction decreases. According to researchers who developed therisk-taking strategy called "Self Regulation Model", excessive trust facilitates risk taking, while those who feel inadequate avoid risk taking. Because these people think they lack the necessary skills. Particularly, students want to have confidence in their classmates in all matters related to lesson.

7. There is a statistically significant relationship between students' academic risk-taking behaviors and perceived excellent communication with those in class. Such relationship seems pleasing for those who say they can communicate very well with everyone in their class. There is a low percentage for those who say they can not communicate with those who are reluctant to communicate well. So it can be said that the students who communicate well with everyone are more successful in taking academic risk in Turkish lesson than those who are not able and are shy.

8. There is a significant relationship was found between academic risk-taking behaviour of students and perceived support received from parents in all conditions and perceived freedom by parents in all conditions. It is understood that pupils are not left alone by their parents on receiving support and freedom. This in turn affects their academic risk taking behaviors in Turkish lesson. Students who stated being supported and set free in any circumstance are more likely to have a higher level of risk than those who reported negative feedback. A similar result was also foundin the study of İlhan, Çetin, Öner Sünkür and Yılmaz (2013) stating children receiving support from family show higherlevel of risk-taking.

9. A significant relationship was found between perceived ban by parents and academic risk-taking behaviour of students. This finding applies to those who stated that their parents have no restrictions on them. In other words, students facing bans from their family take less academic risks.

10. There is a statistically significant relationship between students' academic risk-taking behaviors and their achievement in Turkish lesson. To explain, there is a right proportion between students' academic risk-taking levels and academic achievement. As their success in that lesson increases, the level of risk-taking behaviors increases, and as success decreases, the risk level also decreases. As students become more interested in teaching, academic risk-taking behaviors also

increase(Beghetto, 2009). In their study determining a significant relation between study skills and the academic risk taking behaviours, İlhan, Çetin, Öner Sünkür and Yılmaz (2013) stressed that academic risk-taking behaviors are effective on academic achievement of the students and added that supporting the academic risk taking behaviors of students would contribute to their success. In another study investigating the relationship between risk taking behaviors and academic achievement among high school students (Gündoğdu, Korkmaz and Karakış, 2005), also a significant relationship was found between the two variables. That study revealed that successful students have shown more risk-taking behaviors. It can be argued that individuals who take risk place importance on academic achievement and expect high success. Öner Sünkür et al. (2013) also found out in their study examining the relationship between positive and negative perfectionism attitude of 8th grade students and their academic risk taking levels that academic risk-taking behaviors are positively correlated with positive perfectionism but negatively correlated with negative perfectionism. As a result, students displayed more academic risk-taking behaviors when their positive perfectionism was supported.

Çakır and Yaman (2015) investigated the relationship between students' mental risk taking ability and metacognitive awareness levels. It was found that there is a significant positive correlation between students' mental risk taking ability, metacognitive awareness levels and academic achievement in science. As students' mental risk taking ability and metacognitive awareness levels increased, they recorded higher academic levels in science lesson. In another study, there was a significant positive correlation between the level of academic risk taking of talented students and problem solving skills. Those with higher problem-solving skills were more likely to take academic risks (Tay et al., 2009). This seems to support the findings indicating a meaningful difference between academic achievement and academic risk taking levels levels of students.

11. Taking into consideration the rate of those who are not sure about taking academic risk in Turkish lesson, the level of academic risk taking was also found to be modest. This finding also supports our findings obtained from the quantitative data. There can be many reasons preventing risk-taking by students. For instance, they might stay cautious about showing risk taking behavior in order to avoid failure. A similar result of the study by Erricker (2014) looks striking. The researcher carried out a study by giving an interesting literary text for analysis to students with learning difficulties and those who cannot learn to identify the effects on such students. It was found out that those with learning difficulty were hesitant to take risks in the learning process because they did not want to fail and they were not confident in anlaysing linguistic complexities in discourse analysis and they were not again self-confident in independent studies.

12. In the light of the content analysis, the opinions with high frequency value indicate that perception of a good lesson is teacher-centered. This contradicts the basic principles of academic risk taking and demonstrates that, contrary to the quantitative findings, students put the responsibility on the teacher rather than taking over the responsibility for learning.

13. According to the students in our study, *achieving in lessons* requires studying in a regular and planned way, answering tests, revising topics, listening to the teacher well in class, doing homework. Students who know how to be achieve in lessons and have high ability to study can show more academic risk taking behaviors. As reported by a study (İlhan et al., 2013) indicating a meaningful relationship between study skills and academic risk taking, academic risk taking behaviors increase as studying ability of students increase.

14. As for the students' favourite subjects, mathematics and science were reported in the first rank among the students' favorite courses, but Turkish lesson was reported in the third rank. This result also overlaps with the findings from the quantitative data because those who enjoy Turkish lesson less than the other two lessons exhibited moderate levels of academic risk-taking in the context of Turkish lesson.

RECOMMENDATIONS

This study focuses on the relationship between achievement and academic risk levels of students in Turkish lesson in secondary schools. Research on wider samples can be undertaken to assess different school types and class levels. The present study investigated the relationship between the variables. So future studies could be designed in different patterns.

REFERENCES

Arnett, J. (1992). Reckless behaviour in adolescence: a developmental perspective, *Developmental Review*, 12, 339-373.

Atkinson, J. W. (1957). Motivational determinants of risk-taking behaviour, *Psychological Review*, 64(6), 359-372.

Avcı, E. & Özenir, Ö. S. (2016). Ortaokul öğrencilerinin matematik odakli akademik risk alma davranişlarinin bazi değişkenlere göre incelenmesi, *Turkish Journal of Computer and Mathematics Education, 7 (2)*, 304-320.

Baş, S. (2012). *The Contrubution of Personality, Motivation, Academic Risk-Taking and MetacognitiontoThe Creative Ability in Mathematics*. Unpublished Doctoral Thesis, Ankara: Middle East Technical University.

Beghetto, R. A. (2009). Correlates of intellectual risk taking in elementary school science, *Journal of Research in ScienceTeaching, 46*(2), 210-223.

Bozpolat, E. & Koç, H. (2016). 8. sınıf öğrencilerinin matematik odaklı akademik risk alma davranışlarının bazı değişkenler açısından incelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*. DOI: 16986/HUJE.2016017559.

Budge, K. & Clarke, A. (2012). Academic development is a creative act, *Journal for Academic Development*, 17(1), 59-70.

Byrnes, L. P., Miller, D. C.&Schafer, William D. (1999). Gender differences in risk taking: a meta-analysis. *PsychologicalBulletin*, 125(3), 367-383.

Clifford, M. (1991). Risk taking: theoretical, empirical and educational considerations, *Educational Psychologist*, 26(3-4), 263-297.

Clifford, M.,Chou, F. C., Mao, K., Lan, W. Y. &Kuo, S. (1990). Academic risk-taking, development and external constraint, *Journal of Experimental Education*, 59(1), 45-64.

Clifford, M., Lan, W. Y., Chou, F. C., & Qi, Y.(1989). Academic risk-taking : development and cross-cultural observations, *The Journal of Experimental Education, 57*(4), 321-338.

Çakır, E. & Yaman, S. (2015). Ortaokul öğrencilerinin zihinsel risk alma becerileri ve üst bilişsel farkındalıklari ile akademik başarıları arasındaki ilişki.*Gazi Eğitim Bilimleri Dergisi*, 1(2), 163-178.

Çetin, B., İlhan, M. & Yılmaz, F. (2014).Olumsuz değerlendirilme korkusu ve akademik risk alma arasındaki ilişkinin kanonik korelasyonla incelenmesi, *Kuram ve Uygulamada Eğitim Bilimleri, 14 (1)*, 135-138.

Çiftçi, S. (2006).*Sosyal Bilgiler Öğretiminde Proje Tabanlı Öğrenmenin Öğrencilerin Akademik Risk Alma Düzeylerine, Problem Çözme Becerilerine, Erişilerine, Kalıcılığa ve Tutumlarına Etkisi*. Yayımlanmamış Doktora Tezi, Selçuk Üniversitesi Sosyal Bilimler Enstitüsü. Konya.

Daşçı, A. D. & Yaman, S. (2014). Fen ve teknoloji dersinde öğrencilerin zihinsel risk alma becerilerinin piaget'in bilişsel gelişim dönemlerine ve eğitim kademelerine göre incelenmesi. *Kuramsal Eğitimbilim Dergisi*, 7(3), 271-285.

Demirel, Özcan. (2007). *Öğretme sanatı*, (11. Baskı), Ankara: PegemA Yayıncılık

Devonshire, I.M.,Davis, J., Fairweather, S., Highfield, L., Thaker, C., Walsh, A., Wilson, R., &Hathway, G. J. (2014). Risk-based learning games improvelong-termretention of information among school pupils, *PLOS ONE*, 9(7), DOI: 10.1371/journal.pone.0103640.

Ely, C. M. (1986). An analysis of discomfort, risk taking, sociability and motivation in the l2 classroom, *Language Learning*, 36(1), 1-25.

Erbaş, A. K. & Baş, S. (2015). The contribution of personality traits, motivation, academic risk-taking and metacognition to the creative ability in mathematics, *Creativity Research Journal*, 27(4), 299-307.

Erricker, K. (2014). Taking risk with literature: an exploration into the resilience of pupil responses to the study of a challenging text at GCSE, *Literacy*, 48(2), 86-94. DOI: 10.1111/LİT.12016.

Farahani, A. A. & Hivechi, Z. (2013). The relationship between risk taking and self-assessment of efl learners in writing ability, *Mediterranean Journal of Humanities*, 3(1), 125-136.

Freeman, R. & Rossignol, K.L. (2010).Taking risk-experiential learning and the writing student, *Australian Journal of Adult Learning*, 50(1), 75-99.

Gezer, M., İlhan, M. & Şahin, İ. F. (2014). Sosyal bilgiler odaklı akademik risk alma ölçeğinin (soaraö) geliştirilmesi: geçerlik ve güvenirlik çalışması, *Kalem Eğitim ve İnsan Bilimleri Dergisi*, 4(1), 125-164.

Goodwin, A. L., Ling, L., Tee, N. P., Yeung, A. & Li, C. (2015). Enhancing playful teachers' perception of the ımportance of ICT use in the classroom: the role of risk taking as a mediator, *Australian Journal of Teacher Education*, 40(4), DOI: 10.14221/ajte.2015v40n4.8.

Gullone, E.& Moore, S. (2000). Adolescent risk taking and the five-factor model of personality, *Journal of Adolescence*, 23, 393-407.

Gündoğdu, M., Korkmaz, S. & Karakış, K. (2005). Lise öğrencilerinde risk alma davranışı, *M, Ü. Eğitim Fakültesi Eğitim Bilimleri Dergisi*, Sayı 21, 151-160.

Henriksen, D. & Mishra, P. (2013).Learning from creative teachers, *Educational Leadership*, 70(5).www. ascd.org. ET: 24.02. 2017

Hill, E. & Thomson Ross, L. (1997). The role of future unpredictability in human risk-taking, *Human Nature*, 8(4), 287-325.

House, D. J. (2002). *An Investigation of The Effects of Gender and Academic Self-Efficacy on Academic Risk-Taking for Adolescent Students*. Unpublished Doctoral Thesis, Oklahama State University.

İlhan, M. & Çetin, B. (2013). Ortaokul öğrencilerinin matematik odaklı akademik risk alma davranışları: bir ölçek geliştirme çalışması, *E-İnternational Journal of Educational Research*, 4(2), 1-28.

İlhan, M., Çetin, B., Öner-Sünkür, M. & Yılmaz, F. (2013). Ders çalışma becerileri ile akademik risk alma arasındaki ilişkinin kanonik korelasyon ile incelenmesi, *Eğitim Bilimleri Araştırmaları Dergisi*, 3(2), 123-146.

Korkmaz, H. (2002). *Fen Eğitiminde Proje Tabanlı Öğrenmenin Yaratıcı Düşünme, Problem Çözme ve Akademik Risk Alma Düzeylerine Etkisi*. Yayımlanmamış Doktora Tezi. Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü. Ankara.

Liu, M. & Jackson, J. (2008). An exploration of chinese efl learners' unwillingness to communicate and foreign language anxiety, *The Modern Language Journal*, (92), 71-86.

Maftoon, P. & Affrouktheh, N. (2013). The relationship between risk-taking and vocabulary learning strategy use of iranian efl learners, *Iranian EFL Journal*, 9(6), 131-148.

Majidifard, E.,Shamoossi, N. & Ghourchaei, B. (2014). Risk taking, genderand oral narrative proficiency in persian learners of english, *Procedia-Social and Behavioural Sciences*, 98, 1085-1092.

Miller, David C. & Byrnes, James P. (1997). The role of contextual and personal factors in children's risk taking, *Development Psychology*, 33(5), 814-823.

Neihart, M. (1999). Systematic risk-taking, *Roeper Review*, 21(4), 289-292.

Öner Sünkür, M., İlhan, M., Kinay, İ. & Kılınç, M. (2013).An exemination of the relation between 8th gradestudents' level of academic risk taking and their positive and negative perfectionism traits, *Çukurova University Faculty of Education Journal, 42*(2), 01-10.

Özbek, F. M. (2008). Güven, belirsizlik ve risk alma davranışı ilişkisi: teorik yaklaşım, *Akademik Bakış,* 15, 1-12.

Panno, A., Lauriola, M., & Figner, B. (2013). Emotion regulation and risk taking: predicting risky choice in deliberative decision making, *Cognition and Emotion*, 27(2), 326-334.

Parker, J. & Stanworth, H.(2005). "Gofor it" towards a critical realist approach to voluntary risk-taking, *Health, Risk & Society*, 7(4), 319-336.

Ramos, I. & Lambating, J. (1996). Risk taking: gender differences and educational opportunity, *School Science Mathematics*, 96(2), 94-98. Onlinelibrary.wilwy.com/doi/10.1111/J. 1949-8594.1996.tb15816.x/full. E.T: 06.03.2017.

Richards, J. C. & Schmidt, R. (2002).*Longman Dictionary of Teaching and Applied Linguistics*.(Third Edition). Pearson Education Limited.

Robinson, L. E. (2012). *Academic Risk Taking in an Online Environment*. Unpublished Doctoral Thesis. University of Connecticut.

Strum, I. S. (1971). *The Relationship of Creativity and Academic Risk-Taking Among Fifth Graders*. Retrieved from ERIC database (ED046212).

Tan, E. W.S., Lim, S. W. H. & Manalo, E. (2016). Global-local processing impacts academic risk taking, *The Quarterly Journal of Experimental Psychology*, 1-11. DOI: 10.1080/17470218.2016.1240815.

Tavakoli, M. & Ghoorchaei, B. (2009). On the relationship between risk-taking and self-assessment of speaking ability: a case of freshman efl learners. *The Journal of Asia TEFL*. 6(1), 1-27.

Tay, B., Özkan, D. & Akyürek Tay, B. (2009). The effect of academic risk taking levels on the problem solving ability of gifted students, *Procedia Social and Behavioural Sciences*, 1, 1099-1104.

Young, R. D. (1991). *Risk-taking in learning, K-3*., Washington, DC: National Education Association.

Yselande, P. (2015). *Academic risk-taking in higher education*, Florida International University, USA. digitalcommons.fiu.edu/sferc/2015/2015/17. E.T. 21.12.2016.

International Journal of Progressive Education, Volume 15 Number 4, 2019

Turkish Elementary Teachers' Value Perceptions: A Sample of Rize*

Nermin Karabacak
Recep Tayyip Erdoğan University

Arzu Küçük
National Ministry of Education

Mehmet Küçük
Recep Tayyip Erdoğan University

Abstract

The purpose of this study is to investigate the values of elementary teachers in terms of gender, marital status, seniority and level of education variables. The study was conducted in accordance with the relational screening model. The sample of the study consists of 400 elementary teachers, 182 male and 218 female teachers working in public schools in Rize City, located in the north-east part of Turkey. The data were collected between March-May 2015. The "Schwartz Values Scale" (PBL) developed by Schwartz and adapted to Turkish by Demirutku was used in the study to reveal the values of elementary teachers. The participants were asked to mark a single option from 6 options ranging from "Much Like Me" to "Never Say It to Me" about the scale information and participants' brief portrayal of how similar they were to themselves. SPSS package program was used for statistical analysis of the data. Independent groups t-test, one-way analysis of variance (ANOVA) and correlation analyzes were performed in comparison with the items made in terms of personal characteristics.

Keywords: Elementary teachers, Value perceptions, Schwartz values scale, Turkey

DOI: 10.29329/ijpe.2019.203.19

---

[*] This paper was revised after being presented at International Conference on Research in Education - ICRE, Edirne, Turkey, 8-10 Oct 2015.

[i] **Nermin Karabacak,** Assoc. Prof. Dr., Recep Tayyip Erdogan University, Faculty of Education

Correspondence: nermin.karabacak@erdogan.edu.tr

[ii] **Arzu Küçük,** National Ministry of Education
[iii] **Mehmet Küçük,** Prof. Dr. Recep Tayyip Erdogan University, Faculty of Education

INTRODUCTION

The concept of "value" based on a hypothetical philosophy has become a mission in the functioning of social institutions by becoming an indispensable guide to the field of education in the 21st century. In this context, "value" is an interdisciplinary concept because of its importance. Value has different definitions in sociology, psychology and philosophy. According to philosophy; "Value", the quality of objects and events that determine their importance to human beings (Hançerlioğlu, 1999), according to psychology; (APA, 2006) ethical, social or aesthetic principles that individuals or society accept as good, desirable, and important in determining guidance; according to sociology (Seyyar, 2004, p.156) it is defined as a "shared criterion" or "idea" of which social behavior is good, true and desirable and everything that is desirable for the person and the group.

Equivalent to these definitions value is defined by the experts in more detail "a specific form of behavior, an opposite form of behavior, or a permanent belief in the purpose of life, individually or socially preferred for life purpose" (Rokeach, 1973); "a tendency to choose a particular situation" (Hofstede, 1980); "desirable attitudes that serve as principles guiding people in their importance to their lives, as a social actor, usually helping to select behaviors, to evaluate events and people, to explain their behavior" (Schwartz, 1999); "verbal representations of basic motivations approved by society" (Struch, Schwartz & Kloot, 2002).

The paradigms on the point of view of value have also brought about different classifications of values. In this study we will refer to the classifications that are frequently used in foreign and domestic literature for value. They are Rokeach's Value Inventory, Morris's Classification of Values, Spranger's Classification of Values, Kahle's List of Values, Schwartz's Theory of Values, Dilmac, Aricak and Cesur's Classification of Values (2014). The value classifications cover different dimensions according to the experts. It can be said that the differences in these dimensions are the factors of personal and cultural values reflected by the individuals. In the literature, one of the widely used classifications in the classification and measurement of values is Rokeach Value Inventory (1973) and the other is Schwartz's Value Theory (1992). In the context of using the "Schwartz Value Scale" (PDA) in this study (1992) it was preferred to focus on the Schwartz Theory of Values.

The Schwartz Theory of Values (1992) can be attributed to ten universal bases of fundamental value-based value classifications. According to Schwartz, value types derive from three universal requirements. According to these basic assumptions;

i. the individual's biological needs,
ii. the need to organize social interactions,
iii. the need to fulfill the group and social requirements (Roccas et al., 2002, p.790).

Each individual and group uses values that are cognitive representations of relevant needs in order to explain behavior, to ensure coordination between them, and to justify these behaviors (Demirutku, 2010). Schwartz (1996) moving from three universal needs has constructed ten types of values that are related to each other in a dynamic structure that contain values similar to or different from motivational infrastructures. These values are; power, success, hedonism, arousal, self-interest, benevolence, tradition, conformity, universality and security. These values are classified according to the motivating purpose of the individual. In these classifications, for example, power value contains social status, prestige and domination on people and resources, the value of success contains personal success. Hazing value contains happiness, and value of anxiety contains excitement and innovations in life (Ros, Schwartz & Surkiss, 1999).

Schwartz examined the data both individually and culturally gathered from the sample group of approximately 44,000 samples created by teachers and college students from 54 countries including Turkey (Smith & Schwartz, 1997). The values in the individual dimension are handled according to the preferences (importance) of the people to guide their lives. The purpose of examining values at the

cultural level is to produce information on abstract ideas that are shared across society and based on social norms. The cultural unit at the cultural level is the cultural group (nation, ethnic group) itself. The reason for the distinction between these two levels is the possibility that motivational relations between the values that guide the individual at the individual level cannot exhibit the same characteristics at the cultural level. Such separation leads to the avoidance of a major error (ecological mistake) that is common in social sciences, which manifests itself in the fact that it relies on the findings of an examination level and is related to another (Hofsede, 1980). According to Schwartz (1992), the most important feature that separates individual values from each other according to the basic assumptions in the theory of values is the types of motivational goal. In this context, values that are most likely to be found in all cultures must be values that symbolize the universal requirements of human nature (biological requirements, conditions necessary for harmonious social interaction) in the form of conscious goals.

Schwartz has modeled his theory to determine the dynamic relationships between these values. Value types can be in harmony or contradiction in accordance with their motivational goals. For example, in the Schwartz Value Theory and in the Portrait Values Questionnaire; (i) according to the three universal requirements mentioned above, the motivation underlying each requirement; (ii) By considering the work done in different cultures based on the theoretical framework, by examining the literature on values in many cultures and also taking into account differences with basic motivational characteristics the values were grouped into ten basic values (Bardi & Schwartz, 2003, p. 1208). Based on this theoretical framework and observations in different cultures, Schwartz (1990-1992) developed one of the most comprehensive classifications of value types.

Properties of Value Concept

Values are as important as the theoretical direction, as they are closely related to our society, which is seeking its place in a rapidly changing world. Inevitable consequence of socio-economic developments it is closely related to the fact that the healthy functioning of new social arrangements and the values of the individuals are in harmony with the regulations. This problem of conformity requires that the society to be well-recognized for the success of social policies and therefore a detailed examination of its values (Ergun, 1991; Kağıtçıbaşı, 1990). The results of the most comprehensive cultural-level value surveys (Hofstede, 1980; Schwartz, 1994; Smith, Dugan & Trompenaars, 1996; Schwartz, 2001) in which samples from Turkey are included are evaluated in general. It has been seen that the Turkish culture is among the cultures that emphasize the inner group commitment and provide the social organization mainly through hierarchical roles (Kuşdil & Kağıtçıbaşı, 2000). The function of values today is important to guide individuals and collecting. Schwartz's value theory is based on observing values in different societies, based on universal bases. In this context, society is a whole of values. Traditions, customs, the structure of society and the form of government are the impulses that make up this system of values. The formation of these values is based on a long process. Everything they accumulate during the period from the emergence of societies until the last meeting, exhibited in the scene of civilization, and transmitted to future generations is regarded as a value.

These values are sometimes adopted and accepted by widespread masses and ensure the continuity of societies, and sometimes the space they adopt is limited to a small group and can lead to various problems in society. Human values; personal, institutional, social and cultural resources. In this context, social scientists should give importance to understanding and explaining their valuesValues affect behavior and are a guide to the behavior of individuals (Rokeach, 1973). When the values of individuals become behavior, schools take their place as secondary social institutions. In this context, schools with strong values shared are effective, as schools are value-based institutions. At the forefront of the cultural characteristics of a successful school is the fact that it has strong values supported by a reliable environment (Purkey & Smith, 1983). Although long time has been spent on value education through implicit programs in Turkey, it has been decided in the 18th National Education Council (2010) that "value education" is officially included in school programs. In this context, it can be said that the studies on the values of the teachers have a very recent history.

The teacher who tries to educate and develop society; it is also an asset how useful it will be to the student, to the student and to the community (Ilgaz & Bilgili, 2006). The training of sufficient quantity and quality of our future education and the development of education reflect the quality of the teacher to a great extent (Gürkan, 1993, p. 1). The values that the teacher has are a factor in the functioning and success in the educational systems (Köseoğlu, 1994, p. 2).

It has been found that some of Turkish teachers do not have enough professional values and as a result they have had important challenges with their students, colleagues, parents and school administrations (Altınkurt & Yılmaz, 2011; Gözütok, 1999; Obuz, 2009; Pelit & Güçer, 2006; Turgut, 2010; Yılmaz & Altınkurt, 2009). In this context, the value that teachers have and reflects has been the focus of both education policy makers and educators in the last ten years since value education is given by the teachers in this context. As the values that teachers have and reflect are the theoretical direction, the change in personal and social values is of elementary concern to the educators and the Turkish society is also closely related. The values that teachers have are expected to be reflected first to their students and then to the collective reflection. In social arrangements, the values teachers have are closely related to the relations among teachers, students and community.

In this context, there is a need for teacher values to be consistent with the values of society. In the context of the fact that teachers are a transporter of the cultural values within the process of socialization, detailed examination of the values that teachers possess is required.

Research on Turkish Teachers' Values

Previous research showed that, the researches about the teachers' reflection on the values in Turkey gained weight in the years of 2000, and these research studies were carried out with college students. Despite the research conducted with teacher candidates, it can be said that the teachers have limited efforts to reflect their values. In this context, the information on the work done by the teachers on the values they reflect is given in Table 1.

Table 1. Studies on Teachers' Values Reflections in Turkey

Researcher/s	Participants	Meassurement Tool	Study Results
Kuşdil & Kağıtçıbaşı (2000)	89 Man, 94 Woman 183 Secondary and High School Teachers	Schwartz Values List	gender variable to differentiate teachers' values
Dönmez & Cömert (2007)	313 Woman, 262 Man Elementary Teacher	Lussier Value Scale	gender is an important determinant of value diversity effect of branch in value system
Aktay (2008)	School manager, Teacher	Schwartz Values List	gender and seniority are important determinants of value disparity
Aktepe & Yel (2009)	71 Elementary Teacher	Rokeach Value Survey	no significant difference between social and individual values
Yılmaz (2009)	247 Man, 235 Woman Elementary Teacher	Schwartz Values List	gender and seniority are important determinants of value disparity
Demirutku (2010)	194 Man, 186 Woman University student	Adaptation of the Portrait Values Questionnaire to Turkish	gender is an important determinant of value diversity
Dündar (2012)	275 Man, 132 Woman 407 Elementary and Secondary Teacher	Schwartz Values List	the most powerful value of teachers is universalism and virtue
Şahin-Fırat & Açıkgöz (2012)	255 Man, 647 Woman Elementary Teacher	Schwartz Value Scale	teachers' gender, seniority and branch are determinant in value system
Şafak & Sadık (2015)	126 Man, 187 Woman High School Teachers	Demir and Koç Universal Values Attitude Scale	gender is an important determinant of value diversity

*This table was adapted from a Phd thesis done by Karabacak (2016)

From the data in Table 1, it can be said that studies on the values of teachers in Turkey started in 2000 years and accelerated in the following period, but the work done is limited. In general, when we look at the common characteristics of these studies carried out for teachers' value systems;

(i) There are studies that show that gender is an important determinant of gender differences in value (Kuşdil & Kağıtçıbaşı, 2000; Aktay, 2008; Yılmaz, 2009; Demirutku, 2010; Şahin-Fırat & Açıkgöz, 2012; Şafak & Sadık, 2015) although there are studies in the literature in which gender does not create value differences (İmamoğlu and Aygün-Karakitaboğlu, 1999).

(ii) The effects of the teachers' branches on the value projections (Dönmez & Cömert, 2007; Şahin-Fırat & Açıkgöz, 2012)

(iii) Teachers' occupational seniority is influenced by their reflection on values (Aktay, 2008; Yılmaz, 2009; Şahin-Fırat & Açıkgöz, 2012). Equivalent qualifications that support the results of this research include studies in which the value projections of teachers are presented together with a different scale. These studies are given in Table 2.

Table 2. Investigations Towards the Togetherness Explanation of Teachers' Value Reflections in Turkey

Researcher	Participants	Meassurement Tool	Study Results
Güney-Gedik (2010)	93 Man, 202 Woman Primary Teacher	Schwartz Value Scale, Student Transfer Value	Gender, seniority and marital status are important determinants of value disparity
Yılmaz & Dilmaç (2011)	121 Man, 182 Woman 303 Secondary and High School Teachers	Schwartz Values List Hackman and Oldham Business Satisfaction Scale	Teachers' job satisfaction is related to human values
Dilmaç & Ekşi (2012)	275 Man, 147 Woman Teacher	Schwartz Values List, Teacher Altruism Scale, Professional Self-Respect Scale	Investigation of the values and self-worth of the teachers in terms of professional self-esteem
Işık & Yıldız (2013)	109 Man, 91 Woman Primary Teacher	Schwartz Values List, Interpersonal Problem Solving Inventory	Gender and seniority are important determinants of value disparity
Serin & Buluç (2014)	180 Man, 170 Woman 350 Primary Teacher	Schwartz Value Scale, DiPaola, Tarter & Hoy Organizational citizenship scale	There is a positive relationship between the value perception of elementary teachers and organizational citizenship behaviors and a low level of relationship

*This table was adapted from a Phd thesis done by Karabacak (2016)

From the data in table 2, when we look the common characteristics of these studies, in which the teachers' values are measured together with another predictor, there is a close relationship between the values that teachers are trying to convey to the students with the values they are trying to convey, job satisfaction, altruistic behavior, professional self-esteem, interpersonal problem solving skills and organizational citizenship (Güney-Gedik, 2010; Yılmaz & Dilmaç, 2011, Dilmaç & Ekşi, 2012; Serin & Buluç, 2014).

In these studies, the gender, marital status, occupational seniority and the values of the branches were reflected in the studies. In the current study, the variables of gender, marital status and occupational seniority of the teachers, which are taken into consideration especially in the context of the literature, are included in the study. In addition to these three demographic variables, the level of education was also included in the study. In this study, "elementary teachers" were studied not in the branch of teachers but in special sense. In this context, the differences of "elementary teachers" on the gender, occupational seniority, marital status and educational attainment according to the variables of education level were examined. According to the literature review, two studies conducted for the reflection of values of elementary teachers (Işık & Yıldız, 2013; Serin & Buluç, 2014) the relationship

between the values teachers possess and organizational citizenship and interpersonal problem solving skills and the relation to the values they want to transfer to their students according to their value orientations (Güney-Gedik, 2010) were sought. In this context, except for a claim made by Güney-Gedik & Memiş (2010) a study has not been carried out specifically on the reflection of the value of Turkish elementary teachers.

The task of schools in the transfer of culture is to develop values in the positive direction of teaching the values that are explicitly or unspecified in the school program, disciplining the students in accordance with the established rules, contributing to the moral development, and character and self-perception. Teachers reflect consciously or unconsciously the values they use as a criterion when they are conducting their teaching activities in the course of planning and displaying their behavior (Welton & Mallan, 1999; Mariano, 1999; Veugelers, 2000; Yüksel, 2004). For this reason, it is important for teachers to be role models for their students, to develop and shape the values of the students (Dale, 1994; Can, 2008; Çengelci, 2010). Teachers are guiding students on rearing makes values more important. The values that teachers have been shown to be influenced by student behaviors (Brophy & Good, 1986; Dickinson, 1990; Dale, 1994; Veugelers, 2000; Bakioğlu & Tokmak, 2009).

It is important that the teacher is modeled when values are brought to the pupils at an early age at elementary school level. It can be said that elementary teachers turned into a model to be taken as an example with their way of life. Teaching is not only a process involving the transmission of information, but also involves the goal of bringing values to younger generations (Şentürk, 2009; Toprakçı, Bozpolat & Buldur, 2010). The reflection of the values that the elementary teacher have and being a model on the students is also a professional value (Karabacak, Küçük & Korkmaz, 2015). In this context, it is important to reflect the values possessed by elementary school teachers in the classroom environment.

This study was conducted with the aim of contributing to the literature by filling in the gap in the literature, especially with regard to "elementary teachers", assuming that they were transferring basic cultural values within the socialization process. The aim of the study is to investigate the "values of elementary teachers in terms of gender, marital status, seniority and level of education" variables.

METHOD

Sample of the Study

This study was conducted in accordance with the relational screening model. The study sample consists of 400 elementary teachers, 182 male and 218 female teachers working in public schools in Rize City, located in the north-east part of Turkey. The study group consisted of with the stratified sampling method; the "elementary school" and "elementary teacher" variables that best represent the center of Rize province and its districts are considered as criteria. For this purpose, necessary information and statistics were obtained from Rize National Education Directorate in order to choose the most suitable elementary school according to stratified sampling method. Five Elementary School "representing Rize province center and among the districts, five central elementary school were selected in line with the information received. In this context, a working group of researchers of central schools and elementary teachers in the provinces and districts of Rize has been established. The data of the study were collected between March-May 2015. For this purpose, public schools in Rize and its districts were visited. The school administration and teachers were informed about the purpose of study. Voluntary participation has been made to work. Demographic characteristics of the study group are presented in Table 3.

Table 3. Demographic Characteristics of the Sample Group

Variables	Subcategories	N	Total
Gender	Male	182	
	Female	218	400
Marital status	Maried	304	
	Single	96	400
Seniority	1-3 year	51	
	4-6 year	65	
	7-9 year	68	
	10-12 year	53	
	13-15 year	39	
	16-18 year	34	
	19-21 year	39	
	21 and above year	51	400
Education level	Undergraduated Student	299	
	Graduated student	54	
	Graduated	23	
	Doctorate	13	
	Phd	3	
	Other	8	400

Data Collection Tool

Schwartz has based the theory on the validity of his work by collecting data from many different cultures, including Turkey, in the intercultural dimension so that comments and regulations on values can be made. Schwartz's theory of values; value priorities is based on a two-dimensional structure: (i) in the first dimension, change clearance and conservation (ii) in the second dimension; self-development and self-transcendence.

Opposite values in the first dimension; (i) preserves change (openness, self-direction, hedonism) and (ii) maintains (security, compliance, tradition). In this context, it is emphasized that values such as independence movements and thoughts and protection, keeping to old age and stagnation are in conflict.

Opposite values in the second dimension; (i) self-development (power and achievement) and (ii) self-excess (universalism and commitment). It is emphasized that values such as avoiding words and behaviors to harm others, thinking of others' benefit, proving their own success and power, putting pressure on others are in conflict. One thing to be aware of is the value of hedonism; is both opposite of the change openness and self-improvement values. In the context of these explanations, the Schwartz theory of value is mainly concerned with the motivational goals of values, and values are concerned with issues such as value priorities in a circular structure (Devos et al., 2002, p. 482)

Portrait Value Scale (PBL)

The Portraits Value Scale (PBL) was developed by Schwartz, Melech, Lehmann, Burgess, Haris and Qwens (2001) and adapted to Turkish by Demirutku (2010). PBL is a combination of (i) power, (ii) achievement, (iii) hedonism, (iv) stimulation, (v) self-direction, (vi) universalism, (vii) benevolence, (viii) tradition, (ix) compliance and (x) security dimensions. The scale consists of 40 items, each of which consists of two culled, indirectly measuring the values of different types of values, defining the goals and desires of hypothetical individuals. In each item, short verbal portraits of a hypothetical person are drawn based on values of different value types that define their goals and desires associated with one of the ten value types. For example; "It is very important for him to help people around him. They want to get refaced" item aims to measure the importance level of

"goodwill" value. In PBL, a six point likert-type scale was used. Participants were asked to indicate how similar the person given in the description is to you.

In the analysis of the data, the Smallest Space Analysis (Guttman, 1968; Demirutku, 2010) which is one of the suitable methods to test whether the value of each type of value is included in the predicted value type is given by Schwartz (1992) value theory was used. The data showed that the theoretical ten-value types disintegrated and validated (Demirutku, 2010). Multidimensional scaling analysis is a technique of stimuli, scales or different psychological structures as a result of measurements. Data were analyzed by EKUA using SYSTAT 11. The Schwartz (1992-1996) ten-value model was found to have a very similar circular orientation to the original model. As a result of the analysis, it was observed that the coefficient of alienation was comparable with previous studies (Schwartz et al., 2001).

Only one item out of the forty-four items was theoretically unexpected in the field of value type. Relative shifts of neighboring areas or interlinking with each other can be observed in studies that test the value model of Schwartz (1992) and can be expected according to the characteristics of the sample (Kuşdil & Kağıtçıbaşı, 2000; Schwartz, 1992). It has been observed that empirical work in this study does not show significant deviations from the theoretical model and that the observed deviations are in fact consistent with the deviations from the previous studies. For ten value types, the internal consistency coefficient observed in the first application ranged between .58 and .82, and the internal consistency coefficient in the second exercise varied between .63 and .84. The test-retest reliability for each value type was found to be .65 and .82 (Demirutku, 2010).

The "Schwartz Values Scale" (PBL) developed by Schwartz and adapted to Turkish by Demirutku was used in the study to reveal the "values of teachers". The scale was taken by the author himself / herself. The scale is organized into three parts:

(i) the directive on how to fill the scale,

(ii) demographic information of the candidates and

(iii) the scale itself. In this section, we asked to mark a single option from 6 options ranging from "Much Like Me" to "Never Say It to Me" about the scale information and participants' brief portrayal of how similar they were to themselves.

Data Analysis

SPSS 22.0 package program was used for statistical analysis of the data obtained with data collection tools. Arithmetic mean, standard deviation, frequency and percentage distributions were used in descriptive statistical analysis techniques related to the personal characteristics of the teachers participating in the study. Independent groups t-test, one-way analysis of variance (ANOVA) and correlation analyzes were performed in comparison with the items made in terms of personal characteristics.

FINDINGS

Since the arithmetic average, mode and median values of the total score of the scale were found to be related to each other, normality of continuous data was determined. From this hypothesis, parametric analyzes were performed.

1. Does the Schwartz Scale score show a meaningful difference according to the gender of the teachers?

This sub-objective was examined by t test analysis for independent samples.

Table 4. T-Test Results of Schwartz Scale Scores by Gender

Gender	N	$\bar{x}$	S	Sd	t	p
Male	182	176.41	23.33	398	-3.70	.000
Female	218	185.70	26.24	396.390		

The Schwartz Scale score shows a significant difference by gender [t (398) = -3, 706, p <.05]. The scores of female teachers [$\bar{x}$ = 185.70] were found to be higher than those of males [$\bar{x}$ = 176.41]. This situation has shown that female teachers' views on values are more positive.

Table 5. T-Test Results of Schwartz Scale Scales for Sub-Dimensions with Gender Status Differences

	F	t	Sd	p
Power	17.265	.756	85	.452
		.672	43.378	.505
Achievement	.020	.102	85	.919
		.104	63.391	.917
Hedonism	.079	-2.467	85	.016
		-2.420	55.983	.019
Stimulation	10.142	-.880	85	.381
		-.751	39.398	.457
Self-Direction	.690	.027	85	.979
		.026	53.191	.980
Universalism	4.615	1.545	85	.126
		1.368	42.882	.179
Benevolence	.380	1.665	85	.100
		1.598	52.745	.116
Tradition	15.589	3.814	85	.000
		3.356	42.286	.002
Conformity	1.081	1.933	85	.057
		1.762	46.126	.085
Security	1.594	1.144	85	.256
		1.061	48.234	.294

Table 6. Schwartz Scales for Sub-Dimensions with Gender Status Differences

Sub Dimension	**Gender**	$\bar{X}$	**df**
Hedonism	Male	10.63	2.58
	Female	12.10	2.74
Tradition	Male	15.82	2.58
	Female	13.13	3.97

According to gender, the difference between hedonism and traditionalism subscales were found to be meaningful. Female in hedonism ($\bar{x}$ = 10.63), compared to male ($\bar{x}$ = 12.10); Traditionally, the average scores of male ($\bar{x}$ = 15.82) and female ($\bar{x}$ = 13.13) subscales were found to be higher.

2. Does the Schwartz Scale Score show a meaningful difference according to the marital status of the teachers?

This sub-objective was examined by t test analysis for independent samples.

Table 7. T-Test Results of Schwartz Scale Scores According to Marital Status

Marital Status	N	$\bar{x}$	S	df	t	p
Married	304	179.80	25.94	398	-2.363	.019
Single	96	186.78	22.72			

The Schwartz Scale Score shows a significant difference from the marital status [t (398) = -2.363 <.05]. Scale scores of single teachers [$\bar{x}$= 186.78] were higher than married teachers [$\bar{x}$ = 179.80]. This shows that single teachers according to marital status have higher value scores than married teachers.

Table 8. ANOVA Results of Sub-Dimensions of Schwartz Scale Scores with Marital Status Differences

		SS	df	S^2	F	p
Power	Between Groups	2.462	1	31,924	. 6,062	.016
	Within Groups	2.377	85	447,662		
	Total		86	479,586		
Achievement	Between Groups	1.351	1	34,007	3.832	.180
	Within Groups	1.572	85	1582,890		
	Total		86	1616,897		
Hedonism	Between Groups	.542	1	2,182	1.765	.589
	Within Groups	.504	85	632,162		
	Total		86	634,345		
Stimulation	Between Groups	-.362	1	,871	2.262	.719
	Within Groups	-.345	85	566,026		
	Total		86	566,897		
Self-Direction	Between Groups	-1.266	1	16,139	.773	.209
	Within Groups	-1.569	85	856,344		
	Total		86	872,483		
Universalism	Between Groups	-1.869	1	63,311	3.425	.065
	Within Groups	-2.700	85	1540,344		
	Total		86	1603,655		
Benevolence	Between Groups	-1.326	1	21,523	5.314	.189
	Within Groups	-1.946	85	1041,097		
	Total		86	1062,621		
Tradition	Between Groups	-2.221	1	53,420	6.217	.029
	Within Groups	-2.927	85	920,649		
	Total		86	974,069		
Conformity	Between Groups	-2.891	1	101,649	7.495	.005
	Within Groups	-4.685	85	1034,006		
	Total		86	1135,655		
Security	Between Groups	-2.023	1	57,275	4.216	.046
	Within Groups	-3.089	85	1190,104		.
	Total			1247,379		

Table 9. Schwartz Scales for Sub-Dimensions with Marital Status Differences

Sub Dimension	Marital Status	$\bar{x}$	df
Power	Married	9,27	2,25
	Single	7,85	2,41
Tradition	Married	14.45	3,59
	Single	16.28	2,02
Conformity	Married	16,04	3,94
	Single	18,57	1,07
Security	Married	20,81	4,19
	Single	22,71	1,52

According to the marital status, a difference was found in the sub-scales of power and tradition. Married in power ($\bar{x}$ = 9.27), according to single ($\bar{x}$ = 7.85); In the tradition, the average values of the subscales were higher than those of the single ($\bar{x}$= 16.28) and married ($\bar{x}$= 14.45). Married in conformity (16.04), according to single ($\bar{x}$ = 18.57); married in security (20,81), according to single ($\bar{x}$ = 22,71).

3. Does the Schwartz Scale Score show a meaningful difference according to the seniority of the teachers?

This sub - goal was determined by one - way ANOVA analysis.

Table 10. ANOVA Results of Schwartz Scale Scores According to Seniority

Source of Variance	Sum of Squares	df	S^2	F	p	Significant Difference
Between groups	12553.177	7	1793.311	2.881	.006	(4 - 6 year) (19 - 21 year)
Within groups	244004.663	392	622.461			
Total	256557.840	399				

According to the Levene statistical test, the variance was not homogeneous in the analysis results [p <.05]. The Schwartz scale score shows a significant difference from the seniority variable [F (7-392) = 2.88, p <.05]. In other words, the scale score changes in a meaningful way with respect to seniority. According to the Dunnett T3 results, which are the differences between the units according to seniority, between teachers with 4-6 years and 19-21 years [p <.05], there is a more distinctive result than the other units. Values have been seen to be more positive than they are to the point of view.

ANOVA						
		Sum of Squares	df	S^2	F	p
Power	Between groups	66,514	7	9,502	1,817	,095
	Within groups	413,072	79	5,229		
	Total	479,586	86			
Achievement	Between groups	213,943	7	30,563	1,721	,116
	Within groups	1402,953	79	17,759		
	Total	1616,897	86			
Hedonism	Between groups	108,788	7	15,541	2,336	,032
	Within groups	525,557	79	6,653		
	Total	634,345	86			
Stimulation	Between groups	76,399	7	10,914	1,758	,108
	Within groups	490,498	79	6,209		
	Total	566,897	86			

	Between groups	105,293	7	15,042	1,549	,163
Self-Direction	Within groups	767,190	79	9,711		
	Total	872,483	86			
	Between groups	217,436	7	31,062	1,770	,105
Universalism	Within groups	1386,219	79	17,547		
	Total	1603,655	86			
	Between groups	101,478	7	14,497	1,192	,317
Benevolence	Within groups	961,143	79	12,166		
	Total	1062,621	86			
	Between groups	153,146	7	21,878	2,105	,052
Tradition	Within groups	820,923	79	10,391		
	Total	974,069	86			
	Between groups	131,769	7	18,824	1,481	,186
Conformity	Within groups	1003,886	79	12,707		
	Total	1135,655	86			
	Between groups	126,625	7	18,089	1,275	,273
Security	Within groups	1120,755	79	14,187		
	Total	1247,379	86			
	Between groups	12553,177	7	1793,311	2,881	,006
Scale	Within groups	244004,663	392	622,461		
	Total	256557,840	399			

4. Does the Schwartz scale score differ significantly from the teachers' level of education?

This sub - goal was determined by one - way ANOVA analysis.

Table 11. ANOVA Results of According to Education Level of Schwartz Scale Scores

Source of Variance	Sum of Squares	df	S^2	F	p	Significant Difference
Between groups	8517.588	5	1703.518	2.706	.020	Undergraduate - master Undergraduate - doctorate
Within groups	248040.252	394	629.544			
Total	256557.840	399				

According to the Levene statistical test, the variances were found to be homogeneous in the analysis results [p> .05]. The Schwartz scale score shows a significant difference from the educational level variable [F (5-394) = 2.706, p <.05]. In other words, the scale score changes in a meaningful way compared to the level of education. According to the results of LSD for determining the differences among the units according to the level of education, there was a more meaningful result among the teachers who have undergraduate - master, undergraduate and doctorate units [p <.05] than the other units. Values have been seen to be more positive than they are to the point of view.

ANOVA

		Sum of Squares	df	S2	F	p
	Between groups	33,174	3	11,058	2,056	,112
Power	Within groups	446,413	83	5,378		
	Total	479,586	86			
	Between groups	14,316	3	4,772	,247	,863
Achievement	Within groups	1602,580	83	19,308		
	Total	1616,897	86			
	Between groups	18,876	3	6,292	,849	,471
Hedonism	Within groups	615,469	83	7,415		
	Total	634,345	86			

	Between groups	11,510	3	3,837	,573	,634
Stimulation	Within groups	555,387	83	6,691		
	Total	566,897	86			
	Between groups	12,022	3	4,007	,387	,763
Self-Direction	Within groups	860,461	83	10,367		
	Total	872,483	86			
	Between groups	78,777	3	26,259	1,429	,240
Universalism	Within groups	1524,878	83	18,372		
	Total	1603,655	86			
	Between groups	46,150	3	15,383	1,256	,295
Benevolence	Within groups	1016,471	83	12,247		
	Total	1062,621	86			
	Between groups	37,584	3	12,528	1,110	,350
Tradition	Within groups	936,485	83	11,283		
	Total	974,069	86			
	Between groups	80,169	3	26,723	2,101	,106
Conformity	Within groups	1055,487	83	12,717		
	Total	1135,655	86			
	Between groups	51,919	3	17,306	1,202	,314
Security	Within groups	1195,460	83	14,403		
	Total	1247,379	86			
	Between groups	8517,588	5	1703,518	2,706	,020
Scale	Within groups	248040,252	394	629,544		
	Total	256557,840	399			

RESULTS AND DISCUSSION

Schwartz Value Scale is an important instrument for the identification and development of cultural values in the context of the formation of a sample group of teachers and university students of the majority of the 54 countries in which Turkey is located amongst the participant group. In this study, "Value Reflections of Elementary Teachers: The Case of Rize Province" was investigated in Turkey using "Schwartz Value Scale (PBL)" which was determined to be suitable for Turkish culture. The following discussion process has been carried out in the light of findings obtained from the examination of the study. In previous studies, similar research results were not found in both the study group and the measurement tools used. In this context; some of the studies in the area (in part) have been used to contribute to the discussion part of the work.

Teachers who interact with children during elementary school; it can be said that the students have a great role in gaining a healthy personality without shaping the future of the students. If the classroom teacher does not have the values desired by society, it is a true "loser" student. It is the society that is lost in the long walks. While the classroom teacher does not have the necessary values for his / her profession, the problem is the dimensions that affect both his / her student and the society (Yeşilyaprak, 1999).

Classroom teachers work on average 6 hours a day. Considering that a child sleeps 10 hours a day during the elementary school age and he / she needs 2 hours, the rest of the day is spent with the teacher. For this reason, the teacher has the chance to shape students' values (Suh & Traiger, 1999). In this context, it can be said that the values of the elders of tomorrow can be shaped from the values of the teachers of the day to a great extent. It is constituted by the classroom teachers of good citizens of the society, qualified parents, professionals, and politicians (Senemoğlu, 1994).

In the study of Karabacak et al., (2015) "studying the professional values of class teachers through metaphors", "class teachers" took their place as teachers who prepared the life of the individuals with the assurance of the future. The teaching profession is separated from other professions by its specific qualities. This feature; your teacher is the teacher of all the professions. The teaching profession is in this respect a sacred position of high status, which is respected in all

societies. Individuals who pursue this profession must also have the obligation to comply with "value" criteria in all their practices (Obuz, 2009; Uzbek, 2003).

Teachers are not the only practitioners of the teaching program. At the same time, they form an implicit value education for the students with their perceptions and behaviors about what teachers give importance to, what is good or bad (Doganay, 2009). For this reason, it is pleasing that the attitudes of teachers towards universal values are highly positive. They are many studies in which teachers' values and values they consider important and value preferences examined (Aktay & Ekşi, 2009; Başol & Bardakçı, 2008; Balcı & Yanpar-Yelken, 2010; Kuşdil & Kağıtçıbaşı, 2000; Veugelers, 2000; Demiryürek, 2008, Kuşdil & Kağıtçıbaşı, 2000, Memiş & Güney-Gedik, 2010; Sarı, 2005; Yılmaz, 2009; Yıldırım, 2009). In this context, the values that class teachers have are not only themselves but also stakeholders; Family, and society (Brynildssen, 2002; Vess & Halbur, 2003).

When the first findings obtained from the study were taken into consideration, the values of the teachers' values were found to be higher in female teachers than in the males. Despite the fact that gender is not a significant difference in value (Karakitapoğlu & İmamoğlu, 2002; Yapıcı & Zengin, 2003), the others found that gender is an important determinant of value differences (Aktay, 2008; Güney-Gedik, 2010; Demirutku, 2010; Kuşdil & Kagıtçıbaşı, 2000; Şahin-Fırat & Açıkgöz, 2012; Sarı, 2005; Şafak & Sadık, 2015; Yılmaz, 2009).

According to this study, female teachers were found to be higher in hazing and males in traditionally. There are many studies in which the value of female teachers in hazing value dimension is high (Güney-Gedik, 2010); men are in the value of tradition is high (Bacanlı, 2002). Despite these findings, it has been revealed that female teachers' attitudes regarding universal values are more positive (Şahin-Fırat & Açıkgöz, 2012; Altunay & Yalçınkaya, 2011; Çelebi, 2014; Şafak & Sadık, 2015). This result may be due to the fact that in almost all societies women are expected to be sensitive, tolerant, compassionate, thoughtful, orderly and responsible from the ideal image of women (Kağıtçıbaşı, 1990). In addition, there are patterned judgments in the Turkish society that the teaching profession is a more suitable profession, especially for women (Tezcan, 1995), and that women are more conscious of choosing teaching profession (Çelenk, 1988). Basic tasks expected from women in Turkish culture; they must be emotional, collaborate, care and show interest. It is emphasized that men should act independently, to represent the family and to be competitive (Temel & Aksoy, 2001). Women's expectation of this upbringing and the environment can make them prefer universalism, benevolence, harmony and security values more than men.

In addition, it is seen that female and male teachers have high value scores in the study. According to a survey conducted in Turkey in 2015, while the teaching profession in the Turkish society took place in the 4th occupational group with the highest percentage of 80.98%, among the top 10 occupations, the teaching profession occupied 81.50% and 80.48% (Sunar et al., 2015). According to this latest study in Turkey, it can be said that the teaching profession has changed the mold judgments (values) that it is female profession. If the teaching profession is thought to be a profession whose human values are very prominent, these results can be interpreted as the fact that teachers try to be sensitive to the individuals they serve, no matter where they work or on which conditions.

It is gratifying that male and female teachers have high value scores. It is widely believed that the teacher is not a passive person, but a professional person whose beliefs and values must be modeled (Billington, 1997; Eisenberg et al., 1987; Senemoglu, 1994). The elementary school teacher has a much more significant influence in the child's life than the teachers at the other levels of education. This is because the first years of elementary education have an influence over future achievements, schools, lectures and attitudes towards them by carrying the infrastructure qualifications for the knowledge, skills and values to be gained in the information and skill education stages which are the basis for the preparation of the child for adult life in this period (Gürkan, 1993; Senemoğlu, 1994).

According to the second bullet point obtained from the study, the values of elementary teachers are higher than those of the married teachers according to the marital status of class teachers. When we review the related literature, we can find out that marital status is very limited in the sense that it creates meaningful value difference in favor of single class teachers (Aktay, 2008; Güney-Gedik, 2010; Tanit, 2007). According to marital status, value preferences do not make a meaningful difference (Tanit, 2007), whereas values of preference according to marital status differ only in strength and traditionality dimensions (Aktay, 2008); A significant differentiation in all dimensions except the power dimension according to marital status variable (Yılmaz, 2009) was observed.

This finding of the study is supported only by this work (Güney-Gedik, 2010) in the field of high altitude attitudes "worth having by single teachers". It can be said that single class teachers are more ambitious than married teachers, and their feelings of social position, control over people and resources, individual pleasure and pleasure orientation, excitement and search for innovation are more dominant. Despite this finding of the study, there is a belief in the higher value attitudes of married people in Turkish society. In a study conducted (Karabacak, 2016), it was revealed that student parents prefer married female teachers.

According to the third finding obtained from the study, the attitudes of the class teachers with 4-6 years and 19-21 years according to the seniority variable of the class teachers were found higher than the other seniority units. The seniority as an important determinant of value diversity was supported by the other studies (Erdem, 2009; Şahin-Firat & Açıkgöz, 2012; Yılmaz, 2009). When the related literature is examined, there are very limited number of studies that do not create meaningful value difference in favor of class teachers (Aktay, 2008; Aktay & Ekşi, 2009; Tanit, 2007). Finding that the study created meaningful value disparity in favor of class teachers who were between 4-6 years and 19-21 years in this finding; while in a study done by Işık and Yıldız (2007) as the first ten years of the profession and between 1-5 years and 6-10 years are high (Yılmaz, 2009) was supported. On the other hand Dönmez & Cömert (2007) found out that reflection of values decreases as the senior years of the teachers increase.

The fact that the reflection of the value of the teachers between 4-6 years and 19-21 years is high; the fall of these values that they reflect in the following years while they are more excited and actively involved in reflecting basic human values during their first years of work can be attributed to the difficulty of working conditions, not the fact that teachers do not have these values. Because, under Turkish conditions, classroom teachers work in the provinces and in situations where the conditions of difficulty change. On the contrary, it can be said that they continued the motivation to keep the enthusiasm for starting the new business. The classroom teacher in the teaching profession group has a special position in all other teaching areas. In this context, it is important to emphasize who the class teacher is and what values she should bear. In the literature studies, classroom teacher; (Karabacak et al., 2015; Uslu, 2010), as a profession that is both different and difficult than other teachers and also possesses the skills that it possesses.

The fourth bulletin according to the level of educational attainment shows that the teachers of the class have a meaningful value difference in favor of having a bachelor 's degree - a master' s degree and a bachelor 's degree - doctorate. In the field there is a study that negatively supports this finding. In this study (Aktay & Ekşi, 2009), value preferences do not differ according to education level. It can be said that based on the excitement of doing graduate education in the way of becoming a researcher scientist and making significant difference in favor of doing a doctorate. This data also supported by being a teacher researcher while teaching (Küçük, 2002).

REFERENCES

Aktay, A. (2008). *Yönetici ve öğretmenlerin değer tercihleri ile örgütsel vatandaşlık davranışları arasındaki ilişkinin incelenmesi* (Yayınlanmamış yüksek lisans tezi). Yeditepe Üniversitesi, İstanbul.

Aktay, A., & Ekşi, H. (2009). Yönetici ve öğretmenlerin değer tercihleri ile örgütsel vatandaşlık davranışları arasındaki ilişki. *İş Ahlakı Dergisi*, *2*(3), 19-65.

Aktepe, V., & Yel, S. (2009). İlköğretim öğretmenlerinin değer yargılarının betimlenmesi: Kırşehir ili örneği. *Türk Eğitim Bilimleri Dergisi. 7*(3), 607-622.

Altınkurt, Y., & Yılmaz, K. (2011). Öğretmen adaylarının öğretmenlerin mesleki etik dışı davranışlar ile ilgili görüşleri. *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi*, *11*(22), 113-128.

Altunay, E., & Yalçınkaya, M. (2011). Öğretmen adaylarının bilgi toplumunda değerlere ilişkin görüşlerinin bazı değişkenler açısından incelenmesi. *Kuram ve Uygulamada Eğitim Yönetimi Dergisi*, *17*(1), 5-28.

APA (Amerikan Psikoloji Derneği Psikoloji Sözlüğü). (2006). Dictionary of Psychology.

Bacanlı, H. (2002). *Değer tercihleri: Psikolojik kavram analizleri*. Ankara: Nobel Yayıncılık.

Bakioğlu, A., & Tokmak, N. (2009). Öğretmenlerin değer yargılarının eğitim süreçlerine etkisinin incelenmesi. *Marmara Üniversitesi Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi*, *30*, 65-83.

Balcı, F. A., & Yanpar-Yelken, T. (2010). İlköğretim öğretmenlerinin "değer" kavramına yükledikleri anlamlar. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *39*, 81-90.

Bardi, A., & Schwartz, S. H. (2001). Values and behavior: Strength and structure of relations. *Personality and Social Psychology Bulletin*, *29*, 1207-1220.

Başol, G., & Bardakçı, S. (2008). Eğitim değerlerindeki farklılaşmalar konusunda öğretmen görüşlerine yönelik bir çalışma. *Kuram ve Uygulamada Eğitim Bilimleri*, *8*(2), 439-480.

Billington, R. (1997). *Felsefeyi yaşamak, ahlak düşüncesine giriş*. (A. Yıldırım, Çev.). İstanbul: Ayrıntı Yayınları.

Brophy, H. W., & Good, T. L. (1986). *Third handbook of research on teaching*. Chicago: McNally.

Brynildssen, S. (2002). Character education through children's literature. Bloomington In ERIC, *Clearinghouse on Reading English and Communication, Family Learning Association*. Retrieved from http:// www.eric.ed.gov

Can, Ö. (2008). *Dördüncü ve beşinci sınıf öğretmenlerinin sosyal bilgiler dersinde değerler eğitimi uygulamalarına ilişkin görüşler*. Yayınlanmamış yüksek lisans tezi, Hacettepe Üniversitesi, Ankara,

Çelebi, N. (2014). Examining teachers' value perceptions according to different variables. *Anthropologist*, *18*(3), 1005-1018.

Çelenk, S. (1988). *Eğitim yüksekokulu öğrencilerinin öğretmenlik mesleğine ilişkin tutumları* (Yayınlanmamış yüksek lisans tezi). Selçuk Üniversitesi, Konya.

Çengelci, T. (2010). *İlköğretim beşinci sınıf sosyal bilgiler dersinde değerler eğitiminin gerçekleştirilmesine ilişkin bir durum çalışması* (Yayınlanmamış doktora tezi). Anadolu Üniversitesi, Eskişehir.

Dale, N. T. (1994). *Values education in American secondary school*. [Online] Education Conference, Kutztown University, Kutztown. Retrieved from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/ 80/13/d0/ 2b.pdf

Demirutku, K. (2004). *Turkish adaptation of the portrait values guestionnaire*. Ankara: Unpublished Manuscript, Middle East Technical University.

Demirutku, K., & Sümer, N. (2010). Temel değerlerin ölçümü: Portre değerler anketinin Türkçe uyarlaması. *Türk Psikoloji Yazıları*, Haziran, *13*(25), 17-25.

Demiryürek, E. (2008). *Eğitim iş kolunda faaliyet gösteren kamu sendikalarına üye öğretmenlerin eğitim sürecinde kazandırılmasını gerekli gördükleri değerlere ilişkin görüşlerinin değerlendirilmesi* (Yayınlanmamış yüksek lisans tezi). Yeditepe Üniversitesi, İstanbul.

Devos, T., Spini, D., & Schwartz, S. H. (2002). Conflicts among human values and trust in institutions. *British Journal of Social Psychology*, *41*, 481-494.

Dickinson, D. J. (1990). The relation between ratings of teacher performance and student learning. *Contemporary Educational Psychology*, *15*, 142-152.

Dilmaç, B., Arıcak, O. T., & Cesur, S. (2014). A validity and reliability study on the development of the values scale in Turkey. *Educational Sciences: Theory & Practice*, *14*(5), 1661-1671.

Dilmaç, B., & Ekşi, H. (2012). Öğretmenlerin sahip oldukları değerlerin ve özgeci davranışlarının mesleki benlik saygı açısından incelenmesi. *Değerler Eğitimi Dergisi*, *10*(23), 65-82.

Doğanay, A. (2009). Değerler eğitimi. C. Öztürk (Ed.), *Sosyal bilgiler öğretimi demokratik vatandaşlık eğitimi*, içinde (s. 225-256). Ankara: Pegem Akademi.

Dönmez, B., & Cömert, N. (2007). İlköğretim okulu öğretmenlerinin değer sistemleri. *Değerler Eğitimi Dergisi*, *5*(14), 29-59.

Dündar, H. (2012). Öğretmenlerin sahip olduğu değerler ile örgütsel vatandaşlık davranışları arasındaki ilişki. *Erzincan Üniversitesi Eğitim Fakültesi Dergisi*, *14*(2), 215-234.

Eisenberg, N., Cialdini, R.B., McCreath, H., & Shell, R. (1987). Consistencybased compliance: When and why do children become vulnerable. *Journal of Personality and Social Psychology*, *52*, 1174-1181.

Ergun, D. (1991). *Türk bireyi kuramına giriş. Türk kültürünün olanakları ya da Türkiye'de kamu iktisadının kültür kökenleri*. İstanbul: Gerçek Yayınevi.

Gözütok, D. F. (1999). Öğretmenlerin etik davranışları. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, *32*(1), 83-99.

Guttman, L. (1968). A general nonmetric technique for finding the smallest coordinate space for a configuration of points. *Psychometrika*, *33*, 469-506.

Güney-Gedik, E. (2010). *Sınıf öğretmenlerinin değer yönelimlerinin ve öğrencilerine aktarmak istedikleri değerlerin incelenmesi* (Yayınlanmamış yüksek lisans tezi). Zonguldak Karaelmas Üniversitesi, Zonguldak.

Gürkan, T. (1993). *İlkokul öğretmenlerinin öğretmenlik tutumları ile benlik kavramları arasındaki ilişki*. Ankara: Sevinç Matbaası.

Hançerlioğlu, O. (1999). *Felsefe sözlüğü* (On Üçüncü Baskı). İstanbul: Remzi Kitabevi.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. London: Sage Publications.

Ilgaz, S., & Bilgili, T. (2006). Eğitim ve öğretimde etik. *Kazım Karabekir Eğitim Fakültesi Dergisi. 14*, 199-210.

Işık, N., & Yıldız, N. (2013). İlköğretim sınıf öğretmenlerinin değer algıları ile kişilerarası problem çözme becerileri arasındaki ilişkinin değerlendirilmesi. *Researcher: Social Science Studies, 2*(3), 1-16.

İmamoğlu, E. O., & Karakitapoğlu Aygün, Z. (1999). 1970'lerden 1990'lara değerler: Üniversite düzeyinde gözlenen zaman, kuşak ve cinsiyet farklılıkları. *Türk Psikoloji Dergisi, 14*(44), 1-18.

Kağıtçıbaşı, Ç. (1990). Family and socialization in cross-cultural perspective: A model of change. John J. Berman (Ed.), *Cross-Cultural Perspectives*. Nebraska Symposium on Motivation, (pp. 135-200). Lincoln.

Karabacak, N., Küçük, M., & Korkmaz, İ. (2015). Primary school teachers' professional values from the perspective of teaching expert. *Turkish Journal of Teacher Education. 4,* 1-20.

Karabacak, N. (2016). *Sınıf öğretmenlerinin mesleki değerleri üzerine nitel bir çalışma* (Yayınlanmamış doktora tezi). Necmettin Erbakan Üniversitesi, Konya.

Köseoğlu, K. (1994*). İlköğretime öğretmen yetiştiren kurumlarda öğretim elemanı yeterliklerinin değerlendirilmesi* (Yayınlanmamış yüksek lisans tezi). Ankara Üniversitesi, Ankara.

Kuşdil, M. E., & Kağıtçıbası, Ç. (2000). Türk öğretmenlerinin değer yönelimleri ve Schwartz değer kuramı. *Türk Psikoloji Dergisi, 15*(45), 59-80.

Küçük, M. (2002). *Hizmet-içi aksiyon araştırması kurs programının fen bilgisi öğretmenlerine uygulanması: Bir örnek olay çalışması*. (Yayınlanmamış yüksek lisans tezi). Karadeniz Teknik Üniversitesi, Trabzon.

Mariani, L. (1999). Probing the hidden curriculum: teachers' students' beliefs and attitudes. *British Council 18th National Conference for Teachers of English. Palermo,* 18-20, March.

Memiş, A., & Güney-Gedik G. E. (2010). Sınıf öğretmenlerinin değer yönelimleri. *Değerler Eğitimi Dergisi, 8*(20), 123-145.

Milli Eğitim Bakanlığı [MEB]. (2010). Retreived from http://ttkb.meb.gov.tr/meb_iys_dosyalar/2014_10/02113646_18_sura.pdf

Obuz, P. (2009). *Beden eğitimi ve spor öğretmenliği bölümü öğrencilerinin öğretmenlik mesleğiyle ilgili etik olmayan davranışlara ilişkin görüşleri* (Yayınlanmamış yüksek lisans tezi). Çukurova Üniversitesi, Adana.

Özbek, O. (2003). *Beden eğitimi öğretmenlerinin meslekî etik ilkeleri ve bu ilkelere uyma düzeyleri* (Yayınlanmamış doktora tezi). Ankara Üniversitesi, Ankara.

Pelit, E., & Güçer, E. (2006). Öğretmen adaylarının öğretmenlik mesleğiyle ilgili etik olmayan davranışlara ve öğretmenleri etik dışı davranışa yönelten faktörlere ilişkin algılamaları. *Ticaret ve Turizm Eğitim Fakültesi Dergisi*, *2*, 95-119.

Purkey, S. C., & Smith, M.S. (1983). Effective schools: A review. *Elementary School Journal*, *83*, 427-452.

Roccas, S., Sagiv, L., Schwartz, S. H., & Knafo, A. (2002). The big five personality factors and personal values. *Personal Social Psychology Bulletin*, *28*(6), 789-801.

Rokeach, M. (1973). *Nature of human values.* New York: The Free Press.

Ros, M., Schwartz, S.H., & Surkiss, S. (1999). Basic individual values, work values, and the meaning of work. *Applied Psychology: An International* Review, *48*(1), 49-71.

Sarı, M. (2007). *Demokratik değerlerin kazanımı sürecinde örtük program: düşük ve yüksek "okul yasam kalitesi"ne sahip iki ilköğretim okulunda nitel bir çalışma* (Yayınlanmamış doktora tezi). Çukurova Üniversitesi, Adana.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theory and empirical tests in 20 countries. In M. Zanna (Ed.), *Advances in experimental social psychology* (25, pp. 1-65). New York: Academic Press.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, *25*, 1-65.

Schwartz, S. H. (1994). Are the universal aspect in the structure and content of human values? *Journal of Social Issues*, *50*(4), 19-45.

Schwartz, S. H. (1996). Value priorities and behaviour. In C. Seligman, J. M. Olson and M. P. Zanna (Eds.), *The Psychology of Values: The Ontorio Symposium*, Hillsdale, NJ: Lawrance Erlbaum.

Schwartz, S. H. (1999). A theory of cultural values and some implications for work. *Applied Psychology: An International Review*, *48*(1), 23-47.

Schwartz, S. H., Melech, G., Lehmann, A., Burgess, S., Harris, M., & Owens, V. (2001). Extending the cross-cultural validity of the theory of basic human values with a different method of measurement. *Journal of Cross-Cultural Psychology*, *32*, 519-542.

Senemoğlu, N. (2001). Sınıf öğretmeni bilgiyi aktaran kişi değil, bilgiye ulaşma yollarını öğreten kişidir. *MPM Kalkınmada Anahtar Verimlilik*, *7*(81), 12-14. Retreived from http://yunus.hacettepe.edu.tr/~n.senem/yayin.html

Serin, M. K., & Buluç, B. (2014). Sınıf öğretmenlerinin değer algıları ile örgütsel vatandaşlık davranışları arasındaki ilişki. *Kastamonu Eğitim Dergisi*, *22*(1), 273-290.

Seyyar, A. (2004). *Davranış bilimleri terimleri: Ansiklopedik sözlük.* İstanbul: Beta Yayınevi.

Smith, P. B., Dugan, S. & Trompenaars, F. (1996). National culture and the values of organizational employees: A dimensional analysis across 43 nations. *Journal of Cross-Cultural Psychology*, *27*, 231-264.

Smith, P. B., & Schwartz, S. H. (1997). Values. In J. W. Berry, M. H. Segall & C. Kağitçıbaşı (Eds.), Handbook of cross-cultural psychology, *Social behavior and applications* 3, (Second ed.). (pp. 77-118). Boston: Allyn & Bacon.

Suh, B. K. & Traiger, J. (1999). Teaching values through elementary social studies and literature curricula. *Education*. *119*(4), 723-727.

Sunar, L., Kaya, Y., Otrar, M., Nerse, S., Demiral, S., & Kalpaklıoğlu, B. (2015). Türkiye'de çalışma yaşamı ve mesleklerin itibarı. Retreived from http://turkeyses.net/meslekiitibar

Struch, N., Schwartz, S. H., & Kloot, W. A. (2002). Meanings of basic values for women and men: A cross-cultural analysis. *Personality and Social Psychology Bulletin, 28*(1), 16-28.

Şafak, İ., & Sadık, F. (2015). Lise öğrencileri ve öğretmenlerinin evrensel değerlere yönelik tutumlarının incelenmesi. *Akademik Sosyal Araştırmalar Dergisi, 3*(15), 70-88.

Şahin-Fırat, N., & Açıkgöz, K. (2012). Bazı değişkenler açısından öğretmenlerin değer sistemleri. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 43,* 422-435.

Şentürk, C. (2009). Öğretmenlik mesleğinde etik. *Bilim ve Aklın Aydınlığında Eğitim, 10*(111), 25-31.

Tanıt, T. (2007). *Eğitim yöneticilerinin değer tercihleri ile yaratıcılıkları arasındaki ilişkinin incelenmesi* (Yayınlanmamış yüksek lisans tezi). Yeditepe Üniversitesi, İstanbul.

Temel, Z. F., & Aksoy A. B. (2001). *Ergen ve gelişimi: Yetişkinliğe ilk adım*. Ankara: Nobel Yayın Dağıtım.

Tezcan, M. (1995). *Eğitim sosyolojisi*. Ankara: Feryal Matbaa.

Toprakçı, E., Bozpolat, E., & Buldur, S. (2010). Öğretmen davranışlarının kamu meslek etiği ilkelerine uygunluğu. *e-International Journal of Educational Research*. *1*(2), 35-50.

Turgut, N. (2010). *Devlet ilköğretim okullarında görev yapan yönetici ve öğretmenlerin meslekî etik sorununa karşı meslek örgütlerinin yaklaşımı (nitel bir çalışma)* (Yayınlanmamış yüksek lisans tezi). Yeditepe Üniversitesi, İstanbul.

Uslu, M. (2006). *Sınıf öğretmenlerinin kariyer değerlerinin belirlenmesi* (*Sarıyer İlçesi örneği*) (Yayınlanmamış yüksek lisans tezi). Yeditepe Üniversitesi, İstanbul.

Vess, K. A., & Halbur, D. A. (2003). *Character education: What counselor educators need to know*. ERIC/CASS Digest. Retrieved from http://www.eric.ed.gov

Veugelers, W. (2000). Different ways of teaching values. *Educational Review, 52*(1), 37-46.

Welton, D. A., & Mallan, J. T. (1999). *Children and their world*. Boston: Houghton Mifflin Company.

Yapıcı A., & Zengin, Z. S. (2003). İlahiyat fakültesi öğrencilerinin değer tercih sıralamaları üzerine psikolojik bir araştırma: Çukurova Üniversitesi, İlahiyat Fakültesi örneği. *Değerler Eğitimi Dergisi, 1*(4), 173-206.

Yeşilyaprak, B. (1999). Sınıf öğretmenlerinin rehberlik açısından rol ve işlevleri. *Millî Eğitim Dergisi, 144*, 27-30.

Yıldırım, K. (2009). Türk sınıf öğretmenlerinin değerler eğitimine ilişkin deneyimleri: Fenomonolojik bir yaklaşım. *Eurasian Journal of Educational Research, 35*, 165-184.

Yılmaz, E. (2009). Öğretmenlerin değer tercihlerinin bazı değişkenler açısından incelenmesi. *Değerler Eğitimi Dergisi, 7*(17), 109-128.

Yılmaz, E., & Dilmaç, B. (2011). Öğretmenlerin sahip oldukları değerler ile iş doyumlarının incelenmesi. *İlköğretim Online, 10*(1), 302-310. Retreived from http://ilkogretim-online.org.tr

Yılmaz, K., & Altınkurt, Y. (2009). Öğretmen adaylarının mesleki etik dışı davranışlar ile ilgili görüşleri. *İş Ahlakı Dergisi*, *2*(4), 71-88.

Yüksel, S. (2004). *Örtük program: Eğitimde saklı uygulamalar*. Ankara: Nobel Yayıncılık.