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Ethical Dilemmas: A Problematic Situation for Teachers

Neşe Börüⁱ

Nevşehir Hacı Bektaş Veli University

Abstract

During the decision-making process, finding two or more ethically correct alternative solutions is known as facing an ethical dilemma. The current study aimed to determine ethical dilemmas faced by teachers in high schools in Turkey. The study uses a qualitative research method. The data was collected through a semi-structured interview technique. A descriptive analysis method was used in analyzing the data. In the data, 6 main themes were found; individualized education, school regulations, administrators, parents, colleagues, and democratic & social values. Situations causing ethical dilemmas are the centralized curriculum, the testing system, the disciplinary system, class-size and class culture, because of a lack of suitability for individualized education. Other situations causing ethical dilemmas are related to complying with the administrators or school regulations; showing or not showing compassion to parents, students and colleagues; and the disagreement between democratic values and society's values.

Keywords: Ethical Dilemma, Education Politics, Student-Centered Education, Education Curriculum, School Principals, Democratic & Social Values, Testing System, Disciplinary System

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INTRODUCTION

Decision-making is the action of choosing among alternatives (Ergeneli & Mert, 2003). It is essential to think deeply as part of the decision-making process, however, sometimes, individuals may decide too lightly while decision-making (Barker, 1998). The ethical perception of the individual during the decision-making process has to be explicit (Al-Khatib, Robertson, Stanton & Vitell, 2002). Because, to develop moral behaviors in the organization, it is necessary to be loyal to one's values in the decision-making process, and to abide by moral principles (Hosmer, 1991).

During the decision-making process, finding two or more ethically correct alternative solutions is known as facing ethical dilemmas. Having an ethical dilemma is not about choosing right or wrong it's about taking a stand and facing situations where there are one or more acceptable behaviors (Jacobs & Hartshorne, 2003). When people deal with ethical issues, their aim is to do the right thing; however, individuals are often not aware what the right thing is, or if s/he has the capacity to do it. Generally, an ethical dilemma occurs because of the presence of multi-directional values competing with each other, or the claims of conflicting interest within groups (Tooffler, 1986; as cited in Özgener, 2004, p.121). These kinds of dilemmas are often faced in schools because there are various people who have different values and interests in the educational institutions, and all of them pressurize educational institutions to realize their own interests and values (Lashway, 1996).

The teaching profession is a lifework requiring you to make reasonable decisions and judgments in complex and uncertain environments. Teachers strive to handle extremely complex problems with the limited mental processes of humans (Riedler & Eryaman, 2016). Teachers tend to make reasonable decisions instead of rational ones (Borko & Shavelson, 2013). Teachers who are supposed to handle extremely complex problems are likely to encounter ethical dilemmas throughout their professional experience.

The current study investigates which practices, behaviors and physical conditions of the school environment are causing dilemmas for teachers in high schools in Turkey. The current study aims to determine ethical dilemmas faced by teachers in high school in Turkey.

Ethical decision-making

According to Hitt (1990), individuals practice different ethical systems while making decisions. There are four types of ethical systems (Aydm, 2001). The four types, their most notable thinkers, and definitions, can be found in Table 1.

Table 1. Ethical systems

ETHICAL SYSTEM	THINKER	DEFINITION
Intended Consequence Ethics	John Stuart Mill (1806-1873)	Determined moral trueness of actions as a result of intended consequences.
Rule Ethics	Immanuel Kant (1724-1804)	Enacted moral trueness of actions through standards and regulations.
Social Contract Ethics	Jean Jack Rousseau (1712-1778)	Determined moral trueness of actions by the etiquettes and customs of society.
Personal Ethics	Martin Buber (1878-1965)	Enacted moral trueness of actions by individual's conscience.

(Hitt, 1990; as cited in Aydm, 2001)

To Martin Buber, one of the most important thinkers of the personal ethical system in the classification of Hitt (1990), what comprises a personal ethical system is the consciousness inside human beings that allows us to recognize the good and the bad. Intended Consequence ethics, Rule ethics and Social Contract ethics depend on social bases more than personal ethics. In Intended

Consequence ethics, the consequences of the action determine the trueness or falsity of the actions. The goal is to protect the welfare of all relevant parties, within the scope of humanism. In Rule ethics the trueness or falsity of actions are determined through moral principles and virtues. For Social Contract ethics, we are expected to behave in the manner required by the common courtesies of our society (Aydın, 2001).

Dilemmatic spaces at schools

Ding & Wang's (2018) study pertains to the ethical dilemmas which pre-service teachers confront during their professional experience. Pre-service teachers are first-time teachers and in the process of training. When the results of the study are examined, it can be understood that dilemmas are usually concerned with the dilemma of "conventional educational conditions and educational approach of mentors" and "implementation of student-centered education perceptions".

According to the studies of Pope, Green, Johnson & Mitchell, (2009), ethical dilemmas focused on the evaluations of students. 62% of the participants in the study stated that they faced ethical dilemmas in the evaluation of students' academic performance. For instance; giving the answers to the students before the evaluation or changing the marks of the student in view of his/her effort.

According to the study of Helton & Ray (2005), teachers faced the following ethical dilemmas:

- Rules and policies: the need to go beyond the rules at situations such as protecting a student abused at home.
- Administrators: The decisions of the administrators conflicting with personal or professional ethics.
- Colleague behaviors: The discriminatory behaviors of colleagues towards the staff and students.

The examples about ethical dilemmas faced at schools determined by the studies of Beckner (2004, p.91) based on the studies of Cooper (1990), Fleishman & Payne (1980) and Kidder (1995) are below:

The facts against the legality: Administrators should have values such as honesty, indulgence, responsibility and keeping promises. The administrators sometimes ignore policies for the sake of the students' private situations. For instance, they may consider not revealing the situation of a family who want to hide the condition of a pregnant girl.

Justice against compassion: Ethical dilemmas are faced in the situations in which something is to be chosen, such as love versus rules, compassion versus equality, and love versus truth. For instance, if a student works at nights to support the family or when one of the family members of this student is sick, should we shut our eyes to the student dropping out, or coming late to the lesson? Being honest is important, but is it always necessary to tell the truth everywhere? Should an administrator take into consideration the psychological problems of a student?

Democracy and Responsibility: Does the meaning of the term majority stand for the majority of the people, school region or the students in general? When school policies are thought to reflect the demands of the majority in the region, should they keep on supporting these policies? Or should they resist these policies? This decision leads to ethical dilemmas according to Beckner (2004).

According to Tirri (1999), teachers face a dilemma about whether they should send out the naughty student or whether they should raise the mark of the student who is academically weak. They

also face dilemmas about whether they should warn their colleagues about unprofessional behaviors towards students. Similar findings are included in the study of Campbell (1996; as cited in Lishchinsky, 2010). Tirri (1999) stated that teachers face dilemmas about the rights of the minority. For instance, teachers think that the inclusion of content about the practices of the religion of the majority during the educational process may lead to the religious rights of the minority being ignored. According to the findings about ethical dilemmas teachers faced in Tirri's (1999) study, which was conducted with the participation of 33 teachers in Finland, teachers have ethical dilemmas about whether they should share students' secrets with their families and the administration, since they do not want to lose their confidence and trust.

Teachers may also have dilemmas about whether they should consider equality or the differences between students when they act. For instance, Colnerud (1997), emphasizes that teachers may be indecisive about whether they should choose to give attention equally to all students, or to concentrate on the students in need. The same study has also shown that when teachers face a dilemma about whether they should behave compassionately or formally to their students it's an indication of an ethical dilemma. Lashway (1996) stated that teachers had doubts, such as whether a guidance teacher should tell parents that a student is having an abortion, causing ethical dilemmas to occur at schools.

Disagreements occurring between experienced teachers and less experienced ones, disagreements about multi-grade classes, and disagreements on the issue whether couples could work together in the same school are all ethical dilemmas that are faced at schools (Nash, 1996; as cited in High, 2005). Strike, Haller & Saltis (1988) suggested that the ethical dilemmas faced at school are the answers to the questions of whether teachers should talk about their students' psychological mood with the parents or not. Should someone, who the administrator doesn't want, be invited for a conference? And should the administrator be against or for the teacher when conflicts about students' marks arise between teachers and parents.

QUESTIONS OF THE STUDY

The current study investigates which practices, behaviors and physical conditions of the school environment are causing dilemmas for teachers in high schools in Turkey. The following sub-problems are also addressed as part of the scope of the current study:

- (1) In which situations do participants face ethical dilemmas regarding an individualized education approach?
- (3) In which situations do participants face ethical dilemmas regarding school regulations?
- (4) In which situations do participants face ethical dilemmas regarding administrators?
- (5) In which situations do participants face ethical dilemmas regarding parents?
- (6) In which situations do participants face ethical dilemmas regarding colleagues?
- (7) In which situations do participants face ethical dilemmas regarding democratic and social values?

MODEL OF THE STUDY

The phenomenology approach, which is a qualitative method, was used in the study. A phenomenological approach to research focuses on participants' perceptions, views, and understandings towards a specific phenomenon (Yıldırım & Şimşek, 2006, p.72).

PARTICIPANTS

The participants in the study were teachers working in high schools in Turkey. Maximum variation sampling was used. In order to provide variety among participants, attention was paid attention to teachers' gender and subject. Table 2 includes data of the participants' code, genders and subjects.

Table 2. Demographic Characteristics of the Participants

Code	Sex	Branch
P1	Woman	Chemistry
P2	Woman	English language
P3	Man	English language
P4	Man	Religion
P5	Man	Turkish language
P6	Woman	Guidance service
P7	Woman	Philosophy
P8	Woman	Guidance service
P9	Woman	Philosophy
P10	Woman	Physics
P11	Man	English language
P12	Man	Philosophy

Data collection tools and the process

Data was collected through semi-structured interviews. The interview questions section consisted of 11 open-ended questions in total. These questions were checked by a field expert before the interviews, for contributing to validity and reliability. Researchers can ask to participants new questions during the interview as well as the predefined questions according to the purpose of the research thanks to the semi-structured interview technique. This flexible structure of the technique allows the responses of the participants to be clarified. Interviews were conducted by the researcher to contribute to objectivity during the analysis of the data. The interview times with the participants vary between 30 and 90 minutes. The written documents obtained at the end of the interviews vary from one to three pages.

Data Analysis

In the analysis of the data obtained at the end of the study, a descriptive analysis approach was used. The stages of the descriptive analysis approach are as follows (Merriam, 2015; Yıldırım & Şimşek, 2006):

Coding of the data: The data are divided into words, sentences, paragraphs or pages and each one is conceptually understood and encoded.

Finding the Themes: The codes obtained are categorized. Each set of categorized code bundles is a subject to encode as a theme, and each theme shows its general case.

Organizing and defining data according to codes and themes: The codes and themes are presented systematically to ease understanding for the reader.

Interpretation of findings: The codes and the themes presented in a particular system are discussed and interpreted in relation to past research.

Reliability and Validity

Interview questions were prepared in accordance with previous research that aimed to determine ethical dilemmas faced by teachers. The questions were sent to experts to be checked. After getting feedback from the experts, necessary revisions were made. According to the views obtained, necessary corrections were made and a pilot interview with 1 teacher was conducted in order to test the clarity of the questions. At the end of the study, the internal validity of the questions was determined. In addition, during data collection from the participants, the extra new questions were used as much as possible, and participants were asked to express their views in detail. Direct citations have been included in the process of revealing the findings. The reliability of the study was calculated by using P (Percentage of divergence) = $(Na \text{ (Number of agreement)} / Na \text{ (Number of Agreement)} + Nd \text{ (Number of Disagreement)}) \times 100$ formula. The numbers of 'agreement' and 'disagreement' were determined by the researcher and an expert. Over 70% of the reliability calculations are accepted as reliable (Miles and Huberman, 1994). According to this calculation, the reliability was found to be 0.85.

RESULTS

After analysis, the participants' views obtained from the study were classified under 6 themes. These are: (1) Individualized education, (2) School regulations, (3) Administrators, (4) Parents, (5) Colleagues, (6) Democratic and social values.

Individualized education

Participants in the study indicated that they face dilemmas ethically in some cases regarding individualized education. These cases are; the centralized curriculum specified for the country by the National Education Ministry, a testing system that evaluates all the students at once, class-sizes, disciplinary rules applied equally for all students, and the classroom culture. Due to these circumstances, teachers feel unsure whether to apply practices based on individualized education. Accordingly, some of the participants' views are as in the following paragraphs.

About the code, "Centralized curriculum OR Student's readiness level", P1 states:

In the curriculum, there are so many irrelevant things. It is not appropriate for the child's readiness level, or well, they are too heavy subjects, maybe university curriculum, but we are expected to give all of these subjects. We try to teach them. However, these children have difficulties in learning, as well as us having difficulties in teaching.

About the code, "Centralized curriculum OR School region's social and geographic conditions", P4 states:

We would like to see a change in students' attitudes, behavior and academic levels during the education process. However, we still face difficult conditions such as physical conditions and geographical conditions of the region. I think it is a bit difficult to get the desired result when thinking of all of them in a comprehensive way because, if the curriculum is applied in the form of a template, it can be considered that positive results will be obtained. But, with any educational policy in any area, perhaps more different alternative training methods can be used. All areas need different perspectives.

About the code, "Centralized curriculum OR To prepare students for life", P1 states:

Chemistry is my branch. I want chemistry to add something to the life of students. But in most cases students only memorize processes or things. There are heavy topics in the curriculum.” For the same code, P6 states that “I have to apply the guidance curriculum, but I am entering the class at scheduled times, but the situation of the class is not very suitable for the process. In the previous hour there may have been a problem among friends, or problems between the teachers. In this situation the question comes, do I have to apply the curriculum or not?

Teachers have difficulty in implementing individualized education in the classroom and so they face dilemmas in the classroom. The primary reasons for this were stated as: the density of the curriculum, the centralized nature of the curriculum and spontaneous unexpected states occurring in the school. Furthermore, class culture and class size are among the other factors that present dilemmas for teachers in terms of individualized education. In this context; some of the participants' views are as in the following paragraphs:

About the codes “Class culture OR Student-centered education approach” P2 states:

We get into the class. We are on the stand. 30/40 students are there, sitting. We are getting in a position to rule them, not like something more equal. Even if I find an interesting activity, students are in a position to get used to something; they do not control themselves, they expect someone or an authority to say, “be quiet, don’t do that.” Or I give time in an activity. This will finish in 5 minutes and then we will get through another stage of this, 10 minute passes. Here, there is a situation, which also exceeds me... Maybe, we don’t give them responsibility from the beginning of their education, the teacher always tells them what to do... The students perceive the lesson as empty. When you make them very active in the lesson, you tell them to do group work. All is related with one thing and that is the responsibility... They have no habit of group work.

About the code “Class-size OR Student-centered education approach” P3 states:

Simple. Now, thirty-four students in forty minutes. We are responsible for forty minutes, what are the minutes per person, thirty-four students? This is my biggest dilemma, for example. Time and population dilemma is the biggest dilemma for me.

Class culture and class-size are other challenges connected to the practicality of student-centered education. Teachers are supposed to give education to all the students and conform to the existing course hours. Furthermore, the disciplinary system is one of the other factors that puts teachers on the horns of dilemmas in terms of individualized education. As a participant (P3) states about the code “Disciplinary system OR Students’ creativity/entrepreneurship”:

We saw something called The One World Schoolhouse, Salman Khan in one of the last seminars, he said he wanted a noisy class, a noisy school. Indeed, our system does not approve this. We wish... Discipline is a must for us, as you know... Unavoidably, this authoritarian personality depresses the child’s creativity and entrepreneurship, I mean, in response to the action, does it take a reward or a punishment? This forces the child to be a passive listener, which we never want them to be.

P3 indicates that he has had training about noisy classrooms from the in-service training sessions organized by the Ministry of Education, and he thinks that the authoritarian manner of the current discipline system leads students to silence, in contrast to what the in-service training encourages. Furthermore, the testing system is another factor that presents teachers with dilemmas in terms of individualized education. In this context; some of the participants' views are as in the following paragraphs.

About the code, “Testing system OR Student-centered education approach”, P3 states:

The system wants us to stay away from the teacher-centered education approach, give these children a chance. The exam causes memorization rather than exploring new things about the lesson. Therefore, the students cannot be expected to gain productivity, creativity.

About the code “Testing system OR Student-centered education approach”, P3 states:

For instance, there are six English teachers in a school. We will set a common test. All of us have the same curriculum. There can be differences between his method and mine or the level of students; the capacities or the student's behaviors of in our classes may show some discrepancies. Finally, making generalizations is the biggest conflict in education. Also expecting student-centered education approach in the generalization is the biggest conflict too.

An assessment and evaluation system based upon the testing system shapes the learning-oriented behaviors of students towards reaching success in the exams. According to P3, this situation blunts the creativity and upstream skills of students. Furthermore, the principle of evaluation through standardized questions is in contradiction with the principle of student-centered education.

The centralized curriculum, the evaluation system of the student's success, class culture, class-size, and disciplinary system contradict the approach of student-centered education in Turkey.

School regulations

The school environment embodies dynamic processes. The school administration and teachers face dilemmas with factors such as student population and diversity, students' age group, and the aims of education as applied according to the school regulations. Some of the participants' views in this direction are as in the following paragraphs:

About the code “Regulation of tobacco products” OR “Attitudes of school administrators and parents”, P5 states:

No. A student is smoking a cigarette, warning him/her. But tobacco products are forbidden. If one is caught at second time, He/she has to pay a fine. This time the parents do not accept it. The authority cannot support the teacher.

About the code “To lie to the students about abolished disciplinary punishments OR To be honest to the students”, P5 states:

For example, there is no a discipline penalty for the students, but we still say there are penalties just in order to ensure the order not be broken down.

About the code “Regulation of school uniform” OR “Characteristics of adolescents”, P1, P2, P7 state:

They are adolescents for students. They want to express themselves, dress freely, wear make-up, and so on. We, teachers, hear their worries about the freedom to express themselves. ... The administration warns us that students have to obey the rules regarding school uniform. Throughout this process we face dilemmas.

About the code “Regulation of school uniform” OR “Students' psychology”, P6 states:

The expectations of the headmaster regarding dress regulations leave me in a dilemma about warning students. For example, a student may have a problem with their family, thus they might not dress according to the regulations.

About the code “Break time” OR “Flexibility”, P2 states:

During forty minutes of lesson, sometimes the children make a show, or try to amuse themselves, we may want to go out. But we still get stuck in.

About the same code, P1 states:

Because when we have a break, of ten minutes for example. In the breaktime, sometimes children come and ask us questions. It is our break time but we while we are trying to drink tea, trying to breathe, it is in fact impossible because on the other side the bell rings. The administration wants us to follow the rules of class and do not understand whether we had a break or not. This situation puts us under stress.

Teachers face dilemmas in implementing school regulations. One of the leading reasons is that some school regulations' legitimacy is ambiguous. Secondly, teachers can find more pragmatic solutions rather than implementing school regulations. Lastly, all the members of the school may not implement school regulations. These reasons present teachers with dilemmas regarding implementation of school regulations.

Administrators

Participants in the study indicated that they face ethical dilemmas in some cases regarding administrators' attitudes or decisions. Some of the participants' views in this direction are as in the following statements.

About the code "Administrator's attitudes OR To implement disciplinary rules for students" P3 states:

Imagine there are 30 students in a class. You cannot achieve a university place for all of them. However, you should teach all these 30 students. Unless you set some rules, the problems caused by 5 of them deactivate the rest of the students. When the school administration is passive about these problematic students and when this is reflected in other students, this number increases to 10, and in time 15, and at the end of the year you just have 5 students available for the education. We put pressure on the administration about this issue, but the administration cannot convey this problem to the upper authorities. In the end, they have their own position and want to keep their position and in a colloquial manner do not want to get a scolding.

P3 utters that s/he is on the fence with regards to applying the discipline system thoroughly because of a perceived lack of essential support from the administration about behavior in the classroom. P3 also indicates that this attitude of the principal is because of him not wanting the school to be seen as problematic to the his or her superiors.

About the code "To comply with the decisions of the administrator OR To comply with school regulations" P6 states:

Between our ideas and the administrator... I point out our ideas to the administrator, yet I don't insist to the administrator. I just look and don't know if I should insist or not about our concern. For example, our headmaster commanded us not call the family and the police because he couldn't spare her/him. The decision of the headmaster left me in dilemma to obey the school regulations or obey the decision of the headmaster. Implicitly, I was on the fence between my conscience and the regulations and used my preference for school regulations.

P6 tells of a dilemma in which s/he is caught between the reverse decision of the administrators and the school regulations when it comes to contacting the police or family when the student has committed a crime.

Parents

Participants in the study indicated that they face ethical dilemmas in some cases regarding parents. They cannot decide whether they should support parents' attendance or not. Some of the participants' views in this direction are as the following:

About the code, "To know the negative attitudes and behaviors of the parents about the student pedagogically OR To share problems of students with the parents", P8 states:

While explaining some significant cases to the parents, we encounter some problems. Then we need to choose the wise and right words while talking. Before the interview starts, we have some dilemmas such as how will they react, if there is any harm to the child, will they give positive reaction for the situation or will they place the child at the center of the problem or not.

About the code, "Parents' expectation from their own children OR Students' real success", P2 states:

Parents are always optimistic about their children. For instance... My child is intelligent while knowing that his or hers does not work as much as he should. In this kind of situation, they ask that we sympathize with them regardless of the reality.

About the code, "Parents profile OR Parents attendance", P5 states:

Our parents' potential, our profile has not improved yet. So we do not have much dialogue with the parents.

About the code, "Parents profile OR Books proposal", P5 states:

How can students read about another idea? We give a book; we have a book called Homeland Hotel. Parents often complain about it yet, our responsibility is to give such guidance. We may have to tell them like read this, but read in the library, do not take it to your home because... Why? Because still we cannot pass the cultural steps, thus it's our biggest annoyance anyway."

About the code, "To ask donors OR Parents' economic conditions", P4 states:

"We always feel uncomfortable in telling parents to buy the books due to economic conditions, some of the books may be expensive for them. It is another dilemma.

Findings regarding to this theme leave teachers in dilemmas regarding instability between teachers due to parents' expectations from teachers and the school.

Colleagues

Participants in the study indicated that they face ethical dilemmas in some cases regarding colleagues. They do not decide to support behaviors of colleagues or not.

About the code, "To respect colleagues OR To protect personal rights", P2 states:

Some of us teachers pamper the students too much. And we always take them into the teachers' room. Yet, the teachers' room is not for students or private extra curriculum explanation but some of us do it and often students hear what we are talking about with other teachers. And so on and so forth but some of us have no power to prevent. Even if we may want them to go out, and in case I report to the principle it won't be on my colleagues but all of us.

About the code “To respect colleagues OR To protect students’ rights”, P10 states:

For example, if the teacher comes to class wearing inappropriate clothes ... the student end up doing the same why? Because the teacher did dare come to school wearing unsuitable clothes, now when it’s time to give the moral lesson we get ashamed about warning our student about the dress code once one of us came dressed inappropriately.

About the code “To respect colleagues OR Reality” P2 states:

Let’s suppose that one of our teacher's children is our student in that school and he is not even a hard worker, but because of the camaraderie we tend to support and give all the necessary tools because the child is a part of us. This is another dilemma.

About the code “To respect colleagues OR To raise students’ marks”, P11 states:

For example, let's say that the child is really working hard, trying hard, and putting in the best of his best to the limits of his own capacity. But I'm afraid he does not get good enough marks from the exam. In such cases, we tend to give the highest verbal grades the highest. Why? It's because we believe in the student's ability. It's a dilemma? Yes it is, but due to the ability of the student and expectations we do it. Yet in private schools, children's grades are usually not only inflated, but extremely high. They even send their children to private schools to buy grades .We teachers sometimes criticize among us, but a dilemma is a dilemma.

About the code “To defend teachers towards parents OR To know inadequacy of teachers”, P10 states:

For instance, if a teacher’s speech is not clear. The parent may complain about it yet as the teachers’ side we are forced to support them regardless of the truth, why because of ... the culture of the institute. ... We have to be in favor of our member. We can keep things within the family, but we protect our family against the outside.

About the code “To believe the teamwork OR To know inadequacy of the work motivation of the colleagues”, P5 states:

60% of our teachers regard teaching not as a profession. But a last option to join. When we assess it not as a profession, well! We are only doing it to make living, we only go into the class and teach the lesson to the ones who can understand, and for the others who cannot, we say they will understand through time, we don't put effort into teaching them or even show the love of the subject that we are teaching. And if one of us does the opposite like hard-work, he is then blamed for supporting the school administration. And even blamed for being pragmatist. The teachers’ vocational task is not an individual task. ... In fact, teaching or education itself is teamwork. Therefore, the same motivation should be spread so that we teachers can have a better system for our students, yet this is not what is happening.

Participants are informed about professional truths regarding students’ and parents’ rights, ideal behaviors oriented towards teachers’ cooperation and their own personal rights; however, in some circumstances, they witness the behaviors of their colleagues who do not conform to these truths. Thus, they are on the fence between maintaining friendship and warning their colleagues with the aim of preserving the organizational culture despite the misbehavior of colleagues.

Democratic and social values

Participants in the study indicated that they face ethical dilemmas in some cases regarding democratic and social values. They face dilemmas in abiding by the values of society and supporting free thought, which arise as a necessity of democracy.

About the code “Democracy OR Cultural values” P5 states:

You cannot expect a person to grow in an environment within which we are not culturally ready to accept democratic values to become fully democratic. We cannot even talk about democracy to a society who has learnt to vote just by using ballots in every 4 years, founds and administrates the country in the corners of the coffeehouses”

About the code “Democracy OR Cultural values”, P11 states:

I think there is a bit of culture in Turkish society, there is a culture of fear. With persuasion, you cannot convince the children; especially those who are starting to become new adults. Even if you say it repeatedly, it's not what you want. But when you make it hard; This is sometimes a hard look, sometimes in a loud tone; It is much more effective when you say something with a high tone of voice.

About the code “Liberalization OR Cultural values”, P4 states:

What we want is, to some extent, to flex and expand the point of view of young individuals. However, this isn't mostly approved by the families when we look at the traditional approaches... We often offer them innovative sentences, words and an innovative point of view so that they can progress in their ways of life. However, strictly speaking, this point of view that we offer can lead to problems in their personal and family lives.

About the code “Liberalization OR Society's religious values”, P4 states:

Giving an example from my field, it is possible to say that there is an understanding of religious monopolism. In this understanding of monopolism, we take a look at a young individual who sees his belief as the best, most reasonable and sensible one, but when he reaches that point, universality and locality conflicts start to occur.”

About the code “Liberalization OR Cultural values”, P5 states that

Talking about socialism. When we introduce socialism to the student in return they label us as socialists, and so do the parents. The next week we may want to talk theories like nationalism. But again our students we will keep on labeling us nationalist.

Participants are of the opinion that cultural values are not ready for different ideas, so sharing thoughts in the class environment that differ from national and moral values may trigger a conflict with parents or possible conflicts with children. Therefore, they are on the horns of a dilemma in sharing different thoughts. The views through this theme are based upon teachers' being mixed up in universal and local values. In other words, teachers do not find common ground in terms of both universal values and social expectations.

DISCUSSION

The current research aims to identify situations where high school teachers are indecisive about which rights they should implement. Six themes were found at the end of the research. These are ‘student centered education approach’, ‘school regulations’, ‘administrators’, ‘parents’, ‘colleagues’ and ‘democratic & social values’. When the views under the all themes are examined, the participants remain in their teaching behaviors with the current education policies, administrators and parents, the beliefs / behaviors of colleagues and the culture of society

When the views under the individualized education theme are examined, dynamics such as ‘intensive content of the curriculum’, ‘class-size’, ‘testing system’, ‘settled educational habits of the students’ and ‘teachers’ effect on participants’ decisions’ are connected with whether to implement

student-centered education. In other words, the findings reveal some obstacles in applying individualized education. In Wang's 2011 study, which was carried out with pre-service teachers working in the suburbs of China, it was discovered that factors such as lecture time, curriculum, economic and cultural disadvantages of students keep the teachers in limbo in the frame of implementation of student-centered education perception.

According to participants in this research; 'intensive content of the curriculum' and 'evaluation system of the academic achievements of the students' are notable when considering the factors that make the implementation of the individualized education difficult. Both of them are a centralized structure in Turkey. In parallel with this situation, the OECD, of which Turkey is a member, makes some suggestions such as designing 'curriculum' and 'examination system' as a centralized structure to members (Aypay, 2015, p.245). As a result; 'centralized curriculum' and 'centralized examination system' are paradoxical contexts in terms of 'individualized education' in the participants' minds.

Pre-service teachers' responses related to student population and school timetable in the study of Ding & Wang (2018) clash with the findings of the individualized education theme in the current study. In the study of Ding & Wang, pre-service teachers state that they are eager to respond to students' personal needs and remember their names. On the other hand, they say that their efforts towards individualized education are being worn down owing to there being nearly 400 students, and that the content in school books is so intense. Accordingly, the mentor indicates that s/he educates with traditional methods. All the mentioned cases lead teachers to instability.

At the end of this research, the view is reached that a 'centralized curriculum' does not meet the needs of the individuals in all the cities of this country. The view suggests that a 'centralized curriculum' and 'centralized education policies' do not respond to the physical and geographical conditions of each school district. Moreover, in the current research, participants' views on the conflicts between the democratic values and the expectations of the society, which are included in the scope of democratic and social values, have been reached. In relation to these views, the research by Beckner (2004, p.91) based on Cooper (1990), Fleishman & Payne (1980) and Kidder (1995) questions if school policies should continue to be supported or resisted when reflecting the demands of the majority of the school district. Furthermore; the teacher of religious lesson participating in the research expresses worries that "the idea of freedom and the curriculum of the religious lesson" contradict his ideas. This view overlaps with the findings of the researches of Husu & Tirri (2001) and Tirri (1999). In the context of this, new studies can be carried out for whether the curriculum needs to be revised in terms of both social and democratic values.

At the end of the research, it was found that students' earlier experiences in teacher-centered education make applying student-centered education in high-school more difficult. Furthermore, 'class culture is more suitable for serving authority' and "teacher-training system" have an important role in affecting student-centered education negatively. New research can be done in how the restructuring of education faculties and the national education system should be organized in this direction.

One of the participants of this study thinks that the current perception of discipline damages creativity and keeps him/her hanging in midair. His view on this is under the sub-theme of "the present disciplinary approach - students' creativity/entrepreneurship". From the findings in the study of Ding & Wang's (2018), one of the pre-service teachers mentions that s/he got trained according to custodial pupil control but s/he couldn't control difficult situations without threatening punishment. S/he expresses that he is on the fence.

About the code of 'the curriculum - to prepare students for life' under the theme of individualized education, should the teacher show more interest to students? Or should she follow the curriculum? Dilemmas have been faced about these questions. The opinions match the findings of Colnerud (1997) and the research of Elbaz (1992) within which the teachers have had contradictions about how and when they should show compassion, kindness and concern to the students.

Uncertainties experienced by teachers regarding whether students are allowed to copy in examinations under the theme of colleagues and school regulations are similar to Pope et al. (2009) and Tirri (1999). Both this research and Pope et al. (2009) and Tirri's (1999) findings show that teachers who give students high grades while they do not deserve it experience dilemmas.

The code of "to comply with the decisions of the administrator - to comply with school regulations" under the theme of administrators, overlaps with the findings of the research of Helton and Ray (2005) regarding 'the decisions of the administrators on conflicting with professional ethics'. In this finding the counselor speaks about the dilemma in which s/he is confused by the reverse decision of the administrators and regulations of the school when it comes to communicating with to the police or family when the student commits a crime

The same guidance and counseling teacher who participated in the study underlined that some students experience familial problems and the students do not comply with the dress code at such times. For this reason, the guidance and counseling teacher expresses a doubt about the implementation of the regulation. These dilemmas overlapped with the findings of Beckner's research (2004). These findings are about "equality against schools of compassion, laws against love". In addition, Mahony (2009) underlines the necessity of the need to explore the causes of teachers' actions before making ethical decisions.

The dilemma between "to know the negative attitudes and behaviors of the parents about the student pedagogically – to share the negative attitudes and behaviors of students with the parents" under the theme of parents is similar to the findings of Tirri (1999), Lashway (1996) and Strike et al. (1999). The view of "positive expectations about "the students' achievement level - negative facts about the achievement level of the students" under the same theme overlap with the findings of Husu & Tirri (2001).

At the end of the study, it was also found that the professional values of the participants do not agree with some colleagues. They are concerned about whether to respect the negative behavior towards students of their colleagues. The views under this theme are similar with Tirri's (1999) survey done with 33 teachers in Finland and Campbell's (1996, as cited in Lishchinsky, 2010) finding on whether to warn their colleagues about their irrational behaviors towards students. In addition, the views under this theme overlap with the finding of "the discriminatory behavior of colleagues about students and staff" in the results of Helton & Ray's study (2005). A teacher who participated in the research of Husu and Tirri (2003) believes that smoking cannot be prevented if their colleagues continue to smoke in school and so the teachers face dilemma between 'colleagues', 'laws' and 'health of students'. As for the study of Ding & Wang (2018), most of the pre-service teachers hesitate between their classroom management and teaching perception and other teachers' education implementations. For example, while pre-service teachers prepare classes based on the principles of a student-centered education that allows students to gain experience, think critically and learn life, their mentor colleagues base classes on a perception of students having success in the exams as of more importance; in other words, a traditional perception. Pre-service teachers are concerned about this state. The related study of Ding & Wang (2018) show the findings on whether pre-service teachers adopt or not the student-centered education perception. In addition, the pre-service teachers who participated in the study of Ding & Wang (2018) find the authoritative behaviors of the mentors toward students unacceptable; however they say that they stay quiet rather than warning them and this leads to an increase in tension. These findings of study of Ding & Wang (2018) are similar with the current study's findings.

CONCLUSION

As a result, there are many views in the current research that the curriculum is not suitable for individualized education. The other obstacles in front of the applicability of the individualized education are the testing system, disciplinary system, class-size and class culture. This awareness leaves the participants in dilemmas about how they should behave in the classroom during activities.

Some participants are in doubt as to whether they should comply with the administrator or school regulations in some cases. At the end of the study, some of the participants have uncertainty in which circumstances they should show compassion to parents, students and colleagues. Another common teachers' dilemma is the disagreement between democratic values and society's values.

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District Leadership Study: A Bivariate Analysis of Language Descriptors in Defining Educational Leadership Constructs

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Abstract

In 2013, a bivariate designed instrument of personality descriptors was given to a district school system to correlate difference between the teacher population and that of the administration. Results indicated a correlated population grouping where the two groups were similar in generalized personality constructs. Results indicate the leadership population is similar, in general, to the teachers, but some specific traits registered higher for the latter group. An inferential analysis using a paired sample, students' t analysis of the survey instrument confirmed that the educational leadership group was different in response than that of the teacher population.

Keywords: Teaching, Educational Leadership, Personality Constructs

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Objectives/Purposes

This study attempts to determine teacher leadership by comparing teachers and administrators' responses on a predesigned survey within a selected public school system. Using the Five Factor Model (FFM) of personality traits as well as descriptors developed through a meta-analysis of the current literature, the author developed a bivariate (two part) instrument to discern personality and management/leadership traits specific to educational populations and issues. The sample frame consisted of a medium sized school district in the South Eastern region of the United States. The district administration, primarily the leadership team, consisting of the superintendent, school principals, and assistant principals answered the instrument as well as the teaching staff in all eleven of the district's schools. The premise of the study was that administrators and teachers would exhibit certain traits, or levels of traits, possibly defined only within their specific populations. If differences can be determined or measured between these populations, it would be possible to assume that certain personality characteristics may populate, or favor one or the other. Differences are the objective in the study, designated under the premise that administrators typically get hired within the teacher ranks of the individual school. For those that had not 'moved up' from within, it was probable they had to exhibit certain characteristics to be hired and may have lacked such contexts or measures. Assuming that this culture is self-sustaining and typically recruits from within it is reasonable to ascertain that differences from leadership and of faculty can be determined.

Perspective(s) or Theoretical Framework

Educational leadership, as a discipline, devolves the study of a leader or leadership construct to that within an educational system or setting. Though strong in research, this sub-field still falls within the better known and more established contexts of the business or political fields, from which many pertinent models arrive. Traditionally, these genres have dominated leadership studies, consequently generating a large portion of leadership literature pertinent to their disciplines (Gardner, 2000; Northouse, 2004). Education, arguably, is one of the newer fields of the leadership disciplines, with its unique issues and constraints. The complexity of the discipline itself and the difficulty in defining terminology and consistent roles and responsibilities makes this a powerful subset of leadership studies. Educational organizations, especially public ones, tend to be complicated structures, involving dynamics such as politics, internal policies, accountability and regional and cultural differences, though this is by no means an exhaustive list. Schools, within the organization at large, are multi-faceted entities that will differ, to some degree, from each other based on variables not consistent from one to the other. These differences can involve the people within the organization, the region, and culture in which the school resides and, including the geographic and political entities of the area, culture, religion and other trends. The complexity delimits the effectiveness of studying influential people who, though probably successful, were in contexts and situations not applicable to educational roles (Silova & Wiseman, 2009).

What is needed is an accepted model or template of leadership behaviors, adjectives or terminology that can be analyzed, understood and hopefully recreated in different educational circumstances. Such models do exist but tend to focus towards generalized leadership behaviors, usefully filtered through literature not necessarily specific to school leadership settings. The utilization of such descriptors in defining leadership is common and deemed effective, allowing for potential outliers to be associated or correlated through the same or similar words. Many of these align but, unfortunately, the lists can be exceptionally long depending upon the instrument used. This has been a frequent issue of leadership trait research; what model to use and the length of the descriptors used. They do not always align. In this study, it was devised to utilize a personality model instead of a standard leadership construct to see if it can be an effective assessment.

Personality models have used descriptors or adjectives for years with much-heralded success, primarily through the assumption that common language is the primal resource for these descriptive traits. Lexicon derived descriptors of personality, called surface traits, have emerged in recent research theory (Craig, 2005). These traits, usually referred to as factors, have led to the development

of three competing models of personality; the Big Three, the Big Five (usually referred to as the Five Factor Model) and the Alternate Five (Zuckerman et al, 1993). These models differ from personality tests as they are generalized templates of an individual’s overall personality dynamic, unlike specific assessments which tend to focus on one’s needs, moods, and their possible states of anxiety or levels of depression (Craig, 2005). These templates are reasonably easy to administer, utilize language and scales simplistic for self-analysis and due to their descriptive nature are compatible for comparison to other disciplines and models. The Five Factor Model (FFM) was chosen as the design template for this and consequent future studies (Digman, 1990; Zuckerman et al, 1993 & Paunonen. 2003).

The Five Factor Model (FFM) is a template of basic personality descriptors that have been categorized into five domains, or super traits, through a meta-analysis of the modern English language (Mann, 2003). It should be noted, however, that the FFM is built from study of the English (formal) lexicon and is, therefore, limited by the scope of the language itself. Each of the five domains within the FFM, referred to as super-traits, also consist of four to five sub-traits within. These are basic descriptors that correspond, albeit positively or negatively, to their linked super trait or category (Judge & Bono, 2000).

Table 1- Five Factor Model (FFM) – of personality

	Super traits – common descriptor	Super traits – other names	Letter code	Antonym descriptor/ continuum	Sub-traits – correlated traits
Factor 1	Extraversion	Extroversion Introversion	E	Introvert to Extrovert	1. Ethusiasm 2. Sociability 3. Energy mode 4. Taking charge
Factor 2	Accommodation	Agreeableness Friendliness Honesty	A	Challenger to Adapter	1. Service 2. Agreement 3. Deference 4. Reserve 5. Reticence
Factor 3	Consolidation	Conscientiousness	C	Laissez Fair to Focused	1. Perfectionism 2. Organization 3. Drive 4. Concentration 5. Methodical
Factor 4	Stability	Neuroticism	N	Resilient to Reactive	1. Sensitiveness 2. Intensity 3. Interpretation 4. Rebound time
Factor 5	Originality	Intelligence	O	Preserver to Explorer	1. Imagination 2. Complexity 3. Change 4. Scope

These sub-traits are best defined through continuum scales, as either a strength or weakness of the relationship as delineated by their linked super-trait (Howard & Howard, 2004). Indications for the scales being utilized by the particular word can be accomplished through synonyms, separate for each super-trait, binding the sub-traits back to the one general definition or descriptor. This, then, establishes a form of measurement, generating data which can be interpreted to different personality dynamics. The model is considered statistically accurate and simplistic enough for multiple uses and users, a reasonable choice for educators to use (Digman, 1990; Oxford Handbook of the Five Factor Model, 2017 & Paunonen, 2003).

The factors of the FFM consist of extroversion, accommodation, consolidation, stability and originality (See Table 1). Factor one, extraversion, is described as the level or degree upon “which a person can tolerate sensory stimulation from people and situations” (Howard & Howard, 2004, p. 5). Traits common with this domain are enthusiasm, sociability, level of energy, trust, tact and taking charge. Factor 2, accommodation, is defined as friendliness, honesty, and agreeableness depending upon the theorist or author (Zuckerman et al, 1993; Howard & Howard, 2004). Corollary sub-traits or

adjectives of this domain are agreement, deference, reticence, service and reservations. Factor three is consolidation or conscientiousness which has listed five sub-traits or descriptors; perfectionism, organization, level of drive, the level of concentration and how methodical an individual can be. Four is stability or neuroticism, the other domain like extroversion both universally agreed upon as a personality super-trait. Its descriptors are sensitivity, levels of intensity, how interpretive a person can be to different situations and surroundings, and the time it takes to recover from a situation or crisis. Finally, factor five is originality or intellect and is described through adjectives of imaginative, complexity, degrees or willingness of change and scope or breadth of knowledge and intellect (Howard & Howard, 2004).

Using traits to correlate with leadership has significance in the determination of these adjectives themselves. If personality is measured or developed through language descriptors, then it may be safe to say the same paradigm could also apply to leadership studies. Doing so correlates to the trait conceptualization models of leadership (versus process or outcomes) where specific descriptors of individuals deemed as leaders are measured (Northouse, 2004). Outliers, or common adjectives of similar traits, has long been used in leadership, as it has in personality studies. From here the research study may use different or correlating adjectives or descriptors as determined by teachers and administrators (education students as well) to determine differences or similarities, potentially isolating specific variables of the leadership construct.

Another aspect concerns the informal leadership roles and traits that educational leadership may best employ. In this instance teacher leadership, primarily those not specifically identified within the overall faculty population. Unlike formal leadership endeavors there is no defined title, nor possible labels, powers or any other defining characteristic for a teacher leader than that of a traditional school leader, such as a principal. Autonomous leadership qualities are examples of personality within themselves; they have just not been assigned or discussed as such. However, such outliers should still correlate with specific trait and language descriptors regardless of the study. It is assumed a personality dynamic should still delineate these individuals, as they will exhibit traits correlating to the language descriptors.

METHODS OF INQUIRY

The instrument has been 'field tested' twice and is in its third iteration as of this study. The first survey consisted of 22 Likert (five) scaled questions, consisting of four or five questions for each of the five factors. The questions or prompts were internally consistent; the direction was the same (Creswell, 2020 & Babbie, 2010). In each, left was negative while the right was always positive. Administered in the fall and summer semesters of 2010, over 300 education students eventually participated. Validity was ascertained through a concurrent-criterion methodology, as the questions were built from an already established model (Groves, et al, 2004 & Creswell, 2020). Internal Consistency was determined by Cronbach's Alpha (α) utilizing SPSS software. The internal consistency for the instrument measured 0.76 alpha, good enough to go forward.

The second iteration of the instrument was developed partially from the first. Through a Principal Component Analysis (PCA) 6 components were identified from the 22 questions, indicating a good reduction of variables (DeCoster, 1998 & Howell, 2004). However, this was one more than the initial five developed from the FFM. Validity would best be illustrated with a data reduction back to the original five components. Subsequent testing for internal consistency scores of the five different sections was not as high as hoped either. To bring up the alpha scores, questions in each section was assessed or measured in different combinations. Eleven questions would eventually remain, combining in some way to give each of the five factors an alpha score of 0.7 or higher. This would be the first section in the new instrument.

A somewhat similar study, conducted in 2011, asked 115 students to self-assess their teaching, overall personality characteristics, and leadership traits. The list of personality descriptors was populated through another meta-analysis of existing literature, delimited to studies concerning the

FFM (Babbie, 2010). Unlike the 2010 study, this instrument did not use scaled questions, instead of asking students to identify the adjectives or descriptors which they, themselves, felt best suited them. A list of potential attributes was provided. This study was developed to identify common traits in populations; initially first-year education students, senior education students, and first-year graduate students. The survey was modified to reflect the adjectives generated from the first sample then added as the second component of the research instrument.

The two sections of the instrument developed the bivariate design, exploring the components of teacher leadership through different variables (Babbie, 2010; Creswell, 2020; Hakim, 2000 & Stevens, 2001). The adjectives or language descriptors would be analyzed through descriptive statistics to see if differences in populations between administration and teachers could be delineated. This will determine a baseline of commonalities for the sampled groups. The second section, involving the Likert Scaled questions, would help determine variance and correlation. Both are language based designs and will correlate effectively through descriptive statistics.

Data Sources

The sample population was a medium-sized, rural school system in the South East United States. The school system was one of two serving a small size city and subsequent county populations. The overall population of the county is roughly 100,000 residents with a school population slightly more than 10, 000 students. The system employed 824 certified staff members in 11 schools (excluding alternative based settings and district office) for the surveyed school year. Survey response was 543 school-based, certified educators from all eleven schools. District leadership, including the superintendent, school principals, and assistant principals, were measured as well, with 18 respondents, including the superintendent and multiple school principals.

RESULTS

Language Descriptors

Teachers and administrators were similar in the descriptor response section though there were some differences (see table 2). Towards personality choices, administrators picked themselves as being ‘personable’ at 72%, ‘friendly’ at 61% and as ‘outgoing’ at 56%. The administrators overall saw themselves as a friendly and open group (See Table 2). These were the only traits illustrated for over 50% of the respondents (N=18). However, ‘humorous’ was almost there with 44% of the respondents choosing this descriptor.

Table 2 - Self Identified Adjectives/Descriptors - Personality

Administration

Personality Style		Responses tallied	Total possible responses	% of response	Correlating Personality Trait
Listed Adjective	Personable	13	18	72%	Extraversion/Accommodation
	Friendly	11	18	61%	Extraversion
	Outgoing	10	18	56%	Extraversion/Stability
	Humorous	8	18	44%	Extraversion / Originality
	Sensitive	7	18	39%	Stability
	Assured	6	18	33%	Consolidation
	Serious	6	18	33%	Consolidation
	Intense	4	18	22%	
	Quiet	1	18		

Teacher

Personality Style

Listed Adjective	Responses tallied	Total possible responses	% of response	Correlating Personality Trait
Friendly	428	492	87%	Extraversion
Personable	338	492	69%	Extraversion/Accommodation
Outgoing	234	492	48%	Extraversion/Stability
Humorous	231	492	47%	Extraversion / Originality
Serious	123	492	25%	Consolidation
Assured	121	492	25%	Consolidation
Quiet	101	492	21%	Extroversion
Intense	61	492	12%	
Egregious	30	492	6%	
Introvert	28	492	6%	
Boisterous	24	492	5%	
Timid	23	492	5%	

Table 3 - Self Identified Adjectives/Descriptors - Management

Management Style

Listed Adjective	Responses tallied	Total possible responses	% of response	Correlating Personality Trait
Open	15	18	83%	Originality
Friendly	14	18	78%	Extraversion
Charismatic	4	18	22%	Extraversion
Stern	2	18		
Authoritarian	1	18		
Controlling	1	18		
Laissez Fair	1	18		
Unlisted Adjective				
Situational	2	18		
Caring	2	18		

Teacher

Management Style

Listed Adjective	Responses tallied	Total possible responses	% of response	Correlating Personality Trait
Friendly	376	492	76%	Extraversion
Open	260	492	53%	Originality
Stern	148	492	30%	Accommodation
Charismatic	85	492	17%	
Authoritarian	82	492	17%	
Controlling	38	492	8%	
Laissez Fair	27	492	5%	
Unlisted Adjective				
Fair	14	492	3%	
Consistent	9	492	2%	
Organized	6	492	1%	
Flexible	5	492	1%	
Structured	5	492	1%	

The teachers had only two traits at 50% or higher; 'friendly' (87%) and 'personable' (69%), the same two as for the administrators. The teachers' next choice was 'outgoing', also similar to the administrators though this did not meet the 50% threshold (48%). Teachers, like the administrators, also saw themselves as friendly, and open; though in significant lower percentages than the administrators. Outgoing, listed above the 50% threshold by the administrators did not meet it for teachers. The biggest difference between the two was 'sensitivity', listed by the administration sample (39%) and 'quiet' for the teachers (21%). Neither was listed by the other population as a major descriptor or trait. Correlating back to the FFM traits, all of the descriptors chosen fell within the super-trait of Extraversion, defined as social constructs and events or activities that fall within personal engagements.

In the management field, the responses were similar for both populations as well (See Table 3). Administrators had only two traits selected by over 50% of the population, 'open' (83%) and 'friendly' (78%). It would be the same two traits for the teachers, except 'friendly' would be higher (76%) than 'open' (53%). A major difference was in 'stern', chosen by nearly 30% of the teachers but conspicuously absent in all but two of the administration responses. 'Authoritarian' was also a significant choice for the teachers as nearly 17% of respondents picked this adjective while only one administrator did so.

Likert Scaled Questions

The Likert responses garnered interesting results especially in the correlation between the two sampled populations. Inferential analysis was conducted by a Students' t test (two paired sample) for correlation on SPSS software (Zhang, 2006 & Garson, 2008). This was a challenging task as the two populations differed greatly in population size. Student's t is recommended for smaller samples, which was appropriate for the administration group, and is somewhat robust towards varying population sizes (Garson, 2008). But the sheer size and discrepancy of the teacher population towards the administration sample is too great in this instance (Howell, 2004 & Garson, 2008). Since the t variable is indicative of differences in means, it was decided to try a harmonic mean effect for the teacher sample; 18 numbers were randomly picked from the population (range included) and tested to see if mean was similar to the overall population (Howell, 2004). Once the mean was statistically similar, this 'batch' was measured against the corresponding administration response. This technique would be similarly used for all 12 questions. Doing so establishes a higher level of power, reducing the risk of a Type I error (Howell, 2004). Meddling with samples is still problematic however, so it was decided to establish the confidence interval at 99%, for a two-tailed test and to be forthcoming within the limits of the inferential testing. Analysis of the descriptive statistics was added for further clarification.

The descriptive analysis also had limits, due to the ordinal nature of the scaled questions (Babbie, 2004, Creswell, 2020; Howell, 2004, Berman, 2006). Because of distance or value ambiguity between the choices on the survey, it is controversial to use means as an example of central tendency, as it is widely suggested that only the median should be used (Howell, 2004; Jamieson, 2004; Berman, 2006 & Lane, 2007). The argument centers on the interpretation of the data more so than the data itself. To avoid the argument both the mean and median values are illustrated. This description will also be presented as a numerical value and a visual descriptor, illustrating where on the scale the respondents' choices lie. Combining the results, and using multiple perspectives it was hoped for better interpretation of the data.

Each trait was tested as a specific domain and illustrated in Tables 4 through 8. The first trait; extraversion, consisted of two questions asking respondents how happy and energetic they felt at work and school. Both groups responded positively in respect to the adjectives, ranking themselves as both enthusiastic and energetic. The difference between the two was that the administration group had a higher mean response for both questions (see Table 4). The difference in means was 0.7 of a scale for enthusiastic and 0.5 (basically half a scale) for energetic, which was significant when comparing to the other questions. Medians were different for each as well, illustrating a difference in distribution for

the two. Students' t results indicated no correlation between the populations for the questions. Administrators, overall, responded higher, or more positive than the teachers in enthusiasm and energy, both in the super-trait of extraversion. Extraversion which was the most cited domain when delineated through the common adjectives was also one with a high variance between the teacher and administrative populations. Interesting, when defining by positive adjectives, administrators would continually rate higher than the faculty in most, if not all, of the questions. There was discernible difference between the two populations across all questions and prompts.

The super-trait of accommodation had two questions; the first asked how much free time the respondent would be willing to give up at work for no advantage or pay, the second asked how far the respondent was willing to concede in an argument with someone they didn't like (see Table 5). Both groups indicated a willingness to help but, again, the administrators rated higher on the scales than the teachers. The difference in means was 0.6, the second highest in range recorded in the instrument. Teachers ranked closer to the scale of 'willing to help' where the administration was closer to 'always willing to help'. Medians were different as well. In the second question, the two populations were closer in their response, ranking themselves between 'sometimes' and 'willing' in admitting to being wrong. The difference in range was only 0.2 here. Students' t illustrated no correlation responses for either question, indicating a difference in both responses from the populations, it just was not as pronounced in the second question.

The super-trait of consolidation had two questions; the first asking how competitive the respondents were at work and the second asking how they rated their drive to succeed as compared to their peers (see Table 6). Teachers ranked themselves between 'average' and 'I do better' with a mean response of 3.5 and a mode of 3. Administrators, however, ranked themselves very close to 'I do better' with a mean of 3.9 and a median of 4. Students' t indicated no correlation between the groups. In the second question, the range in response was 0.5 in scale with administrators ranking themselves more likely in trying to do better than their peers. The teachers responded with a mean of 4.0, directly on the 'usually willing' scale in rating or driving themselves against their peers. Their counterparts had a mean response of 4.5, in between the 'usually willing' and 'willing' scales. Students' t indicated no correlation found for this question either. As in the other domains both populations ranked themselves relatively high in the question responses but the administrators saw themselves as much more so in both questions.

Stability was the first super-trait to use three questions in the domain. The questions asked the respondents their (1) sensitivity to criticism and insults, the (2) effort they put towards understanding others and (3) the length of time it takes for the respondent to get over an incident (see Table 6). There was no inferred correlation for any of the three questions between the two sampled groups. Sensitivity had a range difference of only 0.3 of a scale as both the teachers and the administration ranked within the 'neutral/average' range. The administration illustrated a slight lessening of sensitivity with a mean response of 3.3 to the teacher's 3.0.

Table 4 - Inferential and Descriptive Statistics for the Extraversion Trait

Extraversion Trait	Introvert to Extrovert	Scaled Outcomes				
		Not enthused at all	Mostly unenthused (not happy)	Neutral/Average	Pretty enthusiastic	Always enthusiastic
		1	2	3	4	5
Question 1 -						
How enthused (happy and willing) are you towards work and school?					Teachers Mean - 4.1 Median - 4	
		Students' t results DF 19 (t = 3.883 for correlation) T = 2.71 Not Correlated			Administrators Mean - 4.8 Median - 5	

Question 2 - How energetic are you normally, especially regarding work and/or school?	Not energetic at all 1	sometimes energetic 2	Neutral/Average 3	Usually energetic and ready 4	Always ready to go 5
Students' t results DF 19 (t = 3.883 for correlation) T = 1.79 Not Correlated		Teachers Mean - 4.1 Median - 4		Administrators Mean - 4.6 Median - 5	

The second question was only different by 0.1 of a scale. Both groups responded high in trying to understand others, 4.7 to 4.8 respectively, in between the scales of 'sometimes' to

Table 5 - Inferential and Descriptive Statistics for the Accommodation Trait

Accommodation Trait	Challenger To Adapter	Scaled Outcomes				
Question 1 - To what extent or level are you willing to spend your free time helping your peers with assignments and work (for no gain or advantage)?		Rarely willing to help 1	Sometimes willing to help 2	Neutral/Average 3	Usually willing to help 4	Always willing to help 5
Students' t results DF 19 (t = 3.883 for correlation) T = 2.93 Not Correlated		Teachers Mean - 4.2 Median - 4		Administrators Mean - 4.8 Median - 5		
Question 2 - How far are you willing in conceding a point or an argument to a fellow worker or student who you are not friendly with?		I will not admit to being wrong 1	Rarely will I admit to being wrong 2	Neutral/Average 3	Sometimes I will admit to being wrong 4	I am willing to admit to being wrong 5
Students' t results DF 19 (t = 3.883 for correlation) T = 0.21 Not Correlated		Teachers Mean - 4.4 Median - 5		Administrators Mean - 4.6 Median		

Table 6 - Inferential and Descriptive Statistics for the Consolidation Trait

Consolidation Trait	Casual To Focused	Scaled Outcomes				
Question 1 - How competitive do you consider yourself towards the quality of work you undertake as compared to your peers at work and school?		I am not interested in competing 1	My work is fine as it is 2	Neutral/Average 3	I do better than my peers 4	Anything I do must be the best 5
Students' t results DF 19 (t = 3.883 for correlation) T = 1.14 Not Correlated		Teachers Mean - 3.5 Median - 3		Administrators Mean - 3.9 Median - 4		

Question 2 - How do rate yourself in your drive to succeed as compared to your peers?	Don't care what my peers do 1	Sometimes will let my peers do better 2	Neutral/ Average 3	Usually willing to be better 4	Willing to always be better 5
	Students' t results DF 19 (t = 3.883 for correlation) T = 1.69 Not Correlated		Teachers Mean - 4.0 Median - 4		Administrators Mean - 4.5 Median -

'always' trying to understand others. The biggest difference was in question three, concerning the time respondents felt it took to get 'over' a traumatic event. Teachers had a mean response of 3.5 with a mode of three; administrators had a mean of 4.1 with a mode of 4. The range was 0.6 of a scale with the responses falling within two categories. The teachers saw themselves as average in this regard while the administrators saw themselves as more stable, or quicker in recovering; no doubt a precious skill for that position.

The fifth and last domain, the super-trait of originality, consisted of three questions as well. Respondents were asked (1) to rank how imaginative they perceived themselves to be, (2) to rank the amount of thought they would be willing to put into a complex or difficult issue and (3) to rank the amount of change they would be willing to make for work. Imagination correlated closely with the teachers having a mean response of 3.9 to the administrators 4.0. This put both populations around the scale of 'somewhat imaginative' though once again the administration scored slightly more so than the teachers. The amount of thought put to complicated endeavors had a slightly larger range for the population means. Teachers' had a mean score of 4.0, squarely on the scale of 'usually think' about these issues while the administration was a 4.3, still on the scale but further to the right in willingness. The final question, how is the respondent willing to change also had a range difference of 0.3 of a scale between the two populations, with the teachers having a mean score of 4.4 with the administrators a 4.9. This measure is telling as the threshold can only be a 5, for the administrators they must have exclusively checked five, save for just one. In a generalized view, the administration team is completely willing to change while the teachers are sometimes to always willing to do so. There was no correlation to any of the three questions with the populations as determined by the Students' t analysis.

FINDINGS OF THE STUDY

Description by Language

In the discussion, the traits of the district should be analyzed first, starting with the adjective descriptors. Of the overall population of the district sampled, the teachers and administrators described themselves through their individual (self) perceptions. Overall, both populations reported as being friendly, personable and outgoing, always good signs towards a positive district culture. Interestingly enough, the top two traits of 'friendly' and 'outgoing' juxtaposed in order depended on the population. Teachers picked 'friendly' first (87%) and then 'personable' (69%) while administrators picked 'personable' first (72%), then friendly (61%). Administrators also picked 'outgoing' at 56%. Interestingly enough there was also a different, specific trait that one would have while the other did not. For administration, this was 'sensitive' at 39% of responses, which didn't come up at all with the faculty. The teachers, though, had 'quiet' at 21% which the administration did not.

It must be noted that this was a self-populated instrument so perceived bias is definitely a limitation in the responses, however good intentions can still be derived from the findings, regardless of others actually perceive the populations as 'friendly' or 'outgoing'. The switch between these two,

arguably similar traits between teaching and administrators is an intriguing construct of developed though a pedantic lens. Perhaps teachers see ‘friendly’ as more conducive to teaching styles and/or classroom culture where an administrator would feel that outgoing, or extroverted, would have more benefit to their particular duties? Both are important in general, which can be extrapolated back to the school culture at large but the differences in roles and responsibilities dependent on each position one may benefit one population slightly more than the other. ‘Personable’ makes sense for administrators as well as they would need to

Table 7 - Inferential and Descriptive Statistics for the Stability Trait

Stability Trait	Resilient To Reactive	Scaled Outcomes				
Question 1 - How sensitive are you to criticism and insults?		Extremely sensitive 1	Sensitive 2	Neutral/Average 3	Not very sensitive 4	Not sensitive at all 5
		Students' t results DF 19 (t = 3.883 for correlation) T = 1.30 Not Correlated		Teachers Mean - 3.0 Median - 3		Administrators Mean - 3.3
Question 2 - How much effort do you put towards understanding other people and their issues/problems?		Not interested 1	Usually don't think about it 2	Neutral/Average 3	Sometimes try to understand 4	Always try to understand 5
		Students' t results DF 19 (t = 3.883 for correlation) T = 0.62 Not Correlated		Teachers Mean - 4.7 Median - 5		Administrators Mean - 4.8
Question 3 - How long does it take you to get over a stressful or (mild) traumatic event?		Can't get over things 1	Have trouble letting go 2	Neutral/Average 3	Usually no problem letting go 4	Easy to forgive and move on 5
		Students' t results DF 19 (t = 3.883 for correlation) T = 1.93 Not Correlated		Teachers Mean - 3.5 Median - 3		Administrators Mean - 4.1

be more open to different situations and contexts than that of a teacher, arguably more narrowly defined through their classroom and/or subject or content, while a principal would need to have more context and range for his or her varied responsibilities. As for quiet, this segues with personable and is interesting how it does not come up at all with the administration. It can be argued that there are different styles of teaching based on the different personalities of the teacher utilizing them (Lennon, 2012). It may be possible that the quiet, or more introverted teachers, may not illustrate traits deemed important or necessary for this administration. Further study is definitively needed before a stronger analysis can be determined.

In the management descriptor, the two populations were also similar, with another interesting juxtaposition between the top two traits. Teachers picked ‘friendly’ first (76%) then ‘open’ (53%) while administrators’ selected ‘open’ first (83%) than ‘friendly’ (78%). Note the big difference in

percentages of 'friendly' in the two populations and through both sections of the adjective descriptors section of the instrument. This metric was seen as the most or second most important adjective in both sections by both sample groups, obviously seen as the most important descriptor throughout the district. 'Open' is also interesting as this correlates somewhat to personable in the first section as well. The populations are not so dissimilar, at least towards their perceived notions of themselves.

Teachers also reported themselves as stern (30%) and more authoritarian (17%). This difference may be due to the shifting of managerial roles of an administrator to that of a teacher. Focus on the educator is more tuned to children and specific roles and expectations. Educational leaders have more nuanced managerial roles, from teachers to students and parents, and for any myriad of issues in between. The shifting percentages of 'open' may indicate this as well as 'sensitive' for administrators. Comparing the descriptors to the FFM, the trait of extraversion is most pronounced, with accommodation, stability, and originality also present. Interestingly enough, the consolidation super-trait was not measured or determined in any strength through the adjective descriptors. This is interesting as this super trait focuses on perfectionism, drive, being methodical and having higher levels of concentration, common traits associated with management. For many teachers, this can be developed as classroom management and perhaps constructs in grading and pedagogy and, no doubt, seen by many as strength. Yet, for it to be absent for leadership it is surprising not to see this higher in administration. Or is it? Perhaps, school based leaders do not recognize this super trait as highly as other leadership fields. Or, it is seen, once again, more as a managerial duty than a leadership one, with less importance in the specified field of educational leadership. More research is suggested before any further correlations can be explored.

Likert Scaled Questions

In the likert questions domain, differences in scale became apparent. Most interesting, the teachers and administrators were statistically different for all 12 questions. In the students' t analysis of paired samples, significant measures were taken to reduce bias and increase power, reducing the risk of a type I error (Howell, 2004). No correlation was determined, between the two samples for any questions. Though the populations seemed arguably similar in the adjective descriptors, they tested differently in that of the scaled responses. This difference is most revealing through visual interpretation of the means. The scaled questions were designed to indicate differences in personality (at least in degrees) which ranked as negative or positive, weaker or stronger. In this, the administrators were always to the right in mean response to the teachers. Regardless of the personality measure asked, the administration sample was consistently more, or greater than the mean responses than that of the teachers. The two populations are similar still, unsurprising as the one is no doubt derived from the other, but differences are ascertained. The administration is more excessive, or positive towards each trait, magnified more so than their teaching peers.

Of the main traits associated with the FFM, the super-trait of extraversion was the most prominent as seen within the two components of the survey. It was the most cited domain when delineated through the common adjectives' activity and the two questions about it in the Likert section had the largest scaled difference in response. Administrators were more enthused and energetic than the teachers. The adjective response activity had both friendly, which easily correlates to the extraversion super-trait as well personable and charismatic as top choices for both populations. Personable may also segue into the accommodation trait as well, but it will also fit in extraversion. Here further study is also suggested. In the scaled responses, the

Table 8 - Inferential and Descriptive Statistics for the Originality Trait

Originality Trait	Preserver To Explorer	Scaled Outcomes				
Question 1 - How imaginative or creative do you perceive yourself in a daily sense?		Rarely/never imaginative or creative 1	Sometimes imaginative or creative 2	Neutral/Average 3	Somewhat imaginative or creative 4	Very imaginative or creative 5
		Students' t results DF 19 (t = 3.883 for correlation) T = 0.31 Not Correlated		Teachers Mean - 3.9 Median - 4		
				Administrators Mean - 4.0		
Question 2 - How much 'thought' do you put into understanding 'nuances' or issues of complex problems (social/political/spiritual/etc.)?		Don't think about these issues 1	Sometimes think these issues 2	Neutral/Average 3	Usually think about these issues 4	Always thinking about these issues 5
		Students' t results DF 19 (t = 3.883 for correlation) T = 0.95 Not Correlated		Teachers Mean - 4.0 Median - 4		
				Administrators Mean - 4.3		
		Not interested 1	Usually don't think about it 2	Neutral/Average 3	Sometimes try to change 4	Always try to change 5
		Students' t results DF 19 (t = 3.883 for correlation) T = 2.72 Not Correlated		Teachers Mean - 4.4 Median - 4		
				Administrators Mean - 4.9		

differences were over 0.5 for both questions. The difference as totaled is greater in this domain for two questions than any other domain, including those of stability and originality, which had three questions apiece to this one's two.

Other super-traits had indicators of influence or impact as well. Accommodation, stability, and originality could be categorized from the adjective responses. Consolidation, interestingly not referred to in the adjective analysis, also showed a significant difference in the scaled responses between the two populations. This may mean nothing more than a lack of specific adjectives for respondents to have picked, but it may indicate a hidden, mitigating variable that the respondents themselves may not be aware. This domain looked at the drive and overall competitiveness which seemed to be strong within the two populations but, almost, not appropriate for them to admit to doing or being. Seemingly like a correct political statement, it appears that the populations, primarily the teachers, were more cautious than their administrative counterparts in admitting to this personality. It may also indicate a difference in professional expectations where the leadership team, for advancement, may need to be more competitive than the teachers. The trait of originality would be the closest grouping for both populations, with all three questions being less than 0.3 of a scale of the difference.

The individual questions with the biggest disparity in response was enthusiasm at work (+0.7), willingness to spend free time (+0.6), time needed to get to a stressful event (+0.6). Close behind

these three and tied are, energetic at work (+0.5), and drive to succeed (+0.5). In each instance mean administration response was at least a half scale higher in the rankings. These questions also encapsulate four of the five domains of the FFM, though extraversion is the only category to be listed twice. The closest grouping for questions was in trying to understand others (+0.1) and how imaginative the two populations saw themselves (+0.1). These comprise the traits of stability and originality respectively. Stability was somewhat interesting as it had within its domain one of the widest variances of questions response and one of the narrowest. Like in extraversion, this trait needs further study to help determine its role or influence in leadership constructs

The two populations share a common culture as indicated in the adjective activity yet they differ in important, measurable ways. This is no surprise as they are not independent sample groups. The administrative leadership team is part of the overall community, many of them were brought up from the teacher ranks, and those from outside would still need to conform to the culture already embedded in the system. There is a difference, however, though it is impossible in this study to determine if this is a natural construct of differing job expectations, or personality descriptors looked for in these positions. It is probably somewhat of both. Upon moving into an administrative leadership role, an individual would probably already have the appealing characteristics the team is looking for in a leader, regardless of it being implied or stated. This culture is not specific to just individual schools but is probably a subset of the institutional leadership culture of the district. In reviewing the surveys not one school or type (elementary, middle or High school) had a variance of range in the Likert response of more than 0.4 of a scale. Ten of the 12 question had a teacher variance of less than 0.2 for all schools. The administration scored higher than they, indicating an influence beyond the parameters of the building themselves. More data needs to be done, especially in regard to developing a scale of measurement, but it does appear the language and personality constructs can delineate leadership constructs within an educational system and these constructs are different than the teachers they administer over.

It would also seem that within these super traits, some are more dominant than others, at least towards self-perceived or individualized understanding of these concepts. Extraversion, with adjectives such as friendly and open was common in both segments of the study and had high correlations throughout. Both teachers and administrators strongly indicated this as a dominant trait in their dealing with students. Accommodation also seemed important, though not as strong as extraversion, it was commonly referred to with both populations as were stability and originality, though perhaps not as strongly. Of note was the lack, or least indicator of accommodation through the sample responses. Maybe due to the 'nature' of the teaching profession or to variables unknown at this time, this personality trait was shown to be the least important, or relevant to the teachers and administrators surveyed.

SCIENTIFIC OR SCHOLARLY SIGNIFICANCE

Educational leadership, including teacher leadership, is a sub-field of general leadership studies but what works in this domain should also fit in others. It fits a niche somewhere between the educational culture and hierarchy of a school and the leadership team culture and formalized roles as established by precedent and district expectations. This 'pipeline' has been established for years though little research has been done on the traits a person may possess before moving into administration and if these traits can be analyzed for specific data, and if these can be further correlated into leadership descriptors or metrics. In this study the answer is yes, and it appears the populations are different enough to be measured. There are similarities in self-perceived leadership and managerial traits though differences were ascertained. But in the Likert Scales the populations were clearly different. The potential significance of this research is in developing models of informal leadership constructs within a school, identifying traits that make a leader and using them to help identify possible candidates and developing models to make sure the administration is still in sync, to some degree, as the faculty. These are not independent populations, and though the difference is assumed between a teacher and an administrator, this difference cannot be so great that the two cannot communicate or understand the other. Obviously, there is more work needed to be done but the study

indicates it may be possible in utilizing personality templates in determining leadership types or concepts. The study also indicates the potential of personality models part of the cannon in leadership studies as another potential means of identifying, measuring or simply asking what it is that makes an individual a leader, albeit a successful one.

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Determining the Standards of Teaching and Learning Process as a Component of Curriculum*

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Abstract

In this research, it is aimed to determine the standards of learning teaching process as a component of curriculum. On the basis of the Delphi technique, standards were determined through the opinion of two hundred and ninety-five educational sciences experts from ten universities from all regions of Turkey in this study which was performed in three rounds. As a result, ten standards and two hundred six indicators were determined in terms of educational process. These standards have been categorized as 101 items for teachers oriented, 18 items for school administration, 11 items for Education and Training Policies, 19 items for Learning Environment, 22 items for Teaching Material, 9 items for Content, 2 items for Evaluation, 5 items for Teaching Process, 8 items for Learning and 11 items for Curriculum Standards. These standards, which the expert group agreed on independently, were significantly related to both national and international standards in the literature. It will be useful to conduct researches on the extent to which these standards are met in the education process. This research is considered to be very important to be the first research on this subject in Turkey and to provide opportunity to evaluate the curriculum based on standards.

Key Words: Teaching and Learning Process Standards, Program Development, Standard Development, Delphi Technique, Standards in Teaching.

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INTRODUCTION

Standards which are determined by an authority, tradition or common understanding are models or examples that must be followed. (Richardson, 1994:16). Çağlar and Kılıç (2008:49) define standards as unity in production, measurement experiment, and meaning. The British Standards Institute refers standards as instruments (BSI, 2018) which provide trustworthy basis to the people who have same expectations about a product. Likewise, Education standards are defined as indicators that allow educational institutions to reach certain targets in various aspects and not to fall below a specific target. (NEASC, 2009 Cit. by Bakioğlu and Baltacı, 2010). In other words, training standards are also referred as criteria to evaluate the quality of education. (NRC, 1996).

Sweeny (1999) states that the education standards question the expectations of education and enable these expectations to be evaluated. Moreover; that teachers and students have the knowledge and skills they need for success in terms of standards (and the expectation of the parents from students) are crucial. In addition, education standards help teachers and students not only have the knowledge and skills they need to succeed, (Common Basic State Standards (CCSS), 2018), but also enable students to focus on the goals they need to learn (Great Schools, 2015).

Educational institutions can make their own self-evaluations with the standards, present their current situation and determine the aspects which must be developed (MEB, 2015). In this context, standards provide criteria to evaluate whether the progress towards a national target in science learning and teaching is ensured or not (National Research Council (NRC), 1996). On the other hand, they offer a common language for reforming studies.

In the literature, there is some criticism about the standard phenomenon in education. While Darling-Hammond (1999:37) states that standards cannot solve poor quality schools, stereotyped curriculum, unfair distribution of resources or social support problems of children and young people, Lachat (1994) states that the standards developed by consensus will increase the learning levels of the students by creating equal opportunities. Barton (2009), who makes an assessment for the teachers, thinks that standard-based education may bring certain limitations, it can put teacher's creativity at risk and create imbalances in the distribution of school subjects. Doherty (2003:9), who opposes this view, claims that the standards clearly define the roles and responsibilities of educational institutions and make teachers feel more confident in implementing the curriculum. Lachat (1994) draws attention to the fact that failure of standards during the development, implementation and conclusion stages due to inattention and inequality may end up with unexpected outcomes. In addition, it is stated that the government's forming standards according to their own political policies (Pring, 1992) and manipulating standards (Carmichael, Martino, Porter-Magee and Wilson, 2010) may prevent standards to achieve their goals. Wiles (2016:27) emphasizes that standards should be seen as tools rather than goals. Malone and Nelson (2006) states that determining the values that students and teachers must have in order to be responsible, conscious and sensitive citizens should become integral parts of the standards. On the other hand, Bellour (2017) criticises this issue in terms of scope and stresses that the teaching of standards should be directed not only externally, but also internally. Erişen (2003) thinks that it is possible to eliminate the errors by determining the standards for all the elements in the education system. Göksoy (2012) conveys the views of Cavanaugh (2002) on this subject and points out that there should be standards regarding how effective and efficient implementation of teaching-learning process components (teaching methods, materials, learning process, activities, content etc.) in order to ensure quality in education. Furthermore, if we want to talk about the quality of students and teachers and to make an evaluation, there must be the universal, acceptable, valid standards (Göksoy, 2014).

Although countries such as the United States, the United Kingdom and Australia have set various standards both nationally and regionally (Department for Education, 2013; AITSL, 2018; CCSS, 2018; NPBEA, 2015; TESOL, 2017; CDE, 2011; Utah Effective Teaching Standards, 2011; NDESPB, 2017; NSTA, 2003), there are only standards about Secondary Education Institutions and Preschool and Primary Education Standards determined by the Ministry of National Education

(MONE) and teacher training standards determined by Council of Higher Education in Turkey (Beltekin, Özdemir, Yılmaz, Akkalkan). The lack of research on standards in Turkey leads to the lack of standards-based assessments. Therefore, the evaluation products are generally based on objective measurements and the diagnosis of events and cases. Besides, due to the lack of standards, comparing Turkey with other countries in the world can not be possible. Acceptances in the field regarded to teaching and evaluation of standards will only be meaningful with the determination of these standards and research in the field.

METHOD

The research was conducted according to descriptive survey model. Survey models are now accepted in the literature and as Karasar (2009:77) defined it as “a *research aimed at describing the situation in the past or present as it is*”.

The research was conducted on the basis of Delphi technique. The aim of the Delphi technique is to provide a common consensus of selected experts on the subject. Delphi technique which is performed in three rounds, firstly aims at determining the research and selecting the experts. Once the expert group is determined, their opinions are asked through one or more questions about the subject. After the answers to the questions are examined, grouped and placed in an order, they are sent to the experts again in the second round and they are asked to examine, defend or change these answers. The new questionnaire, which is shaped according to the feedback, is sent to the experts in the third round and final questionnaire is formed (Demirel, 2011:86-88).

Population and Sample

The research population consists of the instructors who work in educational sciences department of education faculties of universities in Turkey. Purposeful sampling method was used in the sample selection. In the selection of the sample, it was aimed to select the instructors who are expert in the research subject. Initially, seven universities from seven regions of the country (Artvin Çoruh University, Gazi University, Yıldız Technical University, Çukurova University, Muğla Sıtkı Koçman University, Fırat University and Dicle University) were chosen as samples for the research. However, due to the insufficiency of the number of instructors in these universities, their unwillingness to participate in the research and to give feedback for the research, Recep Tayyip Erdoğan University, Kahramanmaraş Sütçü İmam University and Erzincan Binali Yıldırım University were added to the research.

Of all sample, 15 (5,1%) participants are from Artvin Çoruh University, 20 (6,8%) from Recep Tayyip Erdoğan University, 92 (31,2%) from Gazi University, 28 (9%) from Yıldız Technical University, 27 (9.2%) from Çukurova University, 10 (3.4%) from Kahramanmaraş Sütçü İmam University, 43 (14.6%) from Muğla Sıtkı Koçman University, 16 (%5,4) from Erzincan Binali Yıldırım University, 27 (9.2%) from Fırat University and 17 (5.8%) participants are from Dicle University. When it comes to the distribution of these instructors according to their specialties, 95 (32.2%) of them are working at Curriculum and Instruction department, 67 (22.7%) of them are at Education Administration department, 89 (30.2%) of them are at Psychological Counseling and Guidance department and 44 (14.9%) of them are working at Measurement and Evaluation department. When it comes to the titles of the participants, 46 (15,6%) of them are professors, 56 (19,0%) of them are associate professors, 83 (28,1%) of them are dr. instructors, 13 (4,4%) of them are dr. researchers, 83 (28.1%) of them are researchers, 5 (1.7%) of them are dr. lecturers and 9 (3.1%) of them are lecturers.

Data Collection Tools

The data collection tool of the research took its final form as a result of the Delphi process. Data collection tool consisting of a series of open-ended questions in the first round became a survey

in the third round. In the data collection tool, there are questions aiming at determining the demographic features of the lecturers, two open-ended questions about the opinions of the instructors about the standards of the education (teaching-learning process) and one open-ended question questioning the views of the participants for the overall research. Validity of the data collection tool was ensured through the review of three field experts. The opinions obtained through the application of data collection tool were coded by different researchers and these codes were compared.

In the second round of the study, the experts were asked to evaluate the views coded in the first round. In this round, experts have accepted some of the themes, and some have been rejected due to several reasons. Accepted or rejected opinions were turned into questionnaires and submitted to the experts' opinions in the third round.

Data Analysis

The opinions obtained in the first round of the research were analyzed by using content analysis and descriptive analysis. In the content analysis, existence of certain words and concepts in a cluster of text are analyzed in terms of meanings and relations and inferences are formed about the messages in the texts (Büyüköztürk, Kılıç-Çakmak, Akgün, Karadeniz and Demirel, 2015:246). The views of the instructors obtained from the first round were coded by three different field experts. The opinions encoded by the experts were compared and the correspondence rates were examined in the literature. As a result of comparisons, 96% concordance was obtained. The fact that the expert opinions are simple and short can be shown as another factor which facilitates the coding process and causes the high percentage of compatibility.

In the second round, the arithmetic mean and standard deviation values of the responses to the items were calculated and the direction and the size of the change were tried to be determined. In the last round, the mean and standard deviation values of the items have been calculated and a common opinion has been tried to be obtained. It was decided whether there was a consensus on the acceptance, correction or exclusion of the standards or not by the participants through the mean values of the responses to the standards. In the evaluations made in this respect, the values in Table 1 are taken into consideration.

Table 1. Consensus evaluation intervals

Intervals	For acceptance / rejection of items	For exclusion of items
1,00-1,80	Strogly Disagree	Absolutely Should Not Be Removed
1,81-2,60	Disagree	Should Not Be Removed
2,61-3,40	Indecisive	Indecisive
3,41-4,20	Agree	Should Be Removed
4,21-5,00	Totally Agree	Absolutely Should Be Removed

In Table 1, the level of opinion corresponding to the scoring of five likert type questionnaire is given. Accordingly, the items in “Agree” (3,41-4,20) and “Totally Agree” (4,21-5,00) were interpreted as an indication of the fact that the standards were accepted. Besides, for the standards proposed to be excluded from the scope of the questionnaire, the opinions of “*Should Be Removed*” (3,41-4,20) and “*Absolutely Should Be Removed*” (4,21-5,00) were used.

FINDINGS

After the opinions obtained in the first round of the research were coded by researchers, 10 standards and 253 indicators were determined. Table 2 shows the quantitative distributions of the standards and the indicators that appear according to the opinions obtained from the first round.

Table 2. Standards and Sub-Standards Resulting from the 1st Delphi Tour

Standard	f	%
Standards for Teacher	135	53,4
Standards for School Administration	19	7,5
Standards for Education Policies	11	4,3
Learning Environment Standards	20	7,9
Standards for Materials	25	9,9
Content Standards	9	3,6
Evaluation Standards	5	1,9
Course Process Standards	9	3,6
Standards for Learning	8	3,1
Standards for Curriculum	12	4,8
TOTAL	253	100

Of all the standards in Table 2, 135 (53.4%) are for the Teacher, 19 (7.5%) for Administration, 11 (4.3%) for Education Policy and 20 (7.9%) for Learning, 25 (9.9%) for materials, 9 (3.6%) for content, 5 (1.9%) for evaluation, 9 (3.6%) for course process, 8 (3.1%) for Learning and 12 (4.8%) Standards for Curriculum. According to these findings, it is possible to say that the highest number of standards have been developed for teachers, and for materials subsequently.

The standards obtained from the first round have been converted into a questionnaire and a space is provided for experts to state their opinions and recommendations. In the second round, some criticisms were made on the grounds that some of the statements express the same meaning, some are not meaningful statements and some do not conform to the standards of educational process in the first round. It has been suggested that the items in this structure should be corrected or excluded from the scope of the survey. By using the items related to standards which are suggested to be removed with reasons and the standards which are revised, questionnaire was prepared again. Then, the questionnaire was sent to the experts in the third round by e-mail and the level of participation to the changes was questioned. Table 3 shows the mean and standard deviation values for the responses given to the standards for teacher in 3rd Delphi round questionnaire.

Table 3. Mean and Standard Deviation Values of the Standards for Teachers

Standards for Teachers (\bar{X} :SS)
1. Teacher knows the cognitive, linguistic, social, emotional and physical development areas of the students (4,30:0,76), 2. Teacher takes care of students' moral development (4,34:0,82), 3. The teacher knows the learning environment and its features (4,50:0,67), 4. Teacher creates a democratic classroom environment (4,49:0,78), 5. Teacher has technopedagogical knowledge and skills in his field. (4,16:0,76), 6. Teacher cares about validity and reliability in measurement and evaluation (4,26:0,96), 7. Teacher uses knowledge of learning styles to design learning and teaching (4,14:0,93), 8. Teacher associates the subjects with real life (4,57:0,64), 9. Teacher gives interesting examples in the course (4,50:0,69), 10. Teacher benefits effectively from instructional technologies (4,19:0,94), 11. Teacher is role model for students (4,54:0,64), 12. Teacher has knowledge of learning-teaching theories (4,26:0,88), 13. Teacher uses teaching methods and techniques which make the student active (4,40:0,81), 14. Teacher has critical thinking, problem solving, decision making skills (4,36:0,73), 15. Teacher has efficient communication skills (4,50:0,71), 16. Teacher approaches the student with compassion (4,34:0,73), 17. Teacher conducts field research with questioning approaches (3,90:0,97), 18. Teacher follows the scientific studies in the field (3,96:1,08), 19. Teacher forms groups of students who are in solidarity and cooperation (4,17:0,77), 20. Teacher takes his lesson seriously (4,53:0,75), 21. Teacher is flexible (4,01:0,87), 22. Teacher is sensitive to social events and problems (4,37:0,68), 23. Teacher has a critical perspective (4,47:0,75), 24. Teacher has empathy (4,51:0,67), 25. Teacher does not discriminate (4,50:0,67), 26. Teacher pays attention to student rights (4,49:0,69), 27. Teacher takes care of the student (4,43:0,83), 28. Teacher is open to cultural mixture (4,19:0,86), 29. Teacher is patient (4,41:0,70), 30. Teacher is friendly (4,39:0,78), 31. Teacher has confidence (4,34:0,69), 32. Teacher has understanding (4,44:0,62), 33. Teacher is open to innovation (4,41:0,87), 34. Teacher takes care of physical appearance (4,26:0,80), 35. The teacher appreciates the importance of insight (3,91:0,92), 36. Teacher advises children related to the family and other social environment (4,03:0,89).
Items Recommended to be Combined, New Items (NI) (\bar{X} :SS)
37. Teacher has a philosophy of lifelong learning, 38. Teacher is aware of developments in the field, 39. teacher is open to professional development, 40. Teacher has the knowledge of his field, 41. His field knowledge is up-to-date, 42. Teacher is open to self-development, NI: Teacher strives for professional development by adopting lifelong learning (4,41:0,72) 43. Teacher creates synergy in the classroom, 44. Teacher organizes the learning environment according to objectives and

achievements, 45. Teacher creates a positive class culture, NI: Teacher strives to create the appropriate classroom climate for the purpose of the course (4,29:0,83)

46. Teacher knows the advantages and disadvantages of methods and techniques, 47. Teacher has the ability to apply methods and techniques, 48. Teacher uses pre-organizers, information maps, subject schemes, 49. Teacher has knowledge about teaching strategies, methods and techniques NI: Teacher has knowledge about teaching strategies, methods and techniques (4,24:0,97)

50. The teacher determines the method to be used according to the objectives, 51. Teacher determines the methods and techniques appropriate to the student features and objectives of the course (4,24:0,96), 52. Teacher chooses the method by considering the learning styles, 53. Teacher makes the choice of method and technique according to student age and level. NI: Teacher makes the choice of method and technique according to student age and level, (4,27:0,82)

54. Teacher uses technology interactively, 55. Teacher is a technology literate, NI: Teacher is a technology literate (4,21:0,82)

56. Teacher sets the target for the lesson, 57. Teacher organizes stimulants and content according to the target, 58. Teacher plans each stage of teaching coherently with objectives, NI: Teacher plans each stage of teaching coherently with objectives (4,34:0,89)

59. The teacher applies the prepared plan, 60. Teacher prepares a lesson plan reflecting the draft of the educational process plan, NI: Teacher prepares a lesson plan reflecting the draft of the educational process plan (4,13:0,86)

61. Teacher organizes activities to encourage the student to think, 62. Teacher brings students in high-level thinking skills NI: Teacher helps students gain high-level thinking skills (4,33:0,84)

63. Teacher has good personality, character and morality, 64. Teacher has ethical principles, NI: Teacher has ethical and moral principles (4,50:0,62)

65. Teacher believes students will be successful, 66. Teacher believes that everyone can learn, NI: The teacher maintains the teaching with the belief that everyone can learn (4,24:0,94)

67. Teacher knows the concepts, processes and principles related to the subject, 68. Teacher has skills specific to field, NI: Teacher knows the main concepts, principles, assumptions, discussions related to his / her discipline. (4,26:0,90)

69. Teacher takes the affective characteristics of the student into account, 70. The teacher organizes the lesson according to the learning areas, NI: The teacher organizes his / her lesson according to the learning areas (cognitive, affective, psychomotor (4,36:0,779)

71. Teacher enables teacher-student communication, 72. Teacher enables student-student communication, 73. Teacher uses gestures and mimics effectively, 74. Teacher has effective diction, body language and appearance, 75. Teacher eliminates communication barriers, 76. Teacher has classroom management communication skills, NI: Teacher has effective communication skills (4,44:0,68)

Items Recommended to be Rearranged, New Items (\bar{X} :SS)

77. Teacher does not sit continuously, YM: Teacher manages the learning environment well (4,17:0,94)

78. Teacher follows developments in teaching methods and techniques, NI: Teacher follows new orientations in education (4,26:0,84)

79. Teacher uses the factors determined by the dynamic approach, NI: Teacher deals with students with their feelings, thoughts, behaviors, families, cultural and social structures. (4,17:0,829)

80. Teacher knows his / her own field curriculum and the curriculum of other fields, NI: Teacher knows how interdisciplinary issues are connected to the main subject and how to teach these subjects to the individuals (4,14:0,91)

81. Teacher knows the individual differences of the students, NI: Teacher considers the individual differences of the students (4,47:0,67)

82. Teacher appreciates effort, NI: Teacher appreciates the students' learning efforts (4,47:0,60)

83. Teacher adopts the basic principles of classroom management, NI: Teacher applies the basic principles of classroom management during teaching (4,40:0,83)

84. Teacher considers all the details that distract the student, NI: Teacher performs the teaching by taking into account the factors that stimulate the student's senses (4,20:0,87)

85. Teacher makes evaluation to know, NI: Teacher performs activities to know students (4,39:0,68)

86. Teacher uses his voice well, NI: Teacher knows how to adjust the tone of his voice (4,36:0,69)

87. Teacher manages group dynamics, NI: Teacher organizes group work and manages the dynamics of each group (4,14:0,85)

88. Teacher uses appropriate reasoning processes, NI: Teacher uses the reasoning processes appropriate to the level of the students (4,26:0,78)

89. Teacher makes the student like the lesson, NI: Teacher uses a variety of teaching strategies to motivate the students to the lesson and to make them participate. (4,39:0,74)

90. Teacher develops their discourse skills, NI: Teacher helps students improve their ability to express themselves (4,41:0,66)

91. Teacher makes preparation about the subject to be taught, NI: Teacher comes to the class ready (4,51:0,69)

92. Teacher takes attention, NI: Teacher draws the student's attention to the subject (4,43:0,62)

93. Teacher informs student about target, NI: Teacher explains the objectives of the course (4,49:0,62)

94. Teacher manages behaviors, NI: Teacher tries to manage students' behavior (replacing negative behaviors with desired behaviors) (4,39:0,70)

95. Teacher manages time, NI: Teacher uses time effectively (4,43:0,68)

96. Teacher enables student participation, NI: Teacher strives to ensure students' participation in the class (4,49:0,67)

97. Teacher asks questions, NI: Teacher asks questions that lead students to think (4,56:0,57)

98. Teacher has knowledge about material preparation, NI: The teacher develops materials for the subject to be taught. (4,31:0,72)
99. Teacher has knowledge of assessment, NI: Teacher has knowledge of assessment and evaluation (4,34:0,96)
100. Teacher organizes learning experiences, NI: Teacher plans learning experiences according to student level (4,47:0,62)
101. Teacher implements ice-breaker or roundup activities which are used in initiating and terminating teaching, NI: Teacher performs the mainstreaming activities at the beginning of the teaching process (4,14:0,94)
102. Teacher prepares appropriate materials within students teacher collaboration, NI: Teacher prepares appropriate material for achievements and content within students teacher collaboration (4,24:0,76)
103. Teacher determines clues, feedback and reinforcements, NI: Teacher uses clues, feedback and reinforcements (4,43:0,72)
104. Teacher uses both student and teacher strategies in class management, NI: Teacher uses class management strategies in inappropriate place (4,41:0,59)
105. Teacher has computer skills such as computer and mobile operating systems, office programs and content creation, NI: Teacher has basic computer skills (4,14:0,94)
106. Teacher creates a class culture based on values, NI: Teacher creates a classroom environment based on values (4,30:0,72)
107. Teacher has knowledge of features of lesson plan, NI: Teacher has the knowledge of preparing a lesson plan (4,30:0,91)
108. Teacher plans learning period effectively, NI: Teacher plans learning duration effectively (4,37:0,68)
109. Teacher intervenes the curriculum in certain situations, NI: Teacher behaves flexibly when applying the curriculum (4,20:0,80)
110. Teacher is psychologically and spiritually suitable for the profession, NI: The mental state of the teacher is suitable for the profession. (4,26:0,87)
111. Teacher knows the textbooks and contents of his/her field, NI: Teacher knows domain specific textbooks and content (4,24:0,85)
112. Teacher has knowledge about various subjects of human interest, NI: The teacher has knowledge about current and public issues (4,37:0,75)
113. Teacher has an energetic look, NI: Teacher has an energetic mood (4,19:0,94)
114. Teacher has the art of public speaking which is a need for teaching, NI: Teacher has the art of public speaking which is a need for his/her profession (4,26:0,76)
115. Teacher motivates, NI: Öğretmen, öğrencilerde motivasyon sağlar (4,30:0,68)
Items Recommended to be Removed (\bar{X} :SS)
116. Teacher knows what he does (3,47:1,26), 117. Teacher are in the expectation of high success (3,26:1,31), 118. Teacher also develops affective skills (3,09:1,36), 119. Teacher explains in what way the course will be useful for the student (2,56:1,30), 120. Teacher provides student-teacher dynamism-energy (3,67:1,27), 121. Teacher makes interval summary (3,40:1,25), 122. Teacher makes overall summary (2,97:1,30), 123. Teacher revises the lesson (3,24:1,28), 124. Teacher recognizes and controls teaching variables (3,59:1,20), 125. Teacher uses updated methodology (3,29:1,23), 126. Teacher uses the techniques specific to culture (3,66:1,10), 127. Teacher uses the technique appropriate for feature of the era (3,54:1,16), 128. Teacher blends modern methods and techniques with classical methods and techniques (3,40:1,21), 129. Teacher stimulates students' sensory organs by means of material (3,16:1,23), 130. Teacher teaches in a classroom atmosphere where students are active in the guidance of teachers (3,40:1,26), 131. Teacher's technological perception is high (3,71:1,05), 132. Teacher prepares and uses digital educational content (3,34:1,22), 133. Teacher has an awareness and tendency towards R & D research for education. (3,66:1,13), 134. Teacher acknowledges the importance of knowledge (3,49:1,28), 135. Teacher communicates with respect and ethics (3,30:1,31).
\bar{X} : Mean, SS: Standard Deviation, NI: New Item

Some of the standards for teachers (1, 2, 3, 4, 6, 8, 9, 11, 12, 13, 14, 15, 16, 20, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33 and 34) are given in Table 3 are accepted as “*Totally Agree*”, others (5, 7, 10, 17, 18, 19, 21, 28, 35 and 36) are accepted as “*Agree*” level within consensus. Some items suggested to be combined for teacher standards (37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75 and 76.) are combined with level of “*Totally agree*”, 59th and 60th items are combined with level of “*Agree*”. Of the Items which have been arranged based on expert opinions, some of them, (77, 79, 80, 84, 87, 101, 105, 109 and 113) have been answered as “*Agree*”. Others (78, 81, 82, 83, 85, 86, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 102, 103, 104, 106, 107, 108, 110, 111, 112, 114 and 115) have been answered as “*Totally Agree*”. Items recommended to be removed (116, 120, 124, 126, 127, 131, 133 and 134) have been removed from the questionnaire with the “*Should Be Removed*” level mean consensus. The item number 117, 118, 119, 121, 122, 123, 125, 128, 129, 130, 132 and 135 have not been removed due to lack of consensus. At the end of this round, 101 indicators related to teacher standards were determined.

The third round findings related to administration standards, which are another standard area of the study, are summarized in Table 4.

Table 4. Mean and Standard Deviation Values of the Standards for School Administration

Standards for School Administration (\bar{X} :SS)
1.School administrator’s direct students to social activities (4,00:0,82), 2.School administrators support students in terms of science, art and technology projects (4,23:0,72), 3.School administrators organize activities that enrich the student life not only in school but also outside the school. (4,14:0,85)
Items Recommended to be Combined, New Items (\bar{X} :SS)
4.The school administrator organizes regular and systematic activities to improve teachers’ quality, 5.School administrators strengthen in-service training and teacher education processes, NI: School administrators, organizes regular and systematic activities for teachers to improve them (4,04:0,81)
Items Recommended to be Rearranged, New Items (\bar{X} :SS)
6.School administrators support teacher collaboration and development, NI: School administrators provide teacher cooperation (3,93:0,96)
7.School administrators plan activities to honor successful students, NI: School administrators organize events to honor successful students and to encourage who fail. (3,97:0,92)
8.School administrators motivate students and all school stakeholders, NI: School administrators motivate their staff (4,10:0,94)
9.School administrators monitor the use of equipment and materials in the school by teachers and students throughout the unit and increase the sensitivity of teaching in this subject, NI: School administrators draw attention to the use of materials in the school (4,09:0,87)
Items Recommended to be Removed (\bar{X} :SS)
10.School administrators have professional management skills (3,04:1,30), 11.School administrators act in accordance with instructional leadership in school (2,80:1,29), 12.School administrators lead the institution (2,97:1,29), 13.School administrators continuously develop projects for the institutionalization of schools, quality and standard development (3,17:1,20), 14.School administrators support counselor of the school (3,24:1,29), 15.School administrators plan school budget (3,29:1,35), 16. School administrators establish accountability criteria for teachers and stakeholders (3,17:1,26), 17. School administrators incorporate teachers into management (2,96:1,34), 18.School administrators have a democratic school management approach (2,89:1,36), 19. School administrators organize the school culture to supports formal and informal goals. (2,87:1,24).
\bar{X} : Mean, SS: Standard Deviation, NI: New Item

Considering the findings in Table 4, items 1st and 3rd were accepted as standards by unanimous vote on the “Agree” level and the 2nd item was accepted as standard by unanimous vote on the “Totally Agree” level. Articles 4th and 5th are gathered under one item by unanimous vote on “Agree” level. The 6th, 7th, 8th and 9th items were rearranged at the level of “Agree”. Since there was no consensus on the 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th and 19th items were presented to the expert opinion with the suggestion to be removed, but the items were not excluded from the scope of the survey. At the end of this round, 18 indicators standards were determined for the school administration.

In the study, the third round findings related to the standards for education policies, which are another standard areas, are summarized in Table 5.

Table 5. Mean and Standard Deviation Values of the Standards for Education and Training Policies

Standards for Education and Training Policies (\bar{X} :SS)
1.Teacher must have a teaching profession education (4,69:0,59), 2. Teacher must have master’s degree graduate (3,56:1,15), 3. For teacher employment, professional willingness should be tested (4,19:0,97), 4. The teacher should be tested in terms of mental health (4,41:0,80), 5. Each teacher should be employed in his / her own field (4,50:0,87), 6. Education policies should be flexible (3,80:1,00), 7. All schools must have access to the same materials (4,16:1,00).
Items Recommended to be Rearranged, New Items (\bar{X} :SS)
8. Prospective teachers should do internship for 2 years at theoretical and for 2 years at practice schools, NI: Practice should be given more emphasis in teacher education (4,41:0,85)
9. In-service training (at least 3 activities per year) should be provided for teachers,NI: Local in-service trainings should be provided for teachers in accordance with the needs (4,23:0,77)
Items Recommended to be Removed (\bar{X} :SS)
10. Financial problems should be solved by government (3,30:1,38), 11. Basic policies and standards in class management should be determined in a way that they will contribute to the students’ and teachers’ development in terms of attitudes

and skills. (3,26:1,35)

\bar{X} : Mean, SS: Standard Deviation, NI: New Item

When the findings for Table 5 were examined, items 2, 3, 6 and 7 were accepted as standards with consensus over “Agree” level and the items 1, 4 and 5 were accepted with “Totally Agree” level. Items 8, 9 have been rearranged with consensus over “Totally Agree”. Since there was no consensus on the 10th and 11th items submitted to the opinion of the participants with the suggestion to be removed, it was not excluded from the scope of the questionnaire. At the end of this round, 11 indicators were determined related to the standard area of education policies.

In the study, the third round findings related to learning environment standards, which are another standard area, are summarized in Table 6.

Table 6. Mean and Standard Deviation Values for 3rd Round Learning Environment Standards

Learning Environment Standards(\bar{X} :SS)
1.The learning environment should be organized according to regional differences which facilitate the implementation of the curriculum in the classroom (4,11:0,78), 2. Learning environment should be suitable for learning through experience (4,43:0,62), 3. The learning environment should be designed in accordance with the general readiness of students(4,37:0,65), 4. Classrooms must have ergonomic and age-appropriate seating (4,47:0,71), 5. Classes should be placed on floors according to age of the students (4,21:0,87), 6. Each class must include the chalk board, ink board, and electronic board together (3,37:1,12), 7. School corridors must have exhibition spaces (4,26:0,71), 8. Each school must have technology-integrated classes (4,30:0,68), 9.Each school should have a multi-purpose laboratory (4,34:0,63), 10. Every school should have a multi-purpose hall (4,46:0,62), 11. Each school should have an art room (4,30:0,70), 12. Each school should have an agricultural field for students to cultivate. (4,17:0,84).
Items Recommended to be Rearranged, New Items (\bar{X} :SS)
13.The learning environment should be reassuring, ethical and stimulating. NI: The learning environment should be reassuring (4,43:0,88).
14. The learning environment should be appropriate for the number of students, age, development level, NI:The learning environment should be prepared in accordance with the number of students, age and development aspect (4,47:0,71)
15. Learning environment should be healthy and comfortable in terms of heat, sound insulation, hygiene, light, moisture etc., NI: Learning environment should be healthy and comfortable in terms of temperature, light, humidity, insulation and cleaning (4,61:0,54)
16. Floor must be easy to clean and non-slippery, NI: Interior places of school should be easy to clean and non-slippery (4,44:0,80)
17.There must be a high platform in front of the board for hanger, cupboard, lectern and teacher, NI: Every class must include basic tools for teaching(4,10:1,11)
18. There should be a library and a museum, NI:Each school must have a library (4,40:0,78)
19. There should be a canteen, gym and garden suitable both for studying and having fun., NI: Each school should have spaces for studying and having fun (4,34:0,77)
20. Class size should not exceed 32, NI:Class size should not exceed 20 (4,10:0,86)

\bar{X} : Mean, SS: Standard Deviation, NI: New Item

According to the findings of Table 6, items 1 and 12 were accepted as standards with consensus over “Agree” level, and the items 2, 3, 4, 5, 7, 8, 9, 10 and 11. were accepted over “Totally Agree” level. Although the item 6 was agreed with consensus in the previous round, it was removed from the scope of the survey with consensus over “Undecided” level. Items 17 and 20 were rearranged with consensus over “Agree” level. In addition, 13, 14, 15, 16, 18, 19 items were rearranged with consensus over “Totally Agree” level. At the end of this round, 19 indicators related to the standard for the learning environment were determined. In the study, the third round findings related to the equipment and material standards, which is another standard area, are summarized in Table 7.

Table 7. Mean and Standard Deviation Values of 3rd round Equipment and Material Standards

Equipment and Material Standards (\bar{X} :SS)
1.They must be functional (4,37:0,75), 2. Every student should have easy access to them (4,39:0,72), 3. They must be suitable for content (4,36:0,75), 4. They must be visual and auditory (4,27:0,77), 5. They must provide interaction (4,27:0,82), 6. They must be rearrangeable(4,26:0,80), 7. They must comply with students’ interests and needs (4,37:0,74), 8. They must be flexible, responsive and useful (4,20:0,85), 9. They must have user’s manual (4,30:0,66), 10. They must be capable of turning abstract things into concrete form.(4,36:0,58), 11. They must be prepared by considering learning styles (4,27:0,77), 12. They must be prepared by considering individual speed and individual differences (4,31:0,83), 13.

They must be prepared for reinforcements (3,84:0,95), 14. They must be approved in terms of health (4,50:0,75).
Items Recommended to be Rearranged, New Items (\bar{X} :SS)
15. They must be updated technologically and scientifically, NI: They must be scientific (4,04:0,96)
16.They must be suitable for developing students' creativity, NI: They must help students develop senior skills (4,34:0,69)
17.They must be useful for everyone, NI: They must be designed to be used easily (4,29:0,84)
18. They must be manual to provide effective learning, NI: They must support effective learning (4,30:0,76)
19. They should support research and exploration, NI: They must be able to stimulate student's research and discovery feelings (4,34:0,80)
20. They must develop technological skills, NI: They must help students develop technological skills (4,09:0,84)
21. They must develop communication skills, NI: They must help students improve communication skills (4,23:0,74)
Items Recommended to be Removed (\bar{X} :SS)
22. They must comply with the curriculum (3,30:1,31), 23. They must be clear, understandable (3,46:1,26), 24. They must be two and three dimensional (3,56:1,14), 25. They must be qualified to feed the brain, the body, the heart and should produce a product (3,51:1,23)
\bar{X} : Mean, SS: Standard Deviation, NI: New Item

According to the findings of Table 7, items 8 and 13 were accepted as standard with consensus over "Agree" level, and the items 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12 and 14 were accepted over "Totally Agree" level. Items 16, 17, 18, 19, 21 were rearranged with consensus over "Totally Agree" level and items 15 and 20 were rearranged with consensus on "Agree" level. Items 23, 24, and 25 which were submitted to the opinion of the participants with the suggestion to be removed were excluded from the scope of the survey with consensus. Since there was no consensus on the 22nd item, it was not excluded from the survey. At the end of this round, 22 indicators for the equipment and material standards were determined. In the study, the third round findings related to the content standards are summarized in Table 8.

Table 8. Mean and Standard Deviation Values of Content Standards

Content Standards	\bar{X}	SS
1. Content must be up to date.	4,51	0,69
2. Content must be visually qualified.	4,33	0,73
3. Content must be appropriate for the learners' level.	4,47	0,69
4. Content must be supported with reference books.	4,31	0,78
5. Content must be adapted to the student's development and environment.	4,33	0,90
6. Content must be useful in real life.	4,33	0,78
7. Content must be eligible for objectives.	4,44	0,78
8. Content must be appropriate for students' features	4,49	0,71
Items Recommended to be Removed	\bar{X}	SS
9. The content should conform with the curriculum	3,31	1,35

When the findings for Table 8 are examined, the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th items were accepted as standards with consensus over "Totally Agree" level. Since there was no consensus on the 9th item submitted to the opinion of the participants with the suggestion to be removed, it was not excluded from the scope of the survey. At the end of this round, 9 indicators were determined for the content standards. The third round findings related to the evaluation standards, are summarized in Table 9.

Table 9. Mean and Standard Deviation Values for the 3rd Round of Evaluation Standards

Items Recommended to be Combined	New Item	\bar{X}	SS
1. Measurement and evaluation should be applied based on the process.	Formation, rearing, recognition and displacement evaluations should be used in appropriate situations	4,21	0,90
2. Measurement and evaluation should be repeated periodically.			
3. Measurement and evaluation should be used for formation and rearing			
4. Performance and monitoring tests should be applied.	Alternative measurement techniques and traditional measuring techniques should be used together	4,34	0,77
5. Alternative measurement techniques should be used.			

As it is seen in Table 9, items 1, 2, 3, 4 and 5 are gathered under one item with consensus over “Totally Agree” level. At the end of this round, 2 indicators were determined as evaluation standards. The third round findings related to the standards for teaching processing are summarized in Table 10.

Table 10. Mean and Standard Deviation Values of the Standards for the Teaching Process

Standards for the Teaching Process(\bar{X} :SS)
1. Different course timing should be applied according to grade / school level (4,16:0,73), 2. Breaks should be changed according to the grade level (4,07:0,90), 3. Course duration should be determined in accordance with the course content (3,87:1,04), 4. Course duration should be arranged according to the number of students (3,17:1,27).
Items Recommended to be Combined, New Item (\bar{X} :SS)
5. Course duration must be flexible, 6. Course duration should be arranged according to students’ features, 7. Course duration should be flexible by taking into account the cognitive and emotional characteristics of the students, NI: The duration of the course should be flexible and take cognitive and affective characteristics of the students into account (4,01:0,96).
Items Recommended to be Removed (\bar{X} :SS)
8. Course duration must be planned according to the indicator chart (3,36:1,27), 9. There should be at least 10 minutes break after lesson (3,54:1,27)
\bar{X} : Mean, SS: Standard Deviation, NI: New Item

When the findings for Table 10 are examined, 1st, 2nd and 3rd items were accepted with consensus over “Agree” level. Since there was no consensus, the 4th item was excluded from the scope of the survey with “Undecided” level with the participation. Items 5, 6, 7 were gathered under the same item with consensus over “Agree” level. The 9th item submitted to the opinion of the participants with the suggestion to be removed was excluded from the scope of the survey with the consensus on “*Should be Removed*” level. Since there was no consensus on the 8th item, it was not excluded from the survey. At the end of this round, 5 indicators were determined as standards of teaching process.

The third round of findings related to learning standards is summarized in Table 11.

Table 11. Mean and Standard Deviation Values of the 3rd Round Standards for Learning

Items Recommended to be Rearranged, New Items (\bar{X} :SS)
1. Learners should be physically and cognitively healthy, motivated, curious, questioning, and he/she should focus on problem-solving, NI: Student must be curious about learning (3,84:1,05)
2. Learners must focus on reaching the goal, NI: Students must have a specific aim (3,79:1,01)
3. They must have awareness of things which are taught, NI: Students must be aware of what is taught (3,73:1,04)
4. They must be in compliance with general moral values, NI : Student must comply with the general moral values (3,87:0,90)
5. They must have motivation for the course, NI: Student must manage personal motivation (3,71:1,00)
Items Recommended to be Removed (\bar{X} :SS)
6. Students must have input behaviors (3,23:1,24), 7. Students must be able to explain basic concepts (3,04:1,22), 8. Students must be able to explain the relationship between concepts (3,13:1,23)
\bar{X} : Mean, SS: Standard Deviation, NI: New Item

When we look at the mean values of Standard for Learning in Table 11, items 1, 2, 3, 4 and 5 were rearranged with consensus over “Agree” level. Since there was no consensus on the 6th, 7th and 8th items, they were not excluded from the survey. At the end of this round, 8 indicators were determined in the standard for learning. The third round of findings related to the standards for the curriculum is summarized in Table 12.

Table 12. Mean and Standard Deviation Values of Curriculum-Oriented Standards

Curriculum-Oriented Standards(\bar{X} :SS)
1. Curricula must be based on Turkish culture (3,90:0,95), 2. Curricula must take values into account (4,31:0,74), 3. Curricula must be appropriate to the student level (4,46:0,71), 4. Curricula must focus on skills (4,23:0,79), 5. Curricula must be up to date (4,39:0,74), 6. Curricula must be applicable (4,46:0,71), 7. Curricula must encourage students to search (4,43:0,74), 8. Curricula must take the student to the center of teaching learning process (4,33:0,82), 9. Curricula must pay attention to individual differences (4,37:0,75), 10. Curricula must include comprehensive instructions for the method and techniques (4,20:0,90), 11. Method and acquisition relationship must be established in curricula (4,24:0,81).

Items Recommended to be Removed (\bar{X} :SS)

12.It is the curriculum that pay attention the moral development of the student most (3,41:1,16)

\bar{X} : Mean, SS: Standard Deviation

When we look at the findings for Table 12, items 1 and 10 have been adopted at “Agree” level and items 2, 3, 4, 5, 6, 7, 8, 9 and 11 have been adopted with consensus over “Totally Agree” level. Item 12 which was submitted to the opinion of the participants with the suggestion to be removed was excluded from the scope of the questionnaire with consensus at “Should Be Removed” level. At the end of this round, 11 indicators were determined for the standard of curriculum.

CONCLUSION AND DISCUSSION

As a result of this research, ten standard areas and 206 indicators related to the education process have been determined. It can be concluded that the experts have developed standards mostly for teachers. The indicators obtained are similar to the standards set in the context of qualified teacher status in the UK. The standards set in the context of qualified teacher status in the UK include indicators such as teacher's ability to keep the field knowledge up-to-date, competence in planning, implementation and evaluation activities, teaching skills, and doing research in the field (Department for Education, 2013). Similar to these surveys, in several States in America such as, Colorado, North Dakota and Utah, standards regarding teacher knowledge, sensitivity to student development and learning, teaching skills, teaching leadership, and personal characteristics (Utah Effective Teaching Standards, 2011; CDE, 2011; NDESPB) (2017) has been developed. Apart from these, the standards for the teacher determined in this research overlap with the standards for the teacher determined in different researches (European Commission, 2009; Department for Education, 2013; Utah Effective Teaching Standards, 2011; CDE, 2011; NDESPB, 2017; Kahramanoğlu, 2014).

In his research, Kahramanoğlu (2014) has determined standards for trainees' personality traits, their interest in the profession and the field, their suitability to the profession, their knowledge of the field, their general knowledge of culture, their attitudes and skills related to the profession. That the most indicators were determined in this dimension within the scope of the research may have been influenced by the fact that the experts think that the most effective factor is the teacher in the learning-teaching process and that the quality of learning process depends on the task and responsibility of the teacher. Indicators developed for the importance of teachers are compatible with many other research findings (Sarıtış, 2013; Das, El-Sabban and Bener, 1996; Pozo-Munoz, Reboloso-Pacheco and Fernandez-Ramirez, 2000; Yanpar-Yelken, Çelikkaleli and Çapri, 2007). On the other hand, some indicators of teacher standards set by the Council of Europe and the European Commission (European Commission, 2009) differ from the indicators of this research. Unlike this research, the standards set by the Council of Europe and the European Commission include some indicators such as teaching students national feelings, encouraging them to respect and understanding intercultural culture, identifying common cultural values among students, being sensitive to the ethics of knowledge, and working effectively with partners and stakeholders in education.

In this study, eighteen indicators have been determined regarding the standard for School Administration. These include statements about school development, student development, staff development, and leadership characteristics of the principals. It can be observed that these standards for school administration coincide with standards set for principals in the UK (Department for Education, 2016). Furthermore, the characteristics of the school principle which are highlighted in some studies (Can, 1998; Şişman, 2004:84; Bozkurt and Aslanargun, 2015; Akalın-Akdağ, 2009; Özdemir and Sezgin, 2002; Yanpar-Yelken et al., 2007) support the standards set in this study. Unlike this research, the ethical attitude of the school principle, the principle's coordination with other schools and the conduct of an outward-oriented school administration, and providing opportunity to enable students to communicate effectively with the students in other schools are also noteworthy (Department for Education, 2016b).

Eleven indicators for education policies have been determined within the scope of the research. These indicators determined within the research are mostly related to teacher employment. These indicators are similar to the teacher employment policies of countries such as USA, South Korea, Ireland and Singapore (Saracaloğlu and Ceylan, 2016). When entering the faculties of education in the USA, in addition to secondary school achievement score and placement examinations, some criterias such as interviews, reference letters, personality and behavioral tests are taken into consideration. In Ireland, universities determine their students through personal applications and interviews. In Singapore and South Korea, the faculties of education accept students based on the quotas determined by the government and teaching vocational courses and practices are carried out for two years. (Saracaloğlu and Ceylan, 2016).

As another standard area, nineteen indicators have been determined for the learning environment. These indicators are related to the physical features of the learning environment, suitability to student characteristics, and appropriateness for teaching. Celep (2014:16-18) states that the number of students, heat, light, color preferences in the classrooms, seating, noise, cleanliness and the location of classroom tools are the physical variables of the learning environment and all these factor affect the quality of leaning –teaching process. Özden (2012: 47-48) approaches the issue in the form of an interaction story, by emphasizing that the world view affects the structure and the structure affects the human behaviors, he also states the importance of classroom arrangements. Shapiro (2006), Karamustafaoğlu and Kandaz (2006) and Güler and Bıkmaz (2002) use similar expressions to the indicators determined in this study with their opinions that school gardens should be organized effectively. On the other hand, Yanpar-Yelken et al. (2007) set standards regarding the availability of computers and equipment, unlimited internet access and information technology room at schools. These findings are also consistent with the learning environment standards determined in the study. Similar determinations were made by Boegehold (1977:146), Ural and Ramazan (2007: 45) and Shapiro (2006). These indicators of the subject of many researches (Karamustafaoğlu and Kandaz, 2006; Güler and Bıkmaz, 2002; Tuncer, Bal, Özütl and Köse, 2012) and according to their findings, Turkey is insufficient in terms of these indicators.

Twenty-two indicators for equipment and material standard have been determined in the study. These indicators are related to whether the equipment and materials are appropriate to the student, functional, health-appropriate, suitable for content, scientific and appropriate to the curriculum. Boegehold (1977: 146) states that materials must be are safe and durable, open to the differences in learning styles, suitable for individual use of children, naturally produced, effective, multidimensional, often created by teachers, children and the community, encouraging individual and group use and suitable for the child's cultural environment. In this study, it can be realized that the tools and equipment criteria and the indicators are consistent. The research findings of Karamustafaoğlu and Kandaz (2006) and McNairy (1985) draw attention to the importance of these indicators. It is important to use of materials in effective teaching (McNairy, 1985; Şimşek, 2009:25; Taşpınar, 2005:175). However, the functionality of these materials is also important (Boegehold, 1977:146). It is still known that there is insufficiency of materials in some schools in Turkey (Karamustafaoğlu and Kandaz, 2006).

In this research, nine indicators have been determined that the content should be up-to-date, visually qualified, consistent with the objectives, suitable for students' traits and equipped with information that can be used in the field. It can be seen that the qualifications of the content which are determined by Varış (1996:116), Küçükahmet, (2011:20) and Beane (1995:621), coincide with the content standards determined in the research. Varış (1996:116) states that the innovations in the disciplines should be followed and added to the curriculum, Küçükahmet, (2011:20) states that the objective-content relationship should be up-to-date, accurate and useful and that the information should be consistent with each other and Beane (1995:621) states that the subject-theme relationship should be questioned.

In the research, two indicators related to the standard at evaluation were determined. According to the findings of the research, standards have been determined that assessment should be

applied not only to gain a final product but also to recognize and improve the student. Hotaman (2010) states that instead of classical measurement and evaluation techniques which are result-oriented, it is vital to give priority to process and performance evaluation techniques which will provide the opportunity to recognize and evaluate the student and provide a democratic education and this statement supports the research findings. When the standards related to the course are examined, it is seen that there are some statements about the duration of the course and breaks. Some researches conducted (Osmanoğlu and Yaşa, 2018; Sezgin and Duran, 2010) support these findings. Fidan (2012:110) stated that each student is responsible for their own learning, and according to Alkan (2011:100) it is important to determine the quality of students and these claims match with learning standards determined by Bacanlı (2018:197) and Kılıç (2002) and with the standards of this research.

In addition to all these standard areas, eight indicators related to the standards for learning have been determined. It has been observed that these indicators determined for learning consist of cognitive and affective characteristics such as students' interest in learning, having a specific purpose, self-management, explaining the basic concepts and having student input behaviors. Fidan (2012: 110) emphasizes that no one can realize the learning for another and also states that the student is responsible for his / her own learning. Similarly, Bacanlı (2018:197) describes factors such as readiness specific to humankind, maturation, motivation and attention as learning factors that affect learning. In addition, Kılıç (2002) states that general readiness and anxiety, readiness to learn, age, intelligence, physiological status and transferring of previous learning are some of the learner factors. Alkan (2011:100) emphasizes that the aim of the teaching system is to take the student from an initial behavior and to the target behavior, and after determining the goals to be achieved in the system, the quality of the student should be determined. Fidan (2012: 102) also states that knowing the pre-knowledge and attitudes of the individual who starts the learning-teaching process will affect the teaching. These views support the learning indicators determined in the research.

The number of indicators developed for the curriculum is eleven. In this research, when the standards determined for the curriculum are analyzed, it can be said that a curriculum structure generally focuses on the student, adopts the individual as basic principle and gives importance to culture and values. Confirming these indicators, Boegehold (1977: 146) states that curriculum should be organized in a way that will enable individuals to develop in a mutual respect in a helpful atmosphere and provide situations to make students actively participate in experimentation, exploration and make them work with other children, making in a learning community. Yanpar-Yelken et al. (2007) stated that the curriculum should be practical. In support of these views, Hotaman (2010) focuses on a democratic curriculum and the education based on such a program must be student-oriented, allow the students to express themselves, enable students to gain democratic attitudes and values, allow them to share and solidarity and provide equal opportunities.

By reflecting the expert opinion that some standards should exist in education, findings of this research are supported by some studies in the literature. In general, it is known that students with high socioeconomic status are provided more opportunities and investments at schools while in regions where poor families live have insufficient support (Arıkan, 2016; Stevens, 1993; Meyers and Rogers, 2014; Banicky, 2000; Eryaman, 2007). While Arıkan (2016) states that equalizing learning opportunities will increase success of students, it is stated by the National Education Standards and Improvement Committee (NESIC) that by providing standardization of learning opportunities, all students will be provided with resources, implementation and all necessary conditions and fairness; therefore, equality in education will be provided (Dougherty, 1996). These views have emphasized the importance of standards-based teaching once again. The established standards can shed light on the unfair conditions in the school and the system that limit the equal access of students to a high quality education. (University of California (UCLA/IDEA, 2019). In addition, these standards can provide criteria that can measure both individual and system progress and may help to save resources and time (National Committee of Standards and Testing (NCEST), 1992:4). Banicky (2000) emphasizes that there is an agreement on the necessity in the standardization of curriculum, teaching quality, time, resources and school physical conditions. Schwartz (1995) states that to provide equal opportunities to

the students, standards should be shaped in terms of curriculum, time, teacher competencies, school facilities and resources, school environment and culture and assisted services.

Within the scope of the research, it can be seen that these standards and indicators agreed by the expert group independently from each other largely correspond to the national and international literature. Two conclusions can be reached from this result. The first of all, there is an acceptance of a standards-based understanding of education in the literature of education. The experts do not reject a standards-based structure in education and they set numerous standards and indicators on this subject. Secondly, it can be realized that the standards and indicators determined in this research are compatible with the literature studying other sample and universe. From this point on, what needs to be done is to evaluate the current situation in terms of these standards. As a result of these evaluations, a diagnostic study can be carried to find out which standards exist and which level they are. Besides, it can be discussed what can be done for missing or inadequate indicators. These standards and indicators, which are encountered in many countries around the world, can also be used in international comparisons.

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Gender Gap and Career Choices in STEM Education: Turkey Sample

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Abstract

This study aims to explore middle school students' attitudes towards STEM fields and their interest in STEM careers in terms of gender. Furthermore, this study examines the relationship between middle school students' attitudes towards STEM fields and their interest in STEM careers. Seven hundred and seventy four students from 10 cities located in 6 geographical regions of Turkey completed the STEM Attitude Scale and STEM Career Interest Survey. It was determined that middle school students' attitudes towards STEM were not statistically significant in terms of gender. In addition, it was found that students' interest in STEM careers differed in terms of gender. When the scores of attitudes towards engineering and technology fields and the interest in careers in these fields were compared in terms of gender, significant difference in favor of male students was found. Furthermore, a positive correlation between the middle school students' attitudes towards STEM fields and their interest towards STEM careers was determined. Results indicate that approximately 43% of the total variance of interest towards STEM careers stems from attitudes towards STEM fields. The results obtained from this study will give an insight into how to shape the aims and applications of the future STEM education programs.

Keywords: STEM Attitude, STEM Career Interest, Gender, Middle School Students

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INTRODUCTION

STEM education is an interdisciplinary approach involving learning and teaching in the fields of science, technology, engineering and mathematics (Gonzalez and Kuenzi, 2012). STEM education develops skills of students in problem solving, critical thinking and analytical thinking (Koyunlu Unlu, Dökme and Unlu, 2016) and aims to raise innovative individuals who have an interdisciplinary point of view while approaching problems (Bybee, 2013; Clark and Button, 2011). In addition, STEM education allows students to engage with real-life problems and use questioning, problem solving, collaboration, and practical activities to find solutions, by focusing on student-centered education (Soylu, 2016).

“In the 21st century, scientific and technological innovations have become increasingly important as we face the benefits and challenges of both globalization and a knowledge-based economy” (National Science Board, 2007, p. 2). In order to achieve this, it is necessary to be sure of the tendency towards careers in the STEM fields and to draw the attention to the STEM fields. “Over the past 10 years, growth in STEM jobs was three times faster than growth in non-STEM jobs.” (Langdon, McKittrick, Beede, Khan and Doms, 2011, p. 1). Thus, in many countries' education policy in the 21st century developing learning and teaching STEM education is associated with scientific leadership for the world of the future and is seen as an economic factor (Kennedy and Odell, 2014; National Research Council, 2011). This ensures to be focused on both increasing the interest and attitudes of female and male students towards fields of science, technology, engineering and mathematics and careers concerning these fields (Wyss, Heulskamp and Siebert, 2012). There are also a low number of students and gender differences in STEM fields (Mutlu and Korkut-Owen, 2017). For instance, according to a research made by Turkish Industry and Business Association in 2014 which was on gender distribution in STEM graduates working in companies working in STEM fields, the rate of male was higher (male 64%, female 36%). In relevant studies it is stated that women constitute the minority in STEM fields both in Turkey and the world (e.g. Beede, Julian, Langdon, McKittrick, Khan and Doms, 2011; Craig, Verma, Stokes, Evans and Abrol, 2018; Dika and D'Amico, 2016; Ivie and Tesfaye, 2012; Korkut-Owen and Mutlu, 2016; LeGrand, 2013; Mutlu and Korkut-Owen, 2017; National Science Board, 2014; OECD, 2006; Smith, 2011). Thus, it is crucial to investigate the attitudes of male and female students towards STEM fields and their interests in STEM careers as of their early ages and carry out activities accordingly. Furthermore, it is thought that attitudes towards STEM fields can affect the interest in STEM careers (Wiebe, Unfried and Faber, 2018). Therefore, research questions were determined as follows:

- 1- How do middle school students' attitudes towards STEM fields change considering their gender?
- 2- How do middle school students' interests in STEM careers change considering their gender?
- 3- Are there any significant relationships between middle school students' attitudes towards STEM fields and their interest in STEM careers?

Literature Review and Theoretical Framework

Social-Cognitive Career Theory (SCCT) and Interest in STEM Careers

In the present study, social-cognitive career theory (SCCT; Lent, Brown and Hackett, 1994) guided the present study because SCCT offers a relevant theoretical view regarding the interest in and choice of STEM careers (Chachashvili-Bolotin, Milner-Bolotin and Lissitsa, 2016). So far, SCCT has been used in many STEM studies as a theoretical framework (e.g., Beier, Kim, Saterbak, Leautaud, Bishnoi and Gilberto, 2018; Chachashvili-Bolotin et al., 2016; Wiebe et al., 2018). SCCT is based on Bandura's social-cognitive theory (Bandura, 1986). SCCT argues that people's interests stem partly

from their self-efficacy (beliefs about personal abilities), outcome expectations (beliefs about the outcome of certain behaviors), social support, and learning experiences (Lent et al., 2005). Self-efficacy refers to a person's belief in his ability to complete tasks and to influence events affecting his life (Bandura, 1986). Moreover, self-efficacy is an important factor influencing students' interests in careers (Tang, Pan and Newmeyer, 2008). Scott and Mallinckrodt (2005) indicated that students' high self-efficacy in middle or high school science influences their choice of STEM fields at the university.

The scales utilized in the present study (STEM Attitude Scale and STEM Career Interest Survey) are closely related to individuals' self-efficacy beliefs regarding STEM fields and careers (Kier, Blanchard, Osborne and Albert, 2014; Unfried, Faber and Wiebe, 2014; Wiebe et al., 2018). Additionally, the STEM Career Interest Survey is based on the key features of SCCT (e.g., self-efficacy, outcome expectations, personal inputs, and contextual supports and barriers) (Kier et al., 2014). Therefore, SSCT framework guided selection of these two instruments for the purpose of addressing research interests of the present study. The schematized form of the SCCT is illustrated in Figure 1.

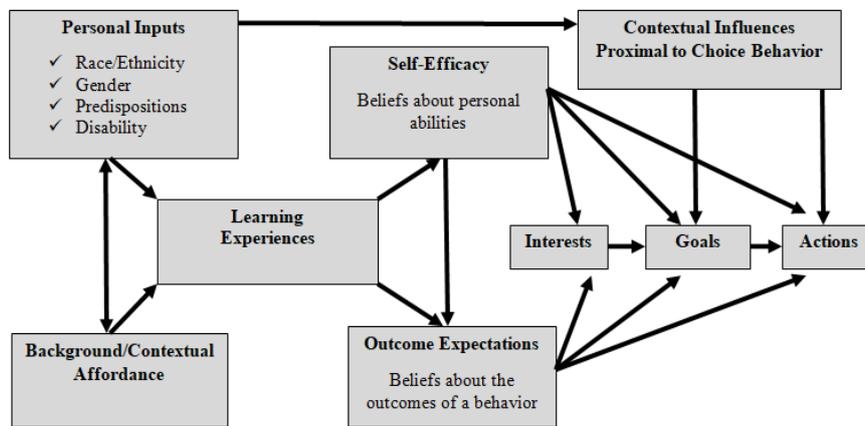


Figure 1. The social-cognitive career theory (Lent, Brown and Hackett, 2000)

STEM Education and Gender

Today, there are concerns that different groups are not adequately represented in STEM fields (Dika and D'Amico, 2016). In this context, gender inequality is a highlighted issue in STEM careers. Gender is an important factor shaping interest in STEM fields and attitudes towards STEM careers (Chachashvili-Bolotin et al., 2016; Wiebe et al., 2018). It is widely known that women are underrepresented in STEM-related careers and there is no gender equality in this respect (Ivie and Tesfaye, 2012; Craig et al., 2018; LeGrand, 2013; National Science Board, 2014; OECD, 2006; Smith, 2011) and that female students are less interested in STEM careers (Unfried et al., 2014). For example, according to the National Science Board (2014), women are represented at 23% in engineering, 25% in computer sciences, 33% in physical sciences, and 38% in economics, which are quite low. Bokova (2017) stated that women in higher education account for only 35% of all students enrolled in STEM-related study fields. The lack of representation of women in STEM fields is a problem for society, organizations, employers and individuals, which, above all, threatens the power of global competitiveness (Greenfield, Peters, Lane, Rees and Samuels, 2002). Underrepresentation of women in STEM fields may also cause social inequality. Therefore, it is necessary to emphasize this problem and finding solutions in studies (Fox, Sonnert and Nikiforova, 2011). In this respect, the present study examines whether gender is a significant factor on the attitude towards STEM fields and interest in STEM careers.

Attitude towards STEM Fields and Interest in STEM Careers

Being interested in something means that thing is important to us and we have (mostly) positive feelings towards it (Harackiewicz and Hulleman, 2010). Therefore, interest is one of the most important factors that influence a student's field of work choice (Vulperhorst, Wessels, Bakker and Akkerman, 2018). Recent research has focused on students' interest in STEM careers since STEM-related careers often offer higher financial returns, and STEM has an important role in supporting and sustaining economic prosperity (Riegle-Crumb, King, Grodsky and Muller, 2012).

Nowadays, there is a need for the labor force specializing in STEM careers for countries to achieve a sustainable development (Chachashvili-Bolotin et al., 2016; Wyss et al., 2012). The number of students studying in STEM fields is considered to be insufficient to meet the needs of the labor market (Craig et al., 2018; Vulperhorst et al., 2018). For this reason, studies are carried out to enhance students' interest in STEM careers. In 2011, the National Research Council called on K-12 educators to convince their students to pursue STEM careers. Moreover, an emphasis is also placed on designing STEM education programs to ensure that students develop positive attitudes towards STEM subjects and careers (Faber, Unfried, Wiebe, Corn, Townsend and Collins, 2013). Due to the importance of meeting the needs of the labor market, students need to be encouraged to work in careers in the STEM fields.

Attitude is a whole of beliefs about an object, event or subject and can be positive or negative (Crisp and Turner, 2007). One of the factors that affect students' interest in STEM careers is the attitude towards STEM fields (Wiebe et al., 2018). The attitude towards STEM fields is also related to self-efficacy in these fields (Unfried et al., 2014). Also, students' belief in self-efficacy in STEM fields affects their interest in STEM careers (Tang et al., 2008; Wiebe et al., 2018). For example, in their study, Scott and Mallinckrodt (2005) found that students' high self-efficacy in science influenced their choice of STEM fields at university. In studies conducted on the subject, it is stated that there is a relationship between attitude towards STEM and interest in STEM careers. For example, Unfried et al. (2014) found that female students had a negative attitude towards engineering and technology from STEM fields and their interest in STEM careers was low. In another study, Wiebe et al. (2018) found a relationship between attitude towards mathematics and interest in STEM careers. Aydın, Saka and Guzey (2017) also found that students with high level of attitude towards STEM prefer careers in STEM fields. This finding shows that there is a relation between the attitude towards STEM and interest in STEM careers. Therefore, it is necessary to give importance to helping students develop positive attitudes towards STEM fields in order to increase their interest in STEM careers.

Purpose and Rationale of Study

When the literature concerning to STEM education was examined, it was determined that the research which investigated attitude towards STEM fields (Karakaya and Avgın, 2016; Tseng, Chang, Lou and Chen, 2013) and interest in STEM careers (Wyss et al., 2012) were carried out separately. However, we have not found any research within the current literature investigating middle school students' attitudes towards STEM fields and their interests in STEM careers in terms of gender simultaneously and particularly in Turkey context. Moreover, in many studies, it is emphasized that interest towards STEM fields and STEM careers begins during middle school period or even before middle school period (Kier et al., 2014; Maltese and Tai, 2010; Tai, Liu, Maltese and Fan, 2006; Wyss et al., 2012). Therefore, it is important to investigate *middle school students'* interests and attitudes towards STEM fields and careers. Besides, related literature about STEM education includes studies on gender gap in STEM education both in Turkey and the world (Beede et al., 2011; Craig et al., 2018; Dika and D'Amico, 2016; Ivie and Tesfaye, 2012; Korkut-Owen and Mutlu, 2016; LeGrand, 2013; Mutlu and Korkut-Owen, 2017; National Science Board, 2014; OECD, 2006; Smith, 2011), and projects such as Girls In STEM (GIS), Girls Can STEM, to encourage female inclusion to STEM fields and careers in Turkey. In this regard, investigation of whether gender effect is a major factor in students' attitudes towards STEM fields and their interest in STEM related careers is a crucial point of

interest in the current STEM education agenda. In addition, the number of studies (e.g., Wiebe et al., 2018), which focus on the relationship between attitude towards STEM and interest in STEM careers, is insufficient in the current literature. For this reason, the aim of present study is to investigate the attitudes of 5th, 6th, 7th and 8th grade students' towards STEM fields, and their interests in STEM careers in terms of gender variable. Furthermore, investigation of the relationship between middle school students' attitudes towards STEM fields and their interests towards STEM careers is another purpose of the study. In line with the aims of the present study, SCCT which provides a relevant theoretical view on the interest in STEM career choice (Chachashvili-Bolotin et al., 2016) was employed in the present study.

In the 21st century, STEM education and STEM related careers get more important importance day by day, leading educational policies of governments in accordance with its needs. Therefore, determination of Turkish students' attitudes towards STEM fields and their interests in STEM careers in terms of gender, and relationship between their attitudes towards STEM fields and their interests in STEM careers would provide guidance for the Ministry of Turkish National Education (MoNE) or other countries that are trying to integrate STEM education into their curricula, as well as ready to use the data for related studies in science education. This study can also make a significant contribution for policy makers in terms of providing empirical data for creating future research agenda in STEM education.

METHODS

The correlational method was used in this study. This method is used to determine the presence and the power of the relationship between two or more quantitative variables (Fraenkel and Wallen, 2003). To this end, in this study, the relationship between middle school students' attitudes towards STEM fields and their interest in STEM careers was examined.

Participants

Participants of the study consisted of 774 middle school students (478 female, 296 male) from 10 cities (Istanbul, Ankara, Zonguldak, Kocaeli, Konya, Muş, Mersin, Kahramanmaraş, Diyarbakır, Bitlis), located in 6 geographical regions of Turkey in fall semester of the 2017-2018 academic year. The reason why we selected middle schools from different regions was to be able to generalize our findings to a wider population in Turkey. Moreover, the selection of different regions of Turkey will provide a better cultural and educational representation of Turkey (Yilmaz-Tuzun & Topcu, 2008). The age range of participants was between 9-15 and 20.4% of the students are studying in the 5th grade, 30.0% of them are in the 6th grade, 22.9% of them are in the 7th grade and 26.7% of them are in the 8th grade. The detailed demographic information of the participants is given in Table 1.

Table 1. Information on the participants

	Attributes	F	%
Gender	Female	478	61.8
	Male	296	38.2
Grade level	5 th grade	158	20.4
	6 th grade	232	30.0
	7 th grade	177	22.9
	8 th grade	207	26.7
	Total	774	100.0

Data Collection Tools

In the present study, two scales and personal information form were used to determine the students' attitudes towards STEM fields and their interests in STEM careers in terms of gender, and

the relationship between their attitudes towards STEM fields and their interests in STEM careers. Personal information form consists of students' gender, grade levels, age, and their provinces. Detailed information about the STEM Attitude Scale and STEM Career Interest Survey (STEM-CIS) is given below.

STEM Attitude Scale

One of the scales utilized in the present study is STEM Attitude Scale developed by Friday Institute (2012) and adapted to Turkish by Gülhan and Sahin (2016). There are 37 items in this scale. Gülhan and Sahin (2016) calculated the Cronbach alpha reliability coefficient of the scale as .92. As a result of applying the scale to 774 middle school students, the Cronbach alpha reliability coefficient was calculated as .93 for STEM Attitude Scale in the present study. As a result of the confirmatory factor analysis, goodness of fit values for the model was determined as follows: RMSEA=.060, GFI=.86 CFI=.97, NFI=.96, NNFI=.97, AGFI= 0.84. When these values are examined, it is seen that the scale is fit for the sample of the present study.

STEM Career Interest Survey (STEM-CIS)

The second instrument is the STEM Career Interest Survey (STEM-CIS) developed by Kier et al. (2014) and adapted to Turkish by Koyunlu Unlu et al. (2016). This scale consists of 40 items. The Cronbach alpha reliability coefficient was calculated as 0.93 by Koyunlu Unlu et al. (2016). As a result of applying the scale to 774 middle school students, the Cronbach alpha reliability coefficient was calculated as 0.94 for STEM-CIS in the present study. As a result of confirmatory factor analysis, goodness of fit values for the model was determined as follows: RMSEA=.087, GFI=.76 CFI=.95, NFI=.94, NNFI=.95, AGFI= 0.73. When these values are examined, it is seen that the scale is fit for the sample of the present study.

Data Analysis

Frequency and percentage values were used for descriptive analysis of the participants' attributes. The Shapiro-Wilk test was used in order to test the normality assumption. The normality assumption was met. Since the necessary assumptions are met for the independent samples t-test, this test was used in comparing male and female students' scores. Pearson correlation method was used since normality assumption for each variable was met. Furthermore, simple linear regression was used in determining the relationship between students' attitudes towards STEM fields and their interests in STEM careers.

FINDINGS

The findings obtained from the present study are given under the headings of “students' attitudes towards STEM fields in terms of gender”, “students' interest in STEM careers in terms of gender”, and “relationship between attitudes towards STEM fields and interest in STEM careers”.

Students' Attitudes towards STEM Fields in Terms of Gender

In this study, independent samples t-test was conducted in order to determine whether there is a significant difference between the scores of the male and female students. In this context, independent samples t-test was applied for the scale and the sub-dimensions. The results are reported in Table 2.

Table 2. Students' attitudes towards STEM fields considering gender

	Gender	N	\bar{X}	SD	Df	T	p
STEM Attitude Scale	Female	478	144.91	21.62	772	-.910	.36
	Male	296	146.35	21.09			
Science Dimension	Female	478	35.79	6.82	772	.054	.95
	Male	296	35.76	6.69			
Mathematics Dimension	Female	478	30.81	7.20	772	.798	.42
	Male	296	30.37	7.55			
Engineering & Technology Dimension	Female	478	32.80	7.02	772	-5.365	.00
	Male	296	35.56	6.83			
21st Century Skills Dimension	Female	478	45.50	7.52	772	1.518	.12
	Male	296	44.64	7.74			

* $p < 0.05$

As a result of the independent samples t-test, a significant difference between the scores of male and female students in terms of STEM attitude scale ($t(772) = -.910, p > .05$) was not found. As seen in Table 2, there was only a statistically significant difference between the scores of male and female students in favor of male students for the sub-dimension of "Engineering and Technology" ($t(772) = -5.365, p < .05$).

Students' Interest in STEM Careers in Terms of Gender

In the present study, independent samples t-test was conducted in order to determine whether there is a significant difference between the scores of the male and female students. In this context, independent samples t-test was applied for the scale and the sub-dimensions. The results are reported in Table 3.

Table 3. Students' interest in STEM careers considering gender

	Gender	N	\bar{X}	SD	Df	T	p
STEM Career Interest Survey	Female	478	153.27	25.31	772	-2.259	.02
	Male	296	157.47	24.88			
Science Dimension	Female	478	40.59	7.23	772	1.622	.10
	Male	296	39.68	7.76			
Mathematics Dimension	Female	478	39.13	8.59	772	1.293	.19
	Male	296	38.30	8.85			
Technology Dimension	Female	478	38.04	8.31	772	-4.082	.00
	Male	296	40.50	7.92			
Engineering Dimension	Female	478	35.50	8.92	772	-5.389	.00
	Male	296	38.98	8.38			

* $p < 0.05$

It is seen that there is a significant difference between male and female students in terms of general STEM career survey ($t(772) = -2.259, p < .05$) in Table 3. Considering the mean score in Table 3, it is seen that male students have higher interest scores. As seen in Table 3, there was a statistically significant difference between the scores of male and female students in favor of male students for the sub-dimensions of "Engineering" and "Technology".

Relationship between Attitudes towards STEM Fields and Interest in STEM Careers

In the present study, Pearson correlation coefficient was used in order to determine whether there is a relationship between the students' attitudes towards STEM fields and their interests in STEM Careers. The results are given in Table 4.

Table 4. Attitude towards STEM fields & interest in STEM careers

	Attitude towards STEM Fields	Interest in STEM Careers
Pearson Correlation	1.00	.655**
Sig. (2-tailed)	-	.000

Attitude towards STEM Fields	N	774	774
	Pearson Correlation	.655**	1.00
Interest in STEM Careers	Sig. (2-tailed)	.000	-
	N	774	774

**Correlation is significant at the 0.01 level (2-tailed).

When Table 4 is examined, it is seen that there is a moderately positive and significant relationship between middle school students' attitudes towards STEM fields and their interest in STEM careers, ($r = 0.655, p < .01$).

A simple linear regression analysis was run to determine the extent to which the attitude towards STEM explains the interest in STEM careers. In order to perform the simple linear regression analysis, the Durbin Watson value should be around 2. This value was found to be 1.909 for this study. In addition, in order to perform this analysis, there should be a linear relationship between the two variables and the variables should be normally distributed. All assumptions were met for simple linear regression. Since all these assumptions were met, a simple linear regression analysis was performed. The results obtained are given in the table below.

Table 5. Attitude towards STEM fields & interest in STEM careers

Variable	β weight	Adjusted R^2	F	p value
STEM attitude	.655	.428	580.490	.000

Dependent variable: STEM Career Interest

When the findings given in the table are examined, it is seen that the attitude towards STEM fields is a significant predictor of interest in STEM careers, Adjusted $R^2 = 0.428, F(1,772) = 580.490, p < .01$. It can be stated that about 43% of the total variance related to interest in STEM careers is explained with the attitude towards STEM fields.

DISCUSSION AND CONCLUSION

The results of the present study shed light on an important social issue related to encouraging female and male students to engage in STEM fields and STEM careers. In the 21st century, growth in STEM careers is faster than the one in non-STEM careers (Langdon et al., 2011). Therefore, the need for individuals working in STEM careers has increased. This situation has affected the countries' education policies. In the present study, middle school students' attitudes towards STEM fields and their interests in STEM careers are examined in terms of gender variable. In addition, the relationship between their attitudes towards STEM fields and their interest in STEM careers is examined.

Regarding the first research question, *How do middle school students' attitudes towards STEM fields change considering their gender?*, our findings reinforce previous research that attitudes towards engineering and technology differ in terms of gender (cf., Mahoney, 2009; Unfried et al., 2014). In the present study, a significant difference was found in favor of male students only in engineering and the technology sub-dimension. Male students have more positive attitudes towards engineering and technology fields than female students. Likewise, Unfried et al. (2014) and Mahoney (2009) found that female students have attitudes less positive than those of male students towards engineering and technology in STEM fields. Educationalists often emphasize that male students are more successful than female students in the STEM fields (Knezek, Christensen and Tyler-Wood, 2011). Similarly, it was concluded in the study of Weinburgh (1995) that in science, male students are more successful and have more positive attitudes than female students.

In the present study, it was determined that students' interests in STEM careers also significantly differed in terms of gender. Similarly, in some studies it was reported that interests in STEM careers differ in terms of gender (Christidou, 2006; Sadler et al., 2012; Unfried et al., 2014; Ünlü and Dökme, 2018). In comparison of interests in STEM careers in terms of gender, male students

scored higher than female students. In the present study, it was found that female students had less interest in the careers related to engineering and technology than male students. Similarly, Sadler et al. (2012) and Unfried et al. (2014) reported that the interests of female students in STEM careers were low especially in engineering and technology careers. In addition, female students' low interests in science, technology, engineering and mathematics fields support SCCT (Ünlü and Dökme, 2018).

In the present study, many factors may affect the emergence of these findings. Some of these factors are self-efficacy (Lent et al., 2005, Scott and Mallinckrodt, 2005; Tang et al., 2008); outcome expectations, and social support (Lent et al., 2005; Mutlu and Korkut-Owen, 2017); and gender stereotype (Dasgupta and Stout, 2014; Gottfredson, 2005; Sadler et al., 2012; Shapiro and Williams, 2012). Konrad, Ritchie, Lieb and Corrigan (2000) emphasize that gender stereotypes lead females to social activities, to be helpful, to care about a baby and to interpersonal relationships. It is also thought that STEM careers are more suitable for males (Cooper and Heaverlo, 2013). Therefore, these historical and invalid stereotypes negatively affect the interest and attitudes of girls to STEM fields and STEM careers (Cooper and Heaverlo, 2013). The divergence of interest and attitude towards the STEM fields and STEM careers may be due to the different experiences of males and females (Allan and Madden, 2003; Wyss et al., 2012). Parents also have a critical importance in influencing their children's interests and attitudes towards STEM fields and STEM careers (Dasgupta and Stout, 2014). Individuals working in STEM fields in the family can be role model for female students (Ünlü and Dökme, 2018). Moreover, the toys with which children play can also affect career choice. This is because girls are led to play with dolls or household appliances at early ages at while boys are led to play with toys like cars (Kalan, 2010). In this respect, it can be said that it is necessary to contribute to girls' and boys' having experience in STEM fields at their early ages.

Historically speaking, women are underrepresented in STEM fields (Craig et al., 2018; Ivie and Tesfaye, 2012; LeGrand, 2013; OECD, 2006; Smith, 2011). This suggests that educators should exert further efforts in this field (Unfried et al., 2014). For their sufficient inclusion into these areas, their interests in STEM fields and careers may be improved. The decision of a female student to pursue a career in STEM fields can be affected by a female role model, such as a teacher (Bokova, 2017; Fried and MacCleave, 2009). To this end, female teachers should encourage female students in this regard. In addition, STEM-related after-school activities and summer camps can be organized for female students (Dasgupta and Stout, 2014).

It is important to inform students about STEM careers in order to sustain and enhance the existing interests of students in STEM careers. Informing students about STEM careers is important to ensure competition in the global market (Wyss et al., 2012). Furthermore, middle school period is significant in terms of focusing on career development (Wyss et al., 2012). Therefore, middle school students should be informed about STEM careers, regardless of gender and should be trained according to the requirements of the 21st century. In studies, it is stated that students acquire information about careers directly from the teachers (Wellcome Trust Monitor, 2013). To this end, teachers can relate the professional roles in STEM fields to the curriculum (Watermeyer, Morton and Collins, 2016). Teachers can also show videos about STEM careers to the students in line with the curriculum in classrooms. For example, while students learn about plant morphology or plant pathology, they can also watch interviews held with a gardener (Wyss et al., 2012). Over and above, teachers and pre-service teachers need to be well educated about STEM fields and its teaching methods.

In this study, a positive correlation between the middle school students' attitudes towards STEM fields and their interests in STEM careers was determined. Simple linear regression results indicate that approximately 43% of the total variance of interest in STEM careers stems from attitudes towards STEM. Based on the results of present study, it can be said that the attitude towards STEM is an important factor in determining the interest in STEM careers. Similarly, Wiebe et al. (2018) state that there is a relationship between the attitude towards STEM and interest in STEM careers. In another study, Aydın, Saka, and Guzey (2017) concluded that students with a high level of attitude towards STEM would prefer to choose professions in STEM field. This result shows that there is a

relation between the attitude towards STEM and interest in STEM careers. According to the interview conducted with university students, Sarıkaya and Khorshid (2009) determined that the students preferred their current department according to their previous positive opinions about the profession. Therefore, learning environments should be established in schools aimed at helping students develop positive attitudes and views towards STEM careers so that students will grow interest in STEM careers. According to the SCCT, learning experiences are an important factor in the interest in STEM careers (Chachashvili-Bolotin et al., 2016). Therefore, it is necessary to ensure that students acquire positive learning experiences in STEM fields in schools.

Suggestions for Future Research

This study was solely interested in gender impact on attitudes towards STEM fields and interests in STEM careers. Further studies may investigate other potential factors that influence students' attitudes towards STEM fields and their interests in STEM related careers. Additionally, further studies can investigate why female students are less interested in STEM fields and STEM careers than male students. In addition, the effect of all components of SCCT on interests in STEM careers can be examined through different studies. Furthermore, a more detailed longitudinal study can be conducted to measure students' attitudes towards STEM and their interests in STEM careers, during their high school years.

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Relationship Between High School Students' Motivation Levels and Learning Strategies

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Abstract

This study aims to reveal high school students' learning strategies and motivation levels, the relationship between their learning strategies and motivation levels and to determine if these two variables differ according to gender and grade at school. This study was conducted in correlational survey model. Besides, "Motivation and Learning Strategies Scale" (GOSO), which was adapted to Turkish by Büyüköztürk, Akgün, Karadeniz, Kiliç Çakmak and Demirel, was used in the study. Data of the study were collected from 251 high school students studying in Safranbolu district of Karabük province in Turkey in 2017-2018 school year. Results of the study reveal that students' motivation levels and frequency of using learning strategies are slightly higher than average. According to the findings of the study, gender variable does not affect high school students' motivation levels, but female students use learning strategies more than male students do. It was also found that students' grades at school do not affect their motivation levels and frequency of using learning strategies. Lastly, findings of the study reveal that there is a meaningful relationship between students' motivation levels and their learning strategies. In the light of the findings of the study it is recommended that online and digital applications be used in class in order to increase students' motivation levels and develop their learning strategies.

Keywords: Motivation, Learning Strategies, High School Students, Education

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INTRODUCTION

The aim of education is to raise individuals who learn how to learn, find new information and use it in their lives, adapt to changes in the society, and at the same time become the source of these changes. In order to gain these characteristics, individuals need to be willing to participate in the learning process, that is to say, they need to be motivated and use learning strategies effectively because students' motivation levels and their using learning strategies effectively affect their current and future success.

In order for an individual to succeed in a task and feel happy, his / her motivation level is expected to be high. In general, an individual who has high levels of motivation is energetic and determined to succeed in anything, tries hard to be successful, has high levels of performance, uses time wisely, develops himself / herself, has high self-confidence. On the other hand, a student whose motivation level is high in the learning process is interested in the lesson, gets prepared for the class, asks questions, joins discussions, focuses on the subjects he / she needs to learn, never gives up at hard times, is persistent and determined to learn (Zambas, 2019).

Motivation, which is vital for learning and success, is defined as need or desire that makes an individual take action (Merriam-Webster, 1997); effort made to reach a result (DuBrin, 2008; and Williams, 2011). Motivation consists of three main factors namely initiating human behaviour, directing this behaviour and maintaining it. Motivation has two dimensions: intrinsic and extrinsic. Intrinsic motivation is defined as an individual's doing something which he/she is curious about, which attracts him/her and which he/she wants; it is seen that individuals who have high levels of intrinsic motivation make necessary effort with their free will to reach their goals (Lei, 2010). On the other hand, extrinsic motivation is defined as having the desire to learn under the influence of external factors. An individual who behaves with extrinsic motivation makes effort to reach his / her goals with an expectation of material gains in return (getting high scores, being appreciated for learning, getting pocket money, gain status) or abstaining from various punishments or restrictions (Ryan and Deci, 2000).

Literature review reveals that Maslow enriched motivation with a five-level list of needs. These are ordered from basic psychological needs to security, love, belonging, respect and self-realization. In his ERG theory Alderfer classified motivation into three groups, namely existence needs, relationship needs, growing-up needs. McClelland put motivation into three groups: success, membership, power. On the other hand, Herzberg explains two-factor theory consisting of motivating factors and hygiene factors (Badubi, 2017). Pintrich, Smith, Garcia and McKeachie (1991) grouped motivation in three main components (value, expectation, affective) and six sub-components (intrinsic purpose orientation, extrinsic purpose orientation, task value, learning control belief, self-efficacy perceptions regarding learning and performance, exam anxiety). Value component is defined as students' beliefs and interest regarding the importance of their aims and tasks. It consists of sub-components of intrinsic and extrinsic purpose orientation and task value. Intrinsic and extrinsic purpose orientation is about studies regarding students' learning the subjects that are interesting (even if difficult) for them to learn. Task value is about students' evaluation regarding how interesting, important and useful a task is. Expectation component consists of students' perceptions and beliefs about their performances. It is constituted of two sub-components. Learning control is about students' belief about how properly and how much they need to study in order to learn all subjects. Self-efficacy perceptions of learning and performance is about students' beliefs that they can understand the most complicated subjects, that they can do homework in the best way, that they can learn the skills in the best way, that they can be successful, and that they can get high marks. Affective component includes students' affective responses towards a task. Under affective component is only exam anxiety sub-component (Pintrich, et al., 1991).

Although motivation is important in the learning process, it is not enough alone for an individual to reach his/her goals. It is pointed out by educational experts (Namlu, Kabakçı and Gülümbay, 2003; Şengül, 2017; Young and Vrongistinos, 2002; Zimmerman and Martinez-Pans,

1990; Eryaman, 2007) that it is necessary and important for individuals to be aware of their learning and use various learning strategies in order to facilitate learning. Relevant studies reveal that when individuals do not use effective, right learning strategies in the learning process, it leads to failure, decrease in trust and motivation, unwillingness and indifference to learning (Çiftçi, 1998, Jimenez, Garcia and Pearson, 1996).

Researchers who agree on the importance and usefulness of learning strategies have different opinions about the definition and classification of learning strategies. Thus, there are a number of definitions and classifications of learning strategies in literature (Güven, 2004). For example, O'Malley and Chamot (1990) define learning strategies as special information processing methods that develop understanding, learning and storing of information (p.1) while Marisi (2019) defines learning strategies as actions, steps and techniques used by students in order to improve their learning (p. 95). Weinstein and Mayer (1986) define learning strategies as strategies which make individual self-learning easy and permanent, enhance productivity in learning, and enable students to gain the skill of independent learning (p. 95). Regarding learning strategies, Özer (2002) maintains that they help students to learn easily and permanently as well as having a very important function: "Learning strategies raise students' awareness of learning and enhance the productivity of learning, enable independent learning, help students to learn willingly and in a fun way, forms the basis for students to continue all these after school as well." A number of factors have a role in students' developing effective learning strategies in the learning process. For example, individual preferences, importance of the task, self-efficacy perception are among these factors (Weinstein, Ridley, Dahl and Weber, 1989). In addition, there are some other factors that influence students' developing effective learning strategies such as students' being unaware of the fact that they are not learning (weak cognitive monitoring), their age, success or failure as a result of the strategies which students are accustomed to using (Fayol and Monteil, 1994).

Just like definitions of learning strategies, their classifications also vary in literature. Weinstein and Mayer (1986) put learning strategies into five groups namely repetition, interpretation strategies, organization strategies, comprehension monitoring strategies and affective strategies. Öztürk (1995) puts learning strategies into seven groups namely attention strategies, repetition strategies, interpretation strategies, encoding strategies, remembering strategies, cognitive management strategies, and affective strategies. Pintrich et al. (1991) divide learning strategies into three main components (cognitive strategies, metacognitive strategies and resource management strategies) and nine sub-components (regulation, critical thinking, repetition, elaboration, meta-cognitive, peer cooperation, time and study environment, effort management, seeking help). Cognitive strategies are about what kind of strategies are used when learning reading passages about the lesson or class notes; these strategies consist of four sub-components namely repetition, elaboration, regulation and critical thinking. Repetition strategies refer to reading or repetition of items to be learned on a list. Elaboration strategies consist of paraphrasing, summarizing, making analogues and taking notes productively. These strategies help learners to connect and combine new information with previous knowledge. Regulation strategies include grouping information, making outlines, deriving main ideas in reading passages and organization. Critical thinking strategies are about to what extent students apply previous knowledge in solving problems, making inferences from what they have learned, making critical assessments in terms of perfection standards (Pintrich, vd., 1991). Metacognition can be defined as individuals' knowledge about in what ways they can learn better, their awareness of their own thinking processes, and their ability to control these processes. Metacognitive strategies consist of three main processes: 1. Planning, 2. Monitoring, 3. Regulation. Planning process includes activities such as setting goals and task analysis. This process helps learners to activate gained knowledge or make it ready for use, which facilitates organization and comprehension of the material. Monitoring strategies include students' monitoring their attention, testing and questioning themselves, which helps learners to understand the material and combine it with their previous knowledge. Regulation strategies are about an individual's carefully performing cognitive activities and continuously correcting them. It is assumed that regulation strategies enhance students' performance by helping them to control and correct their behaviours as they proceed in the task (Büyüköztürk, Akgün, Karadeniz, Kılıç Çakmak and Demirel, 2007). Resource management

strategies help students to adapt to their environment and change it in order to reach their aims and meet their needs (Hofer, Yu and Pintrich, 1998). These strategies include six sub-components: regulating time and study environment, effort management, peer cooperation, and seeking help (Pintrich et al., 1991; Zimmerman and Risemberg, 19997).

In literature there are studies on learners' motivation carried out with students from different grades of education (Debnath, 2005; De Vicente, 2003; D'Souza and Maheshwari, 2010; İflazoğlu-Saban and Tümkaya, 2008; Namlu, et al., 2003) as well as studies explaining the relationship between motivation and different variables (grade, department, success, etc.). Moreover, literature review reveals that there are a number of studies which aim to determine learning strategies with different study groups (Aydın, 2011; Eroğlu, 2007, Güven, 2004; Lynch, 2006; Toy, 2007; Young, and Vrongistinos, 2002) and that these studies are related to different variables (academic success, academic self-efficacy, attitude towards lessons, department, gender, etc.). Obviously both concepts have a structure which can directly contribute to individuals' shaping their future lives. Literature review shows that the number of studies which explain to what extent students' learning strategies influence their motivation levels is low. For example, the study conducted by Namlu et al. (2003) reveals that there is a meaningful relationship between success, motives and cognitive strategies, and that learning strategies can facilitate success without motivation. In her study, Cebesoy (2013) researched the effect of variables such as gender and physics course final scores on preservice teachers' self-regulation skills regarding physics course, also the relationship between motivation and learning strategies. The data, which were obtained via sectioning approach of correlational survey model, reveal that sub-dimensions in the motivational strategies and learning strategies were related in line with the original form in which the scale was developed. What encouraged the writer to do research on this subject was that both studies abovementioned were conducted with preservice teachers and the number of studies analysing the relationship between high school students' motivation and learning strategies is quite limited. It is thought that findings of this study can enable high school teachers and directors to design learning environment in such a way to develop students' learning strategies and support the development of students' motivation levels positively. Besides, this study is expected to contribute to making education more effective. Therefore, the study aims to reveal high school students' learning strategies and motivation levels, the relationship between their learning strategies and motivation levels and to determine if these two variables differ according to gender and grade at school. In line with this general aim, answers were sought for the following questions:

1. What are high school students' motivation levels? Is there a meaningful difference between high school students' motivation levels in terms of their gender and grades at school?
2. What are high school students' learning strategies? Is there a meaningful difference between high school students' learning strategies in terms of their gender and grades at school?
3. What kind of relationship is there between high school students' learning strategies and their motivation levels?

METHOD

Correlational survey model was used in this study in order to determine whether high school students' motivation levels are affected by their learning strategies (Karasar, 2014). Correlational survey model is a research model that aims to reveal the existence or degree of covariance between two or more variables (Karasar, 2013). Study group consists of students studying in the 9th, 10th and 11th grades of Safranbolu Atatürk Anatolian High School in Safranbolu district of Karabük in Turkey in 2017-2018 educational semester. Study group was determined via convenience sampling method. The study group consists of 251 students in total. 48.6 % of students are females (n=122); 51.4% of students are males (n=129); 35.1% of students study in the ninth grade; 17.1% of students study in the tenth grade (n=43), and 47.8% of students study in the eleventh grade (n=120).

Data Collection Tool

The scale used in this study is “Motivation and Learning Strategies Scale” (GOSO), which was developed by Pintrich, Smith, Garcia and McKeachie (1991) for university students and was adapted to Turkish in 2007 by Büyüköztürk, Akgün, Karadeniz, Kılıç Çakmak and Demirel, who defined the norms and approved that the scale could be used for primary, secondary and high school students. The scale has two dimensions. There are 63 items; 20 items in the motivation dimension, 43 items in the learning strategies dimension.

Motivation dimension of the scale consists of three main components (Value, Expectation and Affective), six sub-components (Intrinsic Purpose Orientation, Extrinsic Purpose Orientation, Task Value, Self-efficacy Perception Regarding Learning and Performance, Learning Control Belief and Exam Anxiety).

Learning strategies dimension of the scale consists of three main components (Cognitive Strategies, Metacognitive Strategies and Resource Management), nine sub-components (Repetition, Elaboration, Regulation, Critical Thinking, Planning-Monitoring and Regulation, Management of Time and Study Environment, Effort Management, Peer Collaboration Management, Demanding Help). The scale is a seven-point likert scale including items ranging between “absolutely false for me” to “absolutely true for me”.

Cronbach’s Alpha in motivation dimension of the scale was found 0.86; Cronbach’s Alpha in this study was found 0.85. Cronbach’s Alpha in Learning Strategies dimension range between 0.51 and 0.83. Cronbach’s Alpha in this study was found 0.93.

In the adaptation process of the scale, confirmatory factor analysis, Cronbach’s Alpha internal coefficient of consistence and corrected items total correlations were examined in order to determine validity and reliability. Results of confirmatory factor analysis revealed that factorial models defined for both scales are compatible with the data in general ($\chi^2=28891.34$, $p=.000$, $sd=857$, $RMR=0.12$, $SRMR=0.038$, $GFI=0.91$, $AGFI=0.90$, $RMSEA=0.050$, $CFI=0.85$, $NNFI=0.85$). It was found that item factor load and total item correlations are meaningful (Büyüköztürk, et al., 2007).

Analysis of the Data

In the process of analysis of the data, whether the data showed normal distribution or not was tested. With this regard, values of central distribution, deviancy and kurtosis were examined on the distribution of total score which was taken for the factors that constitute the scale. Kolmogorov-Smirnov Test was also used. Accordingly, it was seen that GOSO score showed normal distribution. In addition, homogeneity of the variances of measurements was examined via Levene F test. Percentages, frequencies, arithmetic mean, standard deviation and t test were applied in the analysis of the data in line with sub-problems. While comparisons about GOSO total scores according to gender were made via t test, comparisons regarding GOSO total scores according to department variable were made via one-way analysis of variance (ANOVA). Scheffe test was used in multiple comparisons. Besides, Pearson Correlation coefficient analysis was carried out in order to identify the relationship between students’ motivation levels and frequency of using learning strategies. Significance level was taken as .05 in the interpretation of the results.

FINDINGS AND DISCUSSION

Findings are presented separately for motivation and learning strategies dimensions.

Table 1. Motivation Levels of High School Students

Dimensions of Motivation Levels	Sub-components of Motivation Levels	N	\bar{x}	S
Value Component	Intrinsic purpose orientation	251	4.89	1.47
	Task value	251	5.34	1.60
Expectation	Learning control belief	251	5.96	1.49
	Self-efficacy perception regarding learning and performance	251	5.40	1.32
Affective	Exam anxiety	251	3.76	1.37
Total		251	4.59	1.04

Analysis of Table 1 reveals that high school students' total average scores of motivation levels are slightly above medium level with 4.59. As for sub-components of motivation levels, the table shows that average score of "intrinsic purpose orientation" sub-component is 4.89; average score of "task value" sub-component is 5.34; average score of "learning control belief" sub-component is 5.96; average score of "self-efficacy regarding learning and performance" sub-component is 5.40. These results reveal that high school students' motivation levels are slightly above medium level, and that only the average score of "exam anxiety" sub-component is below medium level with 3.79.

Analysis of sub-components of students' motivation levels reveal that the highest average score belongs to "learning control belief", a sub-component of "expectation" main component, with 5.96 while the lowest average score belongs to "exam anxiety" sub-component of "affective" main component with 3.79.

Table 2. Comparison of High School Students' Motivation Levels according to Their Gender (Independent Samples t test)

Dimensions of Motivation Levels	Sub-components of Motivation Levels	Gender	N	\bar{X}	SS	sd	t	p
Value Component	Intrinsic purpose orientation	Female	122	5.02	1.34	249	1.44	0.15
		Male	129	4.76	1.57			
	Task value	Female	122	5.38	1.42	249	0.37	0.70
		Male	129	5.31	1.76			
Expectation	Learning control belief	Female	122	6.17	1.25	249	2.18	0.03
		Male	129	5.76	1.66			
	Self-efficacy perception regarding learning and performance	Female	122	4.64	1.51	249	0.13	0.89
		Male	129	4.61	1.56			
Affective	Exam anxiety	Female	122	3.69	1.29	249	-0.82	0.41
		Male	129	3.83	1.44			
Total Scores of Motivation Levels		Female	122	4.62	0.95	249	0.33	0.73
		Male	129	4.57	1.12			

Independent samples t test results about the comparison of high school students' total scores of motivation levels according to gender reveal that the difference between female and male students is not meaningful. It can be maintained according to this finding that students' gender differences do not affect motivation levels.

Analysis of Table 2 reveals that only in "learning control belief" sub-component of "expectation" component the difference between female and male students is meaningful [$t_{(249)}=2.18$; $P<0.05$]; average scores of female students are higher than those of male students. In other words, it can be maintained that in "learning control belief" sub-component, female students' motivation levels are higher than male students'.

Table 3. Results of One-way Analysis of Variance (ANOVA) That was Conducted in order to Determine whether High School Students' Motivation Levels Differ according to Their Grades at School

Dimensions of Motivation Levels	Components of Motivation Levels	Grade	N	\bar{X}	S	sd	f	p
Value Component	Intrinsic Purpose Orientation	9 th Grade	88	4.95	1.25	2	0.53	0.58
		10 th Grade	43	5.03	1.52	248		
		11 th Grade	120	4.79	1.59	250		
	Task Value	9 th Grade	88	5.63	1.26	2	2.58	0.07
		10 th Grade	43	5.36	1.68	248		
		11 th Grade	120	5.12	1.77	250		
Expectation	Learning Control Belief	9 th Grade	88	6.24	1.08	2	3.18	0.04
		10 th Grade	43	6.05	1.37	248		
		11 th Grade	120	5.72	1.74	250		
	Self-efficacy perception regarding learning and performance	9 th Grade	88	5.61	0.94	2	2.36	0.09
		10 th Grade	43	5.48	1.38	248		
		11 th Grade	120	5.21	1.51	250		
Affective	Exam Anxiety	9 th Grade	88	3.71	1.41	2	0.11	0.89
		10 th Grade	43	3.74	1.36	248		
		11 th Grade	120	3.80	1.35	250		
Total Scores of Motivation Levels		9 th Grade	88	4.60	0.97	2	0.09	0.91
		10 th Grade	43	4.65	1.03	248		
		11 th Grade	120	4.57	1.10	250		

The results of One-way Analysis of Variance (ANOVA) regarding comparison between high school students' total scores of motivation levels and their grades at school reveal that although the result in the "Learning Control Belief" sub-component of "Expectation" main component is meaningful at .05 level, the results of Scheffe test conducted between the groups reveal that there is no meaningful difference. In other words, students' grades at school do not affect their motivation levels.

Table 4. Descriptive Statistics regarding High School Students' Views about their Learning Strategies

Dimensions of Learning Strategies	Sub-components of Learning Strategies	N	\bar{x}	S
Cognitive Strategies	Repetition	251	4.50	1.51
	Elaboration	251	4.09	1.60
	Regulation	251	4.34	1.57
	Critical Thinking	251	4.21	1.45
Metacognitive	Planning, Monitoring and Regulation	251	4.29	1.28
Resource Management	Time and StudyEnvironment	251	4.76	1.37
	Effort Management	251	4.37	1.75
	Peer Collaboration	251	3.64	1.43
	Seeking Help	251	4.55	1.51
Total		251	4.33	1.10

Table 4 shows that average total score of high school students' learning strategies is 4.33. Statistics regarding sub-components reveal that mean score of repetition sub-component of cognitive strategy main component is 4.50, mean score of elaboration sub-component is 4.09, mean score of regulation sub-component is 4.34, mean score of critical thinking sub-component is 4.21; mean score of "planning, monitoring and regulation" sub-component of metacognitive main component is 4.29; mean score of "time and study environment" sub-component of "resource management" main component is 4.76, mean score of "effort management" sub-component is 4.37, mean score of "peer collaboration" sub-component is 3.64, and mean score of "seeking help" sub-component is 4.55. These statistics reveal that frequency of high school students' use of learning strategies is at medium level.

As statistics about sub-components of learning strategies used by students show, students use “time and study environment” sub-component of “Resource management” dimension the most with the highest mean score ($x=4.76$) while students use “peer collaboration” sub-component of “resource management” dimension the least with the lowest mean score ($x=3.64$).

Table 5. Comparison of high School Students’ Learning Strategies according to Their Gender (Independent Samples t test)

Dimensions of Learning Strategies	Sub-components of Learning Strategies	Gender	N	\bar{X}	S	sd	t	p
Cognitive Strategies	Repetition	Female	122	4.82	1.39	249	3.27	0.00
		Male	129	4.20	1.56			
	Elaboration	Female	122	4.15	1.27	249	0.53	0.59
		Male	129	4.04	1.86			
	Regulation	Female	122	4.76	1.46	249	4.20	0.00
		Male	129	3.95	1.58			
	Critical Thinking	Female	122	4.21	1.34	249	0.00	0.99
		Male	129	4.21	1.56			
Metacognitive	Planning, Monitoring and Regulation	Female	122	4.48	1.14	249	2.37	0.01
		Male	129	4.10	1.39			
Resource Management	Time and Study Environment	Female	122	4.86	1.35	249	1.05	0.29
		Male	129	4.67	1.39			
	Effort Management	Female	122	4.52	1.73	249	1.35	0.17
		Male	129	4.22	1.75			
	Peer Collaboration	Female	122	3.58	1.49	249	- 0.66	0.50
		Male	129	3.70	1.38			
	Seeking Help	Female	122	4.68	1.46	249	1.25	0.21
		Male	129	4.44	1.54			
Total Score of Learning Strategies	Female	122	4.52	1.02	249	2.23	0.02	
	Male	129	4.21	1.17				

Analysis of the results of independent samples t test about comparison between high school students’ learning strategies according to their gender reveals that the difference between male and female students is meaningful [$t_{(249)}=2.23$; $P<0.05$]. Thus, it can be maintained that female students’ mean scores are higher than male students’. In other words, female students use learning strategies more frequently than male students do.

The results of independent samples t test about comparison between high school students’ learning strategies according to their gender show that there is meaningful difference between male and female students on behalf of female students in “Repetition” sub-component [$t_{(249)}=3.27$; $P<0.05$] and “regulation” sub-component [$t_{(249)}=4.20$; $P<0.05$] of cognitive strategies dimension, and also in “planning, monitoring and regulation” sub-component [$t_{(249)}=2.37$; $P<0.05$] of metacognitive dimension. This finding shows that female students use learning strategies more frequently than male students do.

The same table reveals that the difference between male and female students is not meaningful in “Elaboration” sub-component of Cognitive Strategies dimension, “Time and Study Environment”, “Effort Management”, “Peer Collaboration” and “Seeking Help” sub-components of Resource Management dimension. According to the table, the difference between male and female students is meaningful only in “Critical Thinking” sub-component [$t_{(249)}=0.00$; $P>0.05$] of Cognitive Strategies dimension, which means that female and male students use this strategy equally.

Table 6. Comparison of High School Students' Learning Strategies according to Their Grades (One-way Analysis of Variance – ANOVA)

Dimensions of Learning Strategies	Sub-components of Learning Strategies	Grade	N	\bar{X}	S	sd	f	p
Cognitive Strategies	Repetition	9 th Grade	88	4.58	1.35	2	0.89	0.41
		10 th Grade	43	4.22	1.65	248		
		11 th Grade	120	4.55	1.58	250		
	Elaboration	9 th Grade	88	4.05	1.17	2	0.81	0.44
		10 th Grade	43	3.85	1.36	248		
		11 th Grade	120	4.20	1.92	250		
	Regulation	9 th Grade	88	4.41	1.40	2	1.75	0.17
		10 th Grade	43	3.94	1.60	248		
		11 th Grade	120	4.44	1.66	250		
	Critical Thinking	9 th Grade	88	4.17	1.24	2	0.06	0.93
		10 th Grade	43	4.18	1.54	248		
		11 th Grade	120	4.24	1.57	250		
Metacognitive	Planning, Monitoring and Regulation	9 th Grade	88	4.30	1.04	2	0.94	0.39
		10 th Grade	43	4.05	1.37	248		
		11 th Grade	120	4.36	1.41	250		
Resource Management	Time and Study Environment	9 th Grade	88	4.86	1.18	2	0.69	0.50
		10 th Grade	43	4.86	1.47	248		
		11 th Grade	120	4.66	1.45	250		
	Effort Management	9 th Grade	88	4.46	1.78	2	1.03	0.35
		10 th Grade	43	4.02	1.89	248		
		11 th Grade	120	4.42	1.67	250		
	Peer Collaboration	9 th Grade	88	3.33	1.43	2	3.15	0.04
		10 th Grade	43	3.77	1.36	248		
		11 th Grade	120	3.82	1.44	250		
	Seeking Help	9 th Grade	88	4.63	1.37	2	0.19	0.82
		10 th Grade	43	4.47	1.39	248		
		11 th Grade	120	4.53	1.65	250		
Total Score of Learning Strategies		9 th Grade	88	4.39	0.92	2	0.24	0.78
		10 th Grade	43	4.25	1.17	248		
		11 th Grade	120	4.37	1.21	250		

Results of One-Way Analysis of Variance (ANOVA) regarding comparison between total scores of high school students' learning strategies and their grades reveal that although the result is meaningful in "Peer Collaboration" sub-component (.05) of Resource Management dimension, there is no meaningful difference according to the results of Scheffe test applied between the groups. In other words, students' grades at school do not affect the frequency of their using learning strategies.

According to the analysis of sub-components of frequency of students' using learning strategies, the highest mean score belongs to "Time and Study Environment" sub-component (4.86) of Resource Management dimension while the lowest mean score belongs to "Peer Collaboration" (3.33) of the same dimension. This finding makes one think that high schools students do not interact enough with their peers in the learning process.

Table7. Results of Correlation Analysis between High School Students’ Motivation Levels and Learning Strategies

Learning Strategies		Cognitive Strategies				Meta cognitive	Resource Management				Learning Strategies Total	
		Repetition	Elaboration	Regulation	Critical Thinking	Planning, Monitoring and Regulation	Time and Study Environment	Effort Management	Peer Collaboration	Seeking Help		
Motivation												
Value Component	Intrinsic Purpose Orientation	r	.472**	.435**	.433**	.590**	.574**	.502**	.369**	.310**	.325**	.607**
		p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
		N	251	251	251	251	251	251	251	251	251	251
	Task Value	r	.482**	.349**	.404**	.584**	.539**	.563**	.333	.166**	.326**	.588**
		p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
		N	251	251	251	251	251	251	251	251	251	251
Expectation	Learning Control Belief	r	.379**	.272**	.329**	.400**	.410**	.423**	.234**	.124*	.260**	.437**
		p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
		N	251	251	251	251	251	251	251	251	251	251
	Self-efficacy Perception regarding Learning and Performance	r	.368**	.344**	.339**	.525**	.468**	.453**	.314**	.203**	.186**	.494**
		p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
		N	251	251	251	251	251	251	251	251	251	251
Affective	Exam Anxiety	r	-.068	.054	-.006	-.003	-.039	-.028	-.105	-.087	-.032	-.045
		p	.284	.398	.930	.962	.536	.655	.097	.167	.618	.480
		N	251	251	251	251	251	251	251	251	251	251
Motivation Total		r	.368**	.317**	.353**	.512**	.459**	.452**	.260**	.158*	.225**	.488**
		p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
		N	251	251	251	251	251	251	251	251	251	251

*p< 0.05 **p<0,01

Table 7 reveals that there is a medium-level, positive, meaningful relationship between total scores of high school students’ motivation levels and their learning strategies ($r = .488$; $p < .01$). Details of Table 7 shows that there is a medium-level, positive, meaningful relationship between learning strategies students use with “Value Component” and “Expectation” motivation levels while there is no meaningful relationship between students’ learning strategies they use with “Affective” motivation.

According to Table 7 there is a medium-level, positive and meaningful relationship between high school students’ motivation levels regarding “intrinsic purpose orientation” and all sub-components of learning strategies they use (Repetition $r = .472$; $p < .01$), Elaboration $r = .435$; $p < .01$), Regulation $r = .433$; $p < .01$), Critical Thinking, $r = .590$; $p < .01$), Planning, Monitoring and Regulation $r = .574$; $p < .01$) and Time and Study Environment $r = .502$; $p < .01$), Effort Management $r = .369$; $p < .01$), Peer Collaboration $r = .310$; $p < .01$) and Seeking Help $r = .325$; $p < .01$). Findings of the study show that there is a medium-level, positive and meaningful relationship between high school students’ “Task Value” motivation levels and “Repetition” ($r = .482$; $p < .01$), “Elaboration” ($r = .349$; $p < .01$), “Regulation” ($r = .404$; $p < .01$), “Critical Thinking” ($r = .584$; $p < .01$), “Planning, Monitoring and Regulation” ($r = .539$; $p < .01$), “Time and Study Environment” ($r = .563$; $p < .01$), “Effort Management” ($r = .333$; $p < .01$) and “Seeking Help” ($r = .326$; $p < .01$) strategies among learning strategies they use. On the other hand, there is a low-level, positive and meaningful relationship between high school students’ motivation levels and “Peer Collaboration” strategy. As seen in Table 7, there is a medium-level, positive and meaningful relationship between students’ “Learning Control Belief” motivation level and “Repetition” ($r = .379$; $p < .01$), “Regulation” ($r = .329$; $p < .01$), “Critical Thinking” ($r = .400$; $p < .01$), “Planning, Monitoring and Regulation” ($r = .410$; $p < .01$) and “Time and Study Environment” ($r = .423$; $p < .01$) strategies they use. On the other hand, there is a low-level, positive and meaningful relationship between students’ “Learning Control Belief” motivation level and “Elaboration” ($r = .272$;

$p < .01$), “Effort Management” ($r = .234$; $p < .01$), “Peer Collaboration” ($r = .124$; $p < .05$) and “Seeking Help” ($r = .260$; $p < .01$) strategies. The table also reveals that there is a medium-level, positive and meaningful relationship between students’ “Self-efficacy Perception regarding Learning and Performance” levels and “Repetition” ($r = .368$; $p < .01$), “Elaboration” ($r = .344$; $p < .01$), “Regulation” ($r = .339$; $p < .01$), “Critical Thinking” ($r = .525$; $p < .01$), “Planning, Monitoring and Regulation” ($r = .468$; $p < .01$), “Time and Study Environment” ($r = .453$; $p < .01$), “Effort Management” ($r = .314$; $p < .01$) and “Peer Collaboration” ($r = .203$; $p < .01$) strategies they use while there is a low-level, positive, meaningful relationship between their “Self-efficacy Perception regarding Learning and Performance” levels and “Seeking Help” ($r = .186$; $p < .01$) strategy they use. According to the table, there is no meaningful relationship between students’ “Exam Anxiety” levels and learning strategies they use (“Repetition” $r = -.068$; $p > .05$, “Elaboration” $r = -.054$; $p > .05$, “Regulation” $r = -.006$; $p > .05$, “Critical Thinking” $r = -.003$; $p > .05$, “Planning, Monitoring and Regulation” $r = -.039$; $p > .05$, “Time and Study Environment” $r = -.028$; $p > .05$, “Effort Management” $r = -.105$; $p > .05$, “Peer Collaboration” $r = -.087$; $p > .05$ and “Seeking Help” $r = -.032$; $p > .05$).

CONCLUSION AND IMPLICATIONS

Results of the study reveal that high school students’ total mean scores of their motivation levels are slightly higher than medium level. Results of Yapıcı and Yapıcı’s study (2003), in which they got primary school teachers’ views, shows that students’ motivation levels are low and they behave indifferently. Although students’ motivation levels were expected to be high, the result that their motivation levels are slightly higher than average makes one think that studies are to be conducted in order to increase students’ motivation.

According to the findings of the study, “Learning Control Belief” sub-component of “Expectation” dimension has the highest mean score while “Exam Anxiety” sub-component of “Affective” dimension has the lowest mean score. Literature review in the field reveals that Higgins’s study (2000) overlaps the findings of this study in that students’ exam anxiety levels are low. On the other hand, another study carried out with students getting pedagogical formation training and with those studying at the Faculty of Education found students’ motivation levels high (Ömür and Nartgün, 2013). This result does not overlap the findings of this study. Considering that finding a job, particularly in the favourite field, increases an individual’s motivation positively (Vero and Puka, 2017), it may well be maintained that Ömür and Nartgün’s findings are natural results. Considering the results of this study, it can be thought that students have a perception regarding learning school subjects, they have belief in being able to perform it, and that they do not suffer from exam anxiety.

Results of the study reveal that there is no meaningful difference between high school students’ motivation levels total scores and gender variable; nevertheless, female students’ motivation levels were found higher than males’ only in “learning control belief” sub-component of the scale. As literature review in the field also shows, findings of a number of relevant studies (Ömür and Nartgün, 2013; Saracaloğlu, Karasakaloğlu, and Yenice, 2008) point out that gender does not affect students’ motivation levels. On the other hand, some other studies found that female students’ motivation levels are higher than male students’ (Al Khatib, 2010; Aydın, 2011; Eroğlu, 2012; İflazoğlu-Saban and Tümkaya 2008; Lepper, Corpus, and Iyengar, 2005). There are still other studies which reveal that male students’ motivation levels are higher than females’ (Higgins, 2000; Pajares and Valiante, 1999). The finding that there is no difference between participant students in terms of gender can be regarded as a positive result, but it is thought-provoking that their motivation levels are slightly higher than average.

Findings of the study reveal that there is no meaningful difference between high school students’ grades and their motivation levels. Literature review in the field shows that there are studies whose findings do not overlap with this finding (Kılıç-Cakmak, Erkan, Karadeniz, Büyüköztürk, and Demirel, 2008; Lepper, Corpus, and Iyengar, 2005). In their study, Kılıç-Cakmak et al. (2008) found that motivation levels of students in the 9th and 11th grades are higher than students in the 10th grade. Considering that in education system students need to develop themselves in affective domain as well

as in cognitive domain, motivation levels can be expected to become higher as students' grades get higher. However, further studies should reveal the reason for there being no difference between grades.

Findings of the study reveal that frequency of high school students' using learning strategies is at medium level; they use "Time and Study Environment" sub-component of Resource Management dimension at the highest level while they use "Elaboration" sub-component of Cognitive Strategies dimension at the lowest level. Literature review about the frequency of using learning strategies show that there are studies whose findings overlap with those of this study (Çelikkaya and Kuş, 2010; Karakış and Çelenk, 2007; Öztürk, 1995; Toy, 2007). For example, in his study Aydın (2011) found that students use different learning strategies at different levels. Findings of this study make one think that students effectively use the time spared for studying, do homework in time, join the classes regularly, but they cannot sufficiently use behaviours such as summarizing, paraphrasing important information, making connection between new information and their previous knowledge. Details of the learning strategy which is most frequently used reveal that students show behaviour / effort at information stage of cognitive field the most while comprehension stage of learning strategy is used at the lowest level. In fact, results of the analyses of the study about gender show that female and male students use critical thinking behaviour equally and slightly over the average. This is thought-provoking in that students have high-level behaviour/effort and it may result from the program applied (Özer, 2002; Tekin, 1980) or teaching style of the teachers (Geçer ve Deryakulu, 2004; Özer, 2002; Şen ve Erişen, 2002). Another reason could be that students may not be knowledgeable enough in different strategies or they may not be motivated enough.

It was found in the study that there is meaningful difference between high school students' learning strategies total scores and gender variable. Analysis of sub-components of the scale reveals that female students use learning strategies more than male students do in "Repetition" and "Regulation" sub-components of cognitive strategies and "Panning, Monitoring and Regulation" sub-components of Metacognitive dimension. Literature review in the field shows that there are many studies which have similar findings (Aydın, 2011; Çelikkaya and Kuş, 2010; Ellez, 2004; Hamurcu, 2002; İflazoğlu-Saban and Tümkaya, 2008; Karakış and Çelenk, 2007; Toy, 2007). According to these findings it could be maintained that female students use key words when learning a subject, they revise the subjects, list main topics and sub-topics in order to remember the subjects, use simple table-schema, figures, ask themselves questions about the subjects.

Findings of the study reveal that there is no meaningful difference between female and male students in "Elaboration" sub-component of Cognitive strategies, in "Time and Study Environment", "Effort Management", "Peer Collaboration" and "Seeking Help" sub-components of Resource Management dimension. It was found that female and male students only use "Critical Thinking" strategy of Cognitive Strategies dimension equally. Thus, it can be put forth that female and male students use equally the behaviours of questioning the accuracy of information they learn, do research on whether there are proofs confirming true information, trying to improve their views in the light of the knowledge they gained. This can be related to the fact that today students improve their thoughts and behaviours thanks to technology (smart phones, convenience of internet connection, etc.) (Çalık and Çınar 2009; Madden, Ford, Miller and Levy, 2006; Şerefoğlu-Henkoğlu, Mahiroğlu, and Keser, 2015).

Results of the study reveal that there is no meaningful relationship between high school students' learning strategies and their grades at school. In literature while there are studies supporting these findings of the study (Karakış and Çelenk, 2007; Yüksel and Koşar, 2001), there are others which do not support the findings of this study (Aydın, 2011; Toy, 2007; Hamurcu, 2002). Possible reasons of this finding could be that students in the 9th, 10th and 11th grades plan learning process very well and use it effectively, set realistic goals, arrange the study environment and create a quiet study environment at least partly away from audio-visual distractors.

According to the findings of the study, there is a medium-level, positive and meaningful relationship between high school students' motivation levels and their learning strategies. However, the results make it clear that the motivation level is not at the desired level and learning strategies are not used. It is thought-provoking that the result is positive, meaningful and medium-level. In fact, it is known that an individual who is highly motivated and uses learning strategies effectively will experience quality learning. High school students are expected to have proficiency in learning strategies and use them. An individual who uses effective learning strategies becomes successful and the individual who becomes successful tries to learn more and develop himself/herself, has high level of energy for it, has high performance and self-confidence, in other words, he/she is highly motivated. It is pointed out by experts (Pintrich and Smith Garcia and McKeachie, 1991; Zimmerman and Martinez-Pans, 1990) that students' motivation levels and their using appropriate learning strategies in appropriate places play a key role in being successful both at school and in their future lives.

Results of the study show that there is a medium-level, positive and meaningful relationship between students' "intrinsic purpose orientation" motivation levels and their learning strategies. Considering that intrinsic purpose orientation is students' beliefs and interests in the importance of their goals and tasks, students use learning strategies at medium-level although they are motivated to learn the subjects. In her study, Şengül (2017) found that learning strategies used by students in the 6th, 7th and 8th grades are weaker than their motivation and that majority of students need help in learning strategies. It is observed that curriculum of primary, secondary and high school education in Turkey gives little and irregular place to the importance of learning strategies (Özer, 2002). Findings of this study reveal that students need to be supported by their teachers and school managers in learning strategies.

According to the findings of the study, there is a low-level, positive and meaningful relationship between high school students' "task value" motivation level and Peer Collaboration learning strategy while there is a medium-level, positive and meaningful relationship between their "task value" motivation level and all other strategies they use. The finding that students' task values are high is one of the factors which will help students to participate in learning more. One of the reasons for the results of the research being at medium-level can be that curriculum is conducted in line with the philosophical principle of perennialism. On the other hand, the reason for task value motivation level and peer collaboration strategy being low could be that students may be unwilling to participate in the learning process in collaboration with peers.

Another finding of the study is that there is a medium-level, positive and meaningful relationship between students' motivation about "Learning Control Belief" and their "Repetition", "Regulation", "Critical Thinking", "Planning, Monitoring and Regulation", "Time and Study Environment" strategies while there is a low-level, positive and meaningful relationship between students' motivation about "Learning Control Belief" and their "Elaboration", "Effort Management", "Peer Collaboration" and "Seeking Help" strategies. It is thought that while students tend to use very basic learning strategies such as memorizing, classifying, problem-solving, setting goals and planning time because they believe that effort to learn will bring positive results, students prefer "integrating information", "maintaining attention and effort", "collaboration" and "seeking help" strategies less. The reason for this could be that they tend to prefer the strategies they are used to and that they are not determined in challenging processes which require much longer time.

Results of the study show that there is a medium-level, positive and meaningful relationship between high school students' "Self-efficacy Perceptions regarding Learning and Performance" and all their learning strategies except "seeking help" strategy; there is a low-level, positive and meaningful relationship between high school students' "Self-efficacy Perceptions regarding Learning and Performance" and their "seeking help" strategy. Successful students are aware of what they do not know and they can find somebody to help them. There are a number of studies which reveal that peer collaboration, peer work and getting help individually from the teacher enhance students' success. The reason for students' using "seeking help" strategy at low levels may be that they cannot decide when they need to get help.

According to the findings of the study there is no meaningful relationship between high school students' "Exam Anxiety" and their learning strategies. Pintrich (1989) maintains that there is no relationship between using appropriate cognitive strategies and high or low level of exam anxiety. Further studies in which students' views can be obtained are needed in order to discuss this finding.

In the light of these findings, hidden curriculum (social responsibilities, publishing newspapers etc.) can be applied in class and at school in order to increase high school students' motivation levels. Studies can be carried out to increase the diversity of learning strategies. In order to do this, students' learning strategies can be identified, training and courses can be offered accordingly to help students to develop their learning strategies. In addition, studies can be conducted to define the learning strategies that teachers are familiar with and use. Research can be done to identify students' inefficiencies regarding applying learning strategies and educational guidance can be applied in schools in order to help students to acquire learning strategies. Activities can be organized to support peer collaboration. Considering that today's students are very interested in digital tools and online connections, online and digital applications/activities can be integrated in class to increase students' motivation and develop their learning strategies.

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Investigating Invariant Item Ordering Using Mokken Scale Analysis for Dichotomously Scored Items

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Abstract

Mokken models have recently started to become the preferred method of researchers from different fields in studies of nonparametric item response theory (NIRT). Despite increasing application of these models, some features of this type of modelling need further study and explanation. Invariant item ordering (IIO) is one of these areas, which the present study aims to exemplify using a real dataset and comparing the findings of different methods. The main purpose of this study is to check the IIO assumption for a large scale test by using different methods. Data relating to the high school placement test (applied in 2016) was investigated. The sample size was determined as being 250, which complies with NIRT. Two different methods have been used for dichotomous items in the IIO testing: rest-scores and P-matrix methods. The H^T coefficients were also calculated in order to define the placement of item response functions. Findings show that the test battery is not suitable for Mokken scaling. IIO property was not met for any of the tests, and findings from the different methods were not consistent with each other. As for the results, the rest-score method defined more items violating IIO properties than the P-matrix method for all the tests. The H^T coefficients were also estimated from the critical value, which shows that the tests do not have IIO properties. The conflicting results indicate that there is a need for new studies to investigate IIO empirically.

Keywords: Invariant Item Ordering, Nonparametric Item Response Theory, Mokken Models

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INTRODUCTION

In psychological testing, the problem with ordering items is generally assumed to be the same at both individual and group levels, but this has not been tested empirically. During measurement of psychological traits, such as anxiety, happiness and self-confidence etc., items of the scale tend to represent different levels of intensity of the measured trait. For instance, when measuring satisfaction with life, the item “smiling tactfully” represents a lower level of satisfaction with life, as opposed to the description “bursting into laughter”. Meijer and Baneke (2004) expressed a similar example in relation to measuring depression, which assumes that the item “thoughts of ending your life” represents a higher level of depression than “feeling no interest in things”. This feature can be referred to as item intensity and is often quantified as the mean item score in a group of interest (Sijtsma, Meijer, & van der Ark, 2011). Items can be ordered according to their mean scores, so this can be taken as ordering by increasing intensity with respect to the measured attribute. When the ordering of items by mean scores is the same for each theta value, this means that items in the scale meet the invariant item ordering (IIO) assumption.

A set of dichotomous items (k) is said to exhibit invariant item ordering if the items can be ordered and numbered such that:

$$E(X_1 | \Theta) \leq E(X_2 | \Theta) \leq \dots \leq E(X_k | \Theta) \text{ for each } \Theta, \quad (1.1)$$

or equivalently,

$$P_1(\Theta) \leq P_2(\Theta) \leq \dots \leq P_k(\Theta) \text{ for each } \Theta. \quad (2.1)$$

Ties may occur for some Θ values or the interval of each Θ (Sijtsma & Molenaar, 2002).

Because the equations given above have been based on Θ , it is clear that invariant item ordering is applied on individual Θ s. This property, therefore, becomes essential, especially in assessments where individual performances are compared with one another. In many test applications, the ordering of people is required. Selection of the best applicant for a job or determining the 10 most talented students for expensive training can be done by ordering test scores that have predictive validity (Sijtsma & Junker, 1996).

Due to improvements in the psychometric qualities of the scale, IIO assumptions have attracted the attention of researchers recently. Thanks to advancements in computer technology and data analysis software, it has been possible to check these assumptions easily. Several theoretical studies have been published, which discuss the assumptions and different ways of analysing it with dichotomous and polythomous datasets. For dichotomous items, Sijtsma and Junker (1996) reviewed the IIO literature, and several studies have investigated the usefulness of IIO research for dichotomous item scores (e.g., Roorda et al., 2005; Roorda, Houwink, Smits, Molenaar, & Geurts, 2011). As for polythomous items, studies have investigated this feature in recent years (e.g., Ligtvoet, van der Ark, Bergsma, & Sijtsma, 2011). Ligtvoet, van der Ark, te Marvelde and Sijtsma (2010) developed a new method to check IIO assumptions with polythomous scored items. These studies have all been conducted abroad, and there are virtually no examples of such research in Turkey using a real dataset (Koğar, 2018). In several studies, which have analysed scale development studies in Turkey (Mor Dirlik, 2014; 2017), but none of these have tested the assumptions for their scales. This study, therefore, aims to analyse IIO assumptions in detail and present a framework for other researchers to check this feature in relation to their scale. This study aims to implement various analytical techniques, discussing the possible differences and giving researchers an insight into the usefulness of IIO and methods to check it.

This article is organized as follows: firstly, the place of NIRT models in the context of IRT will be considered. This will be followed by a discussion of invariant item ordering and methods for

checking the assumptions. IIO will then be checked using a real dataset, and, finally, the findings will be presented.

Non-Parametric Item Response Theory

Item response theory (IRT) is one of the most preferred theoretical frameworks for modelling assessment data gathered from different areas, such as education, psychology, health and even political sciences. There are various reasons for this prevalent usage, including: 1) IRT allows computer-adaptive testing to be developed, facilitating more accurate and valid assessment; 2) by using this method, test equation becomes easier; and 3) IRT offers different methods for analysing differentiating items (Embretson & Reise, 2000; Junker & Sijtsma, 2001). Due to these advantages, IRT has become a prominent paradigm within psychometric theory.

Despite the advantages of IRT, some requirements make these kinds of models inapplicable in certain situations, one of which is small sample size. Traditional IRT models, such as one-, two- and three-parameter logistic models, require not only a large sample size but also a large item pool in order to estimate accurate and invariant items, and person parameters. However, there are some situations in which it is impossible to obtain a large sample size or item pool, especially in classroom assessments where the situation is the opposite of what is required by IRT. There are usually fewer people (between 30 and 50) and few items (generally around 30 or 40 at the most). Psychological tests, which are particularly used in medicine or psychology, can be related to a very limited number of people, such those with disease “x” or experiencing problem “y”. It is, therefore, virtually impossible to reach the number of people required by general IRT models, and limitations in terms of the numbers of test-takers and items make traditional IRT models impossible to use. Most of the time, in such assessments, normality (the basic assumption of parametric IRT models) may not even be provided by the datasets. Hence, classroom datasets cannot be scaled using parametric IRT models. In this case, the other IRT approach, nonparametric item response theory (NIRT), may be preferred by test administrators. NIRT is a newly developed IRT approach, which is based on nonparametric techniques of scaling proposed by Mokken (1971). Mokken’s models are called nonparametric because the item response functions (IRF) are not defined parametrically and because there are no assumptions made concerning distribution of the latent trait. Due to the nonparametric structure of this approach, these models facilitate ordinal-level scaling with both person measurement, and person and item measurement, using two models.

Mokken initially developed models only for dichotomous items. Molenaar (1997) subsequently proposed polytomous versions of these models: the monotone homogeneity model (MHM) and double monotonicity model (DMM), which are nested within each other. The MHM, which is a more flexible NIRT model, is based on the following assumptions:

1. All the items in a scale measure the same underlying attribute, which is represented by a latent trait (θ) termed unidimensionality.
2. The second assumption is local stochastic independence, which implies that the response behaviour of a person to an arbitrary, selected item (say, item “x”) is not affected by his or her response to previous items and will not affect his or her response to subsequent items.
3. The last assumption of the MHM is monotonicity. In this assumption, it is specified that a higher attribute value implies an increasing probability of responding positively to an item.

According to the MHM, when these three assumptions are met by the items in a test, the test can be scaled, and persons can be ordered according to the latent attribute (Mokken, 1971). In this model, the ability parameters of persons cannot be estimated numerically, and people are ordered according to θ values using the true score (T). Mokken (1971) showed that T and θ have the

same order, so they can be used for each other at ordinal level. Items meeting these assumptions can then be scaled according to the MHM in a NIRT context.

As for the second model of NIRT (the DMM), in addition to the three assumptions stated above, one more assumption is required, which is the non-intersection of item response functions (IRFs). IRFs may touch or coincide with one another, but they are not allowed to intersect. This assumption brings monotonicity to the item difficulties and items are ordered according to their difficulty parameters. Apart from ties, the order of items is the same in each subpopulation of the sample. In addition to enabling persons to be ordered according to the true score (T), this model also allows items to be ordered based on the proportion of persons giving a positive response to items. The DMM is more restrictive than the MHM, and the number of items that can conform to this model is more limited than with the MHM (Sijtsma & Molenaar, 2002). As the main aim of this study is to analyse IIO assumptions, it is essential for them to be discussed together with checking methods.

The Importance of Invariant Item Ordering

In most assessments, in addition to ordering people, it is helpful (and possibly essential) to order items according to their difficulty level. This makes interpretation of test scores easier. For example, in intelligence testing, items are administered in order according to increasing difficulty and in accordance with students' age. In these tests, the easiest item is used as a starter item, and starting and stopping rules are based on the difficulty level of items. Thanks to item ordering, less able people do not have to complete the most difficult items in a test, which makes it possible to develop adaptive tests (Sijtsma & Molenaar, 2002).

A second example illustrating the importance of invariant item ordering is differential item functioning (DIF). This arises when examinees from different groups (such as gender, ethnic or country) with the same ability have a different probability of giving the right answer to the same item (Sijtsma & Junker, 1996). These different probabilities of giving the right answer to a given item may be based on one or more negligible characteristics of the examinees together with their ability as assessed by the test. When different groups systematically vary in terms of the possibilities, these differences become advantages and disadvantages for the groups, and comparison of group test scores becomes incorrect. Item difficulty levels are, therefore, critical in DIF analysis. When test items meet invariant item ordering assumptions for the dataset, this ensures that there is no differential item functioning for the test items. This property can then be accepted as proof that there is no DIF in the test. This usage of IIO was discussed in a study by Sijtsma and Molenaar (2002), who proposed that it could be used in detection and interpretation of aberrant item score patterns (Meijer, Egberink, Emons, & Sijtsma, 2008). They also stated that IIO may provide important information for developing test theories about psychological constructs.

Considering the related studies, it can be argued that if scale items cannot be ordered in the same way for all participants across the latent trait continuum, then different scores will have different implications. This property becomes particularly important in assessments where individual performances are compared with one another. Large-scale assessment is an example of such situations where students' performances are compared with one another and critical decisions are made. For these reasons, they are also called high-stakes exams. In Turkey, large-scale assessments are used for the purpose of offering students places in higher education institutes and on bachelor programmes. Due to the importance of decisions based on large-scale assessments, the psychometric qualities of such tests should be investigated in detail. However, it is not only psychometric qualities that might have limited validity and reliability; invariant item ordering will also be analysed in order to interpret test scores in a reliable and valid way. In this article, invariant item ordering is investigated using the test administered to eighth grade students in Turkey to determine placement of students in high schools. Many studies have investigated the validity, reliability and differentiation item functioning of this exam, but no study has been found of IIO properties for this assessment. The possible reason for this is that IIO is a new concept. Even though it dates back to Guttman's perfect scaling technique, a computer program facilitating analysis of this feature has only recently been developed. Lastly, the importance and functions of this aspect of NIRT have been studied since the beginning of the 2000s.

Although some simulation studies have endeavoured to analyse IIO (Kođar, 2018), few have investigated it using real data, especially in Turkey. It is also clear from the findings of Ligtvoet et al. (2011) that there is a need for new studies, exploring IIO with real datasets. In view of all the reasons listed above, this study aims to analyse IIO using a real dichotomous dataset in order to understand its framework better. Different methods for checking IIO will also be administered and the obtained results compared, which other researchers might find informative. The next section presents the methods that will be used to investigate IIO in this study.

Methods for Investigating IIO

Several models are proposed, which will be used to investigate IIO with dichotomous and polytomous data. The first approach of investigation is using the graphs. In general, when IIO items are being investigated, a distinction is made between sets of item response functions that are close to one another and sets of item response functions that are further apart (Ligtvoet et al., 2010). If item response functions are very close to one another, this means that these items contain scant information about item ordering, and if items are placed far away from one another, this indicates that these items will provide much more information for item ordering. For these reasons, the distances between item response functions can be taken as a measure of item ordering and can be interpreted as an index of the accuracy of ordering of item response functions (Ligtvoet, van der Ark, & Sijtsma, 2008).

The second way of investigating this feature is by composing rest-score groups and analysing the distances of IRFS by using these data. In terms of the distances between IRFs, Ligtvoet et al. (2010) proposed a method of investigating IIO with polytomous items, which is termed the manifest IIO method. This method compares item ordering means for all item pairs in different rest-score groups. Items are compared in group of two and in composing the total score, these two items' scores are not taken into account, hence the rest items are used. In order to make these comparisons, the rest score ($R_{(ij)}$), and total $k-2$ score are calculated, and the $k-2$ score is estimated without the scores for items i and j . When the following equation is produced for all r and item pairs, this means that manifest IIO is acquired. This investigation is done by numbering and ordering the items according to their conditional sample means for all r . This property is shown in Equation 2.

$$E(X_j | R(ij) = r) \geq E(X_i | R(ij) = r) \quad \text{Equation 2.}$$

This method can be used for confirmatory purposes when one wants to know whether all k items have the property of IIO. Manifest IIO is checked for all item pairs, but items are not removed from the datasets. For the remaining item subset or whole item subset, the H^T value can be computed in order to evaluate the possibility of accurate IIO (Ligtvoet et al., 2010).

Using the coefficient in the analysing of this feature is the other technique. The H^T coefficient can be used as a measure, showing the accuracy of ordering of both dichotomous and polytomous items (Ligtvoet et al., 2010; Sijtsma & Meijer, 1992). If the IRFs are close to one another, the H^T value is low, and a high H^T value is obtained if they are further apart. When IIO holds for the dataset, the H^T value is calculated as being between 0 and 1. However, Sijtsma and Meijer (1992) suggest using $H^T \geq 0.3$ as a lower bound for practical purposes. This coefficient only relates to the k items analysed in the test, so it cannot define which items cause intersections. For this reason, Sijtsma and Meijer (1992) suggest that the information gathered from the H^T coefficient should be combined with the results of other methods of IIO investigation.

In addition to using manifest IIO and the H^T coefficient, the P-matrix and rest-score methods can also be used to investigate invariant item ordering. The P-matrix method uses two square symmetric matrixes ($k \times k$). In these matrixes, the items are ordered according to their difficulty levels, which are estimated as item popularities. Cells in the first matrix show data pertaining to persons passing both items $P(1,1)$, and cells in the second matrix indicate data relating to those failing both items $P(0,0)$. If the rows and columns of the first matrix are not decreasing and, at the same time, are not increasing in the second matrix, then non-intersection of IRFs is obtained. When there is a decrease in one of the rows or columns of the first matrix, $P(1,1)$, and there is an increase in one of the

rows or columns of the second matrix, a violation occurs. The significance levels of these violations are evaluated by McNemar's test (Meijer, Tenderio, & Wanders, 2014).

The last method for checking IIO with both dichotomous and polytomous datasets is the rest-score method. In this method, the IRFs for each pair of items are estimated and compared using the item rest-score function. The rest-score is calculated by using the total score and item score, and the item rest-score functions are composed for the dichotomous items. The rest-score functions are compared for all item pairs. For this comparison, observed response proportions are used. When IIO holds, item proportions for different rest-score groups are the same as the ordering of item proportions estimated for the total group. Violations in this ordering are evaluated using the effect size measure proposed by Molenaar and Sijtsma (2002), called the *crit* value. When this value is smaller than 40, there are no serious violations. *Crit* values between 40 and 80 indicate minor violations, and *crit* values larger than 80 indicate serious violations. Even though these values give information about the seriousness of IIO violation, Meijer et al. (2015) have stated that there are no simulation studies endorsing these values, so they do not clearly indicate acceptance or rejection of IIO. However, these values have been used in this study, and information gathered from the *crit* values was combined with the findings of the other methods (Meijer, Tenderio, & Wanders, 2014).

In this study, all methods except for manifest IIO were used to check IIO assumptions. Results obtained from the different methods were compared and interpreted together in order to make a judgement about IIO assumptions.

METHOD

A basic qualitative research methodology was followed for this study, which aims to test application of IIO assumptions. In the context of this study, different methods of investigating IIO were conducted, and the obtained results were compared. For this reason, the study includes a comparison of models and plans to lead the researchers to the most suitable model according to the dataset. The study aims to expand existing knowledge and be recognized for its exploration of IIO assumptions through the application of real data.

Data Set

In this study, a large-scale test battery (used in Turkey for the purposes of selection and student placement in higher education institutions) was used to investigate IIO. This test was administered to first-grade elementary school students throughout Turkey in 2016. The main purpose of this assessment is to monitor elementary school students' achievement levels. By combining second- and third-grade results, students are placed in corresponding high schools. Hence, this is a high-stakes, large-scale exam, so the items within it and the scale as a whole must measure the traits in a valid and reliable way. This study will analyse item ordering in relation to this exam and provide extra proof of the test's validity.

In terms of the test's characteristics, it comprises five subtests, which are designed to measure attainment in mathematics, science and technology, Turkish language and grammar, and English language and grammar. The number of items change according to the domain being assessed: 16 items for mathematics, science and technology, and social sciences; 19 items for Turkish language and grammar; and 13 items for English language and grammar. All the items are scored dichotomously. When an item is answered correctly, the student gets 1 point; when it is answered incorrectly, s/he receives 0. Each item in the assessment has the same value, and the total score is used as a measure of the student's ability. With regard to sample size (previously mentioned), this is a large-scale assessment, so a significant number of students take the test (4,678 students in 2016). After analysing missing values, analyses were conducted with data patterns for randomly selected students. The sample size was determined following similar studies adopting the NIRT approach, which state that the sample size should be approximately 200 (van Abswoude, van der Ark, & Sijtsma, 2004; van Abswoude, Vermunt, Hemker, & van der Ark, 2004). In the present study, data from 250 students were analysed.

Data Analyses

Before investigating IIO, general steps from the Mokken models were followed, and the model data fit was analysed. This also enabled us to determine the psychometric quality of the total score. Firstly, scalability coefficients were estimated (H_i for items, H_{ij} for item pairs and H for the whole scale). Item means, reliability coefficients and item-test correlations were also calculated.

In the model-data fit analysis, unidimensionality, monotonicity and scalability coefficients were investigated. As previously mentioned, for scalability coefficients, higher positive H_i values indicate the strength of this item in terms of responses. As for the whole scale, the following rules of thumb were suggested by Sijtsma and Molenaar (2002) for interpreting the H value: if an H value between 0.3 and 0.4 is obtained, this means that the scale is weak; if it is between 0.4 and 0.5, the scale has a medium scalability factor; and, lastly, values higher than 0.5 mean that the scale has a strong scalability factor. After analysing scalability coefficients, the procedure described by Sijtsma et al. (2011) was followed in order to investigate IIO in relation to dichotomous items: (1) application of an automated item selection procedure (AISP) to determine items in the scale; (2) checking monotonicity using the rest-score method; (3) application of various methods to investigate IIO; and (4) calculation of the H^T coefficient to check the item ordering accuracy. Violations of the assumptions were evaluated by considering *crit* values. For cut-off scores and lower bounds, $c = 0.30$ was used for the AISP, and $minvi = .03$ was used to investigate monotonicity. For scalability coefficients, the rules of Sijtsma and Molenaar (2002) were applied, and all these analyses were conducted using the R program with the “Mokken” package.

RESULTS/FINDINGS

Because the IIO property is included in DMM, the IIO investigation was started with the DMM assumptions, and scalability coefficients were estimated first for all the tests. As previously mentioned, three types of scalability coefficients were estimated (for items, item-pairs and the whole scale). The ones estimated for items pairs were found to be positive for all pairs in all the tests, so they are not given here. The scalability coefficients of items and scales are presented as tables, and the values calculated for mathematics, social sciences, and science and technology tests are presented in Table 1 below.

Table 1. Items and scalability coefficients estimated for mathematics, social sciences, and science and technology tests

Tests	Maths	Soc.Sci.	Sci. Tech	Tests	Maths	Soc.Sci.	Sci. Tech
Item No	H_i (Se)	H_i (Se)	H_i (Se)	Item No	H_i (Se)	H_i (Se)	H_i (Se)
1	0.396 (0.022)	0.524 (0.008)	0.184 (0.015)	9	0.304 (0.008)	0.459 (0.008)	0.300 (0.007)
2	0.192 (0.015)	0.420 (0.008)	0.318 (0.007)	10	0.249 (0.008)	0.417 (0.008)	0.263 (0.009)
3	0.374 (0.018)	0.447 (0.008)	0.288 (0.008)	11	0.156 (0.011)	0.397 (0.011)	0.226 (0.008)
4	0.325 (0.018)	0.459 (0.009)	0.094 (0.010)	12	0.095 (0.013)	0.472 (0.007)	0.299 (0.008)
5	0.346 (0.027)	0.302 (0.010)	0.086 (0.019)	13	0.243 (0.009)	0.337 (0.009)	0.309 (0.010)
6	0.285 (0.019)	0.325 (0.013)	-0.023 (0.010)	14	0.229 (0.009)	0.376 (0.010)	0.325 (0.007)
7	0.209 (0.017)	0.421 (0.008)	0.251 (0.008)	15	0.344 (0.008)	0.445 (0.009)	0.334 (0.007)
8	0.289 (0.021)	0.333 (0.011)	0.276 (0.010)	16	0.274 (0.008)	0.428 (0.008)	0.253 (0.009)
				<i>H</i> values	0.241 (0.006)	0.254	0.244 (0.005)

As can be seen from the values in Table 1, the item-level scalability coefficients are generally between 0.2 and 0.4, which means that some items have lower scalability values than the benchmark

value of 0.3. When analysing the coefficients according to the tests, it was found that items in the social sciences test have higher scalability coefficients than those of the mathematics, and science and technology tests. In the mathematics test, three items have H_i coefficient values lower than 0.2, while seven items have H_i coefficient values lower than 0.3. In the social sciences test, all H_i coefficient item values are higher than 0.3, and 10 are also higher than 0.4. This means that these items are more suited to NIRT model scaling and have more discriminating power than ones in the other tests. As for the science and technology test, four H_i coefficients are lower than 0.2, and one of these (calculated for item number six) even has a negative value, implying negative discriminating value. Only five of the 20 items have H_i coefficients higher than 0.3. Analysis of H values indicated that those for the mathematics, and science and technology tests were lower than 0.3 as expected because this value is dependent on the item-level scalability coefficients. The scalability coefficient of the social sciences test was found to be 0.254. This value is lower the lower bound which is accepted as 0,3(Mokken, 1971), and, it was, therefore, concluded that the mathematics, and science and technology tests are not suitable for NIRT modelling and require some revisions, whereas the social sciences test can be scaled without any revision according to the NIRT models.

As for the other tests analysed according to NIRT modelling, the scalability coefficients estimated for the Turkish and English language and grammar test items are given in Table 2 below.

Table 2. Items and scalability coefficients estimated for Turkish and English language and grammar tests

Tests	Turkish	English		Turkish	English
Item No	H_i (Se)	H_i (Se)	Item No	H_i (Se)	H_i (Se)
1	0.267 (0.008)	0.378 (0.011)	11	0.415 (0.012)	0.631 (0.007)
2	0.279 (0.008)	0.521 (0.009)	12	0.260 (0.009)	0.559 (0.009)
3	0.204 (0.009)	0.588 (0.008)	13	0.326 (0.013)	0.632 (0.007)
4	0.280 (0.008)	0.517 (0.008)	14	0.303 (0.009)	
5	0.291 (0.008)	0.295 (0.011)	15	0.278 (0.008)	
6	0.321 (0.008)	0.534 (0.009)	16	0.288 (0.009)	
7	0.321 (0.008)	0.577 (0.007)	17	0.328 (0.009)	
8	0.225 (0.009)	0.535 (0.010)	18	0.211 (0.010)	
9	0.258 (0.012)	0.555 (0.009)	19	0.326 (0.009)	
10	0.308 (0.009)	0.415 (0.014)	<i>H values</i>	0.284 (0.005)	0.519 (0.006)

Table 2 shows scalability coefficients for the English and Turkish language test items. Starting with the Turkish language and grammar test items, it is clear that most of the H_i values are between 0.2 and 0.3. Of these, 11 H_i values are lower than 0.3; seven are higher than 0.3; and only one H_i value is higher than 0.4. In terms of the coefficient for the whole scale, the H_i value was found to be 0.28, which shows that the scale is not suitable for NIRT models. The other test shown in Table 2 is the English language and grammar test. The results obtained for this scale indicate that it has the highest scalability power of all the tests analysed. Firstly, nearly all the H_i values are higher than 0.5. Only two item values are between 0.2 and 0.4. There are 13 items in this test, and the H_i values of 11 items are higher than 0.5, which means that these items have strong scalability power. The scalability coefficient for the whole scale was found to be 0.519, showing that, of all the tests analysed, the English language and grammar test has the highest scalability value. In summary, regarding the scalability coefficients estimated for all the items and scales, it was found that most items in the test battery have low scalability power. Some of them have medium power, but only a few have strong scalability power. Except for the English language and grammar test, the H values of all the scales imply low scalability

power, so the scales may require several modifications in the next steps. However, this research primarily focuses on discovering the structure of the test battery, so the decision was made to explore items and features of the scales rather than making changes to them. In short, no changes were made to the scales during the analyses.

After estimating scalability coefficients, the other NIRT modelling assumption (unidimensionality) was tested for all datasets using the AISP. For this analysis, the cut-off score was taken as being 0.2 and 0.3 by turns. The findings are presented in Table 3 below.

Table 3. AISP findings for all tests

Tests	Turkish Language		Mathematics		Social Sciences		Science and Technology		English Language	
	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3
1	1	0	1	1	1	1	1	0	1	1
2	1	1	0	0	1	1	1	1	1	1
3	1	0	1	1	1	1	1	1	1	1
4	1	0	1	1	1	1	0	0	1	1
5	1	1	1	1	1	1	0	0	1	0
6	1	1	1	0	1	1	0	0	1	1
7	1	1	0	0	1	1	1	1	1	1
8	1	0	1	0	1	1	1	1	1	1
9	1	0	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1
11	1	1	0	0	1	1	1	0	1	1
12	1	0	0	0	1	1	1	1	1	1
13	1	1	1	1	1	1	1	1	1	1
14	1	1	1	0	1	1	1	1		
15	1	1	1	1	1	1	1	1		
16	1	1	1	1	1	1	1	0		
17	1	1								
18	1	0								
19	1	1								

Findings obtained from the AISP are shown in Table 3 (1 indicating that the item conforms to the unidimensional structure and 0 indicating that it does not). As can be seen, for all tests, when the cut-off value is taken as being 0.2, more items can be scaled in a unidimensional way. However, when 0.3 is accepted as the lower bound of scalability, fewer items appear as unidimensional because of the lower item scalability coefficients. It is clear that the social sciences test has a unidimensional structure. In addition to the social sciences test, the English language and grammar test has more items that conform to the unidimensional structure than other tests for both cut-off values. In terms of the other tests, the mathematics test has seven items that do not fit the unidimensional structure; the science and technology test has six; and the Turkish language and grammar test has seven. With the exception of the English language and grammar test, all the other tests have one more sub-dimension, which should be taken into account in the analysis of IIO.

Having conducted analyses to discover the dimensionality of the dataset, the other assumption (monotonicity) was tested. The default settings were used and $minvi = .03$ was used in the investigation of monotonicity. Items violating this assumption were defined and the findings are given in the following table. Monotonicity of the datasets was then checked, following the steps suggested by Sijtsma et al. (2011), and an investigation of IIO was conducted using the rest-score and P-matrix methods. H^T coefficients were also calculated for all scales. The findings obtained from these two methods and the H^T coefficients calculated for the scales are given in Table 4 below.

Table 4. Monotonicity and IIO assumptions

Scales	Test	Monotonicity	AISP	IIO		
	No.	Vio.	Vio.	Rest-score Vio.	P-matrix Vio.	H^T
Turkish Lang.	19	0	7	5	0	0.240
Maths.	16	3	7	10	2	0.323
Sci. and Tech.	16	5	6	12	7	0.295
English Lang.	13	1	1	12	10	0.141
Social Sci.	16	1	0	15	1	0.086

Table 4 presents findings of the monotonicity, unidimensionality and IIO assumption analyses. For both monotonicity and IIO assumptions, the number of items violating the assumptions are given. The numbers of items that do not fit the unidimensional structure are also given as AISP violation. Lastly, the H^T coefficients that provide information about the accuracy of item ordering are also given. Starting with the monotonicity assumption, it can be seen that, with the exception of the Turkish language and grammar test, all the tests have several items that violate the monotonicity. The English language and grammar, and social sciences tests only have one item that does not fit this assumption. Three items in the mathematics test were found to violate the monotonicity assumption, and five items were detected in the science and technology test. The *crit* values of these violations were estimated to be higher than 80, and values over 80 mean that the violation is critical. As far as monotonicity is concerned, these findings indicate that only the Turkish language and grammar test items have the monotonicity feature. The other tests need some revision in order to provide the monotonicity feature.

It is clear from the analysis of IIO methods that none of the scales have strong or even moderate level of IIO property. All the tests have items that violate IIO: the Turkish language and grammar test has the least number of violating items, and the English language and grammar test has the most. It is also clear that more violating items have been found in the rest-score method than the P-matrix method in all tests. Analysis of the H^T coefficients reveals that only the mathematics test holds for IIO (the estimated H^T value means a weak scale).

Given the values in Table 4, it can be concluded that the Turkish language and grammar test is more suitable for scaling according to NIRT models, but items in the English language and grammar test have the highest H_i values, which means that these items have more discriminative power than the others. However, in terms of IIO, this was not confirmed for any tests analysed in the study. All the tests have some items demonstrating critical violation of the IIO assumptions, and analysis indicates that the same violating items can be found in both the rest-score and P-matrix methods. However, the number of items deemed to violate the assumptions differ at a high rate. While the P-matrix method detected fewer of these items, the rest-score method detected more (in all tests). A direct and interpretable relationship has also been found between the methods and H^T coefficients. The lowest H^T coefficient was calculated for the social sciences test, but the P-matrix only estimated that one item violated the IIO assumptions in this test. It was, therefore, concluded that this test battery does not demonstrate unidimensionality, monotonicity and IIO, so it cannot be scaled according to NIRT models.

DISCUSSION AND CONCLUSION

It is commonly thought that the intensity of items is automatically reflected in the ordering of items when the quality of a scale is investigated (Meijer & Egberink, 2012). However, as has been found in this study, this is not the case all the time and item popularity may not be the same for IIO. For this reason, IIO assumptions should be checked by researchers in order to ascertain the validity of a test. Despite the need to check assumptions for any scale to be used, a limited number of empirical studies have investigated IIO assumptions in the literature. Because of the lack of literature, researchers may encounter problems when selecting an appropriate method to check IIO assumptions. The study reported here has endeavoured to address this issue by using different methods to check IIO for dichotomous data.

According to the findings of current study, the results taken from different methods were not consisted with each other. The number of items detected having violating the invariant item ordering was different. Whereas the P-matrix method identified few items violating IIO, the rest-score method detected more items from the same tests violating this assumption. The reason of that may be the rest-score method's estimating the all items' information while comparing the IRFs, hence it allows to make more detailed investigation. Furthermore, H^T coefficients are not related to the numbers of items violating this assumption. As stated by Meijer and Egberink (2012), H^T coefficients are affected by several different factors, such as item discrimination and difficulty levels. As Sijtsma and Meijer (1992) demonstrated by means of a simulation study, H^T coefficients "increased when the item discrimination indexes increased or the mean distance between the item difficulties increased". Both situations make the IRFs further apart. In terms of the tests analysed in the present study, it can be concluded that IRFs are not placed far away from each other, which violates the IIO assumptions. It can also be concluded that if items' scalability coefficients increase, H^T coefficients may increase at the same time. This situation was confirmed by Meijer and Egberink (2012), too, who stated that "different criteria may often coincide partially" (Mokken, 1971), and discarding items whose scalability coefficients are lower than the critical value (by using an AISP) reduces the number of items violating the IIO assumptions. This study only sought to investigate an existing test battery, so no items were removed from the tests, which may affect the increase in number of violating items. However, removing items that violate IIO assumptions may create serious validity issues for the test in question and should, therefore, be taken into consideration.

Finally, construction of a measure that satisfies IIO assumptions with few items spaced along the latent trait continuum may be the solution (Meijer & Egberink, 2012). When the item discrimination parameters differ, IRFs have a greater possibility of coinciding. Findings have also confirmed the inferences made by Ligtoet et al. (2010) that IIO research is a new area and that much empirical research should be conducted to determine the characteristics of various methods. This study is an example of such research, investigating IIO properties in the context of dichotomous datasets, which could be extended to include polythomous datasets and removal of items that do not meet the criteria for scalability coefficients and IIO.

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The Element of Water in the Tales and Stories of Ferda İzbudak Akıncı*

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Abstract

This is a study conducted on the works in the field of children's literature by Ferda İzbudak Akıncı who has achieved important goals and created works in the field of children's literature. It has become necessary to conduct the study due to the fact that the author and her works had not been studied with a comprehensive analysis, and the element of water used frequently and functionally in her works has reached remarkable dimensions. We determined the sample group randomly selected among the works of the author in the field of children's literature, in order to determine with which functions the element of water appeared or did not. In the study, we used document analysis as a qualitative research method. We obtained various codes related to the element of water in the documents analysed. These are; rescue, revival, relief and entertainment. In the traditional sense, we observed that mother figure was created based on the element of water; missing parents were replaced with the nature. However, given that the mother figure is not just any random mother, her attributes reach up to supernal dimensions; we believe that the author intended to create a "mother goddess" from a species existing in the form of "Kybele". Since the works contain not only the good aspects of water, but also the destructive sides, we have concluded that god-like aspect of water is completed by using a punishing structure. Water's having protection and auxiliary elements bonded to it, and accepting the natural formations hosting water as sanctuaries can be listed among grounds of our conclusion.

Keywords: Water, Story, Children Literature, Ferda İzbudak Akıncı

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INTRODUCTION

Water, which is defined as “a colourless, odourless and tasteless substance in liquid form” (TDK, 2011, p.2163), is at the same time one of the four elements, which are believed to be at the basis of the universe and the all beings. While it has been discussed, in the theory of evolution, that the first living organism appeared in water, the religious sources, on the other hand, imply that water was prior to all creatures, and all life was built upon water and the essence of all created beings is water. Water, which comprises almost 70% of the body of humans and which is a requisite for living, has been at the centre of human life in every era. In ages, when the technology was not developed, humans established their settlements near water banks. Water has always brought along life.

Humankind, who has to bow down to the power of water in natural events such as torrents, freshets and floods, encounters with the destructive force of water as well as its constructive aspects. At this point humankind resorts to sacralising water and enshrines it. “... This conception goes as far as deifying water in some non-divine religions, and in some of them water is used as a means of religious cleansing.” (Erbaş, 2004, p.242) The concept of water, which exists theologically in beliefs in multifarious religions, represents redemption and cleansing from evil. The use of water as a religious cleansing means is seen in baptism and ritual purification. In Christianity, it is “believed that the individual becomes a new person with baptism, which represents the burial and revival of Jesus Christ after he was killed.” This new individual is redeemed from the sins he or she brought from birth and accepted as reborn with the Holy Spirit. (Akalm, 2014, p. 47) In Hindu mythology, water shows up as the symbol of birth. The life on earth begins with a piece of land, which is brought from the depths of water, which is thought to cover the whole world. The formation of life in the universe is represented with birth, which is the beginning of human life. “The boar, which plunges and brings a piece of soil to the surface, is acknowledged as the symbol of the emergence of the form (embryo) in Hindu mythology” (Türkmen, 2013, p.14).

In Turkic mythology, water appears with its healing property. It is thought, in Turkic mythology, that the ‘water of eternal life’ even cures death. The water of eternal life, which is believed to be at Mount Alburuz (Elbrus) means sweet and tasty water with drops granting eternal life, elixir of life. Water has a holy place in folk beliefs with healing and supernatural powers.” (Büyükyıldırım, 2013, pp.37-38) Water of eternal life, which attracts attention with its healing property, is deified with its properties to give immortality, resurrection and to grant life. Water, which has a significant place in Greek mythology, is seen with its revitalising, exhilarative aspects. Bull’s blood, poured down to the soil by mixing with water for bringing abundance, is a poison without water. “Cretans and Mycenaeans used bull’s blood mixed with water as sorcery to bring abundance to the trees and the crops. Drinking of the pure blood was unique to the priestess of Mother Earth (Gaia); only she had the privilege for not being poisoned for drinking it.” (Graves, 2010, p.810)

Abundance granting feature of water is attributed to earth in the Anatolian culture. Earth is deified in the form of Cybele (mother earth, mother goddess). “Cybele”, which was born in Anatolian culture, but which carried its effects to wider areas, “was brought to Italy as Magna Mater (the great mother) by the Romans, and was respected in all of Europe under this name...” (Ersoy, 1996, p.2) Mother earth / mother goddess, which is referred to under different names in various cultures, embodies features, which are attributed to water, such as protectiveness, wealth and abundance granting, creation, fertility, nurturing, etc. It inevitable for water, which has been penetrated to the consciousness of the societies to this extent, to have a substantial place in the literary works pertaining to those societies. Water, which has been mentioned in poems, epics, folk tales and legends in Turkish literature, is generally reflected with its mythological, religious and cultural aspects.

When the literature is reviewed, it is seen that there has not been any study with the theme “water” on children’s literature, but the following studies are present. Kardaş (2012), in his master’s thesis titled “Spring Motive in Turkish Folk Poetry”, investigated the use of spring motive in folk poetry with regard to its meanings and functions. Türkan (2012), in her paper titled “Water Cult in the Folktales of the Turkish World”, scrutinized first the water owner and the reflections of water in the

culture in terms of mythology and religion. In the light of these, she discussed the water elements in folktales of the Turkish World. Çiftçi (2013), in his paper titled “Water Cult in Turks from Past to Present” scrutinizes the water cult in Turks over the works selected from different eras of Turkish history and also prayers and rituals which have permeated to the consciousness of the people. Batislam (2013), in her paper titles “Water and Water Related Elements in Ottoman Poetry”, investigated the work of Ottoman poets with reference to the use of water as an element of harmony in the poems, and to its use in figures of speech. Öztekten (2013), in his paper titled “Fuzuli and Water Qasida”, scrutinised the Water Quasida by the Ottoman poet Fuzuli to praise his holiness Mohammad, and he found that there is an intonational structure in the poem with the alliteration and rhythm elements as well as the use of the water element. Yeniterzi (2013), in her paper titled “Reasons for Fuzuli Selecting the Water Radif in Water Qasida” investigated the semantic relation between water and his holiness Mohammad, in the work, which was written to praise the prophet. Erbaş (2004), in his paper titled “Water Motif in Different Religions” investigated the meanings and functions of water owner in different religions.

In this study, the element of water in the works of Ferda İzbudak Akıncı will be examined. Akıncı, who is one of the children’s literature authors, informed the children by using the denotational meaning of water, and gave coverage to the perception of water in mythological, religious and cultural dimensions by using symbolic expressions. The author, who organizes various educational activities and talk shows, also reflects her didactic characteristics in the works. She informs the reader sometimes via water or wind, which she personified, or sometimes she does this through the agency of the heroes. In this respect, the following works of the author are analysed: Rüzgar Masalları (Wind Tales), Kuş Kulesi (The Bird Tower), Su Masalları (Water Tales), Sokak Kuşu/Uçurtmanın Gözleri (Dead-end Bird/The Eyes of the Kite), Işıklı Ayakkabılar (Light-up Shoes), Çuvaldiken Kasabası (Sackstitch Town), (The Child Nobody Understand is at Home), Çamur Bebekler (The Mud dolls), Çitlembik Ağacındaki Masalcı (Taleteller on the Nettle Tree), Kuğu Gecesi (Swan Night), Bisiklet Yarışçıları (Bike Racers).

METHOD

The data in this study, which is a qualitative one, is evaluated via content analysis by conducting an examination of documents. The study is conducted using stories/tales and a novel of Ferda İzbudak Akıncı. The writer’s stories and tales are (Rüzgar Masalları (Wind Tales), Kuş Kulesi (The Bird Tower), Su Masalları (Water Tales), Sokak Kuşu/Uçurtmanın Gözleri (Dead-end Bird/The Eyes of the Kite), Işıklı Ayakkabılar (Light-up Shoes), Çuvaldiken Kasabası (Sackstitch Town), Kimsenin Anlamadığı Çocuk Evde (The Child Nobody Understand is At Home), Çamur Bebekler (The Mud dolls), Çitlembik Ağacındaki Masalcı (Taleteller on the Nettle Tree), Kuğu Gecesi (Swan Night). The novel of the writer which is also selected with simple random sampling method is Bisiklet Yarışçıları (Bike Racers). The other novels of the writer is Kış Ülkesi Çocukları (Winter Country Children), Bergamalı Simo (Simo from Bergama), Mutluluk Sokağı (Happiness Street), Üç Yapraklı Yonca (Three Leaf Clover), Aynalı Göl (Mirrored Lake), Süpürge Bebek (Broom Baby), Sudaki Ateş (Fire in Water), which are not included sample of study. Simple random sampling is a sampling method where every item in the population has an even chance. In this method the selection of the items entirely based on chance or by probability.

This study that aims to detect the water elements in works of Akıncı, one of the writers of the children’s literature in Turkey, was analyzed with “document analysis” method that is one of the qualitative research methods. Document analysis is defined as follows: “A research approach that aims to describe a past or current situation (work, source, etc.) as it is.” (Karasar, 2007, s.77). Taking this approach into consideration, the works (documents) in the study area were examined with content analysis method. Researchers and experts of the field examined the works in accordance with the document analysis and presented their analysis while carrying out the data analysis.

The purpose of the content analysis is to achieve helpful concepts and relations in explaining the obtained data. The basic process done in the content analysis is to gather similar data within certain

concepts and themes and to interpret them by arranging in a way that the reader can understand. In the works analysed, the functions of water elements are investigated, and nine codes are formed considering these functions. These are reunification, relaxation, entertainment, substitution for mother, rejuvenation, salvation, deification, vitalisation, and instruction-arousing curiosity. The data in the works were matched with codes.

FINDINGS

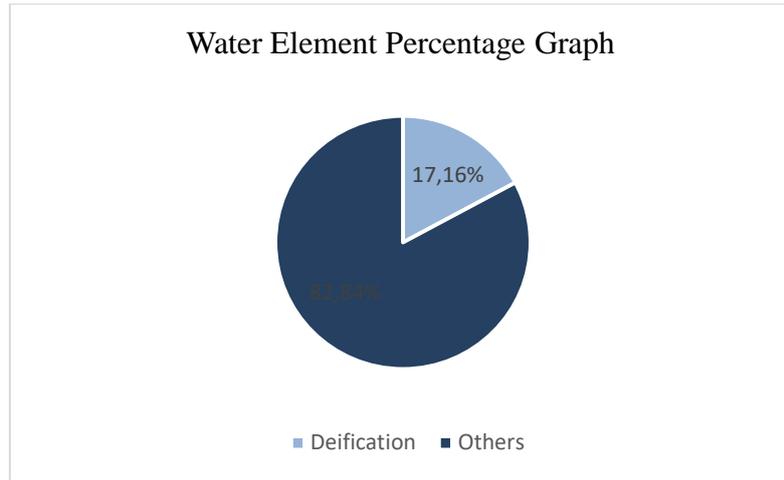
When the use of the element of water in the works is examined, nine separate codes are found as reunification, relaxation, entertainment, substitution for mother, rejuvenation, salvation, deification, vitalisation, and instruction-arousing curiosity. It is seen that 'deification' and 'vitalisation' are used the most among these codes.

A-Deification

Water has been seen as a divine power and sacralised in numerous cultures and mythologies. In the works of Akıncı, motherhood and femininity are attributed to water along with the deification of water. The motherhood structure is preserved in water image along as well as the divine functions. In this case, it can be thought that water becomes visible in the form of the 'mother goddess'. The deification via the element of 'water' by the author is done through 'earth' in the Anatolian culture. 'Mother earth' expressed as 'Cybele' exhibits the characteristics of protection, nurturing and accepting offering with the altar structure. These features of 'mother earth' corresponds to the 'mother water' structure seen in the works of Akıncı.

In the book titled "Çamur Bebekler (The Mud dolls)" the doe-gazed girl becomes further isolated with the death of her father and after her mother. The animals who visit her garden every night resolve her loneliness. The girl offers water from the fountain in the garden to these animals, who are thirsty. One night, the animals turn up in the garden with different things they found in the forest in return for the water: "There were some stack of flowers, a pinch of herbs, a piece of branch or a forest fruit in the mouth of each animal. They left what they had brought to the fountainhead... In the small hours, all of them fell asleep." (Ç.B, Akıncı, 2007, pp.30-31) The 'altar', the structure where the animals offered to the God are sacrificed, the gifts are presented, is represented as the fountainhead in the work. The fountainhead, reflected as an altar, reminds us the rock stairs of the Anatolian Goddess Cybele. Because "these stairs climbing towards a kind of seat are believed to be used as an altar." (Birecikli, 2010, p.6) The gifts being placed, not in front of the girl or in her hand, but on the fountainhead, supports the altar conception that can be explained as the "stone table in the temples on which animals are sacrificed, sweetgum incenses are burnt and religious rituals are performed." (TDK, 2011, p.2171) In addition, the animals, visiting the girl every night, either come directly to the fountainhead or they rest at the fountainhead after drinking water. This incident that repeats every night in a similar fashions appears ritualistic.

In the tale, in the book "Su Masalları (Water Tales)", the help of a lighthouse to two little girls is told. At the beginning of the tale, detailed information is given about the lighthouse. In this information, the lighthouse becomes prominent as a protective element. The lighthouse can be thought to have similarities with the one-eyed creatures in mythology. These one-eyed creatures mentioned in Odyssey and called the Cyclops are the children of Poseidon, the god of sea, and the sea nymphs. (Homer, 1994) The one-eyed creature, which is present in different cultures under different names, does not represent evil in the works of Akıncı, to the contrary to mythology; it represents a form related to good in accordance with the 'divine water' imagery: "Not only waiting for ships was its duty. It watched over the town too. Its light is the eye of the lighthouse. It kept its weather eye open when darkness fell." (S.M, Akıncı, 2010c, pp.7-8) The one-eyed creature, which we encounter as Tepegöz (Fore-Eye) in Turkish mythology and as the children of the sea of god and sea nymphs in Greek mythology, is impersonated as the 'lighthouse' in the tale. The high interaction of the lighthouse with the sea strengthens the 'divine water' imagery, and represents the lighthouse as a foot soldier/help mate to the sea.



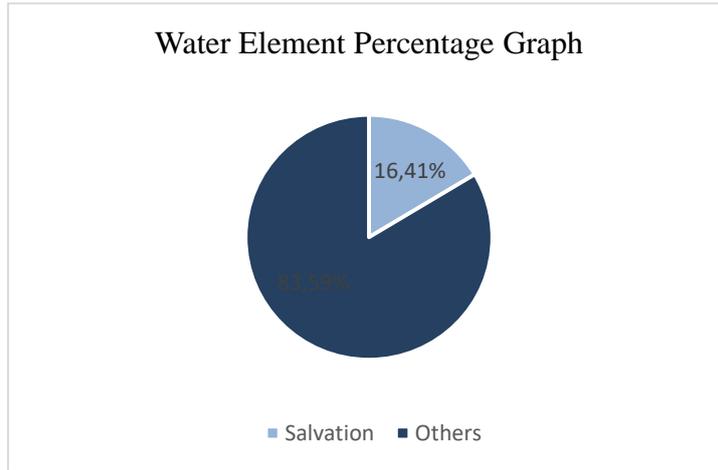
Deification is the most used code with 17.16% among other codes. Among the works analysed, deification code is encountered in stories/tales titled “Su Masalları (Water Tales) (f:7)”, “Çamur Bebekler (The Mud dolls) (f:7)”, “Rüzgar Masalları (Wind Tales) (f:3)”, “Çitlembik Ağacındaki Masalcı (Tale-tellers on the Nettle Tree) (f:3)”, “Kuş Kulesi (The Bird Tower) (f:2)” and “Sokak Kuşu (The Dead-End Bird) (f:1).” In the works titled “Uçurtmanın Gözleri (The Eyes of the Kite)”, “Işıklı Ayakkabılar (Light-up Shoes)”, “Kuğu Gecesi (Swan Night)”, “Bisiklet Yarışçıları (Bike Racers)”, “Çuvaldiken Kasabası (Sackstitch Town)” and “(The Child Nobody Understand is at Home) deification code is not found. The books titled “Water Tales”, which comprises of the tales the author wrote basing on the element of water, and “The Mud dolls”, in which water is used as a means of ritual, are the works in which the deification code is intensely used.

B-Salvation Aspect

It is seen, in Akıncı’s books, that water has the role of helping people, rescuing them from dire situations. Water brings salvation, sometimes by helping a broken girl to find the talent of her hands, or sometimes by being the beacon hope for a whole town.

In the story called “Çuvaldiken Kasabası (Sackstitch Town)”, a small town is told, which is self-supporting, productive and which eats its fill and earns its keep with what it produces. However, this situation changes with a vendor coming to the town one day. The town leaves producing and starts to trade with the vendor. The townspeople, who became poor as they made trade with the vendor, decide to start producing again to get rid of this dire situation. Because, the means to subvert the vendor’s order based on consumption is to work and to be productive again: “Beforelong, a never-before-seen work started in the town. They ran about for days. The fields were ploughed, sown, and irrigated.” (Ç.K, Akıncı, 2010a, p.47) The recommence of production by the townspeople have the characteristics of a silent revolt against the system of exploitation, and the return of the town to its life before the arrival of the vendor. Water has a salvation role, albeit it is indirect, in the townspeople recommencing to produce by cultivating.

In the book titled “The Mud dolls”, the doe-gazed girl makes babies from the earth, which is dampened by the rain, while she is waiting for her animal friends at the fountainhead: “One night, the lonely girl was sitting at the fountainhead in the garden again all by herself. The earth was wet for it rained a couple of days. She started to play with the mud where the water ran. She took a lump of mud in her hand. She turned it up and down, back and forth. She kneaded and shaped it.” (Ç.B, Akıncı, 2007, p.32) When the girl was losing her hope for discovering her ability, suddenly water appeared and shaped the girl’s future. It can be thought that water, offered to the thirsty animals, saved the girl’s life by changing dimension and by appearing as the rain.

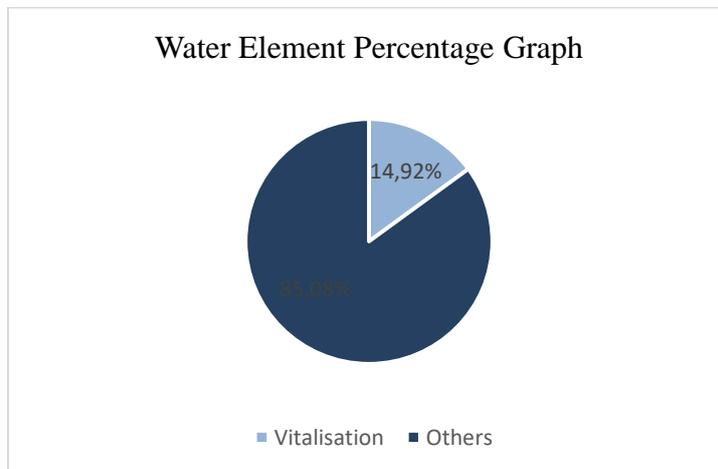


Salvation comprises 16.41% of the water elements determined in this study. The salvation code intensely used in the book titled “Çamur Bebekler (The Mud dolls) (f:10)” is also seen in the works titled “Çitlembik Ağacındaki Masalçı (Taleter on the Nettle Tree) (f:5)”, “Kuğu Gecesi (Swan Night) (f:2)”, “Rüzgar Masalları (Wind Tales) (f:2)”, “Kuş Kulesi (The Bird Tower) (f:1)”, “Su Masalları (Water Tales) (f:1)”, and “Çuvaldiken Kasabası (Sackstitch Town) (f:1)”. In the works titled “Sokak Kuşu (The Dead-end Bird)”, “Uçurtmanın Gözleri (The Eyes of the Kite)”, “Kimsenin Anlamadığı Çocuk Evde (The Child Nobody Understand is at Home)”, and “Bisiklet yarışçıları (Bike Racers)”, any examples of salvation could not be found.

C-Vitalisation

Water gives life to living things with its nurturing structure as well as offering a habitat for these living things. Water gives life, in the works, sometimes to a quince tree, sometimes to the leaves and gardens.

In the story titled “Ayva Ağacı (The Quince Tree)” in “Kuş Kulesi (The Bird Tower)”, Ezgi and her mother go and visit a relative who live in a house with a large garden. Ezgi loves the thing in this garden so much that she decides to become an agricultural engineer and has a dream about this garden that night: “She was spudding the bases of the trees, pouring water on the ground. The flowers of the quince tree were increasing as she watered and spudded the soil. Among these lowers the golden quinces were falling down.” (K.K, Akıncı, 2012, p.61) In Ezgi’s dream, the blooming of the quince trees and bearing quinces, are related to the pouring of water on the ground. This reflects the abundance and fruitfulness bringing features of water.

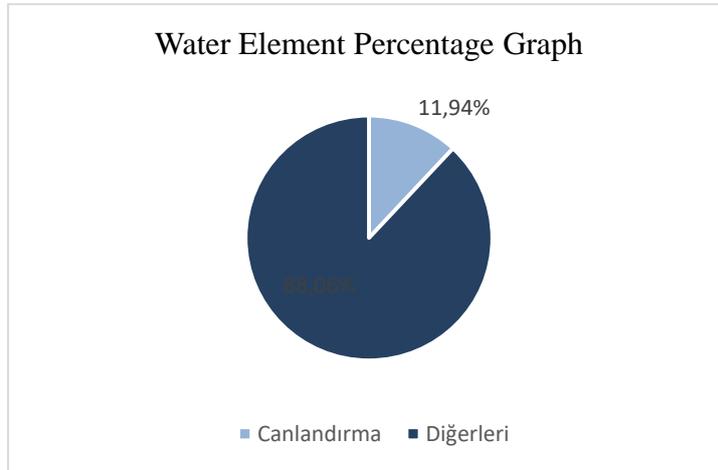


The vitalisation code has a 14.92% share among the determined elements of water. The vitalising feature of water is seen intensely in the books “Kuş Kulesi (The Bird Tower) (f:6)”, “Rüzgar Masalları (Wind Tales) (f:6)” and “Kuğu Gecesi (Swan Night) (f:4)”. The vitalisation of water is also observed in the books “Çitlembik Ağacındaki Masalcı (Tale-tellers on the Nettle Tree) (f:2)”, “Uçurtmanın Gözleri (The Eyes of the Kite) (f:1)” and “Sokak Kuşu (The Dead-end Bird) (f:1). Among the analysed works, vitalisation code is not found in “Su Masalları (Water Tales)”, “Işıklı Ayakkabılar (Ligh-up Shoes)”, “Çamur Bebekler (The Mud dolls)”, “Kimsenin Anlamadığı Çocuk Evde (The Child Nobody Understand is at Home)”, “Çuvaldiken Kasabası (Sackstitch Town)”, and “Bisiklet Yarışçıları (Bike Racers)”.

D-Rejuvenation

One of the elements in the works is the rejuvenative feature of water. It is possible to mention the effect of water on humans to maintain and increase their livingness. The organism’s contact with water increases the life potential and contains the feature of rejuvenation.

In the narrative titled “Kış Kulesi (The Bird Tower), the children in the city does not accept Mustafa among them, who was newly moved to the city from the village. They leave Mustafa in an olive grove and set for their way. Mustafa, who is curious about the thing the other children are hiding from him, follows them secretly. The children are planning to have fun in the river on their way. “He envied as the children take off their shoes and jumped into the water. He felt like to join them in the water. The children splattered water to each other and washed their faces. They drank water. They cooled off. Mustafa sweated buckets.” (K.K, Akıncı, 2012, pp.74-75). While water is quenching the thirst of children, it also replenishes and rejuvenates them.



The rejuvenation code has a percentage of 11.94% in the works analysed. The rejuvenating feature of water is seen in the works titled “Çitlembik Ağacındaki Masalcı (Tale-tellers on the Nettle Tree) (f:5)”, “Kuş Kulesi (The Bird Tower) (f:5)”, “Rüzgar Masalları (Wind Tales) (f:1)”, “Kuğu Gecesi (Swan Night) (f:2)”, “Çamur Bebekler (The Mud dolls) (f:1)”, “Kimsenin Anlamadığı Çocuk Evde (The Child Nobody Understand is at Home) (f:1)”, and “Bisiklet Yarışçıları (Bike Racers) (f:1)”. The rejuvenation code is not seen in the books titled “Su Masalları (Water Tales)”, “Sokak Kuşu (The dead-end Bird)”, “Uçurtmanın Gözleri (The Eyes of the Kite)”, “Çuvaldiken Kasabası (Sackstitch Town)”, and “Işıklı Ayakkabılar (Light-up Shoes)”.

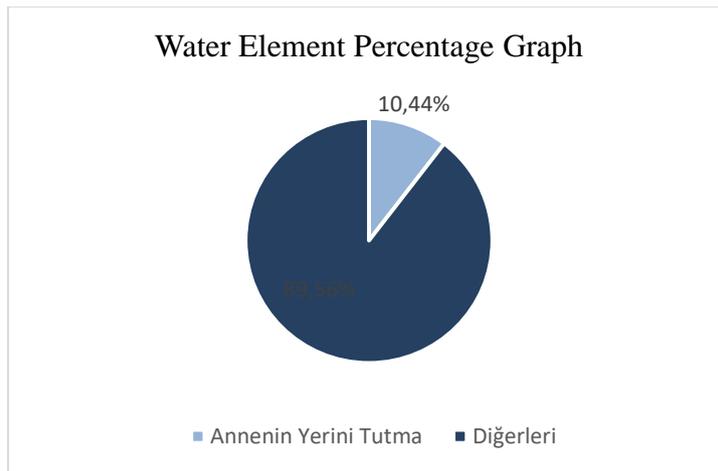
E-Substitution for Mother

The element of water in the works of the author reflects all the qualities a mother could have. These are qualities like nurturing, lulling, and teaching. The author completes the lives of children who are experiencing the lack of a father and/or mother by impersonating the element of water. Water

turns into a compassionate mother who mothers the children with its protection sometimes, and who lulls them to sleep some other time.

The element of water, which is acknowledged to have a feminine nature and which is related to birth in mythology, "... is the uterus, in other words it is female and fertile, it is the sum of all concealed powers, within the cosmology forming around it." (cited from Eliade by Türkan, 2012, p.136) Akıncı completes the fertility feature of water with other features such as nurturing, showing affection, lulling, and singing lullabies.

In the tale titled "Kırmızı Balık (The Red Fish)" in the book "Su Masalları (Water Tales)", the story of a youngster who lives with his grandmother and earns their lives by fishing. As it can be understood from the young fisherman's living with her grandmother, there is a deprivation from parents. The sea, which the young fisherman meets every night, fulfils the young fisherman's longing for a mother: "He dipped his hands into the sea and slept hand by hand with the sea. The water was soft as velvet. And the sea, too, knew how to make herself loved. She was rocking his small boat swiftly like a cradle. She was caressing his goldilocks with her sweet breeze. She was giving him plenty of fish for him to feed and to live. (S.M, Akıncı, 2010c, s.19) In the story, the motherhood of water to the young fisherman is described. The sea lulls the young fisherman by holding his hands with her velvet swift touch, and by rocking his boat like a mother rocking her baby's cradle with mother's affection. Water uses her breezes for caressing the hair of the young fisherman. The sea does not fail in doing the most divine work a mother would do for her children. She feeds the young fisherman as a mother feeds her babies.

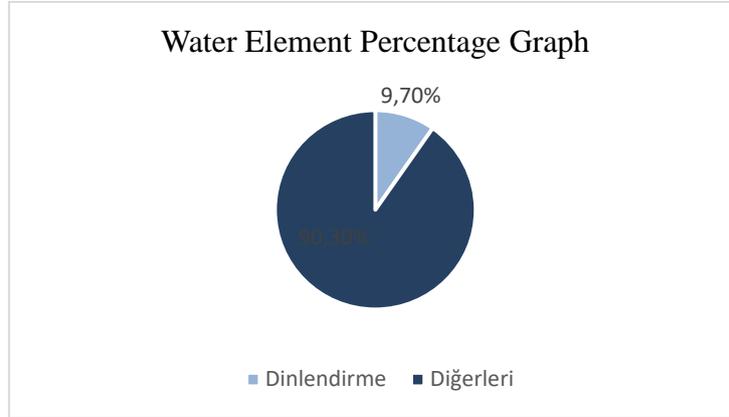


The substitution for mother code has percentage of 10.44% among other codes. The substitution for mother code is used the most in the book "Su Masalları (Water Tales) (f:9)". It is thought that the element of water is used as a substitute for mother in the books "Rüzgar Masalları (Wind Tales) (f:2)", "Işıklı Ayakkabılar (Light-Up Shoes) (f:1)", "Kuğu Gecesi (Swan Night) (f:1)", and "Kimsenin Anlamadığı Çocuk Evde (The Child Nobody Understand is at Home) (f:1)". The substitution for mother code is not found in the books "Kuş Kulesi (The Bird Tower)", "Sokak Kuşu (The Dead-end Bird)", "Uçurtmanın Gözleri (The Eyes of the Kite)", "Çuvaldiken Kasabası (Sackstitch Town)", "Çamur Bebekler (The Mud dolls)", "Çitlembik Ağacındaki Masalcı (Taleter on the Nettle Tree)", and "Bisiklet Yarışçıları (Bike Racers)".

F-Relaxation

Water exhibits a relaxing effect with its soothing and refreshing characteristics. Batur (2016, p.281), who explains the soothing and refreshing features of water over 'blue' colour, asserts that cold colours like blue recalls positive emotions such as confidence, calmness, comfort, peace, and freedom. He also states that blue colour, which is close to the colour of the sea and the sky increases the effect of relaxation. He mentions that water is used in the Ottoman Empire for its therapeutic effects for neurological diseases with its sound, apart from its colour.

In the tale titled “Küçük Tohum (The Small Seed)” in “Rüzgar Masalları (Wind Tales)”, a small pistachio seed carried by the wind is dropped near the brook. The sound of the brooks functions as a lullaby for the small seed which tries to sleep where he is carried by the wind to sprout and to grow: “In the nook, the seed has got sleepy. The splash of the brook was like a lullaby.” (R.M, Akıncı, 2010b, s.45) The brook can be compared to a mother who is singing a lullaby to lull her child.

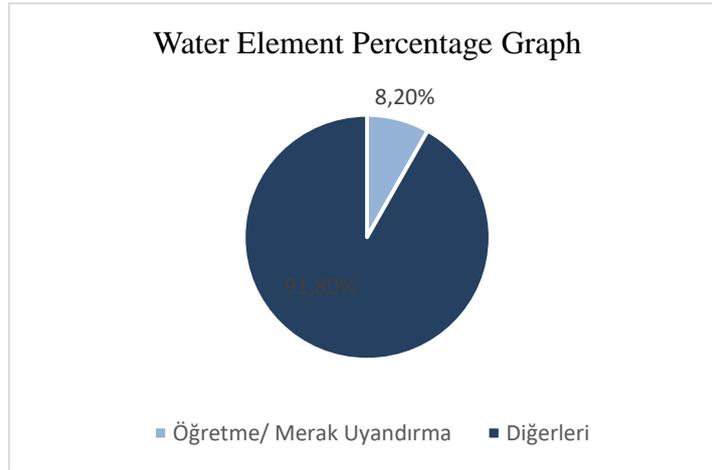


The percentage of the relaxation code among others is 9.7%. The relaxing feature of water is found in the books *Rüzgar Masalları (Wind Tales)* (f:3), *“Su Masalları (Water Tales)”* (f:2), *“Kimsenin Anlamadığı Çocuk Evde (The Child Nobody Understand is at Home)* (f:2), *“Kuş Kulesi (The Bird Tower)* (f:1), *“Uçurtmanın Gözleri (The Eyes of the Kite)* (f:1), *“Işıklı Ayakkabılar (Light-up Shoes)* (f:1), *“Çuvaldiken Kasabası (Sackstitch Town)* (f:1), *“Çitlembik Ağacındaki Masalcı (Taletheller on the Nettle Tree)* (f:1) and *“Kuğu Gecesi (Swan Night)* (f:1) The relaxation code for water is not seen in the books *“Sokak Kuşu (The Dead-End Bird)”*, *“Çamur Bebekler (The Mud dolls)”*, and *“Bisiklet Yarışçıları (Bike Racers)”*.

G-Instruction-Arousing Curiosity

The instruction feature, which is quite rare to be attributed to water in mythology or in other sources, appears directly in water’s or in water related elements’ personalities in Akıncı’s works. Instruction is performed by either real or symbolic uses of water. The author uses water in a material sense with the water cycle, or may question water via a ‘red fish that speaks’.

In the tale ‘The Red Fish’, the curiosity arousing and instructing features of water are expressed in the narrations of the fisherman and the red fish. In the tale, one night, a red fish jumps into the boat of a young fisherman who lives with her grandmother. This fish asks questions to the fisherman every night and arouses curiosity and desire for learning. The questions of the red fish are mostly related to the sea: “Why is the sea blue?” (S.M, Akıncı, 2010c, p.22) The young fisherman learns the answers to this question by the red fish from the old fisherman: “It takes the colour of the sky, it’s why. The sky is blue. So is the sea... The sky turns to smoke-colour when it’s covered with rain clouds. Then take a good look at the sea. The sea also becomes smoke-colour.” (S.M, Akıncı, 2010c, p.26) The questions of the red fish orient the young fisherman to think, to question and to be more curious. The author performs the informing feature via the heroes, while instruction is performed in between the lines.



The percentage of the instruction/arousing curiosity feature of water among other codes is 8.20%. The instruction code is intensely seen in the book “Su Masalları (Water Tales) (f:8)”. Water is attributed with instructive features in the books “Uçurtmanın Gözleri (The Eyes of the Kite) (f:2), and “Kuğu Gecesi (Swan Night) (f:1)”. In mythological and religious sources water is attributed with various duties; however, in these sources the information that water exhibit instruction feature is not present. The instruction/arousing curiosity structure of water poses a difference with this new mission imposed on water, although it remains in the background among other codes.

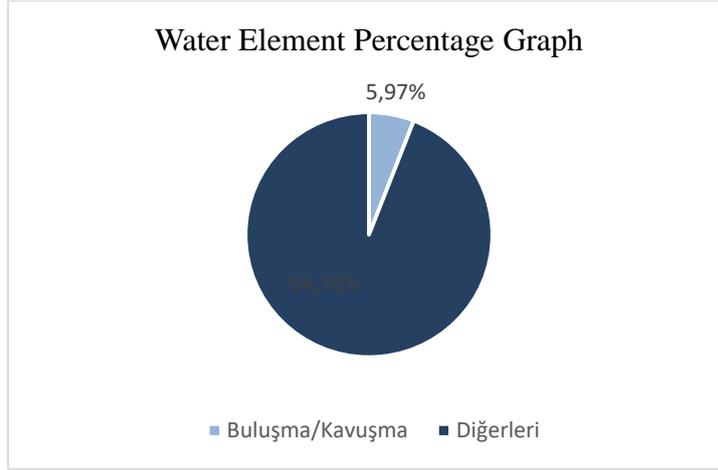
H-Reunification Element

‘Water’ effects the lives of humans by various means in the works of the author. One of these to reunite people either in real life or in fantastic or associative dimensions, who had to separate from each other even though they loved each other.

1. The Real Dimension: In the narrative “Gökyüzü Masmavi (The Sky is Deep Blue)” in “Işıklı Ayakkabılar (Light-up Shoes)”, the meeting point for a child, living with his grandparents, with his parents, who are living in Germany, is the campsite near the sea. The sea is the place that reunifies the heroes in the real world. This situation shows up in the expressions of the child who yearns for his parents: “In the summers, my parents come. They set up a tent big, even bigger than our alcove.” The sea becomes a place for reunification for the family members who cannot see each other too often.

2. Fantastic and Associative Dimension: In the books, heroes who could not reunite in the real world wish to reunite with their beloved ones in the fantastic dimension. In the narrative “Gökyüzü Masmavi (The Sky is Deep Blue), the hero who misses her mother, this time prefers a well for the place. The hero who has a difficulty in remembering her mother’s face, see the dream of her mother in the water as he looks at the surface of the water: In my dreams, my mother’s face is not present. Because she takes her face too, when she goes to Germany. I feel faint when I catch a glimpse of her. Tears start to fall down from my eyes one by one...” (I.A, Akıncı, 2009, p.42) The little girl who tells her sorrow and her joy to the well, in this way feels the presence of her mother via association. People, who have to separate from each other reunite either in the real world or in the fantastic dimension. However, water stands out as the common point for the two dimensions.

However, we see that both concepts have the ‘element of water’ in common.

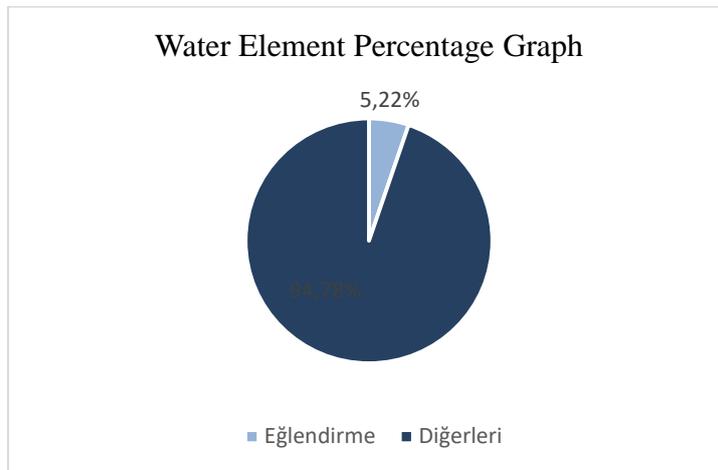


The percentage of the Reunification code is 5.97%. The reuniting feature of water on the people who had to separate from each other is seen in the books “Işıklı Ayakkabılar (Light-up Shoes) (f:3)”, “Rüzgar Masalları (Wind Tales) (f:2)”, “Su Masalları (Water Tales) (f:1)”, “Çitlembik Ağacındaki Masalcı (Tale-tellers on the Nettle Tree) (f:1)” and “Kuğu Gecesi (Swan Night) (f:1)”. Reunification code is not seen in “Kimsenin Anlamadığı Çocuk Evde (The Child Nobody Understand is at Home)”, “Kuş Kulesi (The Bird Tower)”, “Uçurtmanın Gözleri (The Eyes of the Kite)”, “Çuvaldiken Kasabası (Sackstitch Town)”, “Çamur Bebekler (The Mud dolls)”, “Sokak Kuşu (The Dead-End Bird)”, and “Bisiklet Yarışçıları (Bike Racers)”.

I-Entertainment

Water appears in different forms in the books analysed, and especially in the form of ‘sea’, it symbolises vacation and entertainment. Especially, when the heroes are children, the entertainment aspect of water is apparent.

In the story title “Sevgili Rita (Dear Rita)”, our hero Emre moved from Germany to Turkey with his parents. Emre, who couldn’t get used to his new life, says that the only good side of this new place is the ‘sea’. “There is nothing beautiful here, other than the sea. But I have to wait for the summer to go to the sea. There’s nothing else except for watching it for now. How bad it is that there is not a swimming pool here.” (I.A, Akıncı, 2009, p.47) The entertainment feature of water is expressed via ‘sea’ and ‘swimming pool’.



The entertainment code is the least used code for the element of water in the works analysed with the percentage of 5.22%. The entertainment code is found in the books “Kuş Kulesi (The Bird

Tower) (f:2)”, “Işıklı Ayakkabılar (Light-up Shoes) (f:2)”, “Çitlembik Ağacındaki Masalcı (Taleteller at the Nettle Tree) (f:2)”, and “Kuğu Gecesi (Swan Night) (f:1)”.

CONCLUSION

In this study, conducted using eleven books out of twenty-one books of Ferda İzbudak Akıncı, (Rüzgar Masalları (Wind Tales), Kuş Kulesi (The Bird Tower), Su Masalları(Water Tales), Sokak Kuşu/Uçurtmanın Gözleri(Dead-end Bird/The Eyes of the Kite), Işıklı Ayakkabılar (Light-up Shoes), Çuvaldiken Kasabası (Sackstitch Town), (The Child Nobody Understand is At Home), Çamur Bebekler (The Mud dolls), Çitlembik Ağacındaki Masalcı (Taleteller on the Nettle Tree), Kuğu Gecesi (Swan Night), Bisiklet Yarışçıları (Bike Racers)) selected with simple random sampling method, the functions of the element of water is investigated. The water motifs in the works analysed are categorised with regard to mythological, cultural and religious aspects, into nine codes (reunification, relaxation, entertainment, substitution for mother, rejuvenation, salvation, deification, vitalisation, and instruction-arousing curiosity).

When the codes are examined, it is seen that deification is the most used code with 17.16%, and it is followed by salvation (16.41%), vitalisation (14.92%), rejuvenation (11.94%), substitution for mother (%10.44), relaxation (9.7%), instruction-arousing curiosity (8.2%), reunification (5.97%) and entertainment (5.22%).

The literary works are affected by the values and lifestyles of societies. The most used deification code in the works is operative in understanding the mythological and religious characteristics of the society in which the work is produced. The intensive use of deification can be explained by the believing potential of a society. The structures used in the works of the author, such as ‘altar’ and ‘tepegöz (fore-eye)’ are the bases of the deification code. The deification code is intensely present in the books “Su Masalları (Water Tales)” and “Çamur Bebekler (The Mud dolls)”.

It is also seen that the salvation aspect of water is used frequently in the works. Water, which helps the heroes or to whole town’s people, appears at dire situations and fulfil the salvation task. It is seen that the salvation aspect of water is intense in the books “Çamur Bebekler (The Mud Dolls” notably, and also “Çitlembik Ağacındaki Masalcı (Taleteller on the Nettle Tree)”.

Vitalisation code is analysed in the works via the power of water to give life to the plants, flowers, trees and their leaves. This situation becomes apparent with the example of the quince tree which gives fruits as soon as it is watered. The vitalisation feature of water is frequently seen in the books “Kuş Kulesi (The Bird Tower)”, and “Rüzgar Masalları (Wind Tales)”.

Water is an indispensable source of life for human beings as other living things. The situations in which water enables humans to maintain or increase their liveliness are examined under the vitalisation code.

Another frequently used structure of water element is seen as the substitution for mother. In situations, where the parents are separated from their children or behave uninterested in them for whatever reason, nature, water in particular, plays the ‘mother’ role to the child heroes in the works. It can be thought that these impersonalisations are warnings for the parents. The substitution for mother code is seen the most in the book “Su Masalları (Water Tales)”.

In relaxation code, there are the relaxing, soothing, and refreshing features of water with its sound, smell and colour. Water, which finds its place in the works with these features, would fulfil the relaxation task for the reader through the child heroes. Together with the heroes, who are alone with the smell of the sea, the sound of the river, the splash of the rain, the reader also reaches to serenity. The relaxation code is observed the most in the book “Rüzgar Masalları (Wind Tales)”.

The instruction feature, which is not frequent in mythological and religious sources, is examined under the instruction/arousing curiosity code. The instructor water motif, used in the works of Akıncı, is remarkable since it brings a new perspective to water. The elements of nature such as the wind and water, and the heroes are used in the works to inform the reader and arouse curiosity in them for the unknown. This attitude of the author can be attributed to the purpose for arousing curiosity and forming a motivation for research in the children. The work, in which the instruction/arousing curiosity code most intensely used, is “Su Masalları (Water Tales)”.

The meeting of the heroes or fulfilling their longing via the water element is analysed under the reunification code. In the examples, which reflect the opinions of the author on separations, we witness the obligation of the children to be separated from their beloved ones. In order to fulfil the longings of the heroes who fell apart, the water element would be used. It can be argued that the author wishes to transfer a pedagogical message about the separation and isolation the children experience. Because the author does not look on the separations the children experience. The element of water provides the meeting up of individuals in both the real world and in the fantastic dimensions. The reunification code is most frequently observed in the books “Işıklı Ayakkabılar (Light-up Shoes)” and “Rüzgar Masalları (Wind Tales)”.

The entertainment feature of water is the least frequently used code; however, it provides both the child heroes and the child readers an escape, a relaxation. The presence of the entertainment and instruction features of water at the same time could be assessed as the author reflecting a pedagogical perspective.

In the works, reflecting the significance of water in human life, water is sometimes deified, sometimes it becomes a saviour, sometimes it grants life, rejuvenates or it functions as an element of instruction/arousing curiosity, sometimes it becomes the element of reunification, sometimes it vitalises, sometimes it is a substitute for mother, sometimes it is the one that reunites, and sometimes it becomes prominent with its entertaining feature. Akıncı’s works contain important messages for both children and parents via the codes comprising various effects of water. Human beings, as a whole in various dimensions, are surrounded in all aspects from entertainment to instruction.

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Comparing Performance of Different Equating Methods in Presence and Absence of DIF Items in Anchor Test

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Abstract

This study aims to compare the performance of different small sample equating methods in the presence and absence of differential item functioning (DIF) in common items. In this research, Tucker linear equating, Levine linear equating, unsmoothed and presmoothed (C=4) chained equipercentile equating, and simplified circle arc equating methods were considered. The data used in this study is 8th-grade mathematics test item responses which obtained from Trends in International Mathematics and Science Study (TIMSS) 2015 Turkey sample. Item responses from Booklet-1 (N=199) and Booklet-14 (N=224) are chosen for this study. Data analyses were completed in four steps. In the first step, assumptions for DIF detection and test equating methods were checked. In the second step, DIF analyses were conducted with Mantel Haenszel and logistic regression methods. In the third step, Booklet 1 was chosen as base form and Booklet 14 chosen as a new form, then test equating was conducted under common item nonequivalent groups design. Test equating was done in two phases: the presence and absence of DIF items in the common items. Equating results were evaluated based on standard error of equating (se), bias and RMSE indexes. DIF analyses showed that there were two sizeable DIF items in anchor test. Equating results showed that performances of equating methods are similar in presence and absence of DIF items from anchor test and there is no notable change in se, bias and RMSE values. While the circle arc equating method outperformed other equating methods based on se, 4-moment presmoothed chained equipercentile equating method outperformed other methods based on bias and RMSE evaluation criteria.

Keywords: Test Equating, Small Samples, Differential Item Functioning

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INTRODUCTION

In national and international testing programs, multiple forms of a single test are used to provide test security or to allow sampling a large of items without having each student answer all of the items. Alternative test forms which developed considering the same construct and blueprint almost differ somewhat in their difficulty. If one form is more difficult than other form, examinees would be expected to get higher scores from the easier form and get lower scores from the more difficult form. Test equating is required to remove effects on scores of these undesirable differences in test form difficulty (Dorans, Moses, & Eignor, 2010). As Kolen and Brennan (1995, p. 2) defined “equating is a statistical process that is used to adjust scores on test forms so that scores on the forms can be used interchangeably.”

In testing programs like Trends in International Mathematics and Science Study (TIMSS), Programme for International Student Assessment (PISA) common-item nonequivalent groups (CINEG) design is used to equate test scores. In CINEG design, common items from different test forms are used to equate test forms. Like other statistical analysis methods, common item test equating is exposing to sampling error. One way to reduce sampling error is to conduct equating with large samples of examinees (Kurtz & Dwyer, 2013). Random equating error is directly related to sample size. The sample sizes required to conduct test equating accurately vary based on equating designs and equating methods. For example, “a random-groups design requires a much larger sample than a common-item design, which requires a larger sample than a single-group design” (Kim & Livingston, 2010, p. 286). Kolen and Brennan (2004) suggest that the minimum sample size for linear equating should be 400 and the minimum sample size for equipercentile equating should be 1500. However, large samples always may not be accessible in real test situations. Hence, a variety of methods has been recommended to cope with equating problem in small samples. These methods can be listed as identity, linear, chained equipercentile equating with log-linear presmoothing, circle arc, and synthetic equating (Babcock, Albano & Raymond, 2012). In this study, chained equipercentile equating, linear and circle arc methods are considered so information about these methods is given below.

Chained Equipercentile Equating

Chained equipercentile equating method is an alternative equipercentile equating method. Firstly, this method was described by Angoff (1971) and then Dorans (1990) named this method as chained equipercentile equating. In this method, Form X scores are equated to common items scores. Then scores of common items are equated to the Form Y scores. Assume that Form A is an anchor test for Form X and Form Y. Population P takes the Form X and Population Q takes the Form Y. The scores of Form X are equated to scores of anchor test A using examinees from Population P. Then anchor test A scores are equated to Form Y scores using Population Q. Because of including a chain of two equipercentile equating, it is called as chained equipercentile equating (Kolen & Brennan, 2004).

As Livingston (1993) reported smoothing in equipercentile equating is decreasing sample size requirements by about one half. Presmoothing and postsmoothing are two types of smoothing method which used in equipercentile equating. While the score distributions are smoothed in presmoothing, the equipercentile equivalents are smoothed in postsmoothing. Presmoothing can be done with a polynomial log-linear model or a strong true score model. In this study, we consider presmoothing with the polynomial log-linear model. For the polynomial log-linear presmoothing method, choosing the degree of the polynomial (C) is important because it limits how much smoothing is done. The C parameter is generally chosen from numbers from 1 to 10. After presmoothing, the fitted distribution has the moment preservation property. This means that first C moments of the fitted distribution are the same to sample distribution's first C moments. For instance, if C=2, the mean and standard deviation of the fitted distribution are the same to the mean and standard deviation of the observed distribution. Likelihood ratio chi-square goodness of fit statistic can be used for choosing the C parameter. For instance, the difference between chi-square statistics for C=3 and C=4 can be examined with one degree of freedom. A significant difference between chi-square values means that the more

complex model (C=4) fits the sample data more than the more simple model (C=3). If the two models fit the data adequately the simplest model should be chosen (Kolen & Brennan, 2004).

Linear Equating Methods

Linear equating assumes “apart from differences in means and standard deviations, the distributions of the scores on Form X and Form Y are the same” (Crocker & Algina, 1986, p.458). Tucker and Levine are most prevalent (Kolen & Brennan, 2004) linear equating method in CINEG design and their use in small samples are supported by prior researches for small sample sizes (Parshall, Du Bose Houghtan, & Kromrey, 1995; Skaggs, 2005). In this study, we consider Tucker and Levine linear equating methods. Tucker equating was described by (Gulliksen, 1950) and he attributed it to Ledyard Tucker (as cited in Kolen & Brennan, 2004). Tucker equating method makes two important assumptions: regression slopes of the total test scores on the common item score for both populations are equal and variance on the common item score between both examinee populations are equal (Kurtz & Dwyer, 2013). Levine observed score equating is another equating method which used with CINEG design. There are three assumptions in Levine observed score equating which related to the observed scores in classical test theory: (1) there is a perfect correlation between the true scores of total test and true scores of anchor test in the old and new form populations, (2) the total test true scores’ regression on to the anchor test true scores are assumed to be the same linear function for the old form and the new form populations, (3) the measurement error variance for X is the same for Populations 1 and 2 (Kolen & Brennan, 2004).

Circle-Arc Equating

Livingston and Kim (2008, 2009) suggested the circle arc method for small-sample data. This method has a curvilinear equating function. There are two kinds of circle arc equating method: the symmetric circle arc and simplified circle arc. Circle arc equating gets its equating function due to arc connecting three points in a Cartesian coordinate system (Babcock et al., 2012). “The upper end of the curve is determined by the maximum possible score on each form. The lower endpoint of the curve is determined by the lowest meaningful score on each form. The middle point on the curve is determined from the data, by equating at one point in the middle of the score distribution. If those three points happen to lie on a straight line, that line is the estimated equating curve. If three points do not lie on a straight line, they determine an arc of a circle.” (Livingston & Kim, 2009, p.332). Livingston and Kim (2008) reported that the circle arc method typically yielded more precise and less biased results than other methods (mean, linear and smoothed equipercentile equating) in small samples.

Differential Item Functioning

The other issue that should be considered in national and international testing programs differential item functioning (DIF). The purpose of DIF analysis is to determine items that function differently for examinees which have the same underlying ability from different subgroups. DIF studies are usually carried out regarding to reference and focal groups that are established by considering manifest (observed) group characteristics such as gender and ethnicity. It is supposed that the observed groups are homogeneous subgroups. In line with this assumption, an item containing DIF is considered advantageous or disadvantageous for all individuals in any manifest groups. Therefore, with these studies, once a DIF item has been determined, there is little knowledge about the examinees for which the item functions differentially (Cohen & Bolt, 2005; De Ayala, Kim, Stapleton, & Dayton, 2002). However, there is a low relationship between the manifest characteristic associated with DIF and the actual advantaged or disadvantaged groups. Therefore, comparisons of item responses for manifest groups may lack sensitivity to determine the true source(s) of DIF (Cohen and Bolt, 2005; De Ayala et al., 2002; Oliveri, Ercikan, & Zumbo, 2013; Samuelson, 2005).

Latent group means that to set the group membership to an unknown homogeneous subgroup which can be determined by mixture modeling (McLachlan & Peel, 2000). In mixture modeling, while

the item functions the same in a latent group, it functions differently among latent groups (Fieuw, Spiessens, & Draney, 2004). So the use of mixture IRT models can overcome this problem that rises with the use of manifest groups. They can make it possible to detect latent groups for which the items function differently (Cohen & Bolt, 2005). In this study, DIF analyses were conducted based on latent classes.

Latent DIF

The mixture model is defined by Rost (1990) as a “Mixture Rasch” model. It is a combination of latent class and the Rasch model. In this model, it is assumed that a population of examinees can be grouped into several discrete latent classes based on examinees response patterns. With this model, item parameters can be simultaneously estimated with individual’s ability and the class he/she belongs (Alexeev, Templin, & Cohen, 2011; Cohen and Bolt, 2005; Mislevy and Verhelst, 1990; Rost, 1990). In these models, each latent class fits Rasch model but classes have different item difficulty parameters. Therefore, MixIRT models can simultaneously determine subpopulations that display qualitative differences and quantify the differences in the ability within the groups (Mislevy & Verhelst, 1990; Rost, 1990). According to the model, the possibility of giving a correct answer is as follows.

$$P(y_{ijg} = 1 | g, \theta_{jg}) = \frac{1}{1 + \exp[-(\theta_{jg} - \beta_{jg})]} \quad (1)$$

In equation 1, $g=1, \dots, G$ refers to index with specified latent class; $j=1, \dots, J$ refers to index with specified responders; θ_{jg} : j . refers to examinees latent ability in g latent class; β refers to difficulty parameter of i . item in class g .

If the DIF detection is carried out during the test construction process, the test developers usually delete flagged items from the test. However, in many situations DIF can be detected after data have been collected. In these situations, deleting DIF detected items may not be a good idea because item deletion can affect test reliability and validity negatively (Elosua & Hambleton, 2018). Hu and Dorans (1989) reported that deleting both minimal and sizable DIF items resulted in different scaled scores after IRT true score re-equating and Tucker re-equating. They also noted that the deleting item itself had a noticeable effect on scale score and the effect size of the DIF item had a less prominent effect on the scale scores (cited in Kolen & Brennan, 2005). Therefore, it is important to determine DIF items during test equating process and apply methods which reduce the effect of these items on test equating constants (Hidalgo-Montesinos & Lopez-Pina, 2002).

In literature, there are some researches (Atalay-Kabasakal & Kelecioğlu, 2015; Chu, 2002; Demirus & Gelbal, 2016; Turhan, 2006; Yurtçu & Güzeller, 2018) which have been compared equating methods in presence of DIF items. In these studies, IRT equating methods were compared in the presence or absence of DIF items. There is not any study which compares small samples equating methods in the presence and absence of DIF items in tests. Therefore this study aims to compare the performance of different small sample equating methods in the presence and absence of DIF in common items.

METHOD

In this study, performance of existing small equating methods was compared in the presence and absence of DIF in common items with using real data. Therefore, this study was designed as descriptive survey. In descriptive survey design, there is not any attempt to change or influence the study situation, existing situation is described (Karasar, 2009).

Data

The data used in this study is 8th-grade mathematics test item responses which obtained from Trends in International Mathematics and Science Study (TIMSS) 2015 Turkey (N=6079) sample. Item responses from Booklet-1 and Booklet-14 are chosen for this study. There are 14 dichotomous scored items common for both booklets. Booklet 1 consists of totally 32 dichotomously scored items and the maximum score which can be obtained are 32. Booklet 14 consists of totally 26 dichotomous scored and 1 polytomous scored (0-1-2) items and the maximum score which can be taken from Booklet 14 is 28. There are 199 students who took Booklet 1 and 224 students who took Booklet 14.

Table 1. Summary of Data

	Common Items	Total of Items	Maximum Score
Booklet-1 (N=199)	14 MC	32 MC	32
Booklet-14 (N=224)	14 MC	26 MC + 1 PS	28

Note. MC: Multiple Choice Item; PS: Polytomous Scored Items

Data Analyses

In this study, data analyses were completed in four steps. In the first step, the confirmatory factor analyses are carried out for Booklet 1 and Booklet 14 to assure the unidimensionality requirement for DIF detection and test equating methods. In the second step, DIF analyses are conducted with Mantel Haenszel (MH) and logistic regression (LR) methods based on latent class. In the third step, Booklet 1 is chosen as a base form and Booklet 14 chosen as a new form, then test equating is conducted under common item nonequivalent groups design. Test equating is done in two phases: the presence of DIF items in anchor test and removing sizable (C level) DIF items from anchor test. In this study, Tucker linear equating, Levine observed score equating, unsmoothed chained equipercentile equating, chained equipercentile equating with presmoothing (C=4), and simplified circle arc equating methods are considered. These equating methods are chosen because the researches showed that they gave accurate equating results in small samples (Babcock et. al, 2011, Kim & Livingston, 2010). Equating results are evaluated based on the standard error of equating, bias and root mean squared error (RMSE) index which provided from 1000 bootstrapped samples.

The Mplus (Muthen & Muthen, 1998-2012) computer program is to assess unidimensionality assumption; the WINMIRA (reference) computer program is used to find how many latent groups exist in the data and to estimate item parameters MixRasch analysis; “difR” R package (Magis, Beland and Raiche, 2015) is used to find DIF items across latent class; “equate” R package (Albano, 2017) is used for test equating and calculating bootstrapped standard error, bias, and RMSE indexes. In “equate” package of R, as reported Albano (2017) “standard errors are calculated as standard deviations over replications for each score point; bias is the mean equated score over replications, minus the criterion; RMSE is the square root of the squared standard error and squared bias combined.” (p. 5).

RESULTS

Descriptive Statistics and Testing Assumptions

The descriptive statistics for Booklet 1 and Booklet 14 are reported in Table 2. As seen in Table 2, Booklet 1 has 32 multiple choices (MC) items and Booklet 14 has 26 MC and 1 polytomous scored (0-1-2) items. In both forms, the 14 MC items are common. The mean for Booklet 1 is 14.51 and for Booklet 14 is 12.61 and mean test difficulty is equal for both forms ($z=0.00$, $p>0.05$). Cronbach alpha reliability is .93 for Booklet 1 and .91 for Booklet 14 and there is no statistical difference between forms’ reliability level ($z=.75$, $p>.05$). Item discrimination of items in each form was calculated by using point-biserial correlation coefficient. The mean of point-biserial correlations was the same and .50 for Booklet 1 and Booklet 14 (see Table 2).

Table 2. Descriptive Statistics for Booklet 1 and Booklet 14

	Booklet 1	Booklet 14
N	199	214
Number of items	32 MC	26 MC + 1 PC
Common items	14 MC	14 MC
Minimum score	3	1
Maximum score	32	27
Mean	14.51	12.61
Mode	7	7
Median	11.00	11.50
SD	8.24	7.14
Mean difficulty	.45	.45
Mean r_{pb}	.50	.50
Cronbach's Alpha	.93	.91

Note. N: Total number of students; SD: Standard deviation; rpb: Point biserial correlation

Prior to DIF analyses and equating test forms, confirmatory factor analyses (CFA) is carried out for Booklet 1 and Booklet 14 by Mplus (Muthén & Muthén, 1998-2012). Comparative fit index (CFI), Tucker Lewis index (TLI) and Root mean square error of approximation (RMSEA) indexes for Booklet 1 (CFI= .99, TLI= .99, RMSEA= .027) and Booklet 14 (CFI= .99, TLI= .99, RMSEA= .019) support that each form measures a unidimensional trait (Byrne, 2010; Hu & Bentler, 1999; Kline, 2005).

Estimation of Model Parameters

To determine fitted latent classes to the model, results of model comparison criteria for mixture Rasch solutions given in Table 3 is examined.

Table 3. Results of Model Comparison Information Criteria for Mixture Rasch Solutions

Number Of Classes	BIC
1	6505.23
2	6452.29
3	6512.80

In the MixIRT model applications, information criteria Akaike information criterion (AIC) and Bayesian information criterion (BIC) have been widely used to select the model. Li, Cohen, Kim, and Cho (2009) suggested that the smallest BIC result should be used to determine the number of classes. Based on BIC values in Table 3, we can say that a model with two latent classes' best fit the data.

Results of DIF Analyses

DIF analyses were conducted by using Mantel Haenszel (MH) and logistic regression (LR) methods based on two latent classes. The DIF results are reported in Table 4.

Table 4. The Results of DIF Analyses

	MH			Logistic Regression		
	Δ MH	p	DIF Level	R ²	p	DIF Level
Item 7	-3.63	.02	C	.070	.00	C
Item 13	12.68	.00	C	.047	.00	B

As seen in Table 4, the DIF analyses results showed that two items (7 and 13) sizable (C level) DIF based on Mantel Haenszel and logistic regression methods. In Mantel Haenszel method, Dorans and Holland's (1993) effect size and in Logistic regression method Gierl, Khaliq and Boughton's (1990) DIF cut points are used.

Results of Equating

In this study, five equating methods are considered: Tucker linear equating, Levine observed score equating, chained equipercetile equating no smooth, chained equipercetile equating with presmoothing (C=4), and simplified circle arc equating methods with nominal weights. As mentioned before for the polynomial log-linear presmoothing method, choosing the degree of the polynomial (C) is important. For this study, we compare chi-square values under different smoothing parameter. The moments and fit statistics for presmoothing are given in Table 5.

Table 5. The Moments and Fit Statistics

Form	Smoothing Parameter	$\bar{\mu}$	$\bar{\sigma}$	\bar{sk}	\bar{ku}	$X^2(df)$	$X^2_C - X^2_{C+1}$
Booklet 1	C=5	14.51	8.22	.57	1.91	16.12 (27)	2.38
	C=4	14.51	8.22	.57	1.91	16.93 (28)	0.81
	C=3	14.51	8.22	.57	2.42	76.15 (29)	59.22
	C=2	14.51	8.22	.16	2.13	105 (30)	28.97
	C=1	14.51	9.45	.19	1.85	120 (31)	15.63
Booklet 14	C=5	12.60	7.13	.28	1.74	15.43 (27)	0.68
	C=4	12.60	7.13	.28	1.74	15.73 (28)	0.29
	C=3	12.60	7.13	.28	2.43	75.63 (29)	59.90
	C=2	12.60	7.13	.31	2.47	75.78 (30)	0.15
	C=1	12.60	9.15	.44	2.06	121.88 (31)	46.10

Note. The chosen C parameter for presmoothing is shown in boldface.

As seen in Table 5, for Booklet 1, C=4 the overall X^2 statistic is not significant ($X^2_{(28)}=16.93$, $p>.05$) and the difference statistics for chi-square $X^2_{C=4}-X^2_{C=5}$ equals .81 and it is not significant at .05 level for one degree of freedom ($X^2<3.84$). Based on results, for $C\geq 4$ model fit the data and C=5 do not improve the fit of data. For Booklet 14, as seen in Table 5, C=4 the overall X^2 statistic is not significant ($X^2_{(28)}=15.73$, $p>.05$) and the difference statistic for chi-square $X^2_{C=4}-X^2_{C=5}$ equals .29 and it is not significant at .05 level for one degree of freedom ($X^2<3.84$). Based on results, again for $C\geq 4$ model fit the data and C=5 do not improve the data fit. For Booklet 1 and Booklet 14, C=4 is chosen for presmoothing.

In this study, Booklet 1 is a base form and Booklet 14 is a new form and test equating is conducted under CINEG design. Test equating is done in two phases: the presence of DIF items in the anchor test and removing sizeable DIF items from anchor test. The Figure 1 shows that equated scores versus total scores in the presence and absence of sizeable DIF items in the anchor test.

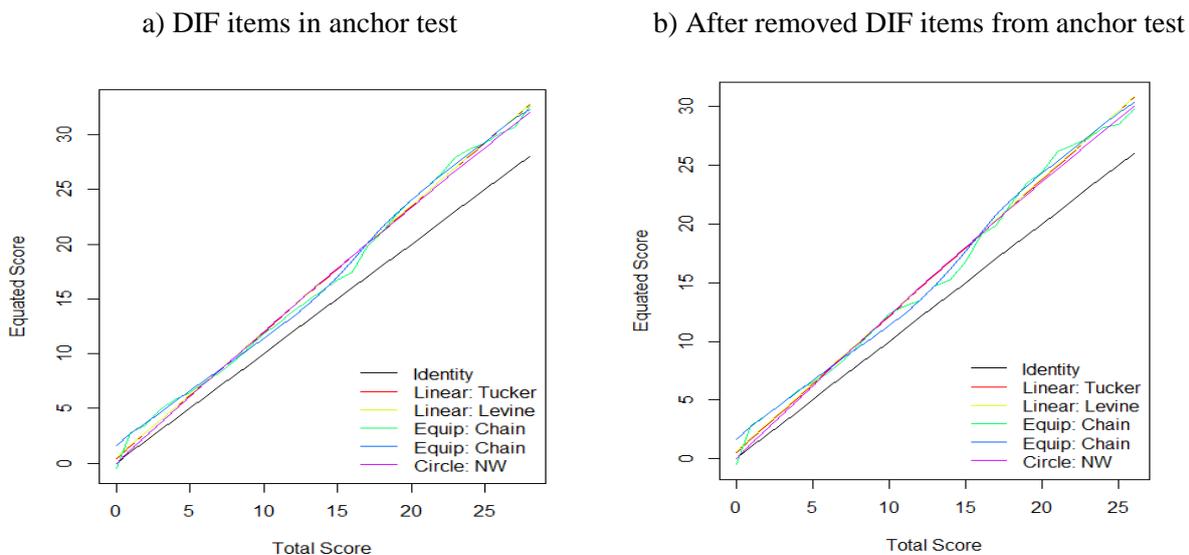


Figure 1. Equated Scores versus Total Scores

In Figure 1, the red line represents Tucker linear equating, the yellow line represents Levine observed score equating, the green line represents chained unsmoothed equipercentile equating, the blue line represents chained presmoothed (C=4) equipercentile equating and the purple line represents simplified circle arc equating method. Also in Figure 1, the black line belongs to identity equating and it means that there is no equating between old form and new form scores. As seen for both conditions Tucker, Levine and circle arc methods yield similar equated scores; their lines in the graphics are almost top of each other. In unsmoothed chained equipercentile equating method, there are some irregularities between equated scores and total scores (see the green line in Figure 1). The random error in estimating equivalent scores causes these irregularities. As seen in Figure 1, these irregularities got lost in presmoothed equipercentile equating (see the blue line).

The performance of different equating methods in presence and absence of DIF items in anchor test was evaluated based on standard errors of equating, bias and RMSE values which provided from 1000 bootstrapped samples and reported in Table 6.

Table 6. Equating Results

Equating Methods	Presence of DIF Items in Anchor Test			Absence of DIF Items in Anchor Test		
	se	Bias	RMSE	se	Bias	RMSE
Tucker Linear Equating	0.36	0.52	0.63	0.35	0.52	0.63
Levine Observed Score Equating	0.37	0.52	0.63	0.39	0.51	0.64
Unsmoothed Chained Equipercentile Equating	0.77	0.54	0.94	0.72	0.61	0.94
Presmoothed (C=4) Chained Equipercentile Equating	0.49	0.19	0.52	0.51	0.17	0.53
Simplified Circle - Arc Equating	0.19	0.69	0.72	0.19	0.72	0.74

As seen in Table 6, when the common items include DIF items, simplified circle arc equating method has the least (.19) standard error of equating (se) and unsmoothed chained equipercentile equating method has the largest (.77) standard error of equating. On the other hand, when we consider bias as a criterion simplified circ-arc method has the largest (.69) amount of bias, 4-moments presmoothing chained equipercentile equating has the smallest amount of bias value. Levine and Tucker equating methods have the same (.52) and smaller bias values than unsmoothed equipercentile equating method. We can say that Tucker linear equating and Levine observed score equating methods show similar and better performance than the unsmoothed chained equipercentile equating method. According to last criteria of RMSE values, again smoothed chained equipercentile equating method has the smallest (.52) RMSE value and the unsmoothed equipercentile equating method has the largest (.94) RMSE value. Tucker linear equating and Levine observed score linear equating methods had the same (.63) and smaller RMSE values than simplified circle-arc equating method (.72). Again we can say that Tucker linear equating and Levine observed score linear equating methods show similar and better performance than the simplified circle-arc equating method.

After removing two sizeable DIF items from anchor test, the similar results have been found (See Table 6). Again based on se criteria, the simplified circle arc method was the best and the unsmoothed chain equipercentile equating method was the worst. On the other hand, based on bias criteria the best equating method is presmoothed equipercentile equating method and the worst one is simplified circle arc equating method. Concerning RMSE values, the best one is again presmoothed chained equipercentile equating method and the worst one is unsmoothed chained equipercentile equating method. Also, according to results, we can say that performances of equating methods are similar with the presence and not presence of DIF items in anchor test and we can say that there is no notable change in se, bias and RMSE values.

Another result of this study is that whether or not common items include DIF items, unsmoothed chained equipercentile equating method has larger se, bias and RMSE values than presmoothed (C=4) chained equipercentile equating method.

CONCLUSION AND DISCUSSION

In this study, five equating methods were considered: Tucker linear equating, Levine observed score linear equating, unsmoothed chained equipercentile equating, chained equipercentile equating with presmoothing ($C=4$), and simplified circle arc equating methods with nominal weights. Equating methods were compared in two phases: the presence of DIF items in anchor test and removing sizeable DIF items from anchor test. The results show that performances of equating methods are similar to presence and absence of DIF items in anchor test and there is no notable change in se, bias and RMSE values. Also, results show that according to the standard error of equating criteria, the circle arc equating method outperformed other equating methods but based on bias evaluation criteria its performance was the worst one in both situations.

As Kolen and Brennan (2004) reported standard error of equating is the standard deviation of equivalent scores over replications of the equating process and random error indexed by the standard error of equating. Standard error equating is closely related with sample size and as the sample size becomes larger it becomes smaller. The result of this study showed that the circle arc method has the minimum se among other equating methods. The circle-arc method especially suggested for small samples (Livingston, & Kim, 2009) and in their study, Kim and Livingston (2010) showed that in small samples the circle arc method clearly outperformed other equating methods (chained equipercentile, Levine, chained linear, Tucker) based on bias, RMSD and, se evaluation indexes. The results of our study supported Kim and Livingston (2010) only in terms of random equating error. Also, among other equating methods the unsmoothed chained equipercentile equating has the largest se value and we can say that based on random equating error its performance was the worst. As seen in Figure 1 there are some irregularities between equated scores and total scores and Kolen and Brennan (2004) noted that the reason for these irregularities is random equating error. Also in our study, the results of unsmoothed chained equipercentile equating method based on se support this view.

Based on bias and RMSE evaluation criteria, smoothed chained equipercentile equating method is the best equating method and unsmoothed chained equipercentile equating method is the worst method. In one of a simulation study, Aşiret and Sünbül (2016) shows that for sample size 200 presmoothed equipercentile equating method produced more accurate results than other methods (linear, circle-arc, mean). Our study results supports this finding with real data which has sample size roughly 200. Tucker linear equating and Levine observed score equating methods show similar and better performance than the unsmoothed chained equipercentile equating method. To all evaluation indexes, smoothed chained equipercentile equating has lower values than the unsmoothed equipercentile equating method. We can say that presmoothing tended to decrease random and systematic equating error as in shown other studies (Aşiret & Sünbül, 2016; Özdemir, 2017; Kelecioğlu & Öztürk Gübeş, 2013; Livingston, 1993; Skaggs, 2005). As a result, we can also say that presmoothed chained equipercentile equating yields more precise and accurate equating results than unsmoothed chained equipercentile equating as is assumed (Kolen and Brennan, 2004).

RECOMMENDATIONS

This study is limited with 8th-grade mathematics data from Booklet 1 and Booklet 14 in TIMSS 2015 Turkey sample. The results showed that performances of equating methods are similar to the presence and not the presence of DIF items in anchor test and there is no notable change in the error of equating. This result should be interpreted carefully and in further researches effects of DIF on small sample equating methods should be examined with real and simulated data sets more detailed.

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Career Planning Scale of Students Studied in Sports Sciences (CPS): Validity and Reliability Study

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Abstract

The purpose of this study was to develop a scale towards career planning of sports sciences students. Study group consisted of 543 students who were attending in physical education and sports teaching, sports management, and coaching departments in Siirt University. Construct validity of scale was tested through factor analysis and confirmatory factor analysis. Reliability of scale was measured through Cronbach Alpha and test-retest test. Discrimination of scale was tested between down %27 and up %27. Correlation analysis was made between scale factors. In order to calculate the reliability of 23 items in Career Planning Scale, Cronbach Alpha which is a inner consistency coefficient was calculated. General reliability of scale were found to be high as $\alpha=0.885$. Analysis results have demonstrated that adjustment statistics calculated through confirmatory factor analysis showed a significant adjustment and positive correlations were determined between scale sub-dimensions and general scores as a result of correlation analysis ($p<0,05$).

Keywords: Career, Career Planning, Sports, Physical Education and Sport

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INTRODUCTION

The term ‘‘career’’ is used in the meaning of acquiring skills, continuous and step by step progression in any field of interest of an individual (Tortop, 1994: 92). Career is a series of works which have continuity for a lifetime equipped with behaviour motives of an individual and is to gain prestige and power, having a better status, and earning money as a result of breaking through in a selected work area (Bayram, 2008:19).

In the stage of beginning of a career (explore), individuals tend to have knowledge of about the careers and professions they are interested in by trying to define what kind of skills they had. In accordance with these, they follow the education process related to professions they are interested in. Therefore, this stage is a process that will go on after starting to work. After starting to work, individuals who are aware of their responsibilities, appear to be important with regard both to make a progress about their careers and to reach to company targets easily.

Individuals can set goals for themselves and exert efforts to reach these goals during university education. In accordance with that if a student can get to know himself-herself better, he/she will enable himself/herself to find a job that is satisfactory.

Sports phenomenon is a process which is a continuing and open for improvement. Thus, while career goals are being defined, it is thought that sports departments are preferred due to both being interested in sports and having a sportsmanship identity in the past.

Sports education/training, is an education process including hypothetic and applied education. During this education process, while student is given theoretical knowledge for his/her profession, they are tried to turn these knowledges into skills in their fields of profession. One of the crucial and initial conditions in developing quality in sports education is the quality of education. Reaching the targets in sports education is depended on using international rules and methods in it.

When considered as a clear approach, an organization process must be established to support and theoretical and applied knowledge with experiences and following innovations all the time. To tell sports education apart from general education, will make targets to reach impossible. Essentially the purpose of education, is to raise qualified human power through education. A qualified individual is well-developed both physically and mentally and who have a proficiency in getting in touch socially within society he/she lived. In this sense, physical education and sports is highly effective in raising qualified individuals (Kızılet, 2018).

As a result of education given in physical education and sports faculties, students can become sports specialist, physical education teacher, coach and also can found an enterprise in sports business. They are expected to have their career plans made in order to be beneficial to society and make difference in these areas during preparation to physical education schools or in the beginning of their education.

For example, as different comparing to other branch teachers; the responsibilities of physical education teachers are not confined to weekly course hours. Physical education teachers also busy themselves with relations with people and other teachers and administrators in addition to extra-curricular activities, need more time for these responsibilities (Altuntaş, 2016).

Sports phenomenon is a social structure where competition environment exists. It has also a significant place in educating and training mind and body. Therefore raising physically and mentally healthy individuals, and raising elite athletes with regard to performance; will contribute positively to people and country.

For this reason, for physical education teachers, knowing purposes well and evaluate them will make physical education teachers contribute to country as sports specialist, coach, educator who

are able to evaluate the performance, whose communication skills are perfect and who understand athlete's psychology after their graduation from school. But if physical education department students would not define their purposes in advance i.e. if they would not target being a good coach, educator and sports specialist and intend only to graduate from their schools, this will cause them not to fulfill their professions better. So this decision must have been given in early years of university education.

Therefore, beginning of a career (explore) constitutes our studies' general framework. While exploring process lasts in mid-twenties, their school life ends and working life starts. An individual mostly in a struggle to understand himself/herself; after that, an individual consider his/her own conditions, and make research related to what kind of job they will be successful.

They determine their weakness and strengths. One of the most important expectations of individuals in the stage of exploring while entering into working life is a long term and productive career. Exploring stage is a very important stage for both individuals and organizations. Because, meeting the expectations of organizations and needs of individuals occur in this stage. In this study which we purposed to measure how they describe the adequacy of the education they took, profession, and expectation they had, it is important for students to select the right professions. As a result of literature search, some studies were reviewed related to career goals and planning. But when considered in terms of sports, there were no any scales found out of athletes career scale. Therefore, to develop a scale towards career planning of sports sciences students and contribute to this field in accordance with this, underlies our research.

METHOD

Research Model

This research was designed in descriptive survey model. As developing a scale was first intended, determining the properties to be tested, writing the items for scale, taking expert opinion and rearranging items, and making validity and reliability stages were followed in research (Cronbach, 1984; Altun ve Büyüköztürk, 2011).

Study Group

Study group consisted of 543 students who were attending in physical education and sports teaching, sports management, and coaching departments in Siirt University. Descriptive statistics related to study group were given in Table 1 below.

Table 1. Descriptive statistics

Groups	Frequency(n)	Per cent (%)
Gender		
Female	184	33,9
Male	359	66,1
Marital Status		
Married	21	3,9
Single	522	96,1
Department		
Physical Education Teaching	159	29,3
Sports Management	311	57,3
Coaching	73	13,4
Class		
1	166	30,6
2	179	33,0
3	87	16,0
4	111	20,4

Education Level of Mother		
Illiterate	241	44,4
Primary School	151	27,8
Secondary School	70	12,9
High School	33	6,1
Associate Degree	6	1,1
Bachelor's Degree/Undergraduate	40	7,4
Graduate	2	0,4
Education Level of Father		
Illiterate	82	15,1
Primary School	166	30,6
Secondary School	108	19,9
High School	125	23,0
Associate Degree	11	2,0
Bachelor's Degree/Undergraduate	42	7,7
Graduate	9	1,7

Students were distributed as 184 (33,9) female, 359 (66,1) male according to gender and Marital status; 21 (3,9%) married, 522 (96,1%) single. Departments; 159 (29,3%) physical education and sports teaching, 311 (57,3%) sports management, 73 (13,4%) coaching. Classes; 166 (30,6%) 1st class, 179 (33,0%) 2nd class, 87 (16,0%) 3rd class, 111 (20,4) 4th class. Education level of mother; 241 (44,4%) illiterate, 151 (27,8%) primary school, 70 (12,9%) secondary school, 33 (6,1%) high school, 6 (1,1%) associate degree, 40 (7,4%) bachelor's degree/undergraduate, 2 (0,4%) graduate. Education level of father; 82 (15,1) illiterate, 166 (30,6%) primary school, 108 (19,9%) secondary school, 125 (23,0%) high school, 11 (2,0%) associate degree, 42 (7,7%) bachelor's/undergraduate, 9 (1,7%) graduate.

Data Collection Tools

In the first stage of developing the scale, literature associated with career and career planning were reviewed and the importance of career planning were tried to determine. Based on related literature search, a 35 item, item repository was established. Trial form of scale established was broached to 5 experts from Physical Education and Sport Department and 3 from Faculty of Economics and Administrative Sciences.

Experts have evaluated the suitability of career planning for properties of physical education and sports students and clarity of items. In accordance with expert opinions, 5 items were omitted from scale and some were tried to be corrected. Following this correction, a 30 item trial form was composed. Participants were asked express their opinions as ‘‘Strongly agree’’, ‘‘agree’’, ‘‘undecided’’, ‘‘disagree’’, ‘‘strongly disagree’’ in a 5 likert type form. Before scale was applied to students, explanations were made to participants related to career planning and the purpose of research was explained. Application of scale lasted in 10 minutes.

Statistical Analysis

Construct validity of scale was tested through exploratory factor analysis and confirmatory factor analysis. Reliability of scale was measured through Cronbach Alpha and test-retest test. Discrimination of scale was tested between down %27 and up %27. Correlation analysis was made between scale factors.

FINDINGS

In order to reveal construct validity of scale, exploratory factor analysis method was applied. As a result of Barlett test, ($p=0.000<0.05$) a relationship was found between variables included in factor analysis. As a result of Kaiser-Mayer-Olkin test, ($KMO=0.904>0,60$) it was determined that sample size was adequate for factor analysis to apply. In applying factor analysis varimax method was selected and construct of relationship between factors were provided to stay same. As a result of factor analysis, variables were collected under 5 factors which had 55.496% variance.

Items 6, 8, 9, 19, 20, 22, 28, were omitted as factor loading was under 0,4. In order to calculate reliability of 23 items in career planning scale; internal coefficient ‘‘Cronbach Alpha’’ was calculated. General reliability of scale was found very high with $\alpha=0.885$. According to explained variance ratio and alpha coefficient it can be said that Career Planning Scale is reliable tool. Factor construct was shown below.

Table 2. Construct of Career Planning Scale

Dimension	Factor Load
Career Awareness ((Eigen value=7,243; Explained variance=14,973; Alpha=0,833)	
4- I want to create differences for the company i work for and be dynamic.	0,653
10- I determine my career goals according to my interests and skills	0,651
11- I think that i focus on my goals according to my career plans	0,647
5- I am aware the way i will follow in order to reach my career goal	0,644
13- While planning my career, I know that not only i will get promotion hierarchically but also i will improve my skills.	0,604
14- My sportive skills are pathfinders for making a career planning for me.	0,490
12- I know positive and negative sides of place I work, i searched it.	0,486
18- I think that i am able to overcome the obstacles that will come in my career way	0,455
1- I am aware of my weak and strong sides and skills	0,433
Professional Awareness (Value=1,925; Variance determined=12,661; Alpha=0,780)	
16- I am aware of my profession’s progress facilities	0,757
15- I have knowledge of the future of my profession	0,697
17- I am aware of knowledge and skills asked in my profession	0,692
23- I follow the events related to my profession	0,475
Faith Towards Career (Value=1,341; Variance determined= 11,688; Alpha=0,784)	
30- Thinking about my career inspires me	0,727
29- I believe that i will overcome any obstacles will come in my way in reaching to my career	0,698
27- I know career planning is important for being successful in my profession	0,633
26- I think that i am compatible with the profession that i chose	0,617
Accuracy of Selection (Value=1,211; Variance Determined= 8,143; Alpha=0,649)	
2- the department i study enables to plan my career and improve it and make me reach my goal	0,817
3- Position i selected, made me to build my career plan	0,803
7- I think that making a career planning, specifies the choices and resolves uncertainties	0,431
Education Proficiency (Value=1,044; Variance Determined= 8,031; Alpha=0,641)	
25- Facilities in school, are adequate to actualize my career planning	0,802
24- I participate in seminars, courses and symposiums for my career	0,738
21- I think that the education i received is adequate to reach my career goals	0,678
Total Variance=55.496%; General Reliability (Alpha)=0.885	

Factor construct obtained in exploratory factor analysis of scale was tested through confirmatory factor analysis. Diagram is given related to confirmatory factor analysis below

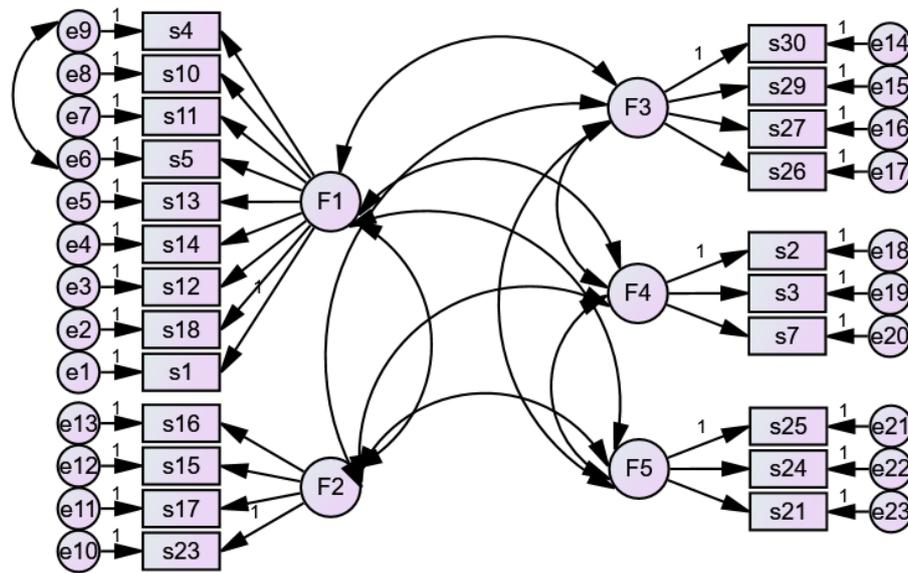


Figure 1. Diagram related to Confirmatory Factor Analysis

Criterion related to Confirmatory Factor Analysis given below

Table 3. Confirmatory Factor Analysis Model Fit Values for CPS

Index	Normal Value*	Acceptable Value**	CPS
χ^2/sd	<2	<5	2.42
GFI	>0.95	>0.90	0.92
AGFI	>0.95	>0.90	0.90
CFI	>0.95	>0.90	0.92
RMSEA	<0.05	<0.08	0.05
RMR	<0.05	<0.08	0.05

*, ** References: (Şimşek, 2007; Hooper and Mullen 2008; Schumacker and Lomax, 2010; Waltz, Strickland and Lenz 2010; Wang and Wang, 2012; Sümer, 2000; Tabachnick ve Fidel, 2007).

As a result of analysis; it was determined that model fit statistics calculated with factor analysis were seen to be fit. Standardised factor loadings, t values and explained variance ratios (R^2) were given below in Table 4.

Table 4. Confirmatory Factor Analysis Factor Loadings and Regression Coefficients related to items

Items	Factors	β	Std. β	S.Error	t	p	R^2
s1	<--- F1	1,000	0,511				0,487
s18	<--- F1	1,453	0,628	0,141	10,276	p<0,001	0,483
s12	<--- F1	1,347	0,517	0,148	9,124	p<0,001	0,569
s14	<--- F1	1,377	0,609	0,136	10,103	p<0,001	0,566
s13	<--- F1	1,309	0,529	0,141	9,258	p<0,001	0,610
s5	<--- F1	1,526	0,619	0,150	10,173	p<0,001	0,473
s11	<--- F1	1,564	0,667	0,147	10,620	p<0,001	0,599
s10	<--- F1	1,623	0,679	0,151	10,723	p<0,001	0,562

s4	<---	F1	1,387	0,607	0,138	10,052	p<0,001	0,568
s23	<---	F2	1,000	0,549				0,504
s17	<---	F2	1,185	0,744	0,100	11,883	p<0,001	0,574
s15	<---	F2	1,228	0,737	0,104	11,819	p<0,001	0,543
s16	<---	F2	1,262	0,757	0,105	11,987	p<0,001	0,554
s30	<---	F3	1,000	0,710				0,522
s29	<---	F3	1,035	0,753	0,068	15,320	p<0,001	0,513
s27	<---	F3	1,006	0,750	0,066	15,257	p<0,001	0,461
s26	<---	F3	0,850	0,568	0,072	11,877	p<0,001	0,445
s2	<---	F4	1,000	0,688				0,538
s3	<---	F4	1,052	0,781	0,094	11,219	p<0,001	0,533
s7	<---	F4	0,583	0,447	0,068	8,523	p<0,001	0,577
s25	<---	F5	1,000	0,754				0,603
s24	<---	F5	0,734	0,553	0,089	8,288	p<0,001	0,544
s21	<---	F5	0,695	0,553	0,084	8,289	p<0,001	0,597

When standardised coefficients were examined, it was determined that factor loadings were high, standard error values were low, t values were significant (p<0,001), R^2 values were high. These results confirm construct validity related to factor construct determined previously.

Discrimination of scale were analysed with the difference between 27% lower and 27% upper groups (Table 5). According to analysis findings, it was determined that scale was able to distinguish upper and lower group with sub-dimensions (p<0,05).

Reliability results of scale were given in Table 5. Reliability of scale depended on time were provided (p>0,05).

Table 5. Discrimination of Scale and Test- Retest Findings

	Discrimination				Test-Retest	
	Lower 27% Avg±Sd)	Upper 27% (Avg±Sd)	t	p	t	p
Career Awareness	3,481±0,639	4,697±0,234	-21,674	0,000	0,357	0,722
Professional Awareness	3,357±0,732	4,738±0,316	-21,016	0,000	-1,054	0,295
Faith in Career	3,456±0,816	4,799±0,271	-18,947	0,000	1,482	0,142
Accuracy of Choice	3,243±0,751	4,456±0,521	-16,096	0,000	-0,820	0,414
Education Proficiency	2,696±0,810	3,862±0,906	-11,625	0,000	-0,292	0,771
General Career Planning	3,322±0,437	4,582±0,153	-32,998	0,000	-0,413	0,681

Table 6. Average Scores and Correlation Matrix

	Average	Standart Deviance	Career Awareness	Career Awareness	Career Awareness	Career Awareness	Career Awareness	Career Awareness
Career Awareness	4,154	0,615	1,000					
Professional Awareness	4,129	0,744	0,649**	1,000				
Faith in Career	4,222	0,750	0,610**	0,615**	1,000			
Accuracy of Choice	3,822	0,791	0,436**	0,360**	0,354**	1,000		
Education Proficiency	3,228	0,988	0,166**	0,186**	0,171**	0,299**	1,000	
General Career Planning	3,997	0,538	0,875**	0,794**	0,772**	0,631**	0,457**	1,000

*<0,05; **<0,01

“Career awareness” of students was average $4,154 \pm 0,615$ (Min=1.67; Max=5), “professional awareness” was average $4,129 \pm 0,744$ (Min=1; Max=5), “faith towards career” was average $4,222 \pm 0,750$ (Min=1; Max=5), “accuracy of choice” was average $3,822 \pm 0,791$ (Min=1; Max=5), “education proficiency” was average $3,228 \pm 0,988$ (Min=1; Max=5), “career planning general” was average $3,997 \pm 0,538$ (Min=1.7; Maks=5).

As a result of correlation matrix; positive correlations were determined between scale sub-factors and general scores ($p < 0,05$).

RESULTS AND FUTURE RECOMMENDATIONS

As a result of education given in sports science faculties, students are able to establish a company as entrepreneur, coach, physical education teacher or sports specialist in sports business. In order to be the best, create difference and being beneficial to society, they are expected to be made their career planning when they were attended in a physical education department and started to receive education.

However, as students attended in physical education and sports departments work in other business sectors, made us think that there might be issues related to career planning. In addition, as there was no any valid and reliable measurement tool towards career planning, demonstrated that there was a need for such a tool. In accordance with this, in this study we have carried out, it was aimed to develop a scale to determine career plannings of physical education and sports students and to test validity and reliability of it.

In this study, 23 items and 5 sub-factor scale were developed consisting of Career Awareness, Professional Awareness, Faith towards Career, Accuracy of Choice, Education Proficiency in order to determine career planning features of sports science students. Career awareness dimension consisted of 9 item, Professional awareness dimension; 4 item, faith towards career dimension; 4 item, accuracy of choice dimension; 3 item, and education proficiency dimension consisted of 3 item. Analysis results toward construct validity of scale revealed that scale items had acceptable level of factor loading and scale was in a five factor form.

It was also revealed that internal consistency was generally on acceptable level. There was a significant relationship between the dimensions of scale. These results demonstrated that **CPS**'s validity and reliability was on a sufficient level. It was thought that with this shape of the scale can be used to determine career planning features of sports sciences students, and also thought to contribute to literature as a valid and reliable measurement tool. It can be recommended that this study can be carried out with larger groups as it has limited groups in current study. The scale was also recommended to be used for sports high school students and graduate students as well as using it for undergraduate students by repeating their validity and reliability studies.

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Why Do Students Prefer Different Question Types?

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Abstract

Measurement tools that are used in education are important factors that affect course success and motivation of students. This study aims to determine the opinions of high school students on different question types. As the subgoals of the research, the study aims to determine the reasons for multiple choice test preference and its effect on learning motivation level according to the grade. Study group consists of 355 students who are 10th, 11th and 12th graders in state schools in Istanbul province center in spring term of 2018-2019 school year. Mixed method and convergent parallel design were utilized for the study. “Academic Motivation Scale (AMS)” that was developed by Bozanoğlu (2004) and “Inventory of Motives to Prefer Written, Short-Answer, True-False and Multiple-Choice Questions (IMP)” that was developed by Eser (2011) were used for data collection in the study. Interview method was utilized to determine the opinions of teachers on test types. Therefore, semi-structured interview form was prepared as a data collection tool. Data analysis was made by using Multivariate Analysis of Variance (MANOVA). As a result, the study found that the motives to prefer multiple-choice questions and averages of learning motivation vary significantly in favor of 10th grade students and final year students in high school. The study revealed that student performance varies by question type. The study also found that multiple-choice questions can be considered as a motivation factor for high school students and a good way of testing the goals and achievements.

Keywords: High School Students, Learning Motivation, Mixed Method, Question Types

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INTRODUCTION

Exam is a method that is applied to measure the accumulation of knowledge and development of students in the education process. Nowadays, it has become an obligation in some way and also one of the efficient methods particularly in receiving feedbacks for the results of the education system. Students encounter exams at all stages of their education life beginning from primary school. In addition to this, exams continue for the whole life after university education is complete. For this reason, exams have an important place in people's life. Considering such an important factor in detail, we encounter different types of exams. In a study on students, student motivation is split into four types: external, internal, social and achievement motivation (Jenkins,2001).

Common question types encountered in the education system are classified as written, multiple-choice, open-ended, gap-filling, matching, classification, true-false and short-answer questions. Students may have different opinions on these exam types. According to Kılıç and Çetin (2018), one of the reasons for the students to have different opinions on the exam types is that exam type preferences of students may be affected by the difference in their strengths and weaknesses. Besides, it is emphasized that exam type preferences of students may vary by their understanding of learning or the level of exam anxiety. In addition, success of students is largely attributed to their awareness of their own learning style and being able to direct their learning. While some students think that they express themselves better in open-ended questions, others think that they find the definitive answer in multiple-choice questions. Among such exam types, multiple-choice and open-ended questions come to the forefront.

While students choose the answer among the predetermined options in multiple-choice exam questions, there is no such option for the answer in open-ended questions. The answer totally depends on the knowledge and skills of students. Therefore, differences of opinion particularly on these two types have arisen among the students; while some students turn towards multiple-choice exam type, others consider open-ended questions suitable (Gronlund, 1998). Clarke et al. (2005) began studying the research question "Is there any difference between student preferences and evaluation types?" and verified the fact that there is a significant difference in student preferences and MCQ test is the most preferred option on average.

Academic motivation is an effective factor that determines the determination and energy of the individual, guides their behavior and ensures their continuation (Dunn & Stephens, 1972). They experience difficulties as the negative attitudes and beliefs about learning change in later years. Therefore, the change of motivation for learning at an early age plays an important role (Patrick et al., 2008).

In literature, studies related to exam type preferences (Kılıç, 2016; İlhan Beyaztaş & Senemoğlu, 2015; Bal, 2013; Demir, 2012; Eser, 2011; Büyüköztürk & Gülbahar, 2010; Bayrak, 2007) were found. In the research conducted by Grandt (1987), the gender effect on success in the multiple choice exam type was analyzed. Accordingly, it has been revealed that male students perform better in the multiple choice exam type than female students. Zeinder (1987), in his study on high school students, stated that the students found multiple choice questions more simple, understandable, interesting and fair. In addition, they found that they preferred the multiple choice question type to open-ended questions.

Purpose and Importance of the Study

The purpose of this study is to find out the opinions of high school students on different exam types and reveal the motives of their opinions. In the meantime, the study aimed to determine the motives of high school students to prefer multiple-choice questions depending on their grades and their effect on the level of learning motivation. In order to hold the optimal exam for students, it is important to take their opinions on different exam types and reveal the motives for them. In addition, it

is also important to analyse the motives of students to prefer multiple-choice questions depending on their grades and their effect on the level of learning motivation.

METHOD

Research Model

In this study, the mixed method in which qualitative and quantitative research methods were employed together was used and the study was developed by using convergent parallel design. According to this design, qualitative and quantitative findings were obtained simultaneously in the study (Creswell, 2012). Phenomenological design which is one of the qualitative research methods was used. A study with phenomenological design focuses on the common meaning of the experiences of several people with respect to a phenomenon or concept (Creswell, 2012). Scanning design is used as quantitative research method. According to this design, it is aimed to reveal a situation as is in a study (Karasar, 2000).

Study Group

Study group of the qualitative part of the study consists of 12 high school students in total in the state schools in Istanbul province, Uskudar district; of the students, four are 10th graders, four are 11th graders and four are 12th graders. Of them, five are male and seven are female.

Study group of the quantitative part of the study consists of 355 students in total who are 10th, 11th and 12th graders in the state schools in Istanbul province, Uskudar district. While 80.8% of the students in the study group (287 students) are female, 19.2% of them (68 students) are male. Besides, 23.1% of the students (82 students) are 10th graders, 26.5% (94 students) are 11th graders and 50.4% (179 students) are 12th graders.

Data Collection Tools

In the part where qualitative method is used, semi-structured interview technique was used as a data collection tool. A pilot study was made beforehand and then final interview questions were obtained. Final semi-structured interview questions consist of five open-ended questions, and flexibility is ensured in these questions according to understanding levels of the students. Face-to-face interviews were made with the students, and notes were taken in the interviews with each student. The interviews lasted for about three hours in total.

Semi-structured interview questions are as follows;

1. Do you think that different exam types have any impact on your success? What are the reasons for thinking or not thinking this way?
2. Do different exam types increase your anxiety or excitement? Could you please explain this along with the reasons?
3. Among multiple-choice, gap-filling, true-false, matching, classification, short-answer questions, open-ended question types, which type would you prefer and what is the reason for this preference?
4. Do you think that multiple-choice questions reflect your actual success? Could you please explain the reasons for your positive or negative thought?
5. If you become a teacher in the future, which exam type would you use in the questions you prepare for your students? Why?

Two scales were used in quantitative method part of the study. One of the scales is “Academic Motivation Scale” that was developed by Bozanoğlu (2004). This scale consists of 20 items and 1 reverse item. 5-point likert scale is used for rating, and the rates are as follows: 1= Strongly not applicable, 2= Not applicable, 3=Neutral, 4=Applicable, 5=Strongly applicable. In the studies made on scale reliability, test-retest method in which 101 high school students participate was applied, and the correlation between the two application was found .87 (Bozanoğlu, 2004).

Another scale that was used in this study is the measurement tool ”Inventory of Motives to Prefer Written, Short-Answer, True-False and Multiple-Choice Questions (IMP)” that was developed by Eser (2011) . This tool was used to measure exam type preference levels of high school students and determine the motives. 3-point Likert scale was used for IMP separately for each exam type, and the rates are as follows: (1) Not true for me, (2) Partly true for me, (3) Entirely true for me (Eser, 2011).

Data Analysis

In the qualitative method part of the study, the data that were obtained from the semi-structured interview results were used in data analysis. Descriptive analysis was used for data analysis. In this analysis method, a descriptive analysis was made based on the words and the language used in qualitative analysis (Kümbetoğlu, 2005). The participants in the study group, for instance, were coded as follows: 1st female student was coded as (F, student 1), 2nd male student was coded as (M, student 2). The data obtained from all of the participants were coded in this way and presented in the findings section.

In the quantitative method part, the data were analysed by using SPSS program. Multivariate Analysis of Variance (MANOVA) was used to test if the dependent variables of the motives to prefer multiple-choice questions and the learning motivation vary by the independent variables of grades.

FINDINGS

In this study, the data were obtained and the findings were analysed by using qualitative and quantitative method simulatenously. In this section, the findings that were obtained by using qualitative method were presented first.

In order to obtain findings through semi-structured interview questions; the students were asked “Among multiple-choice, gap-filling, true-false, matching, classification, short-answer questions, open-ended question types, which type would you prefer and what is the reason for this preference?”. The findings of this question are as follows:

“I prefer multiple-choice questions. In such exams, the questions are asked from where I have studied. Besides, the chance to find the correct answer is higher and cheating is easier.” (F, Student 3)

“I prefer multiple-choice exam type most. Because the answer to the questions is written in one of the options and one can easily understand the question. I arrive at answer by ruling out options.” (F, Student 2)

“My preference is multiple-choice type. I can find the correct answer even if I don’t know anything about the question. I turn the wheel and find the correct answer.” (F, Student 5)

“I prefer open-ended type. The reason is that one can get full score by writing what the teacher covered in the class. But we directly lose the full score if we give wrong answer in multiple-choice questions.” (F, Student 8)

"I mostly do well in open-ended exams. I provide all I know for the question, and options don't misguide me." (F, Student 11)

Upon viewing the answers of the students, it was found that the majority of the students prefer multiple-choice exam type. The reason for this is generally attributed to the chance of finding the correct answer even if they do not know anything about the question. Other students prefer open-ended exam type. These students stated that they directly lose the full score when they fail to give the correct answer in multiple-choice questions, but they can get a certain score to the extent of their knowledge in open-ended questions. Some students stated that open-ended exams are easier and they are not torn between two options as in the case of multiple-selection exams.

Another question that was asked to the students is; "Do you think that different exam types have any impact on your success? What are the reasons for thinking or not thinking this way?". The findings of this question are as follows:

"I think question type is highly effective in testing achievement, I cannot fully express my thoughts and knowledge in open-ended questions. But I often do well in multiple-choice exams because of being more comfortable." (M, Student 6)

"I don't think so, people may make mistakes, and may not exactly reflect their knowledge during exam." (F, Student 2)

"I get stressed a lot in multiple-choice exams and all other types of exams. So, it doesn't have any impact." (M, Student 4)

"There is always a chance to find the correct answer in multiple-choice questions. One cannot give any answer to open-ended questions if nothing comes to mind, so it is more stressful." (M, Student 9)

"Yes, my success varies by the type of exam. I get better scores especially in open-ended exams." (F, Student 7)

When the data above were analysed, students were found to state that they are mostly more successful in multiple-choice exams. Some students stated that success doesn't vary by exam types. The students emphasized that all exam types have the same content and cause stress equally.

Another question that was asked to the students is: "Do different exam types increase your anxiety or excitement? Could you please explain this together with the reasons?" The findings of this question are as follows:

"I am mostly more comfortable in multiple-choice exams." (F, Student 5)

"I get panicked in exams regardless of the question type." (F, Student 2)

"I'm afraid of open-ended exam questions. Sometimes, a question looks complicated." (F, Student 8)

"If I know anything about the subject, I can comfortably answer any types of questions." (M, Student 1)

"I get stressed in all exam types, I generally experience exam stress." (M, Student 9)

When the data above were analysed, majority of the students were found to express that different exam types increase their exam anxiety and excitement. Some students stated that their anxiety and stress don't vary by exam types. Other students emphasized the importance of knowledge and stated that there is no need to get stressed as long as the question is known. In addition, the

students expressed that their anxiety and excitement are not related to question types, but “the exam”, and they are excited in all exam types.

Another question that was asked to the students is; “Do you think that multiple-choice questions reflect your actual success? Could you please explain the reasons for your positive or negative thought?” The findings of this question are as follows:

“I think open-ended questions can reveal the actual success. Because, I can express my knowledge and thoughts clearly in this question type.” (F, Student 12)

“I think the speed of reading, comprehension and solving increase as I solve multiple-choice questions. I think it affects success positively.” (F, Student 10)

“Neither actual success nor inadequacies can be revealed only through multiple-choice question type. There must be different question types in exams.” (M, Student 10)

“Open-ended questions may bring actual success. I think there isn’t such opportunity in multiple-choice type.” (F, Student 7)

“Absolutely no. I don’t believe single exam type can reveal actual success.” (F, Student 2)

When the data above were analysed, it was found that while majority of the students stated that multiple-choice questions reflect actual success, others stated that multiple-choice questions don’t reflect actual success.

A different question that was asked to the students is as follows: “If you become a teacher in the future, which exam type would you use in the questions you prepare for your students? Why?” Below are the findings of this question:

“I would use different question types. I would ensure my students to get used to all question types. Besides, preparing different question types would be efficient in better evaluating the knowledge of my students.” (F, Student 5)

“Sometimes, I would mostly prepare open-ended exams in case there might be some students that give wrong answer to multiple-choice questions although they know the subject.” (M, Student 9)

“I would prefer open-ended questions to evaluate the extent of knowledge of students.” (M, Student 4)

“If I were a teacher, I wouldn’t hold an exam by using a single question type. I would use multiple-choice questions for easy subjects and open-ended questions for the hard ones.” (F, Student 3)

“I am mostly comfortable in giving answers to open-ended questions. So I would prepare open-ended questions if I were a teacher.” (M, Student 4)

When the data above were analysed, majority of the students were found to state that they would prepare questions in open-ended type for students if they become teachers in the future. While some students stated that they would hold a type of exam for each grade depending on their level, others stated that they can prepare exams in both multiple-choice and open-ended question types.

The findings that were obtained by using quantitative method in this study are presented below.

In this section, we tested if the motives of the students to prefer multiple-choice exams and their learning motivation vary by grades, and presented the analysis results.

The study hypothesis is “Do problem-solving skills and learning motivation of students regarding multiple-choice exams vary by grades?”. As seen in Table 1, 10th graders have the highest level of problem-solving skills regarding multiple-choice exams ($\bar{X}=3.60$) in the evaluation that was made by grades. On the other hand, 11th graders were found to have the highest level of learning motivation ($\bar{X}=2.24$).

Table 1 Descriptive Statistics of Scores of the Students by Grades

Dependent Variable	Grade	N	\bar{x}	SD
The motives to prefer multiple-choice exams	10	82	3.60	.434
	11	94	3.56	.409
	12	179	3.47	.418
Total		355	3.52	.422
Learning motivation	10	82	2.31	.253
	11	94	2.24	.292
	12	179	2.23	.288
Total		355	2.25	.283

N: Number of individuals \bar{X} : Average SS: Standard deviation

In table 2, multivariate analysis of variance was used to test if the differences between the averages as a result of the evaluation that was made by grades are statistically significant, and it was found that averages are significantly different from each other (Wilks Lambda (L)=.971, F=.2.559; $p>.05$).

Table 2 Multivariate Analysis of Variance (MANOVA) Results of the Scale Scores

	Value	F	Hypothesis sd	Error sd	p
Wilks' Lambda	.971	2.559b	4.000	702.000	.038

It was found as a result of the two-way trail analysis in Table 3 that averages of learning motivation vary significantly by grades ($F=3.045$ $p<.001$), and there isn't any significant difference among the averages of the motives to prefer multiple-choice exams by grades ($F=2.462$; $p>.05$).

Table 3 Two-Way Trail Test Results of the Scale Scores

Dependent Variable	Sum of Squares	df	Mean Square	F	p
The motives to prefer multiple-choice exams	1.073	2	.537	3.045	.049
Learning motivation	.390	2	.195	2.462	.087

When the average differences of the motives to prefer multiple-choice exams and learning motivations were analysed by grades according to the multiple comparison test for finding the source of difference among the averages in Table 4, significant differences were found among 10th and 12th graders.

Table 4 LSD Paired Comparison Results Regarding Scale Scores

Dependent Variable	Grade (I)	Grade (J)	Difference of Average (I-J)	SE	p
The motives to prefer multiple-choice exams	10	12	.1266*	.05597	.024
Learning motivation	10	12	.0823*	.03752	.029

* $p<.001$ SE: Standard error

Findings on the correlations among the motives to prefer multiple-choice exams and learning motivations

Results are presented for the Pearson Correlation analysis that was made in order to find if there is a significant correlation among the scores of the motives of the students to prefer multiple-choice exams and their learning motivation.

Positive significant correlations were found among the motives of the students to prefer multiple-choice exams and their learning motivation [$r=.95$].

CONCLUSION AND DISCUSSION

Results of the findings that were obtained from the study fit for purpose. Opinions of the students on exam types were obtained and the motives for these opinions were revealed. Considering in general terms, the students put emphasis on multiple-choice and open-ended exam types. Of these two exam types, they preferred multiple-choice exam type most. However, there isn't any significant difference between the number of students that prefer multiple-choice and open-ended exam types. In addition, high correlation was found between the motives to prefer multiple-choice exams and the learning motivation as a result of the study. The motives to prefer multiple-choice exams and the learning motivation differ among the final year students and 10th graders. The results of this study have parallels with those of the studies in this field. According to Kılıç and Çetin (2010), multiple-choice exam type is used in many important exams in our country. Therefore, multiple-choice is one of the exam types which the students that prepare for such exams are mostly familiar with. This case is considered as one of the motives of students to prefer multiple-choice exams more. Learning approaches can be defined as certain strategies that students adopt for studying and their different learning characteristics. It was found that various tools were developed in order to measure them (Cassidy, 2004). Coffield et al. (2004), emphasized various academic foundations of the study on learning styles. These foundations are grouped in three approaches; theoretical, pedagogical and commercial.

Majority of the students admit the hypothesis that different exam types have impact on their success. Also, most of them stated that their exam anxiety and excitement don't vary by exam types. These students indicated that their anxiety is not related to the exam type, but "the concept of exam" itself. Students feel a certain level of anxiety regardless of exam type, because they feel that they are evaluated in exams. Most of the students stated that multiple-choice exams are not sufficient alone in evaluating their knowledge and skills. But still, they prefer multiple-choice exams for various reasons.

However, there are contradictions between the answers they give as a student and the answers they give when they consider themselves as teachers. Most of the students that prefer multiple-choice exam type stated that they would hold open-ended exams for their students when they become a teacher. Besides, there are also students who think that "they would apply both exam types and hold a different exam type for each grade". When we take into account all of these, the students know which exam types benefit them, but they refrain from such exams. Teachers may explain the qualitative and quantitative characteristics of different exam types to students in order to prevent such negative attitudes towards some exam types. In open-ended questions, teachers may avoid using the question types that may unsettle students, and make evaluations by taking account of their interpretation skills besides measuring their accumulation of knowledge. They can make inferences upon exam evaluations and apply the activities and excercises that are suitable for these inferences in the class. In this way, their problems related to different exam types may decrease by means of improving the skills of students as well as making up the deficiencies in their accumulation of knowledge. In addition, the benefit of multiple-choice question type can be emphasized for the students that refrain from such questions. According to Traub (1990), students take a more positive attitude towards multiple-choice exams compared to free response tests. Because, they think that preparation for these tests is easier, they are easier to solve, decrease stress and anxiety and thus bring them relatively higher scores.

Furnham, Batey and Martin (2011) carried out studies in which multiple-choice exams and continuous assessment methods are preferred by students. They found that these methods promote participation and increase the motivation and learning of students. In addition, Bandarage et al. (2009) stated that multiple-choice exams are the sources of motivation for students in terms of continuous assessment.

While multiple-choice and open-ended exams can be applied, different exam types can also be applied. Every exam type has a purpose of application. Hence, teachers should not limit themselves to a single exam type for their students, they should also apply different types. Thus, target achievements can be measured through different question types.

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Determination of Science and Primary Teachers' Teaching and Learning Conceptions and Constructivist Learning Environment Perceptions

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Abstract

The significance of both science education and scientific communication has increased in parallel to the increase in scientific knowledge and rapid advances in technology. In producing students who have science literacy, skills of scientific process and higher-level thinking skills teaching-learning approach of teachers and communication between teachers and students are very significant. The purpose of this study is to determine the science teachers' and primary teachers' learning and teaching conceptions and constructivist learning environment perceptions. The sample of the study consists of 100 participants from science teachers and primary teachers working at the public schools in the Central Anatolia region. "Easily accessible sampling method" was used for the selection of the participants. The study is quantitative research and a survey method that is directed to the determination of the current state has been used. Teaching-Learning Conceptions Questionnaire (TLCQ) and Constructivist Learning Environment Survey (CLES) have been used as the means of data collecting. The findings of the study suggest that the classroom teachers had a constructivist approach in contrast to a conventional approach in regard to learning and teaching. Similarly, it was found that the science teachers had a constructivist approach in contrast to a conventional approach in regard to learning and teaching. It was found that the participants generally had a constructivist approach and that their perception of the constructivist learning setting is higher than the medium level. It was also found that the science teachers had higher perceived levels of about constructivist learning setting than the classroom teachers. The results of the MANOVA indicated that the professional experience of the participants had a significant effect on the perception levels about the constructivist learning-teaching approach. That's why the research for the reflections in application gains importance in this study.

Keywords: Constructivist Learning Environment Perceptions, Primary Teachers, Science Lesson, Science Teachers, Teaching And Learning Conceptions

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INTRODUCTION

Nowadays in which we are living the fourth industrial revolution, scientific information is increasing rapidly, and the rapid progress of technology is increasing the need for science-literate individuals in society. Science Curriculum in Turkey, it is suggested teachers to use the inquiry-based learning approach to train science-literate individuals (Ministry of National Education [MNE], 2013; 2018).

It has been argued that there are two major learning-teaching approaches dominating teaching practices (Schunk, 2008): (a) conventional approach and (b) constructive approach (Aypay, 2011; Bıkmaz, 2011; Chan and Eliot, 2004; Cheng, Chan, Tang and Cheng, 2009; Eryaman, 2007; Şahin and Yılmaz, 2011; Schunk, 2008). It has been suggested that in order for teachers to offer efficient and productive teaching they should employ and follow a constructivist teaching approach of which the focus is on students. The major goal for the constructivist teaching approach is to produce sound and long-lasting learning as well as to improve higher-level cognitive skills (Şaşan, 2002). In a constructive learning environment students should be active participants and teachers, on the other hand, do not just transmit knowledge, but are facilitators in that they guide students in constructing knowledge and in discovering the meaning (Dunlop and Grabinger, 1996).

For the teachers who adopt a conventional approach there is no concern about active student participation and in conventional learning-teaching environments teachers are the sole authority and they themselves guide the environment (Brooks and Brooks, 1999). Such teachers ask questions and attempt to give correct answers from students. In such environments students memorize the information, resulting in that full learning does not take place. Conventional learning and teaching techniques employed in science education are mostly insufficient for concept teaching and direct students to memorize the information offered by teachers. These techniques do not support reducing student misconceptions about topics that require definition, explanation, and prediction (Hewson, 1981; Posner, Strike, Hewson and Gertzog, 1982).

The learning environment has significant effects on student learning. Research suggests that teachers should take into consideration the significant impacts of the learning environment on learning (Fisher and Fraser, 1981; Simpson and Oliver, 1990; Riedler & Eryaman, 2016; Taylor and Fraser; 1991; Taylor, Fraser and Fisher, 1997). In learning and teaching environments based on constructivist approach students take the responsibility of their learning and are active participants of the learning process. Learning and teaching environments based on constructivist approach support for students' active participation, students' questions about the topic at hand, explanations about their thinking, development of alternative perspectives, discussions, and reflections about the topic. Such an environment encourages students to develop their own plans for learning and allows students to learn the topic in their unique way (Taylor and Fraser; 1991; Taylor et. al., 1997). In short, learning and teaching environments based on the constructivist approach contributes to long-lasting learning and to improve high-level cognitive skills. In constructivist environments, there is efficient communication between teachers and students and students discuss and exchange their ideas with their peers. In addition, students are offered opportunities to have information about topics from daily life and in turn, they can employ their learning in daily life situations (Acat, Anılan and Anagün 2007).

Dialogues in a classroom environment between students and teachers and between students have significant effects on student learning (Ecevit and Çakmakçı, 2017). Such communication is reported to have significant effects in improving students' independent thinking, critical thinking and the skills of problem-solving and of reasoning. Teachers may employ the following questions to improve students' scientific communicative skills: "What do you think about it?", "How did you solve the problem?", "Why do you think in this specific way?", "Is it correct for you?", "Who wants to summarize what your friend has explained?", "What do you think about this topic?", "Do you have any objection?", "Is there anyone to add something to it" (Scott, Mortimer and Aquiar, 2006).

Effective science education is very important nowadays in which the fourth industrial revolution, where scientific knowledge and technology develop rapidly. Teaching and learning approaches and constructivist learning environments that teachers have in order to educate students with scientific literacy, inquiry, questioning, high-level thinking 21st-century skills are very important. It can be stated that there are nearly no studies (Head, 2014, January, January and Kalender, 2017) related to teachers' teaching-learning understandings in which the research of the teacher-learnings understanding of the teacher candidates is examined (Aypay, 2011; Bıkmaz, 2011; Oğuz, 2011). It is very important to investigate the teaching-learning attitudes that teachers have and to organize in-service training of teachers in this direction. In this study, it is aimed at revealing the learning-teaching approach of science and classroom teachers and their perceptions about constructivist learning environments.

Research Problem

In parallel to this aim, the study tries to answer the following research questions: How do the teachers' conceptions of learning-teaching and constructivist learning environment perceptions according to the field of teaching, the gender, and the teaching experience?

METHODOLOGY

Research Design

The study was designed as quantitative research. It included and employed a comparative survey method which attempts to provide a description of a specific situation. Scanning model is a research technique which also tries to describe a situation of past or present as it is (Balcı, 2001; Fraenkel and Wallen, 1993; Karasar 2005; Yıldırım and Şimşek, 2004).

Research Sample

The participants of the study were science teachers and classroom teachers working at public schools in Turkey's central Anatolia during the school year of 2014-2015. More specifically, 100 teachers participated in the study. Of them, 61 were classroom teachers and 39 were science teachers. On the other hand, of the 44 were females and 56 were males. Table 1 shows demographic information about the participants including their field of teaching, gender and the year of teaching experience.

Table 1. Demographic information about Participants

Field of Teaching	N	%
Primary Teacher	61	61
Science Teacher	39	39
Gender		
Female	44	44
Male	56	56
Teaching Experience		
1-5 year	18	18
6-10 year	25	25
11-20 year	41	41
20 year	16	16

Research Instrument and Procedure

Teaching-Learning Conceptions Questionnaire (TLCQ)

In order to reveal the dominant learning-teaching approach adopted by the participants the scale of teaching and learning developed by Chan and Elliot (2004) was used. Aypay (2011) adapted the scale into Turkish and carried out the reliability and validity analysis of the scale. It is a five-point Likert-type scale and has two dimensions as well as 30 items. The dimensions of the scale are the constructivist approach and the conventional approach. There are twelve items about the first dimension and eighteen items about the second one. The items are answered through five options: 1 “totally disagree”, “2” disagree, “3” undecided,” “4” agree, and “5” totally agree. The reliability coefficient of the first dimension, the constructivist approach, is .86, that of the second factor, the conventional approach, is .83. It is .84 for the scale as a whole.

Within the scope of this research, the Cronbach’s Alpha reliability coefficients of the scale used to collect the data were analyzed through the reliability test. For the conventional approach dimension of the scale of the learning-teaching approach it was found to be .87 and for the constructivist approach dimension of the scale, it was found to be .79. The Cronbach’s Alpha reliability coefficient for the scale as a whole was found to be .87.

Constructivist Learning Environment Survey (CLES)

In order to uncover the perceptions of the participants about the constructivist learning-teaching environment the scale of a constructivist learning environment developed by Taylor and Fraser (1991) was used. The scale was revised by Ibera (2005) and adapted into Turkish by Acat et. al. (2007). It is again a five-point Likert-type scale and has six dimensions and 25 items. The dimensions of the scale are as follows: learning the world which has six items, learning science which includes four items, learning to express his own views which have four items, learning to learn which covers three items, learning to communicate scientifically which has five items, and the approach towards the class which includes three items. Answers to the items have the following options: 1 none, 2 rarely, 3 sometimes, 4 frequently, and 5 every time.

Table 2. Dimensions of and Sample Items from the Scale of Constructivist Learning Environment

Sub-Dimension	Examples of Substances
Personal Relevance- Learning about the Word	Students understand life outside the school better in science classes.
Scientific Uncertainty- Learning about science	Students would learn that science has changed over time
Critical Voice- Learning to Speak out- Shared Control- Learning to Learn	It was OK for student to ask me “why do I have to learn this?” In science lessons, students can help teach what they will learn.
Student negotiation- Learning to Communicate	In science lessons, students may want to explain each other’s reasons for their ideas.
Attitude Towards Class	Students are eagerly awaiting learning activities in science classes.

Within the scope of this research, the Cronbach’s Alpha reliability coefficients of the scale used to collect the data were analyzed through the reliability test. For the dimensions of the scale of constructivist learning environments the Cronbach’s Alpha reliability coefficients were found to be as follows: .73 for the dimension of learning the world, .64 for the dimension of learning science, .70 for the dimension of learning to express his own views, .60 for the dimension of learning to learn, .79 for the dimension of learning to scientifically communicate and .62 for the dimension of the approach towards the class. It was found to be .89 for the scale as a whole.

These values show that the scales are reliable and serve the aim of the study. Before the administration of the data collection tools, the participants were informed about the study and their permission was granted. Of the data collection tools, the scale of teaching and learning was first administered. Following the administration of this scale, the participants rested for 20 minutes before the administration of the other one.

Data Analysis

The data collected were analyzed by using the SPSS 22.0 (Statistic Package for Social Sciences). Descriptive statistics and one-way MANOVA. The use of MANOVA requires the analysis of the hypotheses about MANOVA. The related hypotheses were as follows: single and multivariable normality, extreme values, linearity, multiple linear equations and singularity, homogeneity of the variance-covariance matrix (Pallant, 2005). Single variable normality was analyzed using the test of normality and found that the value of Kolmogorov-Smirnov was statistically significant [KSZ=.200, $p < .05$]. Therefore, this finding showed that the data were found to have a normal distribution. For multivariable normality, the Mahalanobis offset value was employed. There were eight dependent variables of the study, namely the conventional learning-teaching approach, constructivist learning-teaching approach, learning the world, learning science, learning to express his own views, learning to scientifically communicate and the approach towards the class. Pearson and Hartley (1958) argued that for a study with a dependent variable the critical value for the Mahalanobis distance is 26.13. The values higher than this are regarded as the extreme values of the Mahalanobis offset value. In this study the Mahalanobis off set value was found to be 24.22 (Pallant, 2005). Linearity among the independent variables was analyzed and it was found that there was a linear correlation among them. Pallant (2005) argued that among all binary combinations of dependent variables has a linear correlation. Concerning the homogeneity of the variance-covariance matrix, the statistically insignificance of the Box's M test indicates that this hypothesis is met (Pallant, 2005; Tabachnick and Fidell, 2007). In the study, it was found that for the scale of learning-teaching approach Box's M is 1.138 [$p = .263$], and for the scale of constructivist learning environments, it is 1.070 [$p = .313$]. Given that all hypotheses related to MANOVA were met, it was used in the study. Although this test may be used for different aims, in the study it was specifically used for variance analysis. The reason why MANOVA was selected in this study was that in ANOVA, the analyses were carried out for one dependent variable in terms of independent variables in each case, as MANOVA gave the opportunity to test more than one dependent variable for the same independent variables with less error. Therefore it was possible to demonstrate all the results in one table without unnecessary repetitions.

RESULTS

The findings about the research problems are given as follows:

According to Teachers' Field of Teaching

- a- How are the teaching-learning conceptions and constructivist learning environment perceptions?
- b- Is there any significant difference among the levels of teaching-learning conception?
- c- Is there any significant difference among the perceptions of the constructivist learning environment?

As given above the first research question is about the perceptions of the teachers about the learning-teaching approach and the constructivist environments. Descriptive statistics and MANOVA were employed to see whether or not the data collected differed. The results are given in Table 3.

Table 3. Results of descriptive Statistics and Test of between Subject Effects According to Teachers' Field of Teaching

Dimension	Branch	Mean X	Std Deviation	N	F	Sig
Conventional Teaching- Learning Conceptions	Primary Teacher	3,37	,65	58	0,247	,621
	Science Teacher	3,49	,58	39		
Constructivist Teaching-Learning Conceptions	Primary Teacher	4,45	,42	58	2,004	,161
	Science Teacher	4,49	,43	39		
Personal Relevance- Learning about the Word	Primary Teacher	3,88	,47	57	0,114	,737
	Science Teacher	4,08	,62	38		
Scientific Uncertainty- Learning about science	Primary Teacher	3,48	,55	57	1,491	,226
	Science Teacher	3,51	,68	38		
Critical Voice-Learning to Speak out	Primary Teacher	3,59	,68	57	3,567	,063
	Science Teacher	3,56	,72	38		
Shared Control- Learning to Learn	Primary Teacher	3,24	,74	57	0,038	,846
	Science Teacher	3,44	,74	38		
Student negotiation- Learning to Communicate	Primary Teacher	3,95	,56	57	0,681	,412
	Science Teacher	4,04	,62	38		
Attitude Towards Class	Primary Teacher	4,13	,59	57	0,13	,689
	Science Teacher	4,17	,58	38		

Descriptive statistics showed that the classroom teachers had a constructive approach ($X=4,45$) rather than a conventional approach ($X=3,37$). Similarly, science teachers were found to have a constructive approach ($X=4,49$) rather than the conventional approach ($X=3,49$). The perceptions of science teachers about the constructivist learning environment were found to be higher than those of classroom teachers. On the other hand, the learning and teaching approach of the teachers participated in the study according to questionnaire consisting of two dimensions and analyzed with two-way MANOVA was not significantly different based on their field of teaching ($p < .05$) [Wilks' Lambda= 0,975 $F(2, 80)=1,013$ $p=,368$ $ES=,025$ $Power=,221$]. Similarly, as the constructivist learning environment survey included six dimensions, MANOVA was applied and according to the findings, perceptions of the teachers participated in the study was not significantly different according to their branch ($p < .05$) [Wilks' Lambda= 0,913 $F(6, 75)=1,196$ $p=,318$ $ES=,087$ $Power=,443$]

According to Teachers' Gender

a- How are the teaching-learning conceptions and constructivist learning environment perceptions?

b- Is there any significant difference among the levels of teaching-learning conception?

c- Is there any significant difference among the perceptions of the constructivist learning environment?

As given above the second research question is about the perceptions of the teachers about the learning-teaching approach and the constructivist environments. Descriptive statistics and MANOVA were employed to see whether or not the data collected differed. The results are given in Table 5. Female participants were found to have a constructive approach ($X=4,51$) rather than the conventional approach ($X=3,45$). Similarly, male participants were found to have a constructive approach ($X=4,43$) rather than a conventional approach ($X=3,39$). The perceptions of female teachers about the constructivist learning environment were found to be higher than those of male teachers.

Table 4. Results of Descriptive Statistics and Test of between Subject Effects based on Gender

Dimension	Gender	Mean X	Std Deviation	N	F	Sig
Conventional Teaching- Learning Conceptions	Female	3,45	,63	42	0,201	,655
	Male	3,39	,61	55		
Constructivist Teaching-Learning Conceptions	Female	4,51	,40	42	0,521	,473
	Male	4,43	,43	55		
Personal Relevance- Learning about the Word	Female	4,09	,57	41	1,870	,175
	Male	3,86	,50	54		
Scientific Uncertainty- Learning about science	Female	3,59	,68	41	0,073	,788
	Male	3,41	,52	54		
Critical Voice-Learning to Speak out	Female	3,66	,75	41	0,553	,459
	Male	3,51	,63	54		
Shared Control- Learning to Learn	Female	3,22	,78	41	0,072	,790
	Male	3,32	,70	54		
Student negotiation- Learning to Communicate	Female	4,09	,59	41	0,464	,498
	Male	3,90	,57	54		
Attitude Towards Class	Female	4,20	,59	41	0,277	,600
	Male	4,09	,58	54		

As can be seen in Table 4, gender was found to have no statistically substantial effect of the participants' learning and teaching approach ($p < .05$) [Wilks' Lambda = 0,989 $F(2, 80) = 0,438$ $p = ,647$ $ES = ,011$ $Power = ,119$]. Similarly, gender was found to have no significant effect on their perceptions about the constructivist learning environment ($p < .05$) [Wilks' Lambda = 0,957 $F(6, 75) = 0,556$ $p = ,764$ $ES = ,043$ $Power = ,210$].

According to Teachers' Teaching Experience

a- How are the teaching-learning conceptions and constructivist learning environment perceptions?

b- Is there any significant difference among the levels of teaching-learning conception?

c- Is there any significant difference among the perceptions of the constructivist learning environment?

In order to answer the third research question both scales were used. The related results are given in Table 5.

Table 5. Results of Descriptive Statistics and Test of between Subject Effects based on the Teaching Experience

Dimension	Teaching Experience	Mean X	Std Deviation	N	F	Sig
Conventional Teaching- Learning Conceptions	1-5 year	3,64	,70	18	3,373	,022
	6-10 year	3,60	,42	24		
	11-20 year	3,31	,57	40		
	20 year	3,13	,77	15		
Constructivist Teaching-Learning Conceptions	1-5 year	4,56	,40	18	3,603	,011
	6-10 year	4,55	,46	24		
	11-20 year	4,44	,34	40		
	20 year	4,28	,53	15		
Personal Relevance- Learning about the Word	1-5 year	3,97	,53	18	4,409	,006
	6-10 year	4,10	,53	24		
	11-20 year	4,00	,41	40		
	20 year	3,64	,76	15		

Scientific Uncertainty- Learning about science	1-5 year	3,58	,51	18	0,734	,535
	6-10 year	3,60	,48	24		
	11-20 year	3,39	,68	40		
	20 year	3,48	,65	15		
Critical Voice-Learning to Speak out	1-5 year	3,60	,66	18	2,240	,090
	6-10 year	3,77	,63	24		
	11-20 year	3,50	,70	40		
	20 year	3,41	,74	15		
Shared Control- Learning to Learn	1-5 year	3,24	,62	18	1,965	,126
	6-10 year	3,70	,52	24		
	11-20 year	3,23	,79	40		
	20 year	3,02	,83	15		
Student negotiation- Learning to Communicate	1-5 year	4,10	,61	18	2,328	,081
	6-10 year	4,19	,49	24		
	11-20 year	3,87	,58	40		
	20 year	3,79	,63	15		
Attitude Towards Class	1-5 year	4,20	,57	18	0,589	,624
	6-10 year	4,19	,58	24		
	11-20 year	4,12	,53	40		
	20 year	4,07	,75	15		

It was found that the teaching experience had a significant effect on the learning and teaching approach of the participants ($p < .05$) [Wilks' Lambda = 0,814 $F(2, 160) = 2,886$ $p = ,011$ $ES = ,098$ $Power = ,884$]. The Post-Hoc Tukey test was employed to find the source of this difference and it was found that there was a statistically significant difference between teachers with a teaching experience of 6-10 years and those with a teaching experience more than 20 years [$p = ,048$]. Similarly, Teaching experience was found to have no remarkable effect of the participants' learning and teaching approach ($p < .05$) [Wilks' Lambda = 0,720 $F(18, 212) = 1,456$ $p = ,109$ $ES = ,104$ $Power = ,865$]. It was found that the teaching experience of the participants led to an important difference in the dimension of learning the world of the scale of the constructivist learning environment [$p = ,006$]. The results of the Post-Hoc Tukey test showed that there was a statistically significant difference between teachers with a teaching experience of 6-10 years and those with a teaching experience of more than 20 years [$p = ,036$].

According to both the Teachers' Teaching Experience and Field of Teaching

a- How are the teaching-learning conceptions and constructivist learning environment perceptions?

b- Is there any significant difference among the levels of teaching-learning conception?

c- Is there any significant difference among the perceptions of the constructivist learning environment?

In order to answer the fourth research question both scales were used. Descriptive statistics and MANOVA were employed to see whether or not the data collected differed. Neither teaching experience nor the field of teaching was found to have no remarkable effect of the participants' learning and teaching approach ($p < .05$) [Wilks' Lambda = 0,877 $F(6, 160) = 1,816$ $p = ,099$ $ES = ,064$ $Power = ,668$]. Similarly, For the perceptions of the participants about the constructivist learning environment neither teaching experience nor the field of teaching were found to have significant effects ($p < .05$) [Wilks' Lambda = 0,726 $F(18, 212) = 1,4514$ $p = ,127$ $ES = ,101$ $Power = ,852$].

However, both the teaching experience and the field of teaching were found to have significant effects on the dimensions of learning to express own views and of learning to learn [p values; $p = ,032$ and $p = ,045$, respectively]. In order to reveal the reason for this the Post-Hoc Tukey test was employed. It was found that there was a statistically significant difference in these dimensions between teachers with a teaching experience of 6-10 years and those with a teaching experience more than 20 years [p values; $p = ,024$ and $p = ,048$, respectively].

DISCUSSION AND CONCLUSION

As a result of the data analysis, it was determined that both classroom teachers and science teachers had a constructivist understanding in general. However, it is very obvious that teachers continue to adopt the traditional teaching-learning approach into their teaching environment. This finding is consistent with the findings of the study conducted by Baş (2014) with Engin and Daşdemir (2015). This finding is also consistent with the findings of the studies conducted with the teacher candidates (Aydın, Tunca and Şahin, 2015, Aypay, 2011, Bıkmaz, 2011, Cheng et al., 2009, Oğuz, 2011, Şahin and Yılmaz, 2011). It can be stated that there are a change and development from the traditional understanding of the student-centered understanding that is constructivist understanding, in the science curriculum. This finding is thought to be a reflection of the fact that since 2004 the basic education programs have been developed based on the constructivist principles. Today teachers are expected to adopt a constructivist approach and to employ it in courses. However, the majority of teachers continue to tend to traditional understanding because of the fact that they have learned through teacher-centered understanding, although they usually say that they support constructivist understanding (Bıkmaz, 2017). In this context, it can be stated that science and classroom teachers tend to teach science in their classroom in the same way how they learn science in their primary and secondary school years, even during their higher education. Eren (2009) found that teacher candidates were more prone to the traditional teaching-learning mentality and interpreted it as the reason that teacher candidates were involved in the role models they encountered in their previous learning experiences. Anagün, Yalçınoğlu and Ersoy (2012) found that the teachers' beliefs about science and technology teaching-learning process supported the constructive teaching program in their practice, but the teachers' beliefs were not reflected to their class as they desired. As seen in Anagün, Yalçınoğlu and Ersoy's work, while teachers support constructivist understanding on the one hand, they continue to tend to traditional understanding on the other hand. In the study conducted by Acat, Anılan and Anagün (2010), classroom teachers were asked to evaluate their own learning environments and it was determined that classroom teachers did not pay enough attention to the experiences of students and did not use the constructivist approach effectively. It can be stated that science teachers mostly use the authoritarian / dialogue communication approach of teacher-student interaction where science teachers mostly use the narrative methods (Karamustafaoğlu, Bayar and Kaya, 2014). Baş and Beyhan (2013) and Chan and Eliot (2004) found that student teachers do not a clear preference over conventional or constructivist approaches.

Although the perceptions of female participants about the constructivist learning-teaching approach were found to be higher than those of male participants, this difference was not statistically significant. This finding is consistent with that of Baş and Beyhan (2013), Cheng et. al. (2009), Engin and Daşdemir (2015). However, it is consistent with the finding Aypay (2011) and Baş (2014) in that it was suggested by the study that gender played a significant role in the perceptions of the teachers about the learning and teaching approach.

In the study, it was found that the teaching experience of the participants had a significant effect on their learning-teaching approach. More specifically, those participants with much longer teaching experience had a conventional approach and those with less teaching experience had a more constructivist-oriented approach. Similarly, in the study conducted by Baş (2014), it was found that the teachers' learning-learning attitudes differed significantly according to the years of professional seniority. In this study, it was determined that younger teachers with lower occupational seniority have a more constructive teaching-learning attitude, while those with more seniority years have more traditional teaching-learning attitudes. On the other hand, it has been determined by the research conducted by Engin and Daşdemir (2015) that the teacher-learning attitudes of the class teachers do not show any significant difference according to the seniority year. The latter studies concluded that the teaching experience of teachers had significant effects on their learning-teaching approach. Similar findings were found in the studies on student teachers in that those in senior grades were found to adopt a conventional learning-teaching approach (Aypay, 2011; Bıkmaz, 2011). It can be argued that novice teachers tend to adopt a constructivist learning-teaching approach due to the effects of teacher training programs. Therefore, through in-service training activities more experienced teachers may be

made more familiar with the constructivist learning-teaching approach. Based on these findings, it is very important to organize in-service training so that teachers with more years of vocational seniority can develop a constructivist teaching-learning approach, and direct and support teachers in this direction. Similarly, teacher candidates should be given the opportunity to apply the research-question-based learning approach during their undergraduate education to teacher candidates. In this way, it might be possible to train science-literate individuals having 21st-century skills.

Creating a constructive learning environment for effective science education is one of the most important factors. It is real that the teaching-learning understanding that teachers have shaped the learning environment in their classroom. As known, the role of the teacher and the student in the constructivist learning environment is sharply contrary to his role in the traditional learning environment. The role of the teacher in the traditional learning environment; to explain the correct solution ways, to present open and resolvable problems to the students, to convey the knowledge that is possessed in order to provide silence and focus to the class in a clear and structured way. In contrast, in the constructivist learning environment, teachers direct students to question, create opportunities for them to develop independent problem-solving skills, and allow learners to take an active role (Chan, 2004). The constructivist learning environment requires an interactive / dialogue approach between teacher-student and student-student. In the constructivist learning environment, the teacher asks questions that are thought-provoking questions from a single correct answer, giving each student an opportunity in order to explain his reason with justification, and does not make a correct or incorrect assessment (Ecevit and Çakmakçı, 2017).

The learning environments based on the constructivist teaching approach produce sound and long-lasting learning as well as improve the higher-level cognitive skills of students. Therefore, teachers should take into consideration the learning environment (Fisher and Fraser, 1981; Simpson and Oliver, 1990; Taylor and Fraser; 1991; Taylor et. al., 1997).

Karadağ et. al. (2008) found that although the teachers participated in the study had a constructive learning-teaching approach, they could not manage to establish a constructivist learning environment in classrooms due to the following problems: insufficient teaching materials and tools in classrooms, crowded classrooms, time constraints, poor physical and financial status of schools, system-related drawbacks and unsupportive parents. On the other hand, Çınar et. al. (2007) argued that although teachers had a constructive learning-teaching approach, they still make use of conventional learning-teaching methods. Ersoy (2005) concluded that for teachers it is very difficult to give up following the teaching activities based conventional learning-teaching approach. In many studies, it has been determined that teachers are experiencing problems in constructivist learning environments (Yaşar et al., 2005, Selvi, 2006, Yücel et al., 2006).

In the study, it was found that the perceptions of the science teachers were higher than those of the classroom teachers in regard to learning the world, learning science, learning to learn, learning to communicate scientifically, and the approach towards the class. But this difference was not statistically significant. On the other hand, the classroom teachers were found to have higher perceptions than science teachers about learning to express his own views. However, this difference was not statistically significant either. Female teachers were found to have higher perceptions about learning the world, learning science, learning to express his own views, learning to communicate scientifically, and the approach towards the class. Male teachers, on the other hand, were found to have higher perceptions about learning to learn. However, these differences based on gender were not found to be statistically significant. Aydın et. al. (2012) found that the participants had higher mean scores for the dimensions of learning to express his own views and of learning the world and that the mean scores were lower for the dimensions of learning science and learning to learn. The reason for this finding seems to be that teachers do not have sufficient information about the nature of science as suggested by Lederman (2007).

In the study, it was also found that the teaching experience had an only significant effect on the perceptions about learning the world. Both the teaching experience and the field of teaching were

found to have significant effects on the dimensions of learning to learn and of learning to express his own views. Such differences were observed between teachers with a teaching experience of 6-10 years and those with teaching experience for more than 20 years. It can be suggested that those teachers with a teaching experience of more than 20 years are unfamiliar with the constructivist approach. For this reason, it is very important to provide in-service training seminars on the nature and teaching of science, the development of classroom teacher-student dialogues and the methodology/techniques/strategies based on research questioning for the teachers with years of vocational seniority.

As a result, it was determined that the teachers had more constructive teaching-learning attitudes in this research. At the same time, it was determined that there was no meaningful difference between the teachers' learning and learning perceptions and constructivist learning environment perceptions according to variables of age and sex, and statistically significant difference according to seniority year variable.

In spite of the fact that the science curriculums have proposed the constructivist learning approach since 2004, it can be stated that the goals of the program are not fully achieved due to the traditional understanding of teachers. For this reason, it is necessary to provide in-service and pre-service training that contribute to the professional development of the teachers in order to be successful in the updated science course teaching program.

This research was conducted with the classroom and science teachers who work in a certain region. This study with a quantitative method can be applied by supporting qualitative methods such as interviewing and observation. In this way, the depth analysis would be possible.

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The Relationship Between Teacher Candidates' Critical Thinking Standards and Reflective Thinking Skills

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Abstract

The aim of this study is to investigate the relationship between teacher candidates' critical thinking standards and reflective thinking skills. The study investigates the level of critical thinking standard and reflective thinking skills of teacher candidates as well. Also, another sub-problem of the study is whether reflective thinking skills significantly differentiate according to critical thinking standards divided into three sub-levels. When the findings are examined, it can be stated that students have a high level of critical thinking standards, "depth, width, and competence", "precision and accuracy", and "importance, relevance, and clarity" sub-dimensions, and reflective thinking skills. Also, there is a significant and positive correlation between teacher candidates' reflective thinking skills with critical thinking standards, "depth, width, and competence", "precision and accuracy", and "importance, relevance, and clarity" sub-dimensions. When the data are examined, it can be said that teacher candidates' reflective thinking skills differ significantly according to critical thinking standard level. Besides, it can be stated that the mean ranks determined in all scale are high in favor of teacher candidates with high critical thinking standard level. Compound effect of the level of critical thinking standards with gender and grade is not significant on reflective thinking skills but compound effect of critical thinking standards with department on reflective thinking skills is significant.

Keywords: Critical Thinking Standards, Reflective Thinking, Teacher Candidates.

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INTRODUCTION

The ability to think is a distinctive feature that distinguishes human beings from all other living things. Through the action of thinking, human beings have the opportunity to influence and change the environment and conditions in which they live. Thinking can be defined as an active, goal-oriented, and organized cognitive process in order to make sense of the conditions (Kurnaz, 2013). Considering that life is a problem solving process, mankind can face new situations and problems at any time. Nowadays, the progression in technology and the great accumulation of daily updated information make these problems more complicated. Therefore, today, effective thinking has become a bigger need.

Every person thinks, but if they do not acquire effective thinking skills, they usually have prejudiced, incomplete, and inaccurate thoughts basing on non-objective knowledge (Doganay & Unal, 2006). According to Lipman (1988), the thinking skills can be grouped as follows: information processing, critical thinking and reasoning, creative thinking, problem solving, and meta-cognition (cited in Fisher, 1999). Moreover, there are some researchers classifying thinking skills according to the purpose and form of use and stated that thinking takes place at different levels. For example, Levis and Smith (1993) divided thinking skills into two main steps: lower-order thinking and higher-order thinking. Lower-order thinking is the application of a learned behavior to a problem encountered. However, in higher-order thinking, there is an original direction. The individual associates the elements that he/she has never previously brought together, analyses, makes predictions, or manipulates thoughts.

An important component of the higher-order thinking skills is critical thinking. Critical thinking is to assess the logical level, validity or accuracy of expressions, or the extent to which a result has been substantiated or justified (Paul, 1990; cited in Beyer, 1995). Scriven and Paul (2004, p. 74) defined critical thinking as a skill that develops thinking by recognizing the inherent structures in thinking and taking responsibility for coping with them by applying certain standards. This process is not solely about the acquisition of information. In this process, the individual actively learns, solves the problem, analyses the information units, and uses this information to establish logic (Kim, 2009). That is, critical thinking focuses on both a process and a product (Garrison, Anderson & Archer, 2001).

There are two basic elements of critical thinking. The first one is reflective thinking. Reflective thinking involves conducting a thinking process on one's own thinking, especially about the components of it. Second, critical thinking is called thoughtful thinking, and critical thinking should meet the high standards of thinking. To be able to connect with critical thinking, one must be aware of these standards and strive to achieve them (Bailin, Case, Coombs & Daniels, 1999; Nosich, 2009).

Furthermore, another higher-order thinking skill is reflective thinking. This skill can be defined as a close examination of a process after an accomplished task or while doing a task. It helps students to analyze their learning processes, and students can determine their learning standards by evaluating all learning experiences in this way (Eryaman, 2007; Moon, 2008). Weast (1996) listed the sub-skills of reflective thinking as below:

- examining the conclusion,
- examining the reasons and the evidence,
- examining ambiguous language,
- examining descriptive assumptions and value assumptions,
- evaluating statistical and logical reasoning,
- examining foreclosed information,
- articulating one's own values in a thoughtful and fair-minded way.

Reflection is a concept built on the basis of reflective thinking. Reflection is the cognitive inquiry process that contains analyzing the existing knowledge and finding ways which will lead to production of new knowledge and development of alternative ways. Dewey defined the reflective thinking as “active, persistent and careful consideration of knowledge structure supporting any belief or knowledge and results that it aims to reach”. Dewey focused on the importance of action and describes a reflective practitioner as an individual questioning his/her assumptions and practices as well as being active and determined (cited in Ross, 1989).

According to Schön (1987), reflective thinking has different varieties depending on when it takes place. The most complicated kind of reflective thinking is critical reflection (Black & Plowright, 2010; Rogers, 2001). Critical reflection is an act of deeper examination of the experiences acquired by the individual taking into account the social, political, and cultural context. Thus, the individual acquires an awareness of his/her assumptions and philosophy of life. In this way, the individual analyses the main points related to the phenomena he/she is interested in (Brookfield 1995; Hatton & Smith, 1995; Mezirow 1990, Rodgers, 2002). Educators say this is an important ability for students to develop greater depth of understanding and learning (Boud, Cohen & Walker, 1993; Hatton & Smith, 1994; Junsay, 2016; Moon, 2006).

There are some commonalities between reflective inquiry and critical thinking. First of all, both of these two thinking skills both share a focus on thinking. Additionally, two thinking skills emphasize the principles of logic and application of these principles (Glaser, 1941, p. 19). According to Paul and Elder (2013), a basic prerequisite of critical thinking is to be aware of own thinking process and responsible to develop reasonable criteria for evaluating it. From this point of view, critical thinking and reflective thinking are interdependent thinking skills, and one must think critically to be able to think reflectively (Elaldi, 2013; Riedler & Eryaman, 2016; Tican, 2013).

In the same manner, according to Facione and Facione (1996), self-monitoring is an important sub-skill of critical thinking. Also, Ivie (2001, p. 10) defined critical thinking skill in terms of reflective judgment and established a relationship between these two thinking skills. Moon (2008) stated that teachers’ use of open-ended questions involving students in team works and making use of different forms of reflection conducted in the context of the course subject could motivate students to think critically. Halpern (2007) used the term “metacognitive reflection” for implementing reflectivity in education, and this skill helps educators to develop awareness not only of their own thought processes but also those of their students. In the light of all this information, it is seen that critical thinking and reflective thinking skills are related to each other. Therefore, efforts to bring these two skills together in educational processes are considered important.

Problem Statement

The higher-order thinking skills have an important place in the theoretical and practical processes of university education because they support skills such as questioning all kinds of information units, analyzing complex issues, and revealing the premises behind the expressions (Choy & Cheah 2009). Nowadays, especially critical thought is a standard of participation in academic, individual, and social life (Scriven & Paul 2004). Therefore, one of the skills that form the basis of higher education curriculum should be higher-order thinking, and higher education should accept these skills as one of its main tasks.

Critical and reflective thinking skills increase the professional capacity of a teacher in performing the teaching profession. Reflection allows the teacher to question the experiences of the teacher in the teaching-learning process and to realize the effects of the structure of the organization in which he/she is a member (Posteguillo & Palmer, 2000). In teaching profession which is carried out in many different levels, situations, and different organizational structures, teachers should be able to adapt their skills according to the conditions (Tilley, Marsh, Middlemiss & Parrish, 2010). To be effective teachers, novice teachers should make sense the purpose behind their preferences about

instruction. They must understand the connections between different sub-parts of the course subject that they can understand how individual lessons fit in the greater curriculum picture (Danielson, 2002).

Also, many students cannot be critical thinkers because their teachers do not sufficiently set up the connection between subjects and activities with critical thinking skills which also include a certain amount of reflection (Choy & Oo, 2012). Therefore, only teachers who have acquired these skills can make effective arrangements for the use of these skills in the classroom. Also, teachers who have reflective thinking skills can self-assess their teaching-learning activities and help their students become critical thinkers (Shermis, 1999).

However, although both are high-level thinking skills, the nature of the relationship between critical thinking skills and reflective thinking skills is not clearly defined in the literature. Many researchers working on thinking expressed the relationship between critical thinking and reflective thinking skills, but they could not clarify the point of explaining the issue clearly such as which skill encompasses the other, to what extent they relate to each other, and where they intersect. So, in this study, whether there was a significant correlation between these two skills is investigated. Also, critical thinking standard and reflective thinking skill levels of the teacher candidates are determined. Furthermore, the compound effect of gender, grade level, and department with critical thinking standards on reflective thinking skills is also examined.

METHODOLOGY

Research Design

The research was conducted using the correlational survey model. The correlational survey model is important to reveal relationships between variables, determine the levels of these relationships, carry out higher level research on these relationships (Karasar, 2016, p. 114). Moreover, the correlational survey provides the necessary clues for conducting higher-level research on a relationship (Büyüköztürk, 2016, p. 185).

Population and Sample

The population of the study consisted of students in the Faculty of Education at a state university. The sample of the study consisted of 402 teacher candidates who were identified through convenience sampling in the first and fourth grades of teacher candidates studying at a state university. The distribution of the determined sample according to some variables is presented in Table 1.

Table 1. Distribution of the Sample

Variable	Value	f	%
Gender	Female	326	81,1
	Male	76	18,9
Grade level	1st Grade	229	57,0
	4th Grade	173	43,0
Department	Pre-School Education	153	38,1
	Primary School Education	70	17,4
	Science Education	93	23,1
	Mathematics Education	86	21,4
	TOTAL	402	100

Data Collection Tool

In the data collection process, “Critical Thinking Standards Scale for Teacher Candidates” developed by Aybek, Aslan, Dincer, and Coşkun Arısoy (2015) was used. The scale is a five-point Likert-type scale which shows a three-factor structure with a total of 42 items. The scale consists of three sub-factors: “Depth, Width, and Competence”, “Precision and Accuracy”, and “Importance,

Relevance, and Clarity”. In the present study, the Cronbach Alpha coefficient for the whole scale was calculated as .89 and of the sub-dimensions were calculated as .94, .89, and .82, respectively. Besides, “Reflective Thinking Scale for Teacher Candidates” developed by Güney (2008) was used to obtain the reflective thinking skill level of teacher candidates. The scale is a five-point Likert-type scale which has a single factor with a total of 42 items. In the present study, the Cronbach alpha coefficient for the whole scale was calculated as .92. These values are considered to be highly reliable for the scale to be used in the present research (Tavsancıl, 2006, p. 29).

Data Analysis

The data obtained from the evaluated scales were analyzed using a statistical program. In order to determine the level of teacher candidates' critical thinking standards and sub-dimensions and reflective thinking skills, the mean of their answers was taken. Then it was determined that the data that related to critical thinking standard and reflective thinking skill did not show a normal distribution according to results of normality test. So, a group of statistical analyses were conducted as follows:

- First, Spearman rank correlation test was conducted to determine whether there was a significant correlation between teacher candidates' critical thinking standards and sub-dimensions with reflective thinking skills;

- Critical thinking standards of teacher candidates were divided into three levels as low, positive, and high, and Mann Whitney-U test was applied to determine whether the reflective thinking skills differed significantly according to these three levels;

- Compound effect analyses were conducted to determine whether the reflective thinking skills of the teacher candidates differed significantly according to the standard level of critical thinking standards and the variables determined.

FINDINGS

In the first problem of the study, the level of teacher candidates' critical thinking standards and reflective thinking skills was examined. The results are shown in Table 2.

Table 2. Descriptive Statistics on Critical Thinking Standards and Sub-Dimensions

Dimension	f	Minimum	Maximum	\bar{x}	S.D.
CT Standards	402	107,00	202,00	159,47	18,40
Depth, Width, and Competence	402	34,00	90,00	75,66	10,79
Precision and Accuracy	402	16,00	56,00	38,98	9,42
Importance, Relevance, and Clarity	402	16,00	59,00	44,82	7,68
Reflective Thinking	402	51,00	135,00	115,47	18,35

When the findings in Table 2 are examined, it can be stated that students have a high level of critical thinking standards, sub-dimensions, and reflective thinking skills.

In the second problem of study, it was examined whether there was a significant correlation between critical thinking standards and sub-dimensions with reflective thinking skills. The results are shown in Table 3.

Table 3. Correlation between Reflective Thinking Skills with Critical Thinking Skills and Sub-Dimensions

		Critical Thinking Standards	Depth, Width, and Competence	Precision and Accuracy	Importance, Relevance, and Clarity
Reflective Thinking Skills	Correlation coefficient	,622**	,607**	,272**	,422**
	p	,00	,00	,00	,00

**Correlation is significant at the 0.01 level (2-tailed).

When the results in Table 3 are examined, it can be said that there is a significant and positive correlation between teacher candidates' reflective thinking skills with critical thinking standards, and sub-dimensions. All correlation coefficients are found to be significant. It can be seen that the relationship between reflective thinking skills and the "precision and accuracy" sub-dimension is found to be lowest.

In the third problem of the study, critical thinking standards of teacher candidates were divided into three levels as low, positive, and high, and independent Mann Whitney-U test was applied to determine whether the reflective thinking skills differed significantly according to these three levels. The study was carried out on two levels because there was no candidate with low critical thinking standard level, and so, the results are shown in Table 4.

Table 4. Differentiation of Reflective Thinking Skills according to Levels of Critical Thinking Standard

Group	N	Mean Rank	Sum of Ranks	U	p
Positive	149	128,82	19194,50	8019,50	.00*
High	253	244,30	61808,50		

*p<.05

When the data in Table 4 are examined, it can be said that teacher candidates' reflective thinking skills differ significantly according to critical thinking standard level. Besides, it can be stated that the mean ranks determined in all scale are high in favor of teacher candidates with a high critical thinking standard level. In other words, reflective thinking skill of teacher candidates with high critical thinking standards is found to be higher than the level of teacher candidates with positive critical thinking standard.

In the fourth problem of the study, compound effect analyses were conducted to determine whether the reflective thinking skills of the teacher candidates differed significantly according to the standard level of critical thinking and the variables determined. Firstly, compound effect of gender and critical thinking standard level was investigated, and results are shown in Table 5a and Table 5b.

Table 5a. Descriptive Statistics of Teacher Candidates' Reflective Thinking Skills according to Gender and Standard Levels of Critical Thinking

Gender	N	Positive			High			Total	
		\bar{x}	SD	N	\bar{x}	SD	N	\bar{x}	SD
Female	124	106,16	1,43	202	123,37	1,12	326	114,76	,91
Male	25	95,64	3,19	51	116,58	2,23	76	106,11	1,95

Table 5b. Differentiation of Teacher Candidates' Reflective Thinking Skills according to Gender and Standard Levels of Critical Thinking

Source	Sum of Squares	df	Mean Square	F	p
Gender	4123,22	1	4123,22	16,12	,00
CT Standard Level	20049,48	1	20049,48	78,39	,00
Gender*CTSL	192,42	1	192,42	,75	,38
Error	101794,04	398	255,76		
Total	5495746,00	402			

It was found that the compound effect of the level of critical thinking standards and gender was not significant on the reflective thinking skills of teacher candidates [$F(1,398) = .75; p > .05$]. In other words, reflective thinking skills of female teacher candidates did not differ significantly from reflective thinking skills of male teacher candidates according to the level of critical thinking standards. However, the scores obtained showed a significant difference separately in terms of critical thinking standard level [$F(1,398) = 78,39; (p < .05)$] in favor of high level and gender [$F(1,398) = 16,12; (p < .05)$] and in favor of female teacher candidates.

In the fifth problem of the study, compound effect of class level and critical thinking standard level was investigated, and results are shown in Table 6a and Table 6b.

Table 6a. Descriptive Statistics of Teacher Candidates' Reflective Thinking Skills according to Grade and Standard Levels of Critical Thinking

Grade	N	Positive		High		Total			
		\bar{x}	SD	\bar{x}	SD	\bar{x}	SD		
1 st Class	79	106,70	1,82	150	121,65	1,32	229	114,18	1,12
4 th Class	70	101,78	1,94	103	122,51	1,60	173	112,15	1,25

Table 6b. Differentiation of Teacher Candidates' Reflective Thinking Skills according to Grade and Standard Levels of Critical Thinking

Source	Sum of Squares	df	Mean Square	F	P
Grade	380,87	1	380,87	1,44	,23
CT Standard Level	29376,84	1	29376,84	111,32	,00
Grade*CTSL	772,38	1	772,38	2,92	,08
Error	105025,79	398	255,76		
Total	5495746,00	402			

It was found that the compound effect of the level of critical thinking standards and grade was not significant on the reflective thinking skills of teacher candidates, [$F(1,398) = 2,92; p > .05$]. In other words, reflective thinking skills of the first class teacher candidates did not differ significantly from reflective thinking skills of the fourth class teacher candidates according to the level of critical thinking standards. However, as seen in Table 6b, the scores obtained show a significant difference in terms of critical thinking standard level [$F(1,398) = 111,32; (p < .05)$] in favor of high level but do not show a significant difference according to grade [$F(1,398) = 1,44; (p > .05)$].

In the sixth problem of the study, compound effect of department and critical thinking standard level was investigated, and results are shown in Table 7a and Table 7b.

Table 7a. Descriptive Statistics of Teacher Candidates' Reflective Thinking Skills according to Department and Standard Levels of Critical Thinking

Department	N	Positive		High		Total			
		\bar{x}	SD	N	\bar{x}	SD	N	\bar{x}	SD
Science	47	98,36	22,85	46	121,04	19,03	93	109,58	23,84
Mathematics	42	111,61	14,60	44	116,77	13,02	86	114,25	13,97
Pre-School	38	105,73	17,85	115	122,80	9,73	153	118,56	14,26
Primary School	22	101,18	23,33	48	125,79	14,41	70	118,05	20,82

Table 7b. Differentiation of Teacher Candidates' Reflective Thinking Skills according to Department and Standard Levels of Critical Thinking

Source	Sum of Squares	df	Mean Square	F	p
Department	1330,97	3	443,65	1,75	,15
CT Standard Level	25321,39	1	25321,39	100,00	,00
Grade*CTSL	4639,46	3	1546,48	6,10	,00
Error	99762,74	394	253,20		
Total	5495746,00	402			

It was found that the compound effect of the level of critical thinking standards and department was significant on the reflective thinking skills of teacher candidates [F (1,394) =6,10; p<.05)]. However, as seen in Table 7b, the scores obtained show a significant difference in terms of critical thinking standard level [F (1,394) = 100,00; (p<.05)] in favor of high level but do not show a significant difference according to department [F (1,394) = 1,75; (p>.05)].

As a result of the variance analysis made to analyze the common effect, there was a significant difference between the mathematics education students with primary school education and pre-school education students in favor of mathematics education students with the positive critical thinking standard level. Again, between pre-school education and science education students, there was a difference in favor of pre-school education students. There was a significant difference between mathematics education students with primary school education and pre-school education students with the high critical thinking skill standard level in favor of primary school education and pre-school education students. Moreover, the standard level of critical thinking constituted a significant difference on reflective thinking skills except mathematics education department in favor of the high critical thinking skill standard level.

DISCUSSION AND CONCLUSION

The aim of this study was to investigate the relationship between teacher candidates' reflective thinking skills and critical thinking standard levels. When the findings were examined, it could be stated that there was a significant and positive correlation between teacher candidates' reflective thinking skills with critical thinking standards and sub-dimensions. It could be seen that the relationship between reflective thinking skills and the "precision and accuracy" sub-dimension were found to be lowest. Also, the teacher candidates had a high level of reflective thinking skills, critical thinking standards and sub-dimensions.

Reflective thinking is a constructivist process in which an individual creates his/her own unique intellectual products. With reflective thinking, the individual comes to a conclusion by associating the ideas about an information unit or subject in a consecutive way (Gelter, 2003). During critical thinking which is a purposeful, logical, and goal-oriented way of thinking, the individual creates inferences, calculates the possibilities, and makes decisions in a certain context in the light of these. Reflective thinking is a critical view of what is happening in this process. In this way, the individual will have the opportunity to analyze and evaluate the process of self-learning from the level of mentally immature to the highest level of experience (Halpern, 1996; Moon, 2008).

According to Dewey (1933, 1938), reflective thinking and critical thinking expressions are sometimes used interchangeably (cited in King & Kitchener, 1994). Critical thinking is the activity of making an assessment based on criteria against all events, facts, or opinions that the individual faces. Reflective thinking is associated with critical thinking of the individual on his/her own experiences. The main focus of critical thinking is the logical evaluation of all information, ideas, observations, discussions, events, and communications. The process of the reflective thinking is basically that the individual thinks critically on own experiences, defines and solves the problems encountered, and reconstructs his/her ideas for the future.

In the light of this information, it can be said that the individual must have a critical thinking skill to think reflectively, and critical thinking skill has a critical function in terms of reflective thinking skill. To be considered reflective, critical thinking skills must be used first. Therefore, it is expected that educational processes aimed at developing critical thinking skills will also show a positive change in the reflective thinking ability of the individual. Weast's (1996) list of reflective thinking sub-skills coincides with the sub-skills of critical thinking. For example, identifying causes and evidences, evaluating logical justifications, evaluating implications, and ignoring information that is not mentioned are the skills that fall within the scope of both thinking skills. Reflective thinking is a part of the critical thinking that specifically expresses the processes of analyzing and making sense of experiences (Choy & Oo, 2012).

However, accuracy which is a standard of critical thinking skill is about defining things as realistic as they are by ideas and words. In the context of this standard, it is a requirement to judge accuracy and reality by establishing an effective logic using the most reliable sources. Thinking is precise when someone is sufficiently qualified and detailed to think rationally about a topic. The point to be considered here is that the exact thing is related to the purpose of thinking and the situation. So, precision and accuracy, both, are related to level of openness of expressions used by individuals while they are expressing themselves to other individuals. In contrast, reflective thinking is an intrinsic activity and related to self-experiences and knowledge. So, the nature of this sub-dimension and reflective thinking is not so much related, and the statistics support this situation.

Norton (1994) stated that teachers and students who are good at reflective thinking are individuals who constantly question their goals, follow the results of their applications, think short and long term, and take into consideration the opinions of others while making evaluations and show a critical thinker feature in this sense. In this context, the process of developing critical thinking skills in the research provides an improvement in students' reflective thinking skills and supports the expression of the close and mutual relationship between these two skills in the literature. Also, Griffin (2003) found in his study that a supervised field experience including skills based and coaching in which critical events are used improves teachers' critical and reflective thinking skills.

In Chi's (2010) research, at the end of a curriculum which included reflective thinking activities as a result of the development of teachers' reflection skills, it was determined that they were more competent in situations of uncertainty, instability and conflict of value in various contexts. Also, the process raised awareness on instructional efficiency and improved critical thinking skills of both teachers and learners. Saçlı (2013) found in his study that critical thinking in the reflective student diaries is a dominant component among the intellectual difficulties encountered in the lessons and the logical solutions produced at the beginning and end of the period. However, it has shown that critical thinking has been used as an intellectual resource from the beginning of the period to the end and critical thinking skill developed along this process. Aktaş (2016) carried out study on 400 undergraduate students and tried to determine whether there was a relationship between students' reflective thinking dispositions and their critical reading self-efficacy perceptions. According to the results of the research, there is a significant relationship between students' perception of critical reading self-efficacy and reflective thinking scores. These findings are in line with the results of the study.

In the study, critical thinking standards of teacher candidates were divided into three levels as low, positive, and high. When the data were examined, it could be said that teacher candidates' reflective thinking skills differed significantly according to critical thinking standard level. Besides, it can be stated that the mean ranks determined in all scale were high in favor of teacher candidates with high critical thinking standard level. This result supports the existence of the relationship between the two skills. Critical thinking, in particular, serves as an important provocative for reflective thinking and significantly affects the level and efficiency of reflective thinking in students.

Brabeck (1981) determined that critical thinking skill was in the context of reflective judgment and also limited its conduction. In other words, the inadequacy of critical thinking skills will lead to deficiencies in the application of reflective thinking skills. In the study, the reflective thinking skills of the students with high critical thinking skills were found to be significantly higher than those with low critical thinking skills. Also, the sub-skills of deduction, inference, recognition of assumptions, interpretation, and evaluation were found to be associated with a high level of reflective judgment in this study. So, findings of that study support the claim that critical thinking skill is an important predictor of reflective thinking skill.

In their study Meral and Semerci (2009) found a significant relationship between critical and reflective thinking dispositions of teacher candidates and also according to them, there were significant relationships between the sub-skills of these two skills. Many researchers have found that activities related to one of these two skills have positive effects on the other skill (Bruster & Peterson, 2013; Forneris & Peden-McAlpine, 2007; Francis, 1997; Griffin, 2003; Griffith & Frieden, 2000; Sparks-Langer & Colton, 1991).

Also, Demir (2015) stated that critical and reflective thinking skills support and strengthen one another. For this reason, developing these two skills is highly important for gaining the ability to acquire scientific perspective. According to some researchers (Kennison, 2006; Naber & Wyatt 2014; Scheffer & Rubinfeld, 2000), using reflective discussions or reflective writing activities in teaching processes had a significant effect on development of critical thinking skill. Ghanidzeh (2017) also found that reflection and critical reflection predicted critical thinking positively and significantly. Also, self-monitoring which was an important skill for reflective thinking had a positive and significant impact on critical thinking. So, there is a clear correlation between critical thinking and reflective thinking. In her experimental study, Junsay (2016) divided teacher candidates into two groups as lecture/discussion and the reflective learning group. As a result, the reflective learning approach was found effective in developing the critical thinking skills of the teacher candidates, and this indicated a relationship between these two thinking skills.

In learning-teaching processes, reflective thinking and critical thinking skills are necessary for teachers whose roles have changed fundamentally since constructivist approach was used in educational settings. During the 1980s and 1990s, the goals of student teacher research moved toward reflection and critical thinking. Modern pre-service teacher education focuses on teacher candidates' reflect on their own practice. Rather than merely reflecting on what they teach, they must reflect on how they teach (Kember et al., 2000). Teachers can reach a level that can make specific decisions by changing the objectives, content, strategy and method, and evaluation dimensions by taking into account the reflections they make and the educational context they are in. They see themselves as decision-makers and critical/reflective thinkers who can make a difference in the lives of children. They are not passive recipients of the ideas and the knowledge of others. Pre-service teacher education programs must search ways to develop the reflective/critical thinking skills of teacher candidate if we are to have a role in reforming and restructuring schools (Raines, 2015).

In this study, also, compound effect analyses were conducted to determine whether the reflective thinking skills of the teacher candidates differed significantly according to the critical thinking standards level and the variables determined. It was found that the compound effect of the critical thinking standards level and gender and grade was not significant on the reflective thinking skills of the teacher candidates. However, it was found that the compound effect of the critical

thinking standards level and department was significant on the reflective thinking skills of teacher candidates.

Some reflective judgment studies (Brabeck, 1981; Brabeck, et al, 1981) indicated that reflective judgment scores increase with educational level. Therefore, the level of reflective thinking skills depends not only on other thinking skills such as critical thinking skills, but also on other variables. In this study, the department variable has emerged as a variable that constitutes this difference. As a result of the study conducted by Şahin (2011), it was determined that gender variable had no effect on reflective thinking disposition. So the finding of Şahin (2011) related to gender is in line with the findings of this study.

Also, it was found that the reflective thinking tendencies of the prospective teachers in the fourth grade were higher than those of the first grade. In spite of this, many researchers state that thinking skills do not develop automatically by maturation, but that these skills develop only when students gain experience through deliberate and planned educational activities (Beyer, 1991; Daniel & Auriac, 2011; Feuerstein, Hoffman, Rand, Jensen, Tzurriel, & Hoffmann, 1985; Sternberg, 1987). This view supports the finding that the class variable does not have a significant effect on reflective thinking.

According to the results of the study, the reflective thinking skills of the pre-service teachers of mathematics teaching department were found to be higher than the other departments. This situation can be explained by the instruction of mathematics discipline. The widespread support of different ways of thinking in mathematics teaching and the support of flexible thinking for solutions rather than transferring knowledge and the exact use of specific procedures may have had a positive impact on the thinking skills of students in this department.

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A Follow-up Study on the Metaphoric Perception of Secondary School Students from TEOG to LGS*

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Abstract

This study aims at determining what kind of images represent the practices of TEOG and LGS in the minds of students during the transition from secondary to high school. It attempts to reveal through comparisons conducted whether any metaphorical change occurred in the minds of students during the transition from TEOG to LGS. A data gathering technique through metaphors from qualitative research methods was used in gathering data in this study, carried out with the participation of 187 students in 2017 and 189 students in 2018 at three secondary schools in Samsun, Turkey. The data gathered was analysed using the steps of coding and sorting, compiling a sample metaphor image, category development, validity and reliability. It was observed that exam change did not cause any change concerning the metaphors used by students in defining the exam as a result of the comparison of metaphors regarding both the above mentioned exams.

Keywords: TEOG, LGS, Metaphor, Exam, Transition to High Schools Examination.

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INTRODUCTION

Today, formal education has become an indispensable part of life, and a system, through which students are centred in the education process, and their future planning is conducted by more professional individuals, has begun to be established in almost all parts of the world. Although the systems operating in different countries are generally similar, certain countries (Germany, Austria, Belgium, China and the USA) act correctly in line with the method of guidance in student admissions, while other countries (Turkey, Denmark, Malta, Korea, Luxembourg and a number of regions of the United States) apply a student selection system through examinations.

A formal test that you must pass in order to earn a particular qualification or to be allowed to do a particular job. A test of a student's knowledge or skill in a particular subject (<https://dictionary.cambridge.org/tr/sözlük/ingilizce/examination>). National, regional and school-level assessments carried out for exam purposes serve many basic goals. The assessment is important in terms of ensuring a level of objective achievement as well as providing a measure of the effectiveness of the education system. In addition, it is also regarded as an indispensable tool concerning its structuring the development process of schools and it enables the schools to compare themselves with other institutions (Gültekin and Anagün, 2006).

Certain criteria are considered in the transition to a higher education institution all over the world, and while placements are fulfilled through year-end assessments in some countries, certain other countries prefer to guide students in accordance with their interests and skills in this process. Countries that perform result-oriented assessment admit students to high schools depending on the scores obtained as a result of these evaluations. Students are not tested until the 9th grade level in Denmark as one of these countries (Yüceer and Coşkun Keskin, 2012). The school where the students receive education until the 9th grade is called the Folkeskole, which involves primary and secondary schools. Students who complete their education at the Folkeskole level, are educated at the Gymnasium, a higher education institution. The Gymnasium is a three-year school considered equivalent to a high school in Turkey. It requires students to have completed English language education from the fourth grade and a second foreign language education from the seventh grade, totaling nine years in order to enrol at this school. It is also a requirement for entry to the Gymnasium that students must be reported as qualified by their previous school, and to achieve satisfactory scores in the exit test of Folkeskole (Erdoğan, 2000). While students take SEC exams, which are pre-requisites for placement in high school and post-secondary programs in Malta (Eurydice, 2019), it is required for a Korean student, graduated from secondary school, to pass a proficiency exam or any assessment providing equivalent credits, in order to enrol at high school (<http://english.moe.go.kr>). Furthermore, students are similarly required in Luxembourg to pass examinations, including courses in German, French and Mathematics, held separately for general and vocational high schools (İlğan, 2013).

Austria is one of the countries where the system of transition to a higher level of education will be exemplified. Although there is no chance of failing in class during primary education in this country, assessment with scores or oral assessment may be performed in line with the decision of the class or school at midterm or the end of the year. Students under certain conditions may be moved to higher or lower classes according to their parents' opinions. Students assessed according to their success in the prepared annual report can also be assessed in the later periods of the year. More decisive are the assessments made in the last period of the year (Memduhoğlu, 2008). Considering the educational system of the People's Republic of China, school children and youths may go to schools without taking any examination, and the government will allow them to enrol at schools close to their residences pursuant to the 12th article of Compulsory Education Law (MOE, 2019). With regard to Japan, students receive their education at high schools called Kotogakko, at the end of the secondary school period called Chugakko. Examinations or selection is conducted to be able to enrol at Kotogakko (<https://www.foreignconsultants.com/japan-educ.php> 2019). Although the process of student selection varies from school to school, most private and state schools choose their students themselves. In the regions, the Regional (prefecture) Education Board places students in schools by

conducting a student selection examination that is valid for all schools (Erdoğan, 2000). The system is slightly different in the United States (USA). Though education has unity nationwide on the basis of general principles, there are significant differences between states. Each student with twelve years of education is entitled to receive a high school diploma, regardless of their level of education in the states (Harmancı, 2013). A year-end exam is held in certain regions. The transcript, showing the lessons and grades received from the previous educational institution, is important for attendance at a higher education institution or to apply for a job (Erdoğan, 2000).

There are also a number of other countries performing follow-up assessments, and guiding students in accordance with their interests and skills in the process of placing students in any school along with those countries selecting and placing students with examinations. One of these countries is Germany, where children between the ages of 6-10 years, enrol at one of the following schools; High School (Gymnasium), secondary school (Realschule), elementary school (Hauptschule), or a multi-program school in some of the states during the first period of secondary education. This involves 5th-10th grade students in line with their success and aptitude, and the guidance of the school after they graduate from their four-year primary school. While the most successful students go to high school, students with an intermediate level of success attend secondary school, and other students enrol at elementary school. Assessment is made according to primary school grades. There is no criterion for students wishing to go to a multi-program school. Every student can receive education in this school if they want (Sağlam, 2004). On the other hand, it is possible to see that almost everyone in Germany chooses a school in line with their skills (Ertan Kantos, 2013). While the system in Belgium is aimed, not only to gain mathematical skills, but also to be able to serve the purposes of compulsory education, it also enables students to be placed in schools in accordance with their interests and skills in secondary education (Yılmaz, 2013).

In Turkey, students are selected to high schools through in-class tuition and training applications carried out by teachers along with determining desired behavioural changes and conducting central and multiple choice examinations for the purpose of placement (Yılmaz Koğar and Aygün, 2015; Dinç, Dere and Koluman, 2014).

Although examinations do not show great changes in terms of content, they differ in terms of name and application. The examinations, held by the Ministry of National Education (MEB) during the transition of students completing their primary education to secondary education, have taken different names over the years. The exam conducted in 2013, was called the Transition from Primary to Secondary Education (TEOG), and students began to be accepted into high schools through this examination (Zayımoğlu Öztürk and Aksoy, 2014; Karadeniz, Er and Tangülü, 2014; Ceran and Deniz, 2015).

The MEB declared that common examinations would be held by the Directorate General for Measurement, Assessment and Examination Services (DGMAES) during every term for certain courses. These were Turkish, Mathematics, Science and Technology, Education in Religion and Ethics, T.R. History of the Revolution and Kemalism, and Foreign Language in the 8th grade of Secondary schools in line with the rules and procedures of examinations. These common examinations would be conducted at the time of the first written exam for those courses with two written exams and a second written examination for those courses with three written exams. It was also emphasised that learning outcomes would be based on and prepared considering the written subject of each course, depending on the program of that school year and indicated in the curriculum announced by the Ministry. It was then underlined that questions would be prepared to measure the abilities of students, such as problem-solving, inference, critical thinking, interpretation, and analysis. The scores, obtained from the common exams, would be included in the year-end success calculation by entering them in the system of e-School as the first or second written examination point. As to the weighting system, it was also stated that a Weighted Common Exam Score (WCES) for each course would be calculated by multiplying four coefficients for the scores of Turkish, Mathematics, Science and Technology courses, and two coefficients for the scores of courses of T.R. History of Revolution and Kemalism, Foreign Language, and Education of Religion and Ethics. It was emphasized that the scoring would be made

over 700 full points. It was also added to the rules and procedures that students' year-end success points for the 6th, 7th and 8th grades would be added to the WCES of the 8th year, and that the obtained total score would be divided by two and used in the calculation of a basic score for placement at secondary education institutions admitting students through a central system. The scoring would be made over 500 full points (MEB, 2015a; MEB, 2015b). Many students struggled to achieve places in the schools they wanted with the TEOG system, practised from 2013 to 2017. All types of high schools began to admit students through TEOG scores, and this both increased the importance of central examinations and created disputes concerning the method of examination, and it is constantly being changed due to increasing competition (Şad and Şahiner, 2016). Accordingly, there are many studies investigating the effects of this practice on students, parents and teachers; evaluating the questions, content and scope of the exam; studying the effect of situations that students were in on their exam success, and receiving the opinions about the exam (Şad and Şahiner, 2016; Kaşıkçı, Bolat, Değirmenci and Karamustafaoğlu, 2015; Gökulu, 2015; Yılmaz Koğar and Aygün, 2015; Canpolat and Köçer, 2017; Karadeniz, Eker and Ulusoy, 2015; Erol, 2015; Cayhan and Akın, 2015; Özkan, Güvendir and Satıcı 2016; Akkaya, Özbay and Köksal, 2016; Topçu, 2017; Demirkaya and Karacan, 2016; Altun and Doğan, 2018; Tulunay Ateş, 2016; Kırkaplan, 2015; Taşkın and Aksoy, 2018; Kılıç and Kelecioğlu, 2016; Diken, 2018; Okutan and Daşdemir, 2018; Çelikel and Karakuş, 2017; Çolak, 2017; Batur, Başar and Şaşmaz, 2016; Eroğlu and Özbek, 2017; Bağcı, 2016; Çelikel, 2016; Çamurlu, 2018; Sarıcı, 2016; Yener, 2016; İnceoğlu, 2015). A significant part of the studies conducted about TEOG revealed that this exam had significant effects on students, families and school, and it was especially effective in students' getting stressed.

All these data and studies carried out by MEB led to change in the system and functioning of TEOG, a new system called the High School Entrance Exam (LGS) came into force in 2018. The explanation about the content and assessment type of this exam, aimed to be held by the Ministry for the purpose of placing the students in the 8th grades of public and private secondary schools, temporary education centres (TEC) and religious vocational secondary school to Social Sciences High Schools, Science High Schools, Anatolian technical programs of Education Institutions carrying out projects and Vocational and Technical Anatolian High School is as follows: The examination consists of two parts as numerical and verbal. The verbal section will include question from the courses of Education of Religion and Ethics, Turkish, Foreign Language and T.R. History of Revolution and Kemalism while numerical section would involve questions from Science and Mathematics. The exam will be held on the same day in two sessions. Questions of the exam will be prepared by considering the learning outcomes taking part in the syllabus of 8th grade Science, Mathematics, Turkish, T.R. History of Revolution and Kemalism, Education of Religion and Ethics and Foreign Language. The question will aim to measure students' skills such as reading comprehension, interpreting, inference, analysing, problem-solving, critical thinking and scientific process. Two systems will be applied in Placement in Secondary Education Institutions. The first one of this is central placement in which placement will be performed depending on the scores that students obtained from exams, and the second one is local placement which will be applied for schools admitting students without any exam score (MEB, 2018).

In the literature, there are studies revealing the attitudes of students towards the exams that they took in order to pass to high schools (Çapulcuoğlu and Gündüz, 2013; Bacanlı and Sürücü, 2006; Duman, 2008; Koçoğlu and Kaya, 2016). What is more, studies were also conducted to suggest what kind of mental images students had concerning the exams, and which meanings they attributed to these exams by assuming that students may have concerns about exams (Koçak, Doğan Gül, Gül and Çokluk Bökeoğlu, 2017; Karadeniz, Er and Tangülü, 2014; Koçoğlu and Kaya, 2016; Zaimoğlu Öztürk and Aksoy, 2014). However, no studies have been detected in the literature regarding whether changes in the high schools entrance exams caused any change in the context of students' images. Thus, it was aimed to investigate in this study that whether the transition from TEOG to LGS caused any change in terms of the images and point of views of students concerning these exams. The following questions were sought answers to achieve targeted goals:

Which metaphors do students associate the TEOG exam with?

Which metaphors do students associate the LGS exam with?

What kind of changes occurred in the metaphors used by students to imagine these exams through transition from TEOG to LGS?

METHOD

Study Group

This study was carried out with the students educating in the 8th grade in three secondary schools selected from Atakum, Ilkadam and Tekkekoy districts of Samsun province in 2017 and 2018. While metaphors developed for TEOG were detected in the practice of 2017, the metaphors of LGS were determined in 2018. Whereas data gathering form developed for TEOG was distributed to 179 students, this number was 194 for LGS. It was paid attention to select students from the ones who would attend these exams and were voluntary to participate in this study when distributing the forms.

Data Gathering Tool

Data gathering technique through metaphors from qualitative research data gathering methods was used in this study. The literal meaning of metaphor is “to use any word or concept in different meanings rather than accepted one” (Türk Dil Kurumu, 2018). Therefore, gathering data through simile has the same meaning with collecting data through metaphor. Two data gathering forms, consisting of the patterns of “TEOG is similar to for me. Because....” and “LGS is similar to for me. Because....”, were developed in order to gather data through metaphors. The literature was benefited while developing data gathering forms. Prepared forms were subjected to expert opinion, and then necessary corrections were performed on the forms.

Data Gathering and Analysis

Obtained data were analysed by using the steps of coding and sorting, compiling a sample metaphor image, category development, validity and reliability (Saban, 2009).

The forms were checked in the stage of coding and sorting whether they had information about class and gender, explanations of the metaphors. The forms, which did not include even one of this information, were not received for consideration. Each of the forms was numbered and then alphabetical order of metaphors was carried out.

Percentages and frequencies of the metaphors in forms other than the forms eliminated in the sample metaphor image compilation stage were provided after they were alphabetically ordered, and sample metaphor expressions (explanations about metaphors) were given. Each student was given codes as S1, S2, S3 ... and thus it was aimed to determine the expressions of students clearly. Sample metaphor list was also created to be able to present metaphors in categories, and validate the commentaries with the data analysis process. It was then controlled whether metaphors created by students establish an integrated structure in terms of the subject and the source of metaphor. Conceptual categories were created by associating each achieved metaphor image with a theme and following this stage, ensuring validity and reliability were the next. Generated categories were called TEOG/LGS as the factor giving happiness to entertainment and life; TEOG/LGS as the medium of a new beginning and progress; TEOG/LGS as the factor of process and journey; TEOG/LGS as the element of oppression and tension; TEOG/LGS as the medium of rivalry and competition and TEOG/LGS as the element of uncertainty and doubt.

The researcher should use some additional methods (triangulation, participant approval, colleague approval) for obtained data and achieved results to ensure the validity and reliability of any study (Yıldırım and Şimşek, 2013). Certain questions were sought answer especially to ensure internal

validity in this study. These questions included whether research findings were meaningful and defined depending on the environment where data were gathered; whether findings were meaningful and consistent within themselves; whether findings were ensured by using different data sources, data gathering methods and analyse strategies and then creating a meaningful whole, whether they were conformed with previously generated conceptual framework or theory, whether this framework was guide in gathering data. Moreover, it was checked whether there were rules and strategies used in verifying the finding and these were used appropriately; to determine unclear phenomenon and events, to use alternative approaches in clarifying the findings, whether findings were found to be realistic by the participants, whether estimations and generalizations were consistent with obtained data (Yıldırım and Şimşek, 2013; Miles and Huberman, 2015). It was tried to ensure the internal validity of the study by giving reasonable answers to all these questions. A pilot practice with 22 students was carried out before conducting main practices to determine the reliability, and required corrections were performed in data gathering tool. This study was excluded from the main practices conducted.

FINDINGS

The metaphors developed by students towards TEOG and LGS and their explanations regarding these metaphors were attempted to be presented in this section of the study. What we wanted to reveal is whether any change has occurred concerning the images that students have developed about high school entrance exams following the process of transition from TEOG to LGS.

Gathered Data Concerning TEOG and LGS

The metaphors, obtained from 178 students towards TEOG in 2017, were categorised by using content analysis, and totally 110 valid metaphors were achieved after eliminating reiterated ones. The most commonly used metaphors used by participants towards TEOG are as follows: Fear (12), Future (10), Exam (9), Life (5), Stress (5), Nightmare (5) Exam of the life (3), Incubus (3), War (3) and Torture (2). The metaphors developed towards TEOG, categories of metaphors, percentages and frequencies are provided in the following table:

Table 1: Metaphorical Perceptions and Conceptual Categories towards TEOG

Categories	Metaphors	Number/ Frequency	Percentage
TEOG as the factor giving happiness to entertainment and life	Computer (1), Hobby (1), Cake (1)	3/3	1.6
TEOG as the medium of a new beginning and progress	Door (2), Step (1), A new house and key (1), Lift (1), Stair (1), Beginning (1), Arrow (1), Trailer (1), Gate (1), Bridge (1), Stairs (1), The first day of school (1), Opportunity (1), Turning point (1) Hope (1)	15/16-	8.9
TEOG as the factor of process and journey	Life (5), Moon (1), Pilot Test (1), Film scenario (1), Hourglass (1), Put something learned into practice (1), Chess (1), Titanic (1), Train (1), Lifestyle (1), Road (1), Difficult journey (1), Journey (1)	13/17	9.5
TEOG as the element of oppression and tension	Apple (1), Fear (12), Horror film (10), Future (10), Nightmare (5), Exam (9), Stress (5), Incubus (3), Exam of life (3), War (3), Torture (2), A dark room (2), Horror play (2), Horror tunnel (2), Death (2), Difficult exam (4), Torture exam (2), Unpassable bridge (2), Mother (1), Unpassable mountain (1), Angel of death (1), Father (1), Hell (1), Between heaven and hell (1), A damned school (1), A damned pavilion (1), Celery (1), Doomsday (1), Fearful moments (1), Fear labyrinth (1), A terrible nightmare (1), Anxiety (1), A dark gap (1), Heart throb (1), Pain (1), Last opportunity of the life (1), Murderer of imagination (1), Obstacle to life (1), Illness (1), Tension (1), The death of best-loved (1), An Anxious emotion (1), Obstacle race (1), Drama (1), Hail (1), Grave stone (1), Teacher (1), Death machine (1), An important exam (1), Spider (1), An assailant animal (1), As-sirāt (1), A world full of stress (1),	62/123	69.1

	Leech (1), Challenging (1), A challenging process (1), Difficult (1), Snake (1), Test (1), Borderline (1), Adrenalin (1), Question (1)		
TEOG as the medium of rivalry and competition	Besiktas (1), Excitement (1), Puzzle (1), Filter (1), Race (1), Bumper car (1), Marathon (2), Human being (1)	8/9	5-
TEOG as the element of uncertainty and doubt.	Tunnel (2), High school in my future (1), More than only an exam (1), Labyrinth (1), Scales (1), Never-ending road (1), Clutch pencil (1), An endless staircase (1), Endless tunnel (1)	9/10	5.6-
		110/178	

Totally, 130 valid metaphors were achieved after removing the reiterated ones from the metaphors created by 189 students participating in the study in the analysis of LGS in 2018. Ten most reiterated metaphors by students regarding LGS are as follows; Incubus (15), Fear (10), Nightmare (10), Stress (6), Torture (3), Hell (5), Worry (3), Football Match (3), Mountain (3) and Anxiety (2). Metaphors developed towards LGS, categories of metaphors, percentages and frequencies are given in the following table:

Table 2: Metaphorical Perceptions and Conceptual Categories towards LGS

Categories	Metaphors	Number/ Frequency	Percenta ge
LGS as the factor giving happiness to entertainment and life	Rose (1), A nice garden (1), Imagination (1), An exciting dream (1), The excitement of person going for his/her first vote (1), A good future (1), A good life (1), A good exam (1), Goodness (1), Tale (1), Angel (1), Happiness (1), A useful work (1), Trefoil (1), Festival (1), Health (1), Reading book (1)	17/17	8.9
LGS as the medium of a new beginning and progress	Key to help on the way to dreams (1), A new life (2), Door (1), Transition to real life (1), Beginning to first grade (1), New school (1), Palace (1), Stair (1) Bridge of life (1)	9/10	5.2
LGS as the factor of process and journey	Tree (1), Film strip (1), Bridge (2), Fate (1), Road (1), Journey (1)	6/7	3.7
LGS as the element of oppression and tension	Barbie doll (1), Angel of death (2), Hell (5), Mountain (3), Worry (3), Future (2), Life exam (2), Torture (3), (15), Incubus Anxiety (2), Fear (10), Nightmare (10), Stress (6), LGS (2), Difficulty (2), Deed book (1), Surgery (1), Patient to be undergone surgery (1), Car without key (1), Bee (1), Fire (1), Bomb (1), Monster (1), Horror house (1), Horror film (1), Feeling of horror (1), Horror train (1), Something Horrifying (1), Something Terrifying (1), Fearful dog (1), A complex thing (1), Cactus (1), Going to hospital (1), Fighting with illness (1), Exam which will direct life (1), Nervous waiting (1), Funeral (1), Wall (1), The person who enrolled education faculty and waiting to be teacher but could not appoint as a teacher (1), Obstacle (1), Mountain with an obstacle (1), Donkey (1), Remain paralysed (1), Storm (1), Case with little hope (1), Creature (1), Day of mourning (1), A difficult exam (1), A compelling life (1), Challenging road (1), Question (1), Faded flower (1), Someone I dislike (1), Spider (1), Going to death (1), Day of death (1), Difficult to play (1), Negation (1), An important exam (1), Mine area (1), Judgment Day (1), Something damned (1), A bad smell (1), A bad thing (1), A bad exam (1)	65/118	62.4
LGS as the medium of rivalry and competition	Driving car (1), Football match (3), Formula car (1), Excitement (1), Beaten in Handball match (1), Election (2), Testing yourself (1), Foot-race (1), Test (1), Assessment (1), Experience (1), Effort (1), Normal exam (1), Competition (1), Game (1), Track (1), Rivalry (1), Overhead kick (1), Sport (1), Chance (1), Scale (1)/ Options in the exam (1), Dream (1), Plastic (1), Plastic bottle (1), Lottery (1), Possibility (1), Wonder (1), Box (1), Much (1), A huge mountain (1), Labyrinth (2), Cul de sac (1)	21/24	12.7
LGS as the element of uncertainty and doubt.	Choices in the exam (1), Dream (1), Plastic (1), Plastic bottle (1), Lottery (1), Possibility (1), Wonder (1), Box (1), Much (1), A huge mountain(1), Labyrinth (2), Cul de sac (1)	12/13	6.8
		130/189	

It is possible to state that although metaphors are not literally same, LGS has similar effects on students with TEOG by referencing the explanations. As is seen, metaphors were evaluated under the dimensions of TEOG and LGS and they were placed in appropriate conceptual category, thus totally six conceptual categories were created, the explanations of these conceptual categories were provided below comparatively:

TEOG/LGS as the Factor Giving Happiness to Entertainment and Life

The reason for calling this category as TEOG/LGS as the factor giving happiness to entertainment and life is the association of metaphors and explanations ascribed by students for the exam with entertaining situations of life. When considering the numerical similarities of metaphors obtained for this category in TEOG and LGS, the following table welcomes us. It is observed that the similes made in the dimension of TEOG constitute % 1.6 of all metaphors and % 8.9 in the dimension of LGS. This urges that LGS had more positive effects on students than TEOG. Some explanations of the metaphors in this category are as follows:

S79: ...looks like cake. Because its questions are easy. It has easier questions with more difficult ones. Those difficult questions are easy for hardworking individuals.

S168: ... looks like computer.. Because we pass TEOG as we play games on computer successfully. Just think TEOG as a written exam.

As is seen, there are only three metaphors regarding TEOG while there are 17 metaphors for LGS, and this causes to think that students perceived the new system more positive, and this situation may originate from the negative thoughts developed for the prior system. It can also be considered that this was affected by the hope of students, witnessing the pressure of TEOG on other students around them, about LGS. Some of the explanations performed for these metaphors are below:

S24: ...looks like a beautiful garden. Because I think I will go to a nice high school.

S51: ...looks like a good life. Because corrects and wrongs that I will make in this exam will shape my life. A good exam brings with a good high school and university. For this reason, LGS is the beginning of a good life.

S61: ...looks like a tale. Because I know that it is an action with a good end.

S139: ...look like a festival. Because the questions are very easy. Exam is very nice. It is easy and we enjoy when answering questions.

TEOG/LGS as the Medium of a New Beginning and Progress

The metaphors and explanations stated in this category show that the students focused on the result by leaving aside the positive-negative emotions experienced in the process. It is observed that the students, who made commentary in this category, form %8.9 of all students in TEOG while this rate is %5.2 for LGS. Some of the explanations about the metaphors that students developed in this category concerning TEOG are as follows:

S31: ...looks like a beginning. Because this exam may change your life. We will have a new school and new friends by having a new start with this exam.

S107: ...look like a bridge. Because we will change the rest of our life with this exam. Our future will take shape in accordance with our success in this exam. For this reason, TEOG is like a bridge in our life.

S130: ...looks like a new house and car. Because we enter this new house with our intelligence and success. Some houses may be ugly, small, and irritating. Some houses may be comfort, nice, spacious and comfortable. TEOG is the key to these houses and the key to open these doors is at our hands.

The metaphors in the dimension of LGS indicate that students consider this exam as a new beginning of life and the medium of progress. Students' ascribing meaning to this exam, which will help them to achieve the end of this process, cause to think that students managed this process healthily by being free from the facts such as anxiety, worry, stress. Some of the explanations are below:

S1: ...looks like a step. Because many people have goals and they must struggle for this. LGS is only a step for my achieving goals in the future. I think that if I pass this stage, I will approach my goal one more step.

S7: ...looks like the bridge of life. Because, when we attend this exam, we take a new step for our life and then pass to a new dimension. For this reason, I liken this exam the bridge of life. I determine my own life.

S52:...looks like a new life. Because it is like a step.

S53: ...it is a transition to real life. Because we study all year long for High School Entrance Exam. Thus, the better our future high school is, the more successful we are.

TEOG/LGS as the Factor of Process and Journey

It is seen in this category that students described TEOG as a process and the things lived during this period, and defined it especially with means of transport or moving objects. It is also observed that while %9.5 of students made commentary about TEOG within the scope of this dimension, this is %3.7 for LGS. This causes to think that the students, who would attend TEOG, focused on this process more whereas students, who would take the exam of LGS, did not assign meaning to this process as much as the prior students. Some of the explanations regarding the metaphors that students developed towards TEOG are given below:

S17: ...looks like a train. Because if I do not miss that train, I can reach wherever I want. However, if I do not use the opportunity of getting on the train that is studying, this may take me to any school or job that I do not want.

S38: ...looks like the moon. Because the world has two concepts as night and day. You can see the moon at night but not in a day. I see that I approach more to TEOG with each arrival of the moon to the sky, and I live both outburst of excitement and fear inside me. This affects me both positively and negatively for my future. I will struggle to get a good future with fear and excitement.

S169: ...looks like Titanic. Because my dreams may disappear with a bad result as Titanic sank. If I take a good result, the ship will not sink and continue to be the biggest ship.

The explanations of LGS in this category are as follow:

S2: ...looks like beginning the first grade. Because I think that I will be excited when taking the exam as much as I was when beginning the first grade.

S38:...looks like a film strip. Because everything goes fast and quickly like a film strip.

TEOG/LGS as the Element of Oppression and Tension

The category in which students reflected their emotions as the most pessimistic, worried and stressful is the category of TEOG/LGS as the element of oppression and tension. It also urges that students have mostly negative perceptions towards these exams since most of the metaphors were expressed in this dimension and all of them were negative. In this manner, it is thought that students may need the support of a specialist for the process management rather than the support of their families, schools and peers. When considering the metaphors developed by students towards TEOG in this category, it is observed that while 69.1% of metaphors of TEOG relate to this category, this rate is 62.4% for LGS. It is clear that the developed metaphors and explanations of this category for both of exam dimensions have the biggest part within all metaphors and explanations, and there is not any big difference between them in terms of percentage. This shows that students wait for both exams with concern. The explanations of students about the metaphors that they developed towards TEOG are below:

S91: ...looks like a horror film. Because TEOG is very fearful. It will change my future, and it is important in this respect, but stressful. It is actually an exam which is like torture and fear for students. When you enter the exam, your role is determined in that film. Your future and job will become clear in this exam.

S92: ...looks like hell. Because I go with my own will, but I return by not getting what I want. In other words, I am going to hell with my own foot.

S101: ...looks like the angle of death. Because we may go to a bad high school if we make any mistake. My mother always says that you will see the reality if you go to a vocational high school. I sometimes want to commit suicide.

M106: ...looks like my mother. Because my mother frightens me as much as TEOG.

S107: ...looks like celery. Because I hate celery.

S109: ...it is like the death of my best-loved. Because we had such a little time. The fear of if I could not success kills me. Making the same mistakes and wrongs, each of my day is the same the previous ones. It sometimes seems like that the sun will not rise again, and I will be obliged to darkness. I lose something from myself with each passing day. The fear gnaws away me.

It is understood from the expression of students that they were not only affected by the exam itself as an element of oppression and tension, but stress originating from environmental factors were also effective on students. The most remarkable thing in this dimension of the study is students' associating the exam with the concepts of death and afterlife. It is not difficult to predict how much these statements are worrying for students considering their developmental period and age. Some of the expressions of students about LGS concerning indicated metaphors are below:

S12: ... looks like fear. Because I was thinking to get enough score for Science High School at TEOG. However, when this exam (LGS) appeared, I began to feel stress, worry, fear and similar feelings. Most of my future plans ended with this exam.

S19: ...looks like judgement day. I could not study since the system of exam continuously changes. I do not know what will happen at the end of the exam. I am afraid of getting a low score. If it was TEOG, it would be easier. Come back TEOG.

S26: ...looks like the day of death. Because my heart becomes like skipping a beat when I hear its name.

S103: ...looks like somebody that I dislike. Because you feel bad when you one of your friends that you do not like. I get stressed whenever I hear about LGS.

S128: ...looks like a monster. Because the system has changed in the year that we will take the exam, and I get more stressed than before. I even sometimes could not collect my thoughts. For this reason, I liken the new system to the monster.

S132: ...looks like a faded flower. Because it is very challenging for me, I must always study lesson. I can forget what I know when attending the exam or I have many wrong answers. I may be unsuccessful.

TEOG/LGS as the Medium of Rivalry and Competition

It is possible to see that students, who made explanations about the metaphors of this category, focused only to be successful in this process. The importance of rivalry and competition in the process of achieving success is undeniable, but it is important to know the source triggering the sense of rivalry in estimating that how the mental health of students' is affected. While the spontaneous desire of success provide student's competing with itself, the external wish of success will not evoke the same feelings for the student. Some of the explanations of students, who developed metaphors about TEOG, regarding these similes are below:

S16: ... looks like a puzzle. Because it is demanding. You can find the words over time. TEOG is like this. You can achieve what you want at the end of a long-term study. That is what you want.

S35: ...looks like a marathon. Because when I beat somebody, I am getting ahead. I achieve a better position when I get ahead.

S124: ...looks like Besiktas because there is fear, excitement and it is merciless.

S135: ...looks like a bumper car. Because everybody wants to have better positions by passing this exam.

When considering the explanations of students developing metaphor towards LGS within the scope of this category, it is possible to see that there are students regarding the exam as the medium of rivalry and competition. It is also observed that some of the students, considering this rivalry and competition as required, made comments about the new system by beginning to worry with hearsay information. It can also be understood from the comments that this new system was put into practice fast, and the official declaration was not made for some of the students. Some of these statements are as follow.

S89: ...looks like a rivalry. I think I will get a good score from the exam, and I will obtain a good result by studying.

S126:...looks like a race track. Because it is required to study much to become ready for the exam and to get a high score. Some exams are really difficult like a race track.

S127: ...looks like foot-race. Because it is said that the exam is very difficult. We were studying less for TEOG, but now we must study more.

S155: ...looks like a football match. If you study, you pass it.

S178: ...looks like a formula car. Because it was suddenly put into practice

TEOG/LGS as the Element of Uncertainty and Doubt

It is possible to see students with unclear feelings regarding TEOG in this category. The effect of an uncertain situation of students may be estimated since uncertainty causes the individual to get worried. The explanations of metaphors concerning TEOG are below:

S14: ...looks like an endless road. Because when you enter a road, you would go at the end of it to see its end, but you could not leave that road whether its results would be bad or good. You have entered before...

S36: ...looks like a tunnel. Because we study without knowing what will happen. As for me, it is dark, a tunnel difficult to cross.

S52: ...looks like an endless staircase. Because it does not have an end. There is not an end of subjects, and pilot test every day and same things every evening, you always see the same things every day but there is no end. No end.

In this category, there are students who could not make prediction about the future and looking at the future with doubtful eyes due to the new system. The metaphors of LGS were expressed by students and some of these expressions supporting these metaphors are as follow:

S8: ...looks like a box. Because I do not know whether the thing inside is good or bad. I also do not know that the result that I would get will be good or bad for me.

S160: ...looks like cul de sac. Because exams are going on throughout our life. The type of questions is not known. We could not answer any question in the exam although we answered many questions before. For this reason, I am quite frightened, especially from mathematics. Because both questions are difficult, and they may sometimes be asked from the subjects that we did not discuss. This is like a cul de sac.

S162: ...looks like a labyrinth. Because I could not see any exit from this exam. Ok, each labyrinth may have an exit, but mine has not, and I am thus frightened.

DISCUSSION, CONCLUSION AND SUGGESTIONS

Many different systems were tried in the placement of students to high schools from past to present, and studies were conducted for enabling the new system better than the previous one. These studies mostly aimed at decreasing the exam stress of students. However, although exams have changed, this stress has increased as the fact of exam is still going on. Considering the ages and developmental period of students who were affected from the changes made in the exams of transition to secondary school, it is not difficult to predict that how these students would feel before these changes. However, it is significant to get information about the real feelings of students about this issue instead of judging beforehand by making predictions. For this reason, a study aiming at obtaining information about the perceptions of students towards the exam was decided to be conducted, and it was sought to reveal whether any change occurred in the opinions of students along with the changes made in the exam systems.

To that end, data was gathered separately for TEOG and LGS in 2017 and 2018, and it was then investigated that the change in exam system led any difference regarding the perceptions of students towards the exam by comparing the data obtained from both studies. After categorising the metaphors expressed by students, which category had more metaphors, qualifications of metaphors and their explanations were checked. Accordingly, it was researched that what students were thinking about both of the exams, and whether changed exam system enabled them to have different opinions than prior practice.

When the metaphors and their explanations in the category of TEOG/LGS as the factor giving happiness to entertainment and life are examined, it has been identified that the opinions of students seemed changes in the process of transition from TEOG to LGS. In this category, while 3 students stated positive opinion about TEOG, this was 17 for LGS. Compared to TEOG, LGS has emerged as a factor that reduces stress even though it is very small.

As to the category of TEOG/LGS as the medium of a new beginning and progress, it is possible to reach the explanations of 16 students for TEOG and 10 for LGS. It was detected that considering the new practice as a medium was not lived as much as in TEOG.

On the other hand, while 17 students considered TEOG in the category of TEOG/LGS as the factor of process and journey, this was 7 for LGS. It is thought that students regarded these exams as a preview of their life in the future. It was revealed that students, underlining that meeting the expectations of their families was also important for them, had exterior stress. The studies, emphasizing that families were struggling for their children's enrolling a better high school and thus LGS became more important, are in the parallel of confirming that students are alone with this source of stress (Çolak, 2017).

The category in which feelings and opinions were expressed most regarding both of the practices is TEOG/LGS as the element of oppression and tension. Most of the students defined LGS and TEOG exams as causing pressure, stressing, and affecting the psychology negatively. While 123 students made statements about TEOG, this number was 118 for LGS. This is the maximum number of individuals within the all study group. What is more, it is observed that the new system did not affect students different from the previous one, for this reason, this new system did not raise more positive feelings than the former one. Generally, considering the data obtained in this category, it is possible to see that students associated these exams with the words referring to the end of life such as; death, death machine, hell, between hell and heaven, the death of best-loved, as-sirāt, the angel of death, deed book, funeral, going to death, day of death, judgement day. It is not difficult to predict what kind of pressure students feel on themselves considering the relationship of these words with the fact of death. The explanation of one of the students likening TEOG to the death of angel presents the effect of the exam on students more clearly. S101 coded student "...looks like the angle of death. Because we may go to a terrible high school if we make any mistake. My mother always says that you will see the reality if you go to a vocational high school. I sometimes want to commit suicide. This student both correlated the exam with death closely and emphasized that s/he was thinking about committing suicide by expressing that what kind of pressure was applied on his/her by his/her mother during this process. Another student underlined that s/he did not get support from his/her family during this process by saying "...looks like my mother. Because she is frightening me as much as TEOG". In this regard, it is seen that family support is very important for the students in the preparation process for the exam. The studies, underscoring that the family support is effective regarding the success at TEOG (Çamurlu, 2018) and interfamilial happiness has a positive significant relationship on the net correct answers at TEOG (Sarıcı, 2016), are confirming our related finding and detection. The fact that some students are afraid of the reactions of their families shows that families have a negative role in LGS as it was for TEOG. It can be mentioned that system change did not provide any positive change for the students considering the metaphors in the category of "TEOG/LGS as the element of oppression and tension" concerning both practices. The studies (Kırkaplan, 2015; Şad and Şahiner, 2016) presenting the negative approaches of students against the exam of TEOG support our finding.

While 9 students generated metaphorical expression for TEOG, this was 24 for LGS in the category of TEOG/LGS as the medium of rivalry and competition. It may also be thought that defining the exam of TEOG with the expressions such as getting ahead, competing originates from the pressure that system created on students and focusing completely on the target. However, the statements about LGS such as "...looks like a formula car. Because it was suddenly put into practice." and "...looks like foot-race. Because it is said that the exam is very difficult. We were studying less for TEOG, but now we must study more." cause us to think that exam is considered as a competition factor due to its

sudden introduction and the thought of being difficult. Studies, emphasizing that TEOG forced students joining a competition and led to rivalry (Eroğlu and Özbek, 2017) and this rivalry included the families into the process (Çolak, 2017), confirm that how the process turned into the medium of rivalry, and the expressions of students show that the same situation is also seen in LGS.

The metaphors in the category of TEOG/LGS as the element of uncertainty and doubt indicate that students approach both exams and future doubtfully. It is not difficult to predict that the changed exam system (considering that there is not any sample performed before) establishes an obstacle before students to prepare themselves healthily for the exam for a reasonable period (Çapulcuoğlu and Gündüz, 2013; Bacanlı and Sürücü, 2006; Duman, 2008; Koçoğlu and Kaya, 2016) revealing the anxiety created by the entrance exams for high school on students.

It is not possible to state by referencing all obtained data that the practices of TEOG and LGS raised very different metaphors in the mind of students and generated different effects on them. Starting from this point of view, it can be urged that the important thing is not to make changes in the high school entrance exams, but to produce more radical and valid solutions. Therefore, Hatunoğlu and Hatunoğlu (2006) underline that the operations of recognition and guidance should be carried out with scientific data and methods. Students can be educated according to their interests and skills by canalising the individuals educated in detecting the interests and skills of students to schools. These students, who may get affected by the negations more due to their developmental period (adolescence), need guidance service. In this sense, students should be supported by school guidance services and their families in coordination with the exam process. Büyükkaragöz (1990) argued that the students, tired of the confusion of exam, are affected negatively in psychosocial and educational dimensions, getting more stressed since they are conditioned by their parents to pass the exam, and failing at the end of all these causes the adolescent to lose his/her self-confidence, and this would affect his/her future life.

Assessing students, preparing to enrol a higher level of school, with a process-driven instead of result-oriented approach will both remove the exam anxiety of students and enable them live this process more healthy, and thus they may be mentally more healthy and successful individuals in the future. The exam should be addressed by performing formative assessment instead of the one conducted during the transition to a higher level of school in order to prevent exam's being a "pressuring" phenomenon in the minds of students, and placement should be carried out in this sense.

To conclude, it is observed that LGS, which was put into practice instead of TEOG, caused a little positive difference in the feelings and opinions of students; in general, change did not occur in the meaning ascribed to the exam; exam was considered as a burden by students. It may be better to prepare a process-driven placement system instead of result-oriented one and placing students in accordance with this system in order to prevent exam's being considered by students as a factor creating "fear", and process' generating pressure and tension on students.

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Use of the Public Service Ads in Human Rights, Citizenship and Democracy Courses: A Mixed Method Study*

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Abstract

The aim of the study is to identify the effects of using the public service ads as a teaching and learning material in the course of human rights, citizenship and democracy on the empathy skills of the primary school students and to reveal the views of the primary students about the course of human rights, citizenship and democracy in which the public service ads are employed as a teaching and learning material. The participants of the study are 45 primary school students (25 female and 20 male) who were attending the fourth grade of a public school in Afyon during the fall semester of the school year of 2017-2018. The empathic tendency scale developed by Kaya and Siyez (2010), namely “KA-SI empathic tendency scale child form”, was administered to the participants as both pre-test and post-test. The study lasted for three weeks and a total of twelve public service ads were used in the course of human rights, citizenship and democracy. In addition, the qualitative data of the study were collected through the student diaries kept by the students following the courses. The findings show that the courses of human rights, citizenship and democracy in which the public service ads were employed lead to a significant difference in the emphatic tendency of the participants. The qualitative findings also supports these findings. In the diaries the participants reported that they used empathy towards the people and events which they saw in the public service ads.

Keywords: Course of Human Rights, Citizenship and Democracy, Public Service ads, Primary School Students, Emphatic Tendency.

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INTRODUCTION

Public service ads are informative, educational films, sounds and sub-bands that are prepared by public institutions, organizations and by nongovernmental organizations such as associations and foundations. The Supreme Council (RTÜK) decides whether these public service advertisements can be published or not (RTÜK, 2012). Public service ads are prepared on many issues related to society. The fact that public service is reliable and believable increases its applicability and provides a positive effect on the individuals. People become aware of many vital issues through public service advertisements (Mercan, 2015).

Empathy can be defined as an effective understanding of another person's feelings (Kalliopuska, 1992; Dökmen 1995). The attitude of the teacher is very important in developing empathy in school (Dilekmen, 1999; Kabapınar, 2005; Eryaman, 2007). Also, empathy can be developed with the educational tools used in the lessons. The goal of using the public service ads is to develop an awareness and sensitiveness among individuals about social problems, to provide solutions to such problems and to make possible for people to use empathy. However, primary school courses such as life sciences, social studies and human rights, citizenship and democracy have a common goal of producing students who can offer solutions to social problems and who are active citizens with the skills in empathy. Given that the content of these courses are closely related to daily life sources reflecting it can be employed in relation to gains, skills and values. One of such sources is media products, including public service ads which are short movies aiming at awareness concerning various social issues. Therefore, it is possible to employ the public service ads as teaching and learning tools in the course of human rights, citizenship and democracy. It is thought that the public service ads have many advantages when they are used for educational purposes. However, the effects of these ads on teaching and learning and the reactions of the students about them are not studied in detail. There are some studies about the public service ads in the educational context. Most of these studies are concerned with the content analysis of the public service ads (Zalluhoğlu et. al., 2015; Kükrer Aydın, 2016; Özbük and Öz 2017). There are other studies dealing with the effects of the public service ads (Gençoğlu, Bağlıtaş and Kuşkaya 2017; Güllülü and Türk, 2015; Duğan and Şahin 2016; Ögüt Yıldırım and Ardıç Çobaner, 2017; Şahin Kubat, 2015; Yaman and Göçkan 2015). However, the effects of the public service ads as a teaching and learning material on students' emphatic tendency have not been analysed in relation to the the course of human rights, citizenship and democracy. In addition, the views of the primary students have not been analysed in this regards. Therefore, it is thought that the study fills the gap in the related literature. In this context, the aim of the study is to identify the effects of using the public service ads as a teaching and learning material in the course of human rights, citizenship and democracy on the empathy skills of the primary school students and to reveal the views of the primary students about the course of human rights, citizenship and democracy in which the public service ads are employed as a teaching and learning material.

METHOD

Model of the study

The study was designed following the mixed method research methodology. More specifically, in the study both qualitative and quantitative methods are employed. The mixed method assumes that the qualitative and quantitative complement each other and that these methods can be used simultaneously (Christensen, Johnson and Turner, 2015). Creswell and Plano Clark (2014) state that the mixed method has different designs, including convergent parallel design, exploratory sequential design, explorer sequential design and intertwined mixed design. In the study the exploratory sequential design is employed. In accordance with the design the quantitative data were first collected and then the qualitative data were gathered.

Participants

The participants of the study are 45 primary school students (25 female and 20 male) who were attending the fourth grade of a public school in Afyon during the fall semester of the school year of 2017-2018.

Data collection tools

The empathic tendency scale developed by Kaya and Siyez (2010), namely “KA-SI empathic tendency scale child form”, was employed to collect the quantitative data. The qualitative data of the study were collected through the student diaries kept by the students following the course of human rights, citizenship and democracy.

Concerning the construct validity of the KA-SI empathic tendency scale child form the exploratory factor analysis was employed and found that the scale with thirteen items has two factors: cognitive empathy (6 items) and emotional empathy (7 items). These two factors were tested using the confirmatory factor analysis. The results showed that the scale with two factors has higher fitness index. In relation to the reliability of the scale both internal consistency coefficient and test-retest reliability coefficient were found. The Cronbach Alpha coefficient which refers to internal consistency was found to be .84 for the whole scale and .79 for the emotional empathy factor and .72 for the cognitive empathy (Kaya and Siyez, 2010).

Data analysis

The data collected from the student diaries are examined using the inductive analysis. In this type of analysis the diaries produced by the participants were numbered in terms of pages and sentences and then the sentences were descriptively analysed using an index and several comments were made. Then the data were coded. The related codes were grouped under the themes. In order to establish the reliability of the analysis the sentences were reviewed by the authors and a specialist. Then each statement was categorized as “mutually agreed” and “difference of opinion”. The formula developed by Miles and Huberman’in (1994) was used in the calculations and it is found to be $P= 93$. The quantitative data are analysed using the t-test.

FINDINGS

In the discussion of the findings first the qualitative and then the quantitative findings are given. Table 2 shows the views of the participants concerning the use of the public service ads in the course of human rights, citizenship and democracy as teaching and learning materials.

Table 2. Views of the participants concerning the use of the public service ads in the course of human rights, citizenship and democracy as teaching and learning materials

Categories	Views of the participants
Teaching and learning process	Public service ads positively affected me. Public service ads made the courses fun. Public service ads were very instructive. Public service ads attracted my interest.
Social influence	I shared the public service ads with my parents. I have understood what I should pay attention as a citizen.
Personal development	I would like to develop a public service ad. I have learned that we may also develop public service ads. I have decided to watch for other public service ads.

Table 2 shows that the views of the participants concerning the use of the public service ads in the course of human rights, citizenship and democracy as teaching and learning materials are grouped under three categories: about teaching and learning process, about social influence and about personal development. Concerning the teaching and learning process they reported: public service ads affected them; these ads made the courses fun; public service ads were instructive and interesting. In relation to social influence the participants reported that they shared the public service ads with their parents and that they learned what they should care for as a citizen. Regarding the personal development they stated that they would like to produce public service ads, that they could produce public service ads and that they would be interested in public service ads in the future. These categories are exemplified through direct quotations from the diaries as follows:

The following statement exemplifies the view indicating that public service ads influenced them: *“There was a swimmer in the public service ad who do not have arms. When I put myself into his place I thought that if I do not have arms I cannot swim. However, I later began to think that being a disabled person does not mean you cannot do such things after seeing the other public service ads. All these public service ads really affected me. I would like to do something for these people.”*

The following statement exemplifies the view indicating that public service ads made the courses much more fun: *“It was fun to watch the public service ads and then to discuss their content. Courses were much more fun.”*

The following statement exemplifies the view indicating that public service ads were really instructive: *“I was surprised to see that public spots were used in the course. I had not had any interest in these ads until I saw them in the class. I could learn many things.”*

The following statement exemplifies the view indicating that the use of the public service ads in the courses attracted their interest: *“I observed that many friends of mine who were not interested in the course became very interested in it. The public service ads were very interesting. All of us exchanged our ideas and thoughts in the class.”*

The following statement exemplifies the view indicating that they shared the public service ads with their parents: *“I shared all the public service ads we saw in the class with my parents. I told them what we were taught in the class. They said that then we should watch all public service ads on the television.”*

The following statement exemplifies the view indicating that they understood what to do as a citizen: *“Public service ads teach many things to us. They teach us what a citizen should and should not do. How should we act to seniors and disabled people? What should we do for animals? Why should girls go to school and what is it so important? I think only when we know these we could become good citizens.”*

The following statement exemplifies the view indicating that the participants would like to produce public service ads: *“I would like to produce a public service ad using my phone’s camera... Maybe my teacher will use it in the course if it is related to the topics. I will make me proud of myself.”*

The following statement exemplifies the view indicating that they recognised that they may produce the public service ads: *“My friend told me that we can also produce a public service ad. It is very exciting... I have not thought about it before.”*

The following statement exemplifies the view indicating that they decided to watch the public service ads from now on: *“Before seeing the public service ads in the courses I never watched them. Now I am waiting for watching these ads on television. I will watch them from now on.”*

The views of the participants concerning the content of the public service ads are grouped under five themes as follows: individual differences, equality, fairness, empathy and children rights.

Each of these themes appear to have three sub-themes as follows: awareness/sensitivity, action planning and implementation. The views of the participants about “individual differences” are given in Table 3:

Table 3. Findings about the theme of “individual differences”

Sub-themes	Views of the participants
Awareness/sensitiveness	Public service ads make it possible for me to recognize the struggle of disabled people.
	I have learned that each of us is different.
	I have learned that we should respect for differences. We must take care not to hurt each other
Planning of an action	I would like to help disabled people.
Implementation	I become friend with people who have different characteristics.

The following statement exemplifies the view indicating that the use of the public service ads in the courses made them aware about how disabled people struggle: *“I realized how many things we have done so easily in our lives are actually difficult for the disabled. I understand that arrangements need to be made to facilitate their life.”*

The following statement exemplifies the view indicating that the use of the public service ads in the courses made them understand everyone is different: *“I have learned that each one of us is different. We are different from each other in terms of both physical appearance and personality.”*

The following statement exemplifies the view indicating that the use of the public service ads in the courses made them understand that they should respect for differences: *“There are different people in the world. I have learned that we should love each other although each one of us is different. So we do not need to be the same to love each other.”*

The following statement exemplifies the view indicating that the use of the public service ads in the courses made them understand that they should not hurt each other: *“I understand how important it is to be gentle and not to break people. It is a good habit to talk and act carefully.”*

The following statement exemplifies the view indicating that the use of the public service ads in the courses made them understand that they would like help the disabled: *“If you ask me how I would like to be. I would like to be a helpful person. After watching the public spots about people with disabilities, I would like to be a member of an organization to help them. I want to help them.”*

The following statement exemplifies the view indicating that following the use of the public service ads in the courses they would like to have friends with different characteristics: *“I decided that I should play with my friends whom I could not get well with. It is not correct to just play with my best friends. We must be friends with different people.”*

The views of the participants about the theme of “equality” are given in Table 4:

Table 4. Findings about the theme “equality”

Sub-themes	Views of the participants
Awareness/sensitivity	I understand that men and women are equal. I have learned that everyone either women or man has the right to have equal educational oppurtunities. I recognise that even the words used when talking to boys and girls should be in line with equality. I realized that the necessary arrangements should be made for people with disabilities to survive.
Action planning	I would like to do something to make school an easier place for my disabled friends. I would like to prepare a presentation about Atatürk, who provided equality between men and women in our country.
Implementation	We decided to make a project for our friends with disabilities with my teacher.

Table 4 indicates that the theme of “equality” has several categories under the sub-theme of awareness and sensitivity as follows: an understanding about the equality of men and women; understanding about having rights of equal educational opportunities for men and women; understanding about the words used while talking to boys and girls should be consistent with their equal position; an understanding about the need to make arrangements to make the life of the disabled easier. Concerning action planning the participants reported the following views: they would like to do something to faciliate the life of the disabled at school; they would like to develop presentations about Atatürk who contributed to the equality for men and women in Turkey. In relation to implementation dimension they reported that they would like to develop a project for the disabled with their teacher.

The following statement exemplifies the view indicating that the use of the public service ads in the courses made them understand that men and women are equal: *“There was a topic about gender equality in the public service ads. I think they are both equal. But there are those who cannot live in our country equally. But everyone should look for the right.”*

The following statement exemplifies the view indicating that the use of the public service ads in the courses made them understand that both men and women have the right to have equal educational rights: *“Girls should also attend school. There is no difference between girls and boys. In the public service ads I saw that the state dos many things to make it possible for them to go to school. I really liked them.”*

The views of the participants concerning the theme of fairness are given in Table 5:

Table 5. Findings about the theme “fairness”

Sub-themes	Views of the participants
Awareness/sensitiveness	I recognise that animals need to be treated fairly. I understand that when everyone is treated fairly everyone will be happy.
Action planning	I want to visit animal shelters I want to help street animals
Implementation	I will complain about people who treat animals badly. I am going to shoot a public spot on the necessity of the fairness to animals.

As can be seen in Table 5 the participants reported various views in relation to the sub theme of awareness and sensitivity concerning the theme of fairness. These are as follows: animals should be treated fairly and when everyone is treated fairly they would be happy. Concerning action planning they reported that they would like to visit animal shelters and to help animals living on the streets. In regard to implementation they reported that they will complain about those who treat animals badly and that they will produce a public service ad about the need to be fair to animals.

The following statement exemplifies the view indicating that the use of the public service ads in the courses made them understand that animals should be treated fairly: *“In the public spot, a child*

portrayed what happened to a dog when it was not treated well. I was afraid of putting myself in that dog's place. They deserve to live happily and confidently as we are. I can ask for my right. A dog cannot do that. We need to be fair to them."

"The following statement exemplifies the view indicating that the use of the public service ads in the courses made them understand that when everyone is treated fairly they will be happy: *"Animals, people, children, mothers, I think everyone is happy when they are treated fairly. We will be sorry if we are not treated fairly. And we get very nervous."*

The following statement exemplifies the view indicating that following the use of the public service ads in the courses they would like visit animal shelters: *"The public spots I watched impressed me and I want to go to animal shelters. I love animals very much."*

The following statement exemplifies the view indicating that following the use of the public service ads in the courses they would like help animals living on the streets: *"I want to help to street animals by giving them food and water. Maybe I can also learn to make a cat house."*

"The following statement exemplifies the view indicating that following the use of the public service ads in the courses they would like complain about people who treat animals badly: *"I took notes while watching the public spots. From now on if I see anyone treats animals badly I will complain about him to hayvanhaklari@ormansu.gov.tr. Maybe they punish such people."*

The following statement exemplifies the view indicating that following the use of the public service ads in the courses they would like to produce a public service ad about the need to be fair to animals: *"I'm going to shoot a public spot about people who treat animals badly and those who treat animals well. I may also do street interviews. Maybe I add the news into it."*

The views of the participants in relation to the theme of "empathy" are given in Table 6:

Table 6. Findings about the theme "empathy"

Sub-themes	Views of the participants
Awareness/sensitivity	Public spots enabled me to empathize with people with disabilities. I felt bad when I empathize with people with disabilities. I figured out how difficult my life can be when I put myself in the place of people with disabilities. I learned that being disabled does not mean that they cannot do most things. I learned that people with disabilities should also participate in work force.
Action planning	I want to make activities that will facilitate the lives of people with disabilities.
Implementation	With our teacher, we will prepare and distribute brochures on the need to provide employment for people with disabilities. We are shooting a public spot on how we can facilitate the lives of people with disabilities. I prayed for disabled people.

Table 6 shows that the participants produced several views in relation to the sub theme of awareness and sensitivity about empathy as follows: developing empathy with the disabled; when they put themselves in the place of the disabled they felt bad; understanding of the difficult life of the disabled; understanding of being disabled does not mean that they cannot achieve anything; understanding the significance of joining the disabled into work force. Concerning action planning they reported that they would like develop projects for people with disabilities. In regard to implementation they reported that they would prepare brochures about the employment of the disabled and public service ads to make their life easier and they pray for the disabled.

The following statement exemplifies the view indicating that following the use of the public service ads in the courses they could develop empathy with the disabled: *"I put myself in the place of people with disabilities in the public spot. I do not know what they feel, but I may guess their feelings. I realized it was very difficult. On the way, going with a wheelchair, taking a bus, sidewalks, stairs,*

schools, without a lift, are also very difficult. What do they do at home? They are bored. I would be very upset if I had a problem. I would be very upset if I did not solve it myself.”

The following statement exemplifies the view indicating that following the use of the public service ads in the courses they felt themselves bad when I empathized with people with disabilities: *“I have understood that people with disabilities more powerful than me. Because they have worked so hard and achieved it anyway. But I felt bad when I put myself in their place. I was very sorry. I know it would not help getting upset. Maybe I can help them when I am a little older.”*

The statement below exemplifies the view indicating that following the use of the public service ads in the courses they figured out how difficult their life can be when they put themselves in the place of people with disabilities: *“When I replaced myself with the disabled in the public spot, I thought how hard I could continue my life. Sounds like I cannot manage to continue my life. I was very sorry.”*

The statement below exemplifies the view indicating that following the use of the public service ads in the courses they understood that being disabled does not mean they cannot achieve anything: *“People with disabilities had managed to do such difficult things... So I understand that if I experience such a situation I could also do many difficult things and achieve many things although it is very difficult. One could not just sit and be sad. Life goes on.”*

The statement below exemplifies the view indicating that following the use of the public service ads in the courses they understood that the disabled should join the work force: *“I understood that people with disabilities like everyone should work and make money. They feel happy when they work. If a man does not deal with something, he would be unhappy. It is a bad feeling. Employers should give them job, it is certain that they will do their best.”*

The views of the participants about “children’s rights” are given in Table 7:

Table 7. Findings about the theme “children’s rights”

Sub-themes	Views of the participants
Awareness/Sensitivity	I have learned that we have many rights. I saw that there were many children who could not use their rights because of war and it made me sad. I learned that children should be protected by their parents and the state I am very sorry for the kids who work to make money. I am sorry for the kids who cannot use their right to education. I think it is unfair that there are children who do not have the same conditions I know what I have to do to protect myself from child abuse.
Action planning	We would like to organize a charity campaign with my friends choosing a sister school.

As can be seen in Table 7 the participants reported many views about the children’s rights in relation to awareness and sensitivity as follows: understanding of having many rights as a child; being sorry for those children who cannot use their rights because of war; recognising the fact that children should be protected by their parents and the state; being sorry for children who work to make money and for those who cannot use their right to be educated and thinking that it is unfair that there are children who do not have equal conditions. In regard to action planning about children’s rights they reported that they would like to organize a charity campaign with their friends choosing a sister school. However, there was no view about the implementation dimension.

The following statement exemplifies the view indicating that they learned about their rights: *“I had known that we had some rights, I knew some of our rights, but it was against the law, for example, to employ children or to marry with a child. Children rights are included in the laws. We are just children so these rights should be protected by adults.”*

The following statement exemplifies the view indicating that they learned that there are some children who cannot use their rights because of war: *“Children cannot find food in the war, no toys, no schools ... Maybe they do not even have parents and home. Then there is no children's rights when it comes to war. I am very sorry. There are those who flee to our country from war. We have them at our school too. I think this is a very difficult thing.”*

The following statement exemplifies the view indicating that they learned that children should be protected by their parents and the state: *“There are people who protect and care for us. First our parent and then our teachers protect us. They try to protect us. Every child should be protected by their parents, teachers and other adults. But there are children who do not have parents. Such children are protected by the state. For instance there are public institutions for them which called Sevgi evleri. Maybe it is difficult to live there, but they are protected there. Otherwise they cannot protect themselves and they cannot do anything for themselves.”*

The following statement exemplifies the view indicating that they are very sorry for kids who work to make money: *“It was included in the public service ads. Sometimes we saw them on the streets. They sell something like paper tissues. They cannot attend school. They sell something on the streets even though it is very cold. Parents should make babies if they cannot care for them. I feel sorry for them, but I cannot do anything.”*

The following statement exemplifies the view indicating that they are very sorry for kids who cannot make use of their right to be educated: *“For example, there are children who cannot go to school. We will have a profession after our graduation. They will make money on what they will do. Selling paper tissues is not enough to live as adult. I am so sorry for them. Both schools are fun, warm and we get lots of information there. They are always outside. They may experience a car accident. Someone might kidnap them. God bless. It is very sad.”*

The following statement exemplifies the view that it is unfair that there are some children who do not have equal conditions: *“Some children have a lot of things, but some children have nothing. It is not their fault. Their parents may not want it for their children, but they cannot care for their children. Maybe they are poor and have many children. For me it is unfair.”*

The following statement exemplifies the view that they would like to organize a charity campaign choosing a sister school: *“We will ask our teacher that we could choose a sister school to send necessary materials to them. we would like to organize a charity campaign.”*

As stated earlier the empathic tendency scale developed by Kaya and Siyez (2010), namely “KA-SI empathic tendency scale child form”, was administered to the participants as both pre-test and post-test. The course of human rights and citizenship was delivered using the public service as teaching and learning materials. The data gathered from the scale were analysed using the t-tests. The results of the t-tests are given in Table 8 and Table 9 as follows:

Table 8. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	33.93	45	9.05388	1.34967
	posttest	43.15	45	7.53162	1.12275

Table 9. Paired Samples Test

Paired Differences		t	df	Sig. (2-tailed)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	
			Lower	Upper

Pair 1	pretest - posttest	-9.22	12.43691	1.85	-12.95	-5.48	-4.974	44	.000
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As can be observed in both Table 8 and Table 9 the course of citizenship and democracy in which the public service ads were used as teaching and learning materials had positive contributions on the emphatic tendency of the participants. The quantitative findings are consistent with the qualitative ones.

DISCUSSION, CONCLUSIONS AND SUGGESTIONS

When the views of the primary school students participated in the study on the use of public spots in human rights and citizenship course are examined, it is seen that their opinions are grouped under three main themes: about teaching and learning process, about social influence and about personal development. Their views about teaching and learning process are as follows: public service ads affected them and made the course much more fun. They also added that these ads are instructive and attracted their interest. Their views about social influence are as follows: sharing the public service ads with parents and learning about what to do as a citizen. Their views about personal development are as follows: developing public service ads and improving their interest in these ads. Paul and Elder (2006) argue that media products have significant political and social effects on people. In addition, they stated that public spots directed social rules, roles, beliefs and perspectives. In this context, it can be said that the views of Paul and Elder (2006) are in line with the opinions of elementary school students that they learned the rules of society from public spots. Stokes and Hull (2002) asked the participants who were students to design public service ads about water saving. They concluded that the public service ads and their implementations are both informative and instructive which improved the participants' awareness about the topic. Similarly in the present study the participants reported that the public service ads influenced them and made the course much more fun. They also added that these ads are instructive and interesting.

When the diaries of the primary school students were examined, it was seen that their opinions were categorized under 5 themes related to the content of the public spots. These themes are individual differences, equality, justice, empathy and children's rights. These opinions expressed in relation to each theme were also discussed under three sub-themes: difference / sensitivity, action planning and action. The primary school students participated in the study expressed their views in regard to the theme of individual differences regarding the difficulties experienced by disabled people, respect for differences, sensitivity to disabled people and social responsibility. In Tüsev's (2012) report entitled "a case study: public service ads and non-governmental organizations" it is stated that these ads can be employed by these organizations to improve public awareness. It is reported that the non-governmental organizations who work on the topics of environment, education, health, women's rights, people with physical and mental disabilities frequently employ the public service ads. In this study, it was determined that the primary school students participated in the study expressed their opinions in the context of awareness / sensitivity, action planning and action.

In relation to the theme of equality, it was determined that the participants developed views about the equality of women and men, their right to education, gender discrimination in social life, equal rights and opportunities for disabled people in social life and the innovations brought by Atatürk regarding the equality of men and women.

Concerning the theme of "fairness" the participants stated several dimensions, including the significance of being fair, being fair to animals and the responsibilities of citizens in the context of being fair. Yağan (2012) analysed the public service ads in terms of their semiological significance and reported that if there is a word "fair" in the text of the public service ads, then it refers to the fact that there are some inconsistencies which are also unfair among the interactions among people and among people and animals. It refers to the fact that people should change their behaviour to reduce unfairness." In this study, it is seen that the primary school students participated in the study emphasized fairness. In this context, it is seen that the message that the public spot wants to give and

the messages perceived by the participants are compatible with each other. The participants also mentioned the empathy with disabled people in the theme of empathy and development of projects in the context of facilitating the life of the disabled.

In regard to the theme of children's rights, the primary school students talked about information about children's rights, children who could not use their rights for reasons such as war and child labor, and child abuse. Zalluhoğlu (2015) analysed 168 public service ads which broadcasted on television. It is found that 47.2% of these ads aimed at giving information, 29% at giving suggestions and 23.8% at improving solidarity among people. In this study, the primary school students stated that they wanted to help by making projects for children who could not use their rights as a result of the use of public spots in which the children were taken as subjects. In this context, it can be said that the public spots that can be handled under the theme of children's rights improved the attitudes of the primary school students participated in the study towards solidarity.

In addition to the qualitative data, it was investigated whether the use of public spots in the courses have positive effects on the empathic tendency of the students using the empathic tendency scale as pre- and post test. It is found that this practice made a significant difference on the empathic tendency levels of the primary school students participated in the study. As a result, it was determined that human rights citizenship and democracy course, which is delivered by using public spots as teaching and learning materials, creates a significant difference on empathic tendency levels of the participants. The qualitative findings of the study clearly support the quantitative findings. The primary school students participated in the study stated that they often place themselves in the place of people given in the public spots. In addition, they expressed their opinions on the issues of difference / sensitivity, action planning and action related to the subjects taught and the goals of the course. In this context, it can be said that the use of public spots in the courses contributes to the primary school students gaining information, gaining sensitivity and acting as an effective citizen.

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Early Predictors for Kindergarten Students at Risk for Dyslexia: A Two-Year Longitudinal Study*

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Abstract

This study aim to determine early clues that can be seen in kindergarten students at risk of dyslexia. The sample consisted of 27 students selected from two kindergartens through purposeful sampling. The Kindergarten Dyslexia Pre-Determination Observation Form was developed by researcher, Personal Information Form and Colorado Learning Disability Questionnaire-Reading Sub-Scale (CLDQ-R) were used as a data collection tool. Firstly, the students were observed by the kindergarten teachers during the education period through the scale that was developed by researcher and in the following next year, the classroom teachers in the schools where these students started the first year and the researcher identified the students who were thought to be at risk dyslexia. Finally the early clues in the kindergarten were tried to be reached by following the last measurements. The data were analyzed using Mann Whitney U test and descriptive analysis techniques. As a result of this study, it can be said that kindergarten students at risk of dyslexia have problems to recall the informations (songs, rhymes, words, names and names), phonologic development, rapid automatic naming skills, simple sequencing and arithmetic skills, experienced in time and spatial skills and have less vocabulary than their peers and this situation is reflected in their speeches.

Keywords: Dyslexia, Kindergarten, Dyslexic, Early Symptoms.

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INTRODUCTION

Dyslexia is generally defined as the difficulty in reading and writing skills, so it can be detected by educators and families around the age of six to seven years when reading instruction is started. However, dyslexia is a neurobiological difficulty, as soon as an individual begins to speak and express himself / herself, it is possible to identify early by regular monitoring some skills (Gür, 2013; Doğan, 2012; Balci, 2015).

Early diagnosis of dyslexia is important in terms of achieving a high rate of effect from educational treatment methods, early determination of educational goals, individualized planning, and minimizing both academic and psychological effects of dyslexia (Hutchinson, Whiteley, Smith ve Connors; 2004; Schneider, Ennemoser, Roth & Küspert; 1999). As Hogan and Thomson (2010) stated, if the individual is diagnosed early, the problems they have with reading difficulties can be minimized without prolonging. If individuals are diagnosed late, they will have to cope with reading difficulties that affect their future educational life. Family and educators are important in early diagnosis.

Therefore, social awareness should be increased and educators should be trained in the early signs of dyslexia. An evaluation system based on the observations of kindergarten teachers should be emphasized and early symptoms should not be missed (Snowling, 2012).

One of the earliest signs of dyslexia is the delay in the onset of speech. In general, the child is expected to be able to say his/her first words after the age of one and up to the eighteenth month. However, in children with dyslexia, this process may be delayed and prolong from the fifteenth month to the age of two years (Lyytinen, Eklund ve Lyytinen, 2005; Rescorla, 2000; Shaywitz, 2003). All individuals with dyslexia may not have a history of late speaking, but difficulties in early language acquisition may be predictive of future language problems.

One of the first steps that can be taken in kindergarten is to search for the presence of dyslexia in the family. Research has shown that after early diagnosis of dyslexic individuals with hereditary predisposition, they have made more progress in reading and writing (Caroll, Mundy ve Cunningham, 2014; Lorna, 2013; Regtvoort, 2007). Therefore, it is important to know each student's genetic predisposition to dyslexia before literacy education.

We can catch early clues by watching children's conversation. If the child has problems in pronunciation with the onset of speech it should be closely examined. These children may have difficulty speaking certain words, especially until the age of five to six. He may forget the initial letter of the word or change the position of the word and say a different word. Especially pre-school children enjoy songs and games related to rhyming words. However, children with dyslexia have difficulty in repeating and distinguishing these rhythms. If the child is around 4 years old but still has trouble singing simple nursery songs and rhymes, this may be a sign of early dyslexia (Shaywitz, 2003).

Difficulties in simple arithmetic skills may also be a clue to dyslexia. According to Joffe (1981), 60% of dyslexic students experience difficulties in mathematical activities at school. Although the remaining 40% do not have any mathematical problems, about 11% of them have advanced skills in mathematics. It was seen that individuals with dyslexia had difficulty in counting backwards and forwards, and therefore had difficulty in counting money, changing money, measuring distance and performing simple arithmetic skills (Houssart, 2001).

Most children learn to tie their own shoes before starting primary school and begin using expressions that may indicate time. In 90% of children with dyslexia, these skills can be prolonged until the age of ten years or later. These children are not able to use expressions which provide direction correctly such as up / down, left / right, under / over. They suffer from skills based on direction such as opening the door (Goody ve Reinhold, 1961; Hornsby, 2011).

One of the early clues of children with dyslexia is low self-perception and low self-confidence. Research has shown that individuals with dyslexia can develop low self-perception and feel inadequate after disturbing experiences especially in early childhood and at school age (Edwards, 1994; Humphrey, 2003; McNulty, 2013; Owen, 2014).

The purpose of this research is to determine early clues that can be seen in kindergarten students at risk of dyslexia. In response to this objective, answers to the following question was sought:

- What kind of symptoms do the students at risk of dyslexia show in the kindergarten?
- What skills can be associated with these symptoms?

METHOD

The study was structured with the screening technique which is one of the quantitative research methods since it aims to reveal an existing situation.

Study Group

The study group consists of 27 students selected through purposeful sampling. These students were selected from two pre-schools and two primary schools in Ankara, the capital city of Turkey.

Table 1. Frequency and percentage ratios of the gender of students in the sample group

	Frequency (f)	Percentage (%)
Girl	13	48,1
Boy	14	51,8
Total	27	100

Data Collection Tools

In order to determine the early clues that can be seen in kindergarten students at risk of dyslexia, Kindergarten Dyslexia Pre-Determination Observation Form that is developed by researcher, Personal Information Form and Colorado Learning Disability Questionnaire-Reading Sub-Scale (CLDQ-R) were used. While creating the scale, the kindergarten dyslexia studies in the world were investigated in depth and the characteristics of dyslexia in kindergarten children were determined. Expert opinions were received for scope and language proficiency during the preparation phase.

Kindergarten Dyslexia Pretreatment Scale is a 3 Likert-type measuring instrument consisting of 21 items. The scores that can be obtained from the scale are between 63 and 21 points. The Colorado Learning Difficulty Questionnaire-Reading Sub-Scale is a form used by educators in screening dyslexia for students aged 6-18 years. The scale consists of 6 items of 5 likert type. The points that can be obtained are between 30 and 6 points.

Data Collection

The 27 kindergarten students in two selected kindergartens were followed up at certain times within two years. First of all, the students were observed by the kindergarten teachers during the education period through The Kindergarten Dyslexia Pre Determination Observation Form that was developed by the researcher.

In the following year, the classroom teachers in the schools where these students started the first year were informed about the study. In the second term when reading instruction was completed

to a great extent, studies were conducted on whether the students were at risk of dyslexia. Firstly the teachers and then the researcher identified the students who were thought to be at risk.

The observation forms of these students who were found to be at risk of dyslexia were examined and the early clues in the kindergarten were tried to be reached by following the last measurements.

Analysis of Data

Early clues that can be seen in kindergarten students at risk of dyslexia were measured by Mann Whithney U test.

The relationship of each item in the Kindergarten Dyslexia Pre-Determination Observation Form to individuals with dyslexia determined using the Colorado Learning Difficulty Questionnaire-Reading Subscale was examined.

Colorado Learning Difficulty Questionnaire-Reading Subscale was analyzed by using descriptive statistical methods.

FINDINGS

This study was conducted to examine early clues that can be seen in kindergarten students at risk of dyslexia. The findings of each sub-problem are given below.

Predictive Characteristics of Kindergarten Students Related to Dyslexia

The Kindergarten Dyslexia Observation Form was analyzed to determine the predictive characteristics of kindergarten students regarding dyslexia. In this context, the predictive characteristics of the kindergarten students are expressed as shown in Figure 1.

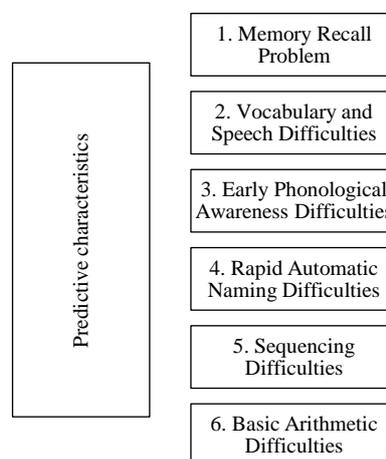


Figure 1. Predictive characteristics of the kindergarten students

Items 4, 6 and 13 related to the first predictive characteristics, item 7 related to the second predictive characteristics, item 8 related to the third predictive characteristics, item 11 related to the fourth predictive characteristics, items 15 and 16 related to the fifth predictive characteristics, items 18 and 19 related to the sixth predictive characteristics.

One of the sub-goals of the study is to determine whether the difficulties of recalling the memory in kindergarten are predictive of dyslexia. The results of the analysis of Mann-Whitney U Test regarding this sub-goal have been presented in Table 2.

Table 2. Mann-Whitney U Test Results related to memory recall difficulties of kindergarten students at risk of dyslexia

Subtest	Group	N	Mean Rank	Rank Sum	U	p
Memory Recall Difficulties	Dys.	6	22,75	136,5	10,5	0,001
	Nor.	21	11,50	241,5		

According to the result of the analysis, the average ranks of the group in the dyslexia (22,75) is higher than the average rank of the group in the normal students (11,50). This difference is statistically meaningful (U=10,5, p<0,05). According to these results, it is possible to say that the ability to recall from memory is a predictor of dyslexia for kindergarten students.

Another sub-goals of the study is to determine whether having low vocabulary in kindergarten and having speech difficulties compared to peers are predictive of dyslexia. The results of the analysis of Mann-Whitney U Test regarding this sub-goal have been presented in Table 3.

Table 3. Mann Whitney U Test Results related to vocabulary and speech difficulties of kindergarten students at risk of dyslexia

Subtest	Group	N	Mean Rank	Rank Sum	U	p
Vocabulary and Speech Difficulties	Dys.	6	21	126	21	0,001
	Nor.	21	12	252		

When Table 3 is examined, there is a statistically significant difference test scores of students in the groups are compared (U=21, p<0,05).

In addition, the average ranks of vocabulary and speech level were higher in the group of dyslexia (21) than the normal students (12). Accordingly, it is possible to say that vocabulary and speaking skills are predictors of dyslexia for kindergarten students.

It is one of the goals of the study whether the Early Phonological Awareness Difficulties in kindergarten has a predictive feature for dyslexia. The results of the analysis of Mann-Whitney U Test regarding this sub-goal have been presented in Table 4.

Table 4. Mann Whitney U Test Results for early phonological awareness difficulties of kindergarten students at risk of dyslexia

Subtest	Group	N	Mean Rank	Rank Sum	U	p
Early Phonological Awareness Difficulties	Dys.	6	22,75	136,5	10,5	0,001
	Nor.	21	11,5	241,5		

According to Table 4, there is a significant difference between early phonological awareness skills of students with dyslexia and normal students (U=10,5 p<0,05). When the average ranks of the students were examined, it was seen that dyslexia students (22.75) were higher than normal students (11.5). In this case, it can be said that the problems of early phonological awareness skills are predictors of dyslexia for kindergarten students.

The results of the analysis of Mann-Whitney U Test regarding this sub-goal have been presented in Table 4.

One of the goals of this study is to determine whether having rapid automatic naming difficulties of kindergarten students are predictive of dyslexia. The results of the analysis of Mann-Whitney U Test regarding this sub-goal have been presented in Table 5.

Table 5. Mann-Whitney U Test Results for rapid automatic naming problems of kindergarten students at risk of dyslexia

Subtest	Group	N	Mean Rank	Rank Sum	U	p
Rapid Automatic Naming Difficulties	Dys.	6	17,5	105	42	0,007
	Nor.	21	13	273		

Considering this finding, it has been discovered that there is a meaningful difference between rapid automatic naming difficulties of students with dyslexia and normal students ($U=42$ $p<0,05$). When the average ranks of the students were examined, it was seen that dyslexia students (17.5) were higher than normal students (13). In this case, it is possible to say that the rapid automatic naming difficulties in kindergarten are one of the predictors of dyslexia.

In this study, it was investigated whether the sequencing difficulties seen in kindergarten was predictive for dyslexia. The results of the analysis of Mann-Whitney U Test regarding this sub-goal have been presented in Table 6.

Table 6. Mann-Whitney U Test Results for sequencing difficulties of kindergarten students at risk of dyslexia

Subtest	Group	N	Mean Rank	Rank Sum	U	p
Sequencing Difficulties	Dys.	6	21	126	21	0,001
	Nor.	21	12	252		

According to the result of the analysis, the average rank of the group in the dyslexia (21) is higher than the average rank the group in the normal students (12). This difference is statistically meaningful ($U=21$, $p<0,05$).

The another aim of the study is whether the having basic arithmetic difficulties are predictive the dyslexia. The results of the analysis of Mann-Whitney U Test regarding this sub-goal have been presented in Table 7.

Table 7. Mann Whitney U Test Results on basic arithmetic difficulties of kindergarten students at risk of dyslexia

Subtest	Group	N	Mean Rank	Rank Sum	U	p
Basic Arithmetic Difficulties	Dys.	6	19,25	115,5	31,5	0,001
	Nor.	21	12,5	262,5		

When Table 7 is examined, there is a significant difference test scores of students in the groups are compared ($U=31,5$ $p<0,05$).

In addition, the average ranks of basic arithmetic difficulties were higher in the group of dyslexia (19,25) than the normal students (12,5). Accordingly, it is possible to say that basic arithmetic difficulties are predictors of dyslexia for kindergarten students.

One of the goals of this study is to reveal whether having time and spatial difficulties of kindergarten students are predictive of dyslexia. The results of the analysis of Mann-Whitney U Test regarding this sub-goal have been presented in Table 8.

Table 8. Mann Whitney U Test Results on time and spatial difficulties of kindergarten students at risk of dyslexia

Subtest	Group	N	Mean Rank	Rank Sum	U	p
Time and Spatial Difficulties	Dys.	6	24,5	147	0	0,001
	Nor.	21	11	231		

According to Table 8, there is a significant difference between dyslexia and normal students ($U=0$ $p<0,05$). When the average ranks of the students were examined, it was seen that dyslexia students (24.5) were higher than normal students (11). In this case, it can be said that time and spatial difficulties are predictors of dyslexia for kindergarten students.

CONCLUSIONS AND DISCUSSION

As a result of this study conducted to determine the skills and behaviors that are seen as predictors of dyslexia in kindergarten students; it can be said that kindergarten students at risk of dyslexia have problems to recall the informations (songs, rhymes, words, names and names). Szalkowski (2012), in his genetic studies on individuals with dyslexia, thinks that a particular gene plays a role in problems related to short-term memory of dyslexic. According to Shaywitz (2003), if the child is 4 years old, but still cannot sing a simple child song or rhyme, it can be a sign of dyslexia.

In the study, it is seen that kindergarten students who are at risk of dyslexia have less vocabulary than their peers and this situation is reflected in their speeches. As Goulandris and Snowling (1991) point out, the vocabulary of individuals with dyslexia is weak and this situation is also seen as difficulty in recognizing words during reading.

As a result of the study, it is seen that the kindergarten students at risk of dyslexia have problems in activities requiring phonological skills. Many studies have shown that individuals with dyslexia have problems in phonological skills (Scheffel, Shaw ve Shaw, 2008; Akhtar, 2008; Lyon, 1995; International Dyslexia Association, 2003).

According to Frith (1985), individuals with dyslexia often have difficulty completing the alphabetical process. Waldvogel (2010), mentioned the importance of phonological awareness skills for kindergarten students at risk of dyslexia.

As a result of the study, kindergarten students at risk of dyslexia also have problems in rapid automatic naming skills. Shaywitz and Shaywitz (2008) also mention that the rapid and automatic naming process is a symptom for dyslexia. Norton (2012) studied with 43 kindergarten students at risk of dyslexia using brain imaging methods and emphasized that dyslexic students can be identified before having difficulty with rapid automatic naming and phonological awareness studies.

According to the another result of the study, kindergarten students at risk of dyslexia have problems in simple sequencing and arithmetic skills. IDA (2009) reported that problems with simple sequencing skills are appropriate to the characteristics of dyslexia. Turgut, Erden and Karakaş (2010) concluded that the ranking skill scores of students with learning difficulties differed from those of normal students. Morganise (1896), who conducted one of the first dyslexia studies, also mentioned the difficulty in simple mathematical problems while describing dyslexia.

Another result of the study is that the difficulties experienced in time and spatial skills can be considered as risk of dyslexia for kindergarten. The child is expected to be able to use his / her language skills well to tell the time and direction skills will be improved in order to tie shoes or to wear the shoe to the right foot. However, 90% of children with dyslexia develop these skills after the age of ten (Goody & Reinhold, 1961; Hornsby, 2011).

Within the scope of the study, the following recommendations are presented for practitioners and researchers.

- Educators, especially kindergarten teachers, and families should be informed about dyslexia can be diagnosed in kindergarten before acquainting with the reading experience.
- The frequency of the problems seen in the skills identified as dyslexia predictor should be determined and monitored.
- Students with suspected dyslexia should receive a preventive educational program immediately upon starting primary school.
- It is needed more medical and educational studies in Turkey about dyslexia.
- The kindergarten dyslexia screening scale should be developed with more comprehensive studies.

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Relationships between Job Satisfaction, Motivation and Life Satisfaction in the Teachers: A Structural Equation Modeling Study

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Abstract

The purpose of this study is to explore the effects of life satisfaction and job motivation to job satisfaction in the teachers, and examining mediating roles of job motivation between the other two variables. The online form consisted of 24 items was voluntary filled by 264 teachers. A structural equation modeling analysis was carried out when analysing data. The fit indices of the hypothesized structural model indicated perfect fit the data. It was found that the life satisfaction was a significant predictor of teacher job motivation and job satisfaction. This means that as the life satisfaction level of teachers increased, the level of job motivation and satisfaction positively increased. We concluded that in order to increase job satisfaction of teachers, any action which might increase the motivation level and the life quality of the teacher should be supported by the schools and ministries.

Keywords: Teacher Education, Job Satisfaction, Job Motivation, Life Satisfaction, Structural Equation Modelling

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INTRODUCTION AND LITERATURE REVIEW

Apart from their responsibilities while fulfilling their duties, the teachers who are one of the most indispensable components of the education and training are also expected to be filled with the required qualifications. The qualified teacher who fulfils his or her responsibilities needs to carry the components required by the occupation and a very successful person. Teachers' satisfaction with life, their perspectives on life, and their professions are interrelated, for this reason; it is quite likely to be affected by each other. When the literature is examined, it is clear that the job satisfaction of the teachers is efficient on shaping their points of view, and high job satisfaction leads to higher life satisfaction on teachers. It is highly important and required to be identified what the job satisfaction is, what it is affected by and what kind of impacts life satisfaction and motivation has on job satisfaction.

Job satisfaction is made up of understanding an individual's job and its experience related to his job as a case which ends up with emotions arousing satisfaction. Job satisfaction, which is sing of physiologic and spiritual emotion of the employees (Koç, Yazıcıoğlu & Hatipoğlu, 2009), and which reflects one's perception and emotion (Şahin, 2013) is a general attitude that employees perform towards their jobs (Greenberg & Baron, 2000; Kara, 2010; Sonmezer & Eryaman, 2008). The general attitude which the employees perform towards their jobs while fulfilling that job is quite important and required, and it is also a fact that it reflects the responsibilities that they feel towards their jobs. Job satisfaction, which might be defined in different ways, can be defined such as through the appreciation of the individual's works and experiences, the increase of the fertility, productivity and the quality of the jobs they do, (Demirtaş & Alanoğlu, 2015), happy and positive psychology based on worker's job experience, through his or her values, job pleasure and expectation, attitude towards the job; its result and emotional reaction, (Tüy, 2008; Weiss, 2002), the pleasure extent they get from their jobs (Muchinsky, 2000, as cited in Terzi, 2017).

Job satisfaction, which expresses the extent of pleasure related to the subjects of the education and training of the teachers (Zembylas & Papanastasiou, 2005) has a significant role on teachers' in spending productive and qualified education period and increasing the quality of education (Michaelowa, 2002). The interaction and communication, which the teachers set on the students, and the effect they leave can be demonstrated one of the main factors which affect the job satisfaction. The effect that the teacher leaves on the student during the education period, the reaction they receive and the feedbacks he or she gets is each a sign of reaction of the qualification. Demirtaş and Alanoğlu (2015) have stated that the factors affecting the job satisfaction have been gathered in two groups as individual and organizational; individual factors are age, experience, education level, length of service, the characteristics of the employee, and organizational factors are the job itself, colleagues, wage, administration, working conditions, promotion opportunities, job security and protection, appreciation, awarding and communication.

There are a lot of factors that affect the job satisfaction of the teachers who take place in the foreground in the society with the tasks and the responsibilities they take. One of the factors affecting the job satisfaction is the pleasure and the happiness they get in life. While the life satisfaction term defines the satisfaction of an individual in or out of his or her work life, when the period of time that the individual spends in his or her work life is also taken into consideration, it is rather probable to comment that there is a relation between job and life satisfaction and due to the relation between job and life satisfaction, life satisfaction has effect on one's work life and reflects the happiness and perception of a qualified life (Karaman, Neslon, & Cavazos, 2018; Keser, 2005; Piccolo, Judge, Takahashi, Watanabe & Locke, 2005; Rode, 2004; Sevimli & İşcan, 2005). While several factors like interpersonal relations and job satisfaction affect life satisfaction, based on these, differences may be observed on individuals' job satisfaction; both life satisfaction and job satisfaction may become efficient on individuals' work lives.

It is rather obvious that there is a relation between job and life relation, a balance between the increase of life satisfaction and the increase of job satisfaction, and positive perception between job satisfaction and life satisfaction (Kırcı Çevik & Korkmaz, 2014; Yenihan, Öner & Balcı, 2016). It can

also be observed that the situations and satisfaction which the individuals experience during their life span are efficient on job satisfaction and there is a relation between them. Since all the situations and satisfaction which the individuals experience or are high likely to experience might result in negative or positive effects on work life, it may be commented that whatever the work place is, all the individuals have upmost job satisfaction; in addition to this, their life satisfaction is also high likely to increase. Therefore, especially in education world, increasing the job satisfaction of the teachers or those taking teaching tasks and also their life satisfaction as it directly affects or affected is needed to be provided with all the required equipment.

The fact that teachers' job satisfaction and motivation is at high or lower level affects also the quality of their service (Smith, Karaman, Balkin, & Talwar, 2019; Yavuz & Karadeniz, 2009). That teachers could get efficiency is constantly bound to keeping alive their emotion and excitement. The continuity of their willingness and happiness is also focused on improving some motivational elements. The fact that teachers feel relaxed, are happy at their works and feel love and respect might also enable to unite with their institutions. Hence, teachers may consider themselves as a part of their institution (Akman, 2009). Yalçın and Korkmaz (2013) determined that teachers could work more voluminously as long as they are happy with their work and work environment; and it is not adequate condition in terms of improving only the fertility of financial satisfaction. They emphasized that the fact that teachers become happy while working, like their jobs and do them well is through a good motivation. Besides, they also expressed that the teachers' motivation is highly important for both teachers' motivation and also education reforms which might be realized. Evans (2000) also stated that motivation affects the fertility in educational environment and has a significant role. It is quite obvious that the feeling of pleasure that the motivated person or people are showing respect to his or her responsibilities have created a positive impression on job satisfaction.

It is obvious that changing world conditions, technology, life balance, economic conditions and the realized educational reforms have negative and positive effects on individuals and consequently affect the national education system and the teachers whose role are crucial in this system. It is also obvious that change and innovation affect the individual's job satisfaction and also the job satisfaction is efficient on individual's work life and job satisfaction. Motivation which increases the pleasure acquired from life and has important role in shaping the point of view related to the life is directly proportionated to the job satisfaction and at the same time it has been detected that it affects the job satisfaction. It has become needy to research and to make explanations about to what extent the life satisfaction and motivation of the teachers who especially play important roles in growing new generations affect their job satisfaction and how important the job satisfaction for the teachers is. To fulfill the roles the teachers take and to be able to give their due to these roles needs inconvenient and intense effort. Therefore, in this research, it has been aimed to identify the teachers' life satisfaction and motivation and to reveal that their life satisfaction and motivation have great effect on their job satisfaction. The following questions have been in pursuit of being answered in order to reach up to this general aim.

Research Questions

- How strong are the structural relations between job satisfaction, job motivation and life satisfaction among teachers?
- What is the role of teacher job motivation as a mediator variable between job satisfaction and life satisfaction among teachers?
- How strong are the direct and indirect effects from life satisfaction to job satisfaction among teachers?

METHODOLOGY

Participants and Procedure

The data in this study were collected from kindergarten, primary, secondary and high school teachers in the month of May-2019. First, an online survey was created on Google Forms application, and then the electronic link was sent to the more than three thousands school teachers. Of the recipients, 264 filled the online form. The form consisted of 24 items was voluntary filled by the participations. The average age of the participants was 32.71 ($SD=8.10$), and the average number of experience was 5.88 ($SD=3.45$) years. Of the participants, 31.4% ($n=83$) was female, and 68.6% ($n=181$) was male. The electronic form did not allow item skipping so, we did not encounter missing data problems. The data collection process was completed in three weeks.

Measures

Teacher job satisfaction survey. This survey was designed and validated by Dilek (2019), and aims to measure teachers' job satisfaction levels. The survey was developed in Turkish. In the survey, there were a total of 13 likert-type items in the three sub-scales. These subscales were named "*enjoying job*", "*respecting job*" and "*receiving support from colleagues*". The first subscale intends to measure how much a teacher enjoys teaching duties, and consists of six items. This subscale includes items such as "I am very happy to be a teacher" and "I recommend being a teacher to those who will choose a new profession". The second subscale intends to measure how much a teacher respects teaching as a profession, and consists of three items. This subscale includes items such as "I respect my profession" and "Teaching is a very important profession". The third subscale intends to measure how much support a teacher receives from his/her colleagues, and consists of four items. This subscale includes items such as "I can easily ask for help from my colleagues" and "I work in harmony with other teachers in my school". All items in the survey had five ordinal categories ranged from 1=*strongly disagree* to 5=*strongly agree*. The measurement tool had second order structural model. This meant that there were three subscales in the survey, and these three subscales measure a general domain named *teacher job satisfaction* (see Figure 1). In this study, we used the same structural relations when analyzing the data. The Cronbach alpha values of the original scale were 0.84, 0.65 and 0.82 for the subscales "*enjoying job*", "*respecting job*" and "*support from colleagues*", respectively. The omega coefficient value for the whole scale in the original study was 0.92. In our study, the Cronbach alpha values were 0.90, 0.78 and 0.86 for the subscales "*enjoying job*", "*respecting job*" and "*support from colleagues*", respectively, and the alpha value for the whole scale was 0.85. There were three negatively worded items in the job satisfaction survey, and these items were reverse-coded before analyzing the data.

Contextual Achievement Motivation Measure. To measure job motivation, Contextual Achievement Motivation Measure (CAMM) developed by (Smith, 2015), and translated into Turkish by Karaman and Smith (2016) was used. This survey was designed and validated by Karaman and Smith and (2016) and translated to Turkish. The survey had six likert-type items, and aims to measure teachers' motivation in their work. The survey includes items such as "In my school, I am an achiever", "In my school, I am productive" and "In my school, I am ambitious". All items had five ordinal response options as *never* (0), *sometimes* (1), *50% = %50 of the time* (2), *usually* (3), and *always* (4). The original scale had two subdimensions as motivation in school work, and motivation in community, but we used the first one in our study. The subscale had a single dimensional structure meaning that all six items were measuring the same construct of interest, teacher job motivation in their work place which is school. The Cronbach alpha value of the translated version of the scale was 0.85. In our study, Cronbach alpha value was 0.89.

The satisfaction with life scale. This psychological survey was designed and validated by (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), and aims to measure how much teachers are happy about their lives outside the school. The Turkish version of the instrument was translated and

validated by Dağlı and Baysal (2016). The survey includes items such as “The conditions of my life are excellent”, “If I could live my life over”, I would change almost nothing” and “I am satisfied with my life”. The survey had five likert-type items, and each item had seven response options, ranged from 1=*strongly disagree* to 7= *strongly agree*. The original scale had a single dimensional structure meaning that all five items were measuring the same construct of interest, satisfaction with life. The Cronbach alpha value of the original scale was 0.88. In our study, Cronbach alpha value was 0.89. The descriptive statistics and Cronbach alpha values for all measures were presented in Table 1.

Data Analysis

A structural equation modeling analysis was carried out with the data consisted of responses from 264 teachers.. Based on the previous work, in the hypothesized model, the teacher job satisfaction was hierarchical factor endogenous latent variable, the life satisfaction was single factor exogenous latent variable and the teacher job motivation was a single factor mediator latent variable. As illustrated in Figure 1, this means that there is a direct effect from teacher life satisfaction to job satisfaction, and there is a specific indirect effect mediated through teacher job motivation. In the data analysis, when there is both direct and indirect effect from life satisfaction to job motivation, we conclude the job motivation plays partial mediating roles. We fit the hypothesized model in Mplus software version 7 (Muthen & Muthen, 1998-2012). The bootstrapping confidence intervals of standardized direct, indirect and total effects with 10.000 iterations were calculated.

RESULTS

The fit indices of the hypothesized structural model were $\chi^2(246) = 462.70.13$ and $p < .01$, $\chi^2/df=1.88$, CFI=.97, Tucker-Lewis index (TLI) =.97, RMSEA=.05 with 90% CI [.04, .06] and WRMR= 1.04. The goodness of fit indices indicated that the model fitted the data well based on the common criteria (see Hooper, Coughlan, & Mullen, 2008; Kline, 2005). All standardized factor loadings for all measurement models were significant, and above the historical cut-off value of .30 (Tabachnick & Fidell, 2013), and ranged from .58 to .96. The standardized factor loadings and their standard errors for the items in all scales were provided in Table 2. The bivariate (e.g., zero-order) correlations between all survey items were presented in Supplementary Table 1. The standardized coefficients found in the analysis were significant and presented in Figure 1. The proportions of the explained variances for the three subscales of the teacher job satisfaction were .79, .50 and .38, for the enjoying job, respecting job and support from colleague, respectively. The standardized loadings for the three subscales were .89, .70 and .62, respectively. The amount of explained variances for the teacher job motivation and teacher job satisfaction were .11 and .46, respectively. All proportions or loadings were significant at the alpha level of .001.

We found that the life satisfaction was a significant predictor of teacher job motivation, and explained 11% variance in teacher motivation ($\beta=.34$, $SE=.05$, $p < .001$). This means that as the life satisfaction level of teachers increased, the level of motivation in job positively increased. The teacher life satisfaction was a significant predictor of teacher job satisfaction, as well. The life satisfaction had effect on job satisfaction with the total effect of $B=.63$ ($SE=.05$, $p < .001$). The .53 ($SE=.06$, $p < .001$) effect is entirely direct as was specified in the model (see Figure 1). This means that the teacher life satisfaction explained %28 proportion of teacher job satisfaction, after controlling for mediator variable, teacher job motivation. This finding implies that as the life satisfaction level of teachers increased, job satisfaction level of teachers directly increases. The .09 ($SE=.02$, $p < .001$) effect is indirect effect through teacher job motivation (i.e., $.34 \times .28=.09$, see Figure 1). The indirect effect was small but significant. This means that as amount of the life satisfaction increases, the amount of job motivation teachers increases, and this leads to meaningful increase in the amount of teacher job satisfaction. These findings support partial mediation hypothesis. Overall speaking, the increase in teacher life satisfaction leads to both direct and indirect increase in teacher job satisfaction. The bootstrapping confidence intervals of standardized direct, indirect and total effects were also presented in Table 3.

DISCUSSION

The purpose of this study was to test the structural relationships between life satisfaction, job motivation and job satisfaction in the teachers, and mediated effect of job motivation among the job satisfaction and life satisfaction. To our best knowledge, no study has simultaneously examined the interrelationships of these three variables in a structural equation modelling in Turkish literature. Thus, we highly believe that the current study contributes to understanding of the literature on the factors affecting job satisfaction and teacher education.

We have found that teachers' life satisfaction directly affects their level of job satisfaction. This aligns with the existing literature. Uyguç, Arbak, Duygulu and Çıraklar (1998) stated in their researches that in most of the people there is a balance between the increase of job satisfaction and life satisfaction and they both interact each other. Koruklu, Feyzioglu, Özenoğlu Kiremit and Aladağ (2013) in their researches came up with the solution that the job satisfaction of the teachers is affected by the life and the variables through teachers' opinions; consequently, when the variables which are considered to have effect on satisfaction are taken into consideration, enhancing the physical conditions of the schools where the teachers work to increase their job satisfaction and identifying the causes of the problems which the administrators have with their colleagues are rather important. Türker and Çelik (2019) in their researches came up with a solution that apart from that the problems and issues which the teachers encounter in work-family environment are not only related to teachers' private lives, but they may cause bigger results and the problems which the teachers encounter in their private lives may affect their job satisfaction and may cause some declines in teachers' performances. Karakaya, Çiçek and Çoruk (2017) in their researches touched on the relation between the perception of school-life quality of the teachers who work in primary schools and their job satisfaction and detected that there is a meaningful result in positive way and at medium level between the level of perception in job satisfaction of the teachers and the level of school-life quality. They obviously stated that there is a direct relation between teachers' job and life satisfaction. In some conducted researches, it was concluded that the pleasure which the teachers get from job and life satisfaction interacts with each other and has a positive direct relation between job and life satisfaction (Aydıntan & Koç, 2016; Bonebrigt, Clay & Ankenman, 2000; Ignat & Clipa, 2012; Perrone, Webb & Jackson, 2007).

We have also found that the level of life satisfaction positively affects job motivation levels of teachers, and this effect leads to positive effect on job satisfaction levels in teachers. This finding also aligns with the previous studies. It was made out in the researches conducted by Yalçinson (2017) and Gökçe (2008) that motivation is highly affected by life satisfaction and future anxiety and they are terms which are highly interrelated.

In the studies conducted in the outside of Turkish literature support our research findings. The other findings indicated that teachers' job satisfaction affects their life satisfaction and motivation. Byron (2005) determined that there is a balance between work life and family life, and the family life of the individual has a significant effect on work life. In the research of Ahsan, Abdullah, Fie and Alam (2009), it was determined that the individuals who have problems and tension in their work life are quite low in their job and life satisfaction.

It was detected in researches conducted by Yerlisu Lapa, Ağyar ve Bahadır (2012) there is a direct positive relation between life satisfaction and free-time motivation and the frequency of participation in these free-time activities. Koç (2018) stated in the research that there is a relation between life satisfaction and motivation, and also stated that there is also inner motivation bound to knowledge, success and identified exterior motivation between life satisfaction and academic motivation and also there is positive relation between the exterior regulations with the sub-dimensions and life satisfaction. Job satisfaction which is detected to have positive effects on life satisfaction has strong relation with the motivation. While Mertler (2016) state that the individuals who trust on themselves and are highly motivated have more job satisfaction and can easily adopt themselves in their work environment, Çevik and Köse (2017) underlined in their researches that motivated individuals are needed in forming the strong cultures of the organizations. Ertürk and Aydın (2016)

also stated in their researches that it is needed for teachers to keep their job motivation at high level and added that their job motivation and organizational commitment are in relation, as well.

CONCLUSION

When the effects of the teachers' life satisfaction and motivation on their job satisfaction are taken into consideration, their working conditions should be healed by the Ministry of National Education to motivate and improve their performances in the institutions where they support service.

Because the increase of life satisfaction means having teachers satisfied with their jobs, the physical conditions of the institutions where teachers work should also be reviewed. It is obvious that the classroom environments which will be designed with technology, innovation and contemporary education perception, and the classroom environments which enable the utility of every kind of technologic devices have also effect on the motivation of the teachers.

In terms of increasing teachers' motivation and affecting the satisfaction they will get from the life, awards which may make teachers happy and satisfied, encouragements; in short, any action which might increase the motivation level and the life quality of the teacher should be supported by the schools and ministries.

Since the fact that teachers' motivation will enable them to focus more on their jobs and get more fertility, schools should focus more on school-parent association and have more meeting with the parents and get more information about the students' situations. Accordingly, workshops which will be conducted will ease the communication between the parents and teachers and will enable the teachers to get healthier and in-depth information related with their students. It is also probable that this case will have effect on teachers' motivation.

When the life and working conditions of the teachers are taken into consideration, area experts can be provided to train teachers to improve their motivation at the seminars or in-service training periodically conducted at the beginning or the end of the education and training academic year or during the education period.

In this research where the effect of the teachers' life satisfaction and motivation on their job satisfaction is identified, the quantitative method has been applied. When the qualitative method is included in this research, broader and in-depth opinions are high likely to be reached by a setting a group and having qualitative discussions and adding the observation method, as well. By adding the qualitative method to the research, it can be provided by teachers what kind of requirements they need to improve their life satisfaction and motivation and can also be provided by people and institutions that can improve the job satisfaction and motivation of the teachers to conduct enterprising education services.

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Table 1. Descriptive statistics for the scales

Variable	Subscale	Mean	SD	α
Teacher Life Satisfaction Survey	1.Enjoying Job	52.48	7.14	.85
	2.Respecting Job	22.64	4.95	.86
	3.Support from Colleagues	13.91	1.40	.64
Teacher Life Satisfaction Survey	-	15.92	2.49	.76
Teacher Life Satisfaction Survey	-	14.96	4.28	.89
Teacher Job Motivation Survey	-	21.48	4.20	.89

SD= Standard deviation, α = Cronbach alpha

Table 2. Standardized factor loadings for all survey items

Variable	Subscale	Item	Factor Loading	S.E.
Teacher Job Satisfaction Survey	Enjoying Job	jb1	.90*	.01
		jb5	.77*	.03
		jb9	.87*	.03
		jb15	.65*	.04
		jb20	.72*	.04
		jb24	.77*	.03
	Respecting Job	jb3	.69*	.05
		jb11	.96*	.04
		jb17	.62*	.06
	Support from Colleagues	jb7	.76*	.04
		jb13	.58*	.05
		jb19	.78*	.03
jb23		.82*	.04	
Teacher Life satisfaction Survey	-	ls1	.92*	.01
	-	ls2	.81*	.02
	-	ls3	.87*	.01
	-	ls4	.80*	.02
	-	ls5	.77*	.02
Teacher Job Motivation Survey	-	m1	.84*	.02
	-	m2	.88*	.01
	-	m3	.71*	.03
	-	m4	.89*	.01
	-	m5	.74*	.02
	-	m6	.88*	.01

* Significant at the alpha level of .001

jb= Job satisfaction, ls= life satisfaction, m= motivation

Table 3. Standardized direct, indirect and total effect estimates with %90 confidence intervals.

Effect	Lower 5%	Estimate	Upper 5%
Direct Effect	.40	.53	.66
Indirect Effect	.03	.09	.16
Total Effect	.52	.63	.73

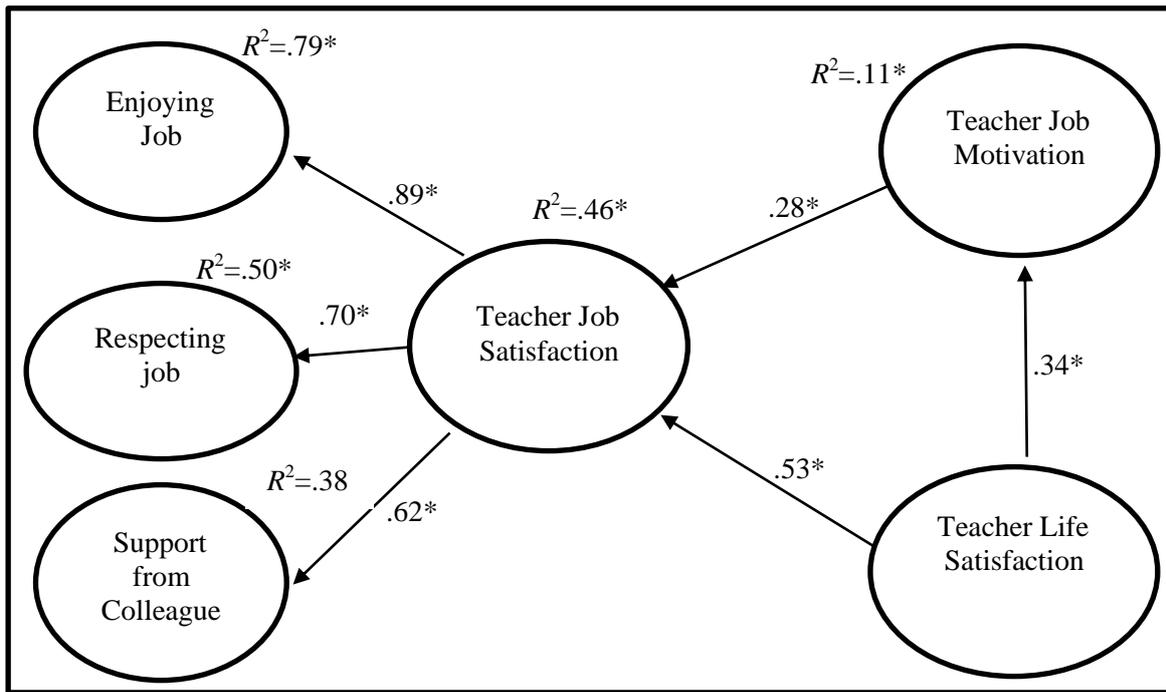


Figure 1. The structural model depicting the hypothesized relations between the variables.

* $p < .001$

Investigation of the Relationships among Psychological Counselor Candidates' Counseling Self-Efficacy, Multicultural Competence, Gender Roles, and Mindfulness*

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Abstract

The purpose of this study was to investigate the relationships between counseling self-efficacy, multicultural competence, gender roles and mindfulness of counselor candidates. Participants of this study were 431 senior students studying in the Guidance and Psychological Counseling Undergraduate Programs of 14 different Turkish universities. According to the results, psychological counselor candidates' gender roles and mindfulness significantly predicted their counseling self-efficacy through the mediation of multicultural competence. The authors discuss implications of these findings.

Keywords: Counseling Self-Efficacy, Multicultural Counseling Competency, Gender Roles, Mindfulness

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INTRODUCTION

The concept of counseling self-efficacy (CSE) was adapted to the field of psychology inspired by Social Cognitive Theory (Bandura, 1977, 1994; Larson & Daniels, 1998). CSE is defined as the belief of a psychological counselor about their ability to effectively counsel a client in the future (Hall, 2009; Larson & Daniels, 1998; Lent, Hill, & Hoffman, 2003). CSE consists of factors such as offering effective counseling, persistence in providing psychological counseling when encountered with a difficult client, being open to learning, and receiving effective feedback (Barnes, 2004).

Studies on CSE have been conducted both with psychological counselors (Hu et al., 2015; Larson et al., 1992; Özteke, 2011; Yam, 2014) and psychological counselor candidates (Al-Darmaki 2004; Atıcı, Özyürek, & Çam, 2005; Jaafar et al., 2009; Pamukçu, 2011). Positively significant findings have been obtained about the psychological counselor candidates' psychological counseling self-efficacy and professional experience (Tanget al., 2004), self-esteem (Atıcı, Özyürek, & Çam, 2005), life satisfaction (Pamukçu, 2011), and supervision experiences and sense of humor (Satici, 2014).

CSE is also associated with the problem-solving skills of the counselor. Indeed, counselors with a high perception of CSE carry on providing effective counseling to clients by struggling with difficulties experienced during the psychological counseling process (Belgi, 2016; Gündüz, 2012; Larson & Daniels, 1998; Larson et al., 1992).

CSE and MCC

In the literature, CSE is considered to be positively associated with multicultural counseling competence (MCC) (Constantine, 2001; Crook, 2011; Havens, 2003; Maldonado, 2008; Vespia et al., 2010). MCC is a basic-level psychological counselor skill (Ivey, Ivey, & Zalaquett, 2010) and an essential qualification that psychological counselors are expected to have (Maldonado, 2008). In this context, the psychological counselor candidate is expected to also make use of their basic counseling skills to recognize and understand the cultural characteristics of the client with different cultural characteristics. Having MCC for the counselor does not necessarily mean approving the thoughts of the client, agreeing with them, or judging them. On the other hand, MCC is not an alternative way of being client-oriented and being empathic, either. On the contrary, being sensitive to culture means making it possible to understand the client by also considering the cultural background in which they live. MCC implies giving value to the client as a human being regardless of their thoughts. The psychological counselor's respect for the client and unconditional acceptance allows the client to open up. The self-disclosure of the client enables them to apply the awareness gained in the counseling medium to their life (Sue & Sue, 2008).

MCC is defined as a field of competence also in the field of psychological counseling (APA, 2017). The effect of culture comes to the forefront in the thoughts and behaviors of the individual, who is a part of society. Approaches ignoring the effects of culture in the field of psychological counseling prove inadequate in terms of understanding the individual and meeting their need for psychological help (Erdur-Baker, 2007). In light of these findings, meeting the needs of the individual for help by considering their cultural characteristics is dealt with the concepts of multicultural psychological counseling competence (MCC) (Barden & Greene, 2015) and culturally sensitive counseling efficacy (CSCE) (Güçlücan, 2016). In this study, the structure in question is addressed with the keyword MCC.

MCC suggests that the psychological counselor has the necessary knowledge, skills, and equipment to offer psychological counseling to a client with different cultural characteristics (such as gender, language, religion, ethnicity, geographical region, sexual orientation and corporal / physical disability) (Ivey et al., 2010; Sue, 2001). MCC means that the psychological counselor knows and understands the social, cultural, and economic characteristics affecting the client's behavior (APA, 2017). In this sense, the familiarity of the psychological counselor with the cultural characteristics of

the client and the use of appropriate methods and techniques by the counselor facilitates the provision of the psychological counseling process (Ivey et al., 2010; Sue, 2001). It is of significance in terms of effective management of the psychological counseling process that the counselor should have counseling skills and know and understand the client's cultural characteristics (Ivey et al., 2010; Sue, Arredondo, & McDavis, 1992).

MCC is also considered as a professional ethical principle in the field of psychological counseling. The American Counseling Association (ACA, 2014) emphasizes that the psychological counselor should gain MCC-related knowledge, skills, and awareness. In the context of MCC, the psychological counselor is responsible for protecting the subjectivity of the client, whose cultural characteristics are different from those of their own (ACA, 2014). When the psychological counselor is not trained on MCC in the multicultural society, ethical problems may be experienced (Sadeghi, Fischer, & House, 2003). MCC is addressed as Multicultural and Social Justice Counseling Competencies upon its update by ACA in 2014 (Ratts et al., 2016). In this context, MCC is handled together with the concept of social justice. In order to ensure and protect social justice, the training of psychological counselors equipped with MCC is considered a necessity.

The areas of competence that the psychological counselor should have with respect to MCC are discussed as knowledge, skills, and awareness in the literature (Ridley & Kleiner, 2003; Sue, 2001; Worthington, Soth-McNett, & Moreno, 2007). Awareness of the counselor of their own assumptions, values, and prejudices makes up the first step of MCC. The second step is defined as the stage where the counselor understands the world view of their client who has a different culture. The final step is described as the stage where the psychological counselor utilizes appropriate interventions, methods, and techniques by considering their client's cultural characteristics (Ivey et al., 2010; Sue, 2001; Sue et al., 1992). The psychological counselor who effectively fulfills the counseling process will feel competent at offering psychological counseling service. CSE is considered to be associated with gender roles in the sense that the psychological counselor accepts their client with different cultural characteristics from that of their own.

CSE and Gender Roles

In the literature, gender roles are seen as a complex part of expectations, beliefs, and attitudes in a social structure (Chao & Nath, 2011). Gender roles taken on by women and men as part of society are reflected in their actions. Gender roles are roles attributed to individuals in accordance with the gender characteristics that they have (Turan et al., 2011). Gender roles are effective in shaping the behavior and thoughts of individuals (Sankır, 2010). Gender roles that individuals learn from society can change from culture to culture and from society to society (Turan et al., 2011). In other words, it can be said that the characteristics of the cultural environment where individuals live shapes the expected gender role of individuals and that gender role expectations may show differences interculturally. Gender roles consist of traditional gender roles and egalitarian gender roles. Traditional gender roles are ascriptions on genders in accordance with the expectations and values of society (Günay & Bener, 2011). Egalitarian gender roles imply that women and men are regarded and recognized as equal in all areas of life, regardless of gender-related characteristics (Beere et al., 1984).

In the field of psychological counseling, research into gender roles emerges as a necessity (Gold & Hawley, 2001; Maldonado, 2008; Robinson, 1999; Stevens-Smith, 1995). It is of critical significance that when working with clients with different genders, psychological counselors should offer psychological counseling service to clients by considering their gender roles and choices and centering on their needs (Chao & Nath, 2011; Ottavi et al., 1994). Egalitarian gender roles in psychological counseling include non-discriminatory beliefs and judgments of the counselor on the behaviors of women and men. In this context, the egalitarian gender role in the field of psychological counseling refers to the provision of equality without any prejudice and discrimination against gender (Chao & Nath, 2011; King & King, 1986, 1990).

Psychological counseling seems to be associated with many areas such as gender, sexual orientation, and gender roles that the psychological counselor and the client have (APA, 2017). It is emphasized that the characteristics of the client regarding their gender roles cannot be seen as a barrier to receiving psychological counseling service. However, certain gender roles that the psychological counselor has as a professional and the transfer of them to the psychological counseling process as an obstacle may constitute a barrier to client's access to the psychological help that the client expects (Chao, 2012). Avoiding the reflection of gender role patterns of the psychological counselor on the psychological counseling experience is important for the protection of the client's uniqueness. When the psychological counselor has stereotypes about gender roles, they may ignore certain characteristics of the client when they meet clients that do not match these stereotypes.

Cultural characteristics of the client are reflected in their gender-related patterns. The client expects to be fully understood in their counseling experience. Understanding the client is possible by recognizing the gender roles which are reflected in their cultural characteristics (Gladding, 2015). In other words, the transfer of the gender roles of the client who needs psychological help to their counseling experience and the sensitivity of the psychological counselor to this facilitates the provision of the psychological help. (Burnham-Smith, 1996). On the other hand, the psychological counselor's prejudicial approaches or the counselor's refusal to offer psychological counseling due to the cultural characteristics of the client or suggest that the counselor does not have MCC (Chao, 2012). Gender roles are seen as a product of cultural differentiation. The individual of a certain community learns their gender roles from the community that they belong to. The individual transfers the gender roles that they have learned to their life in order to meet the expectation of the society which they belong to (Chao & Nath, 2011; King et al., 1994; 1997). During their counseling experience, the psychological counselor should know and be aware of the fact that the behaviors of men and women contain the characteristics of their culture (Cormier & Hackney, 2013).

CSE and mindfulness

Mindfulness is cited as a psychological process, a method, and a skill in the field of psychological counseling (Hayes & Shenk, 2004; Hayes & Wilson, 2003; Kostanski et al., 2006). Mindfulness is to be aware of what is happening right now without judging (Greason & Cashwell, 2009) and it is a process that makes it easy to be open to new experiences (Brown & Ryan, 2003). Mindfulness, in this respect, is an important factor in volunteering for new life experiences and accepting both yourself and others as they are. To identify the concept of mindfulness, its characteristics have been defined (Baer, Smith, & Allen, 2004). The characteristics of mindfulness have been defined as observing, describing, doing conscious action, and accepting without judgment. In addition, the qualities of mindful moments have been identified in order to understand mindfulness (Germer, 2004). The qualities of mindfulness are that mindfulness is not conceptual, it is moment-focused, it is not judgmental, it is purposeful, it needs participant observation, it is not verbal, and that it is discovery-based and liberating.

The client's self-acceptance and development of awareness are achieved by means of the mindfulness of the counselor in the therapeutic relationship (Williams, 2008). Mindfulness is seen as closely associated with counseling skills such as effective listening and empathy in terms of being more cautious about the client's story (Schure, Christopher, & Christopher, 2008). The mindfulness of the psychological counselor allows him to be psychologically sound and, by means of this, to be courageous and voluntary in providing counseling (Rybak, 2013). In addition to the psychological counselor's effective use of counseling skills, their self-awareness, vision, psychological flexibility, and personality affect their perception of CSE (Larson, 1998). Mindfulness is also seen as an important matter for the psychological counseling process. The mindfulness of the psychological counselor contributes to both the counselor and the client to focus on the moment of the counseling process (Davis & Hayes, 2011). Indeed, beginning with "now and here" as a starting point, counselors who have high mindfulness can focus more on the events that occur at the moment in the counseling process and are more cautious about the possibility of ignoring the important items in the client's

history (Greason & Cashwell, 2009). Conscious awareness is used in the field of psychological counseling as a practice that accepts mental rise and decline without any attachment and judgment (Brown, Marquis & Guiffreda, 2013). Mindfulness and psychotherapy practices are similar to each other in terms of focusing what is happening at the very moment (Davis & Hayes, 2011).

Germer (2004) states that the concept of acceptance used in psychological counseling is handled as a skill in mindfulness practices. The psychological counselor experiences many feelings such as rage, anger, and disgust during the process of counseling. The acceptance skill in mindfulness and psychological counseling practices refers to the acceptance of a person without making any judgments. While mindfulness practices involve non-verbal perception, the client is expected to describe the problem verbally in psychological counseling. The description of the problem by the client helps the establishment of empathy between the client and the psychological counselor. Although there are differences in psychological counseling and mindfulness practices, acceptance has an important position as a skill (Brown et al., 2013; Germer, 2004).

The provision of mindfulness training to psychological counselor candidates during their undergraduate education allows them to be aware of their attitudes, behaviors, and emotions during offering counseling service to their clients (Stella, 2016; Urdang, 2010). While mindfulness training to be given to the psychological counselor candidates develops empathy skills, compassion and psychological counseling skills (Davis & Hayes, 2011), CSE and professional self-esteem (Urdang, 2010), it reduces stress and anxiety (Davis & Hayes, 2011).

Mindfulness is seen as a concept related to MCC (Gervais & Hoffman, 2013; Tourek, 2014). Concepts such as self-awareness, compassion, self-acceptance, and empathy, which are considered as important values under the concept of mindfulness, are also seen as values of multicultural competence. In MCC, the awareness of the counselor of their own cultural values and prejudices and acceptance of the client without any internal judgment is considered to be associated with mindfulness (Gervais, & Hoffman, 2013). Mindfulness is seen as a skill above concepts in which cultural diversities such as social values and gender roles are expressed. Mindfulness mediates the learning of cultural sensitivity values and their transfer along generations in terms of emphasizing values such as trust, unbiased acceptance, and sincerity (Tadlock-Marlo, 2011).

Purpose of the Study

This study aimed to investigate the relationships between CSE of the psychological counselor candidates and their MCC, gender roles, and mindfulness.

METHOD

Participants

In this study, the inclusion criteria for the selection of the study group were determined as follows: The instructors of the psychological counselor candidates should have an educational background in the field of Guidance and Psychological Counseling. The candidates are required to have taken the Individual Psychological Counseling Application Course and have been supervised during the course. The candidates are required to have completed the psychological counseling application, which involves initiation, study, and completion process with at least one client. Meeting all the above criteria was taken as a base for the inclusion of participants in the study group. A sampling of 431 volunteering university students from 14 different universities in Turkey was recruited between February 2016 and March 2016. The mean age of the participants was 22.16 (SD = .99), which ranged between 20 and 28. Of the total participants, 71.0% (n = 306) were female and 29.0% (n = 125) were male.

Measures

Counselor Activity Self-Efficacy Scales. Counselor Activity Self-Efficacy was measured with the Counselor Activity Self-Efficacy Scales (CASES) developed by Lent, Hill, and Hoffman (2003). The CASES is a self-report questionnaire with 41 items. Items are rated on a 10-point Likert scale between 0 (no confidence) and 9 (complete confidence). Based on the scale, CSE is a combination of perceived capabilities in three factors (helping skill self-efficacy, session management self-efficacy, and counseling challenges self-efficacy, respectively). The total score of the Turkish-CASES is the sum of the scores from 41 items, which ranged from 0 to 369. A high score from the scale indicates a higher counselor activity self-efficacy level. CASES was translated into Turkish by Pamukçu and Demir (2013). The Turkish versions of the CASES have good construct validity ($\chi^2/df = 3.30$, GFI = .98, AGFI = .98, CFI = 1.00, RMSEA = .07 and SRMR = .05) and internal reliability (Cronbach's $a = .95$ and .95 session management self-efficacy and counseling challenges self-efficacy, respectively; Pamukçu and Demir, 2013). In this study, the CASES also exhibited excellent reliability (Cronbach's $a = .95$ and .92 for session management self-efficacy and counseling challenges self-efficacy, respectively). In this study, CASES's session management self-efficacy and counseling challenges self-efficacy subscale were used.

Perceived Cultural Sensivity Scale. MCC was measured with the Perceived Cultural Sensivity Scale (PCSS) developed by Güçlücan (2016). The PCSS is a self-report questionnaire with 26 items and two components: openness to cultural differences and search for cultural similarity with the client. Items are rated on a 5-point Likert scale between 1 (never) to 5 (always). Items include statements such as "I am trying to learn words from my clients' native language to establish a good relationship with them." The total score of the PCSS is the sum of the 26 items, which range between 26 and 130. A high score from the scale indicates a multicultural counseling competence level. PCSS has adequate construct validity ($\chi^2/df = 3.45$, RMSEA = .086, GFI = .79, AGFI = .75, PGFI = .67 and CFI = .91). It also has excellent internal reliability (Cronbach's $a = .98$ and .79 for openness to cultural differences and search for cultural similarity with the client, respectively). In this study, the PCSS also exhibited excellent reliability (Cronbach's $a = .90$ for openness to cultural differences). In the study, PCSS's openness to cultural differences subscale was used.

Gender Role Attitudes Scale. Gender role attitude was measured with the Gender Role Attitudes Scale (GRAS) developed by García-Cueto et al. (2015). The GRAS is a self-report questionnaire with 15 items. Items are rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Items include statements such as "A woman must not contradict her partner". The total score of the Turkish-GRAS is the sum of the 15 items, which ranges from 15 to 75. A high score indicates a high egalitarian gender role attitude level. GRAS was translated into Turkish by Bakioğlu and Türküm (2019). The Turkish versions of the GRAS have good construct validity ($\chi^2/df = 2.44$, RMSEA = .072, GFI = .90, AGFI = .87, CFI = .96, NFI = .94, NNFI = .96, IFI = .96, RMR = .06 and SRMR = .05) and internal reliability (Cronbach's $a = .88$; Bakioğlu and Türküm, 2019). In this study, the GRAS also exhibited excellent reliability (Cronbach's $a = .84$).

Mindful Attention Awareness Scale. Mindfulness was measured with the Mindful Attention Awareness Scale (MAAS) developed by Brown and Ryan (2003). The MAAS is a self-report questionnaire with 15 items. Items are rated on a 6-point Likert scale from 1 (almost always) to 6 (almost never). Items include statements such as "I find it difficult to stay focused on what's happening in the present". The total score of the Turkish-MAAS is the sum of the 15 items, which range between 15 and 90. A high score indicates a mindfulness level. MAAS was translated into Turkish by Özyeşil et al. (2011). The Turkish versions of the MAAS have good construct validity ($\chi^2/df = 2.09$, RMSEA = .06, GFI = .93, AGFI = .91 and SRMR = .06) and internal reliability (Cronbach's $a = .80$; Özyeşil et al. 2011). In this study, the MAAS also exhibited excellent reliability (Cronbach's $a = .83$).

Data Collection

After obtaining the informed consent of the students, the paper-and-pencil questionnaires were presented to them in the classroom context. In order to encourage honest reporting, the anonymity of the study was emphasized at the beginning of the data collection session. The order of the questionnaires was changed to avoid order effects. Completion of the questionnaires required no more than 30 minutes.

Data Analysis

Descriptive analysis and correlation analysis were performed in IBM SPSS Statistics 22.0. Structural equation modeling (SEM) was used to examine the measurement model and mediation models in AMOS Graphics. To analyze the mediation effects, we used a two-step procedure. We first tested the measurement model. When the measurement model was satisfactory, we tested the structural model using the maximum likelihood estimation. Item parceling method was used in order to reduce the number of observed variables and to improve reliability and normality of the resulting measures (Nasser-AbuAlhija, & Wisenbaker, 2006). Besides, item parceling method allowed us to control inflated measurement errors due to multiple items for the latent variable (Little et al., 2002). Two item parcels for session management self-efficacy, three item parcels for perceived MCC, and three item parcels for both gender role attitudes and mindfulness were created by using an item to construct a balanced approach, the goal of which is to derive parcels that are equally balanced with regard to their difficulty and discrimination (Little et al., 2002). Several indices of the goodness-of-fit were used as criteria for the above model selection. We used $\chi^2/df < 5$, CFI, TLI, GFI, IFI $> .90$, SRMR and RMSEA < 0.08 for assessing standards of the model fit index (Hu & Bentler 1999; MacCallum et al., 1996; Tabachnick & Fidell, 2007).

To compare two or more models, we additionally examined the χ^2 differences test and signification of path coefficients. We performed bootstrapping tests of mediation to analyze whether MCC mediates the relation between gender role attitudes, mindfulness, and CSE. Bootstrapping involves the creation of an empirical representation of the population by continuously resampling from the empirical sample to mimic the original sampling process (MacKinnon et al., 2004). The bootstrapping produced 95% bias-corrected confidence intervals of these effects from 10,000 resamples of the data. Confidence intervals that do not contain zero indicate effects that are significant at .05.

RESULTS

Descriptive Statistics and Bivariate Correlations

The distribution of each variable was normal, with skewness coefficients between $-.63$ and $.11$ and kurtosis coefficients between $-.47$ and $.62$. Table 1 contains descriptive statistics (M and SD) and correlation coefficients for the variables. CSE was positively correlated with MCC, gender roles, and mindfulness. MCC was positively correlated with gender roles and mindfulness. Gender roles positively correlated with mindfulness.

Table 1 Means, standart deviations and bivariate correlations among variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. CSEpar1	–												
2. CSEpar2	.90**	–											
3. RC	.54**	.55**	–										
4. CD	.58**	.58**	.59**	–									
5. MCCpar1	.35**	.30**	.16**	.26**	–								
6. MCCpar2	.42**	.40**	.21**	.29**	.73**	–							

7. MCCpar3	.40**	.37**	.25**	.34**	.75**	.76**	–						
8. GRpar1	.30**	.28**	.17**	.33**	.24**	.25**	.25**	–					
9. GRpar2	.25**	.24**	.11*	.23**	.29**	.26**	.28**	.64**	–				
10. GRpar3	.30**	.26**	.19**	.29**	.33**	.28**	.31**	.65**	.67**	–			
11. MFpar1	.34**	.34**	.24**	.33**	.33**	.33**	.34**	.25**	.23**	.28**	–		
12. MFpar2	.33**	.37**	.24**	.31**	.28**	.33**	.34**	.29**	.21**	.24**	.63**	–	
13. MFpar3	.33**	.32**	.19**	.27**	.26**	.32**	.31**	.25**	.20**	.24**	.62**	.63**	–
M	30.42	29.50	24.93	52.26	28.62	23.41	23.37	18.40	19.33	19.03	20.52	20.77	20.58
SD	6.36	6.28	9.21	14.89	3.60	3.61	3.28	3.43	3.37	3.03	3.93	3.70	3.46

Note. * $p < .005$; ** $p < .001$; $N = 431$; *CSEpar* parcels of counselor self-efficacy; *RC* relationship conflict; *CD* client distress; *MCCpar* parcels of multicultural counseling competence; *GRpar* parcels of gender roles; *MFpar* parcels of mindfulness

Measurement Model

First, we tested the measurement model to assess whether each of the latent variables was represented by their indicators. The measurement model consisted of four latent factors (CSE, MCC, gender roles and mindfulness) and 13 observed variables. The test of the measurement model indicated a satisfactory model fit: $\chi^2_{(58, N = 431)} = 90.956$, $\chi^2/df = 1.57$, 2.09, $p < .001$; GFI = .97; CFI = .99; NFI = .97; TLI = .99; SRMR = .034; RMSEA = .036 C.I. [.033, .091]. The factor loadings of all indicators were significant (ranged from .57 to .95; $p < .001$), demonstrating that respective indicators were true representative of their latent factors.

Structural Model

To examine the efficacy of the theoretical model, a series of structural model were tested. Firstly, fully mediated model (model 1) which included one mediator, MCC, and no direct path from gender role and mindfulness to CSE was tested. Model 1 revealed an accepted fit to data: $\chi^2_{(60, N = 431)} = 129.64$, $\chi^2/df = 2.16$, $p < .001$; GFI = .96; CFI = .98; NFI = .96; TLI = .97; SRMR = .079; RMSEA = .052 (see Fig. 1). After the model 1, we conducted a partially mediated model (model 2) which included one mediator and a direct path from gender role and mindfulness to CSE. Model 2 revealed an accepted fit to data: $\chi^2_{(58, N = 431)} = 90.95$, $\chi^2/df = 1.57$, $p < .001$; GFI = .97; CFI = .99; NFI = .97; TLI = .99; SRMR = .034; RMSEA = .036 (see Fig. 2). All in all, overall result indicated that the model 1 was better than the model 2. In other words, MCC played the partial mediating role between gender role, mindfulness, and CSE.

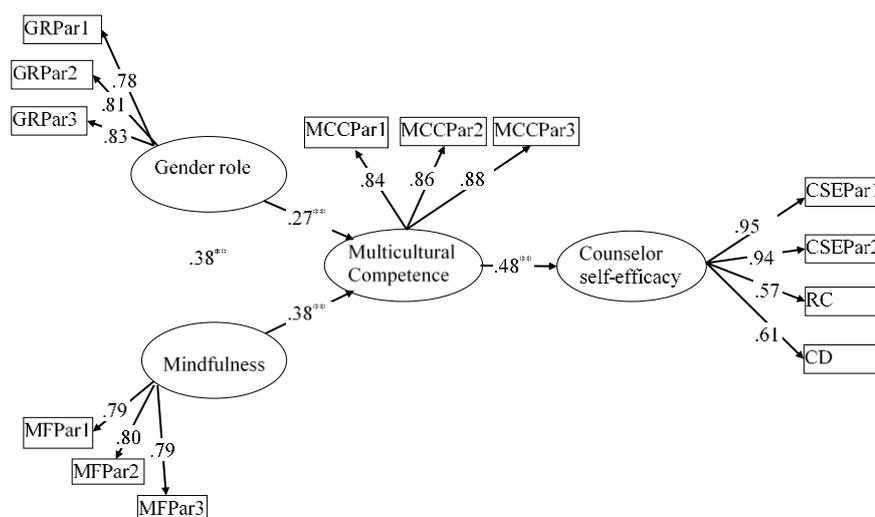


Fig. 1 Standardized factor loading for the fully mediated structural model. Note. $N = 431$; ** $p < .001$; *CSEpar* parcels of counselor self-efficacy; *RC* relationship conflict; *CD* client distress; *MCCpar* parcels of multicultural counseling competence; *GRpar* parcels of gender roles; *MFpar* parcels of mindfulness

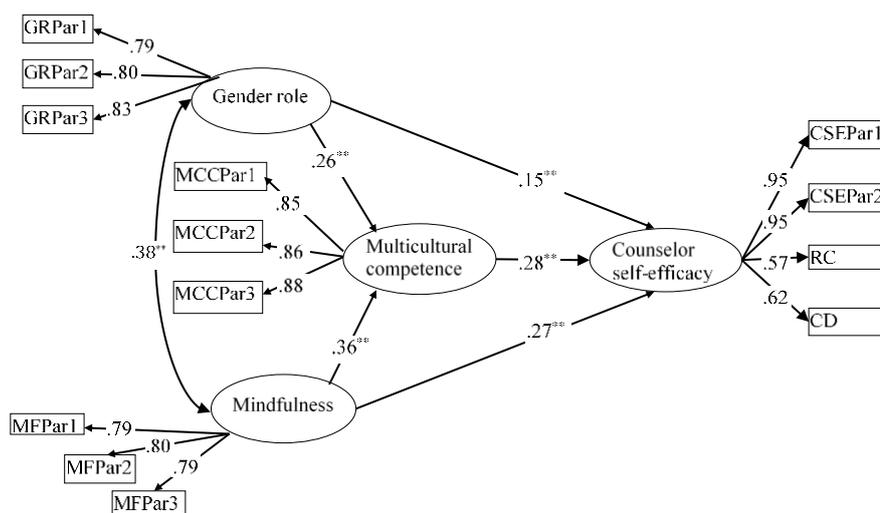


Fig. 2 Standardized factor loading for the partially mediated structural model. Note. $N = 431$; ** $p < .001$; *CSEpar* parcels of counselor self-efficacy; *RC* relationship conflict; *CD* client distress; *MCCpar* parcels of multicultural counseling competence; *GRpar* parcels of gender roles; *MFpar* parcels of mindfulness

Bootstrapping

We relied on 10,000 bootstrapped samples using 95% bias-corrected bootstrapped confidence intervals (CIs) for the partially mediated model. We found that cultural sensitivity provided a significant mediating pathway linking from gender role to CSE [effect = .15; CI = (.05, .25)] and from mindfulness to CSE [effect = .27; CI = (.16, .39)]. The indirect effect of gender role and mindfulness on CSE that is mediated by MCC is shown in Table 2.

Table 2 Parameters and 95% CIs for the paths of the partially mediated model

Model pathways	Effect	% 95 CI	
		Lower	Upper
Direct effect			
gender roles → multicultural competence	.27	.16	.37
mindfulness → multicultural competence	.36	.26	.46
multicultural competence → counselor self-efficacy	.28	.16	.39
Indirect effect			
gender roles → multicultural competence → counselor self-efficacy	.15	.05	.25
mindfulness → multicultural competence → counselor self-efficacy	.27	.16	.39

DISCUSSION

In this study, the structural equation model verified that the gender roles and mindfulness of counselor candidates predicted their CSE through the partial mediation of MCC. The findings obtained from the structural equation model established and verified in the study are discussed in detail below.

It was determined in the study that MCC had a mediating effect on the relationship between gender roles and CSE. The counselor is expected to accept the gender roles that the client culturally has (APA, 2017). The egalitarian attitude towards gender roles refers to the equality of men and women in all areas of life (King et al., 1994). Given that the counselor's egalitarian attitude towards gender roles has an important part to play in the acceptance of the client regardless of cultural characteristics, it is suggested that the MCC of the counselor will mediate strengthening the relationship between gender roles and CSE.

Gender-related roles are learned from society (King et al., 1994). When counselors start their professional life, they should consider the fact that the client learns their gender roles from the community that they belong to (Cormier & Hackney, 2013). In the psychological counseling process,

the client's transfer of their cultural characteristics to their consultation experience and counselor's supportive attitude in this regard is a necessity in achieving the purpose of counseling (Burnham-Smith, 1996). In light of these facts, the counselor should know that the client's gender roles include the cultural features which they belong to. On the other hand, the counselor should allow the client to carry their gender roles to the psychological counseling process so that they can be fully understood. That the counselor creates a medium for allowing the client to transfer their gender roles to the psychological counseling process contributes to the client to open up and it facilitates the development of the awareness that the client gains during counseling.

Gender roles reflect the value judgments of the society which the individual belongs to (Turan et al., 2011). A psychological counselor who transfers the value judgments of their society to the psychological counseling experience chooses to counsel clients who have similar value judgments to their own value judgments. However, the fact that psychological counselors in Turkey mainly work in schools which look for their own value judgments in a client who needs counseling will result in a situation where the multicultural nature of schools is ignored. As a matter of fact, it is known that when the psychological counselor looks for their own value judgments in the client during the psychological counseling process, the client will not be understood. Therefore, the psychological counselor's awareness of the cultural elements related to their own gender roles and knowledge of the barrier that this will create to understanding the client will allow the positive acceptance of the client.

The courses and the training taken by psychological counselor candidates during undergraduate education on their gender roles make it easier for the candidates to understand the cultural characteristics of their clients (Burnham-Smith, 1996). The therapeutic responses of the counselor making the client feel that they are understood allow the establishment of collaboration between the client and the counselor. In addition, MCC courses also nurture an egalitarian attitude towards gender roles (Chao, 2012). In light of all this information, it seems that taking the MCC lesson and attending its course fosters the egalitarian attitudes of the psychological counselors towards gender roles. Indeed, the education that is taken by psychological counselor candidates on gender roles also allows the establishment of an equal level of cooperation with the client in the counseling process. In summary, for psychological counselors, having an egalitarian attitude towards gender roles can mean ridding themselves of their cultural characteristics. It can be suggested that the MCC of a psychological counselor with an egalitarian attitude towards gender roles will increase and, in turn, their CSE will also increase.

In this study, another indirect effect in the proposed structural equation model is the mediation of MCC between mindfulness and CSE. The main purpose of mindfulness practices is that the psychological counselor gains awareness of their own characteristics and the characteristics of the client (Brown, Ryan, & Creswell, 2007). The awareness of the psychological counselor also in terms of MCC is effective in accepting the client (Pope-Davis & Dings 1995). Given the emphasis both on mindfulness and awareness on MCC, it is thought that the awareness of the psychological counselors on the very moment of the psychological counseling process (at that moment and at that time) will mediate the acceptance of their client who has different cultural characteristics, and therefore, this will help offer effective psychological counseling which the client needs.

Mindfulness practices involve the acceptance of the individual without any judgment (Davis & Hayes, 2011). On the other hand, MCC points out to the acceptance of the individual with no prejudices, too (Ivey et al., 2010). In the psychological counseling experience, the unconditional and unprejudiced positive acceptance of the client by the counselor is emphasized. In light of this information, it can be said that the acceptance of the client without judgment is both a mindfulness skill and a value related to MCC. As a matter of fact, the definition of mindfulness is in line with MCC in terms of individual's getting rid of all judgments and inclusion of experiencing what's happening at that moment (Germer, 2004). MCC can be described as an individual's avoidance of all judgments. Therefore, MCC has critical significance in providing effective psychological help in that it helps the individual get rid of their negative past experiences and the judgmental side of their cultural characteristics.

It is emphasized that mindfulness practices in the relationship between mindfulness and CSE are influential in CSE by improving MCC skills (Bohecker & Horn, 2016; Hung, 2014). MCC comprises a positive perspective on the coexistence of different cultural elements. Mindfulness mediates the learning of multicultural values and their transfer along generations by highlighting values such as trust, unbiased acceptance, and sincerity (Tadlock-Marlo, 2011). This information indicates that counselor candidates will also achieve increasing their MCC by improving their mindfulness. It is considered that the increase in the MCC of psychological counselor candidates will also increase the CSE.

Mindfulness contributes to the development of empathy skills (Bohecker & Horn, 2016; Greason & Cashwell, 2009). Increasing the empathy skills of psychological counselors suggests that it will facilitate the acceptance of clients with different cultural characteristics. Development of the empathy skills of a psychological counselor is seen as a sign that they will establish a therapeutic relationship with the client.

A significant relationship was also found between mindfulness of the psychological counselor candidates and their gender roles in this study. When the literature is reviewed, it can be seen that there is research supporting this finding (Gervais & Hoffman, 2013; Price, 2016). Regardless of the gender role of a psychological counselor who has high mindfulness, they can accept the client unconditionally without any judgment. It can be stated based on these results that the development of mindfulness of psychological counselor candidates will pave the way for the development of their egalitarian attitudes towards gender roles, too.

Implications for Counseling Practice and Training

In psychological counseling education programs, the CSE can be promoted by means of theoretical courses and practices (role playing, watching the video recordings of psychological counseling). Adding theoretical and applied courses into the curriculum of psychological counseling education programs relating to MCC, gender roles, and mindfulness can help improve knowledge and awareness in these topics. Organizing in-service training programs, seminars, and conferences can help faculty members gain efficacy in MCC, gender roles, and mindfulness.

Limitations and Suggestions for Future Research

The findings of this study should be considered in light of several limitations. This study was carried out with senior psychological counselor candidates attending guidance and counseling undergraduate programs during the 2015-2016 academic year in different geographical regions of Turkey. For future studies, students studying at the graduate level and psychological counselors working on the field can be selected as the study group. The second limitation was that the data obtained in this research were limited to the characteristics measured by the measurement tools. Another limitation of this study was the use of quantitative measurement methods. Qualitative data can be collected as well as quantitative data in future studies.

Conclusions

The indirect effects among the study variables suggest that psychological counselor candidates should first have egalitarian attitudes towards gender roles, get rid of cultural prejudices, and gain MCC. Therefore, it can be stated that during psychological counseling, a psychological counselor candidate who has MCC will be able to rid their prejudgments as much as possible, accept their client unconditionally by paying attention to their uniqueness and have a high CSE. On the other hand, a psychological counselor candidate with high mindfulness will unconditionally accept the client by getting rid of their prejudices, try to recognize the cultural characteristics of the client, and have MCC, and therefore, have a high CSE relating to offering psychological counseling.

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Investigation of the Relationship Between Preschool Teachers' Perceptions of Efficacy in Mathematics Education and Their Attitudes Towards Mathematics Education

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Abstract

In this study, the relationship between preschool teachers' perceptions of efficacy in mathematics education they give and their attitudes towards mathematics education was investigated. The research method of the study is the relational screening model, one of the quantitative research methods. The research was carried out on 122 preschool teachers actively working in 2018-2019. Random sampling method was used to determine the sample of the study. In this research, self-report based measurement tools were used to collect data. In the analysis of the data obtained, t-test, one-way analysis of variance and correlation coefficient were used. As a result of the analyzes, it was found that teachers' perceptions of efficacy in mathematics education they gave and their attitudes towards mathematics education were generally high. It was seen that teachers' perceptions of efficacy in mathematics education did not differ according to the teachers' professional seniority and the in-service training they received. No significant relationship was found between preschool teachers' perceptions of efficacy in mathematics education they give and their attitudes towards mathematics education. These results were discussed in the light of the relevant literature, and a number of suggestions were made.

Keywords: Preschool, Mathematics, Attitude, Perception of Efficacy

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INTRODUCTION

Mathematics is a field that involves a lot of knowledge and skills which an individual will need in their social life. For mathematics to be able to be used correctly and properly in all areas of social life, teaching processes should be constructed so as to support meaningful and permanent learning (Franke & Kazemi, 2001; Smith, 2000). The foundation of mathematical development is laid during early childhood (Clements, Sarama & DiBiase, 2003; Bekman, Aksu-Koç & Erguvanlı-Taylan, 2012; NAEYC, 2010). The conditions to be offered to the child during the preschool education, which is the most important and first step of education, are important in achieving this purpose.

Mathematics education is a significant part of early childhood education (Ginsburg et al., 2006). Mathematics competences acquired in the early period were found to be related to children's school life (Duncan et al., 2007). Longitudinal research results show that there is progress in mathematical development and school achievement of preschool children (Peisner-Feinberg et al., 2001; Sylva, Melhuish, Sammons, Siraj-Blatchford & Taggart, 2004; Yoshikawa et al., 2013). In this context, it is extremely important to support the mathematical skills of the children from the preschool period for the desired mathematics achievement (Yıldırım, Özgür, Parlak, Gönen & Polat, 2016).

The mathematics education described in the Ministry of National Education (MNE) (2013) Preschool Educational Program aims to contribute to the cognitive development of children, to give children a positive attitude towards mathematics, to help children associate their previously acquired conceptual information with the new information, and to help understand why and how to use mathematical concepts. In addition, it should be aimed with mathematical activities to improve mathematical inquiry skills in children. With the mathematical activities performed, children should be able to recognize the patterns around them, develop hypotheses and try them out, solve problems, reason, and communicate using mathematical concepts. It is stated that mathematics should be supported by examples that children may encounter in daily life. Accordingly, one of the purposes of preschool educational programs implemented in our country is to support children's mathematical skills.

Children with low mathematics skills in the preschool education period are likely to experience negative mathematical experiences throughout their school life (Dornheim, 2008). On the other hand, the mathematics achievement of the children whose mathematical skills were supported was found to be higher in the following educational levels (Krajewski & Schneider, 2009). The different levels of mathematics competence of children are associated with the different household environments they are from (Anders et al., 2012; Sonnenschein & Galindo, 2015). The mathematics competence of primary school children differs, and this difference either remains the same or increases throughout school life (Anders, Grosse, Roszbach, Ebert & Weinert, 2013; Magnuson, Meyers, Ruhm & Waldfogel, 2004). A deliberate effort is required to ensure that children's mathematical skills are supported regardless of their background and environment (Grübing & Peter-Koop, 2008). It was found that children's mathematical thinking developed when they had any guidelines to improve their mathematical thinking, and especially, when they were asked questions (Laine, Näveri, Pehkonen, Ahtee, & Hannula, 2017).

Since the individual's perspective of mathematics is related to how they learn mathematics (Hare, 1999), it can be argued that children should be supported by teachers with high levels of efficacy in mathematics from the preschool period.

The importance of the teacher in mathematics teaching has been demonstrated by the results of the research conducted in the relevant literature (Bergqvist & Lithner, 2012; Kilpatrick, 2001). In this context, teachers should be informed of what they need to do, when they need to do it, and the consequences of their actions (Lester & Cai, 2016; Liljedahl, 2016). Pedagogical beliefs about mathematics are known to be related to the level of motivation required to establish a supportive environment in acquiring mathematical skills (Denny, 2009).

Teachers create learning opportunities by influencing the educational environment in which they choose the approach in the learning content and the educational objectives (Lerikkanen et al., 2012; Schoenfeld, 1998). It was observed that the goals determined by teachers in mathematics education had a supportive effect on children's motivation towards mathematical goals, and thus, their math performances during their transition to primary school (Aunola, Leskinen & Nurmi, 2006). Mathematics education in early childhood should include conceptual knowledge, cause and effect relationship, communication, and mathematics literacy to support children's learning in their future school life. Procedural knowledge (how to solve a problem) and conceptual information (why to solve the result of a particular strategy) generally support each other and are involved in the process of mathematical learning which develops simultaneously (Dowker, 2005; Sarama & Clements, 2009).

As knowledge progresses cumulatively, it is possible for students to be successful in later education levels through the fact that they have a solid foundation in all areas of development to support their preparedness for primary school. This increases the importance of the efficacies of preschool teachers. Teachers are the most important factor in children's achievement (Polly, 2008). Teachers' perspectives of mathematics seriously shape general pedagogical perspectives such as the teaching environment, teaching strategies and the choice of activities (Philippou & Christou, 1998).

According to the review of the related literature, one can say that teachers have a great responsibility in achieving the goals in mathematics teaching process. Teachers need to have certain personal efficacies so that they can fulfill these responsibilities. One can argue that raising individuals at the desired level in early childhood depends on teachers who have basic efficacies of their profession. Efficacies are important as performance indicators that should be exhibited in a profession, and include the minimum criteria required to fully demonstrate the professional performance both quantitatively and qualitatively (Şahin, 2004). Attitude is defined as a "tendency that forms an individual's thoughts, emotions and behaviors properly (Smith, 1968). Teaching is a profession that requires a positive attitude and behavior in a professional sense (Variş, 1988). From this point of view, it can be argued that teachers' attitudes about teaching in a qualified manner and overcoming the problems they experience during the teaching process are important.

In this respect, this study aimed to examine whether there is a relationship between preschool teachers' attitudes about early mathematics education and their relevant efficacies. The sub-questions of the research are as follows:

1. What is preschool teachers' level of efficacy in early mathematics education?
2. Do pre-school teachers' efficacies in early mathematics education differ by demographic variables (professional experience, participation in in-service training, adequacy of the materials, school's financial status)?
3. What is preschool teachers' attitudes towards early mathematics education?
4. Is there a significant relationship between preschool teachers' attitudes towards early mathematics education and their relevant efficacies?

METHOD

The research was designed in the relational survey model of the quantitative research methods. In relational survey models, coexistence and/or degree of variables are determined in an effort (Karasar, 2014).

Population/Sample

The population of the study consisted of kindergarten and preschool teachers who were actively working in the 2018-2019 academic year. The random sampling method was used for the

research sample. Accordingly, 122 scale forms distributed to public schools were filled and delivered by teachers. Of the 122 teachers who participated in the research, only 9 teachers are male and the others are female. The majority of the teachers were between 26 to 35 years old (45.9%). In addition to this group, 28.7% of teachers were 18 to 25 years old and 24.6% were 36 to 45 years old. As for the educational levels of the teachers, the majority had a bachelor's degree (82.8%). 11.5% of the teachers had a master's degree, 2.5% had an associate degree, 1.6% were vocational high school graduates, and 1.6% were high school graduates. Concerning the teachers' professional seniority, 29.5% of the teachers had been working for 2 to 5 years, 27% for 6 to 10 years, 18% for 16 to 20 years, 13.1% for 1 year and less, and 12% for 11 to 15 years.

Data Collection Instruments

Instrument for Identifying Preschool Teachers' Attitudes Towards Early Mathematics

Education:

Developed by Tokgöz (2006), the instrument aims to measure the early mathematics education attitudes of teachers working in nursery schools or kindergartens. The 5-point Likert-type instrument has 22 items with 8 of them being reverse-coded. The instrument also consists of 3 subtests; however, in this study, only total attitude scores of the teachers were evaluated. The Cronbach's Alpha was found to be .712 in the reliability test. The internal consistency coefficient of the whole scale is .73. The highest score that can be obtained is 110 and the lowest score is 22 points in the whole instrument.

Instrument for Identifying Preschool Teachers' Competences of Early Mathematics

Education:

The instrument was developed and its validity and reliability studies were conducted by Tokgöz (2006). The instrument aims to identify whether preschool teachers feel competent in early mathematics education. The 5-point Likert-type instrument developed to this end consists of 30 items. For the face validity of scale's, 7 experts received their opinions. Outlier group analyzes and item total correlations were examined for construct validity. Item total correlations ranged from .62 to .85 and were significant at $p < 0.01$. The item-corrected competence scores correlation values were between .59 and .84 and values were significant at $p > 0.01$. The scale has a single factor structure. The reliability tests found Cronbach's Alpha of the scale to be .97. In this sample group, the cronbach alpha coefficient was .95. The highest score that teachers can get is 150 points and the lowest score is 30 points in the instrument.

Data Analysis

Preschool teachers' attitudes and efficacies regarding early mathematics education and the relationship between them were examined in the study. The relationship between the identified early mathematics education efficacies and variables was examined, and it was investigated whether there was a relationship between their efficacies and attitudes regarding early mathematics education. To this end, data was collected from 122 teachers by random sampling. According to the normality tests, the teachers' efficacies in early mathematics education and their attitudes towards early mathematics education met the assumptions. The kurtosis and skewness values of the data varied between -1 and +1, and the histograms with distribution fit met the assumptions. So, parametric tests were carried out with the collected data.

FINDINGS

The analyses performed in regard to the research questions are examined in detail under this title. Descriptive analyses for the first research question are presented in the table below (Table 1).

¹**Table 1. Teachers' efficacy in early mathematics education**

	N	Min.	X	Max.	sd
Efficacy scores	122	81	120.64	150	17.127

As seen in the table, the teachers' levels of efficacy in early mathematics education referred to a very high score on average ($X=120.64$). One can argue based on these data that the teachers in the sample group had high efficacy in early mathematics education. The analyses conducted for the second research question (Tables 2, 3, 4, 5 and 6) investigated the teachers' levels of efficacy in early mathematics education by different variables. Accordingly, one-way variance analysis based on the professional experience of the teachers is summarized in Table 2.

²**Table 2. Teachers' efficacy in early mathematics education by their professional experience**

Source of Variance	Sum of Squares	df	Mean of Squares	F	p<
Intergroup	274.968	2	137.484		
Intragroup	35219.849	119	295.965	.465	.630
Total	35494.817	121			

According to the table above, the teachers' years of experience did not exhibit a significant difference by their efficacies in early mathematics education ($F=.465$; $p=.630$).

³**Table 3. Teachers' efficacy in early mathematics education by their participation in in-service training**

In-service training	N	X	Sd	df	t	p<
Never participated	83	119.50	16.963			
Participated in 1 or more	39	123.05	17.447	120	-1.067	.288

As seen in Table 3, the teachers' status of participation in in-service trainings related to mathematics education did not differ significantly by their perceived efficacy in early mathematics education ($t=-1.067$; $p=.288$). The analyses conducted for adequacy of the materials in the teachers' classrooms are given in Table 4.

Table 4. Teachers' efficacy in early mathematics education by adequacy of the materials in their classrooms

Source of Variance	Sum of Squares	df	Mean of Squares	F	p<	Difference
Intergroup	2551.616	2	1275.808			
Intragroup	32943.200	119	276.834	4.609	.012	Inadequate-adequate
Total	35494.817	121				

As seen in the table, there were significant differences among the groups ($F=4.609$; $p=.012$). The Scheffe post-hoc test which was performed to see which groups differed significantly is summarized in the Table 4.

¹ N refers to sample size, X refers to sample mean, sd refers to standart deviation.

² For all one-way variance analysis tables, df refers to freedom of degree, p< refers to sig. value

³ For all t-test tables, N refers to sample size, X refers to sample mean, sd refers to standart deviation, df refers to freedom of degree, p< refers to sig. value

According to Table 4, there was a significant difference between the teachers who thought that the materials in their classrooms were adequate and those who thought that the materials were inadequate. This difference was in favor of the teachers who thought that the materials were adequate. The teachers who thought that the materials in their classrooms were adequate had significantly higher efficacy levels than those who thought that the materials were inadequate. The analysis regarding the financial status of the school is shown in the table below (Table 5).

Table 5. Teachers’ efficacy in early mathematics education by school’s financial status

School’s financial status	N	X	sd	df	t	p<
Inadequate	85	118.30	16.718	120	-2.324	.022
Adequate	37	126.00	17.069			

According to Table 5, the adequacy of school’s financial status as perceived by the teachers created a significant difference on their efficacy in early mathematics education ($t=-2.324$; $p=.022$). It is seen that the teachers who thought that the financial status of the school was adequate had higher efficacy levels in early mathematics education than those who thought that it was inadequate.

Table 6. Teachers’ attitudes towards early mathematics education

	N	Min.	X	Max.	sd
Attitude scores	122	53	66.23	82	5.829

As seen in Table 6, one can argue that the teachers’ attitudes towards early mathematics education were high. The correlation analyses performed to determine whether there was a relationship between teachers’ perceived efficacy in early mathematics education and their attitudes towards early mathematics education are shown in Table 7.

Table 7. Correlation between teachers’ attitudes towards early mathematics education and their perceived efficacies

N=122	Attitude	Efficacy
Attitude	-	.018
Efficacy		-

According to the table above, the correlation coefficient between teachers’ attitudes and efficacies regarding early mathematics education was not significant. The analyses concluded that there was no significant relationship between teachers’ attitudes and efficacies regarding early mathematics education for this sample group.

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

It is important for teachers to correctly define the mathematics that should be taught in the preschool period, to use it properly and to know what they can teach children about mathematics. Teachers being able to identify proper opportunities and ways for children reinforce children’s effective mathematics learning (Fuson, Clements & Sarama, 2015). In this context, this study examined the efficacies of preschool teachers in the mathematics education they provide by different variables and investigated the relationship between their attitudes towards mathematics and their perceived efficacies in mathematics education.

One of the qualities that a teacher should have for an effective mathematics education is their belief in their ability to teach mathematics, their belief in themselves is extremely important (Briley, 2012). This research concluded that both teachers’ attitudes towards mathematics education and their efficacies in mathematics education were at high levels. Similarly, Çelik (2017a) examined the efficacies of preschool teachers in early mathematics education and found efficacies at good levels in the sample group. Thiel (2010) stated that the preschool teachers were positive and open-minded about

mathematics. However, according to Todd Brown (2005), although the teachers reported a strong sense of efficacy in their teaching skills, they were yet to reach a consensus on their belief in mathematics as an important content for preschool children. In a qualitative study conducted with preschool teachers, Benz (2012) stated that 35% to 24% of the participants described mathematics as incomprehensible and complex while most of the participants considered mathematics as important and useful. Copley (2004) stated in a study conducted with preschool teachers for five years that the preservice teachers felt very comfortable in activities supporting the language skills but found mathematics activities challenging.

Furthermore, there are research results in the relevant literature that indicate that preschool teachers do not feel competent in teaching mathematics because they think they have insufficient knowledge of mathematics (Doverborg & Pramling Samuelsson, 2009; Lee, 2010; Lee & Ginsburg, 2007; Sheridan, Williams, Sandberg & Vuorinen, 2011). In accordance with the results of this research, one can argue that preschool teachers lack knowledge on mathematics and feel uncomfortable (Chen & McCray, 2014). Research has shown that one of the reasons why teachers do not perform mathematical activities in preschool education classes may be the fear of making mistakes (Wigfield & Eccles, 2002). Teachers' self-efficacies or beliefs are very important. Indeed, some studies reveal that teachers' beliefs about mathematics have a weak but significant relationship with learning outcomes of children (Todd Brown, Molfese, & Molfese, 2008).

In this study, it was seen that the efficacies of the teachers in mathematics education did not differ by their professional seniority. In contrast, Todd Brown, Molfese and Molfese (2008) found that teachers' experience affected children's letter recognition or numeracy skills. It was found that the efficacies of the teachers in mathematics education did not differ by their in-service trainings on mathematics. The reason may be the fact that in-service trainings received did not address the need or the mathematics education they provided in the classroom. Moreover, it has been shown by previous research that well-prepared professional development programs can support mathematics teaching practices of preschool teachers (Clements & Sarama, 2008; Rudd, Lambert, Satterwhite & Smith, 2009).

It was found that the teachers who thought that there were adequate materials in their classrooms had higher levels of efficacy in mathematics education. Uyanık and Kandır (2010) stated that there should be a wide variety of materials in mathematics centers and that mathematics skills should be supported by teachers presenting these materials to children in an interesting way. In addition to the materials used in the classroom, it is thought that teachers' frequent use of mathematical expressions in the classroom setting contributes to children's positive perception of mathematics (Şahin, 2013). For children to use their informal knowledge, they need to be provided with an appropriate environment and materials (Aydın, 2009; Cooke & Buchholz, 2005). In this context, teachers who find the classroom environments adequate feel competent in bringing the mathematical skills to children.

The natural mathematical inputs provided by preschool teachers to the children in the classroom offer rich experiences for children. Teachers being able to identify proper opportunities and ways for children reinforce children's effective mathematics learning (Fuson, Clements & Sarama, 2015). The child being able to acquire mathematical skills depends on proper planning. Systematic planning enables children to acquire new experiences, express themselves in different ways and learn mathematics correctly (Erdoğan & Baran, 2003; Avcı & Dere, 2002). It is observed that teachers make use of mathematical concepts and expressions in gaming activities, music activities, conversations or when trying to achieve classroom management (Erdoğan & Baran, 2003).

It was found that the teachers who perceived the financial status of their schools as adequate had higher perception of efficacy in early mathematics education. It can be argued that this is directly related to the material adequacy in the classrooms. School's financial inadequacy has an impact on materials or toys in the classroom. Research shows that teachers generally associated lack of materials with financial concerns (Ramazan, Arslan Çiftçi & Tezel, 2018). Varol and Farran (2006) emphasize

some factors in the quality of mathematics education. One of them is the use of mathematical tools that facilitate children's learning. The importance of environmental support (such as providing appropriate environment and materials) for children to use the mathematical information they acquire is stated in the relevant literature (Aydın, 2009; Cooke & Bucholz, 2005). One can accordingly say that the current research result coincides with the results of the relevant studies.

The teachers' attitudes towards mathematics education were found to be at high levels. Similarly, Çelik (2017b) found high levels of teacher attitudes towards early mathematics education. The present finding is arguably in parallel with the research results (Chen, McCray, Adams, & Leow, 2014; Thiel, 2010) which observed positive attitudes of preschool teachers towards mathematics. Teachers' attitudes towards teaching mathematics have been shown to be an important factor in mathematics teaching which is developmentally appropriate (Lee, 2005). In addition, there are research results showing that the teachers thought mathematics is not fun (Lee & Ginsburg, 2009) and indicating their negative feelings towards mathematics (Benz, 2012). This usually can be due to negative school experiences in mathematics (Anders & Rossbach, 2015).

There was no relationship between teachers' attitudes towards mathematics education and their perceived efficacy in mathematics education. How a teacher can succeed in their profession is affected by several factors such as the facilities of the educational institution and children's and parents' interest in education as well as internal factors such as teacher's attitude towards the profession and their self-efficacy beliefs (Demirtaş, Cömert & Özer, 2011). In a study on the beliefs and efficacies of preschool teachers, Platas (2008) found that mathematics education practices in the preschool education class were greatly influenced by teachers' beliefs. However, Todd Brown (2005) found that teacher efficacy and teacher mathematics beliefs were not significantly related to reflections of early childhood teachers on the mathematics teaching practices.

Some recommendations were made in the light of these study results. The teachers' efficacy in mathematics education were arguably affected by the conditions of the classroom and school. This finding can therefore be examined in different research with quasi-experimental studies. By developing in-service trainings on mathematics education for teachers, how these trainings can affect teachers' attitudes and efficacies regarding preschool mathematics education can be investigated in particular.

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Testing the Bidirectional Relationship Between Reading and Writing Skills

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Abstract

Reading and writing have an essential place in the social life of individuals as well as in school learning. In this study, bidirectional relationships between reading and writing skills have been examined after gender and socio-economic level of students have been controlled. The participants in this study were 240 fifth-grade students from 10 primary schools in four different districts of Ankara in Turkey. A text was chosen to evaluate students' comprehension and writing skills, and an achievement test that includes questions relating to the text was developed. Analytic and holistic rubrics were used to evaluate the students' reading and writing skills. Hierarchical multiple linear regression analysis was conducted to reveal the bidirectional relationship between reading and writing skills. The results indicated that reading and writing skills are important predictors of each other and support the possibility of a bidirectional relationship between two variables. One possible explanation for this is that reading and writing skills influence each other. Researchers, practitioners, and parents may need to target both reading and writing skills to best help poor readers become proficient.

Keywords: Language Skills, Reading, Writing, Bidirectional Relationships, Hierarchical Multiple Regression

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INTRODUCTION

Language has an essential role in developing individuals' mental skills, communicating with others, expressing feelings and thoughts, and acquiring information. The development of language skills is based on four basic skills (reading, listening, speaking, and writing) that interact with each other. An individual's ability to communicate correctly, openly, and effectively depends on the development of these four basic skills. When language is examined in terms of comprehension and expression, activities related to comprehension are reading and listening while activities related to expression are speaking and writing (Sever, 1998). To understand one's own language, individuals should successfully perform listening and reading activities. To express oneself, an individual needs to perform speaking and writing properly (Çaycı & Demir, 2006). Since these four basic skills interact with each other, education is the key to gaining these skills. Listening and speaking can also be obtained outside of school to some extent but reading and writing skills are acquired through formal education in the first stages of primary education (Belet & Yaşar, 2007).

Reading Skills

Developing information technologies have provided incentive to gain knowledge and highlighted the importance of text-based learning (Broer, et al., 2002). Reading is one of the ways of learning and includes physiological, cognitive, and affective aspects such as analyzing and evaluating the emotions and thoughts in the text (Sever, 1998). Reading is a skill that involves not only the vocalization of symbols of the relevant language but also the processes of making meaning. The primary purpose of reading a text is to understand the thought that is given in the text; therefore, comprehension must be realized after reading. Reading involves the process of adding meaning to the thoughts that are intended to be given in a text, and it also includes the processes in which the reader is active. In this respect, reading and comprehension are connected by the cause-effect relationship (Wilkinson & Son, 2011). In this case, one of the primary conditions for the realization of learning is reading comprehension. Therefore, the reading skill is essential not only for the language course but also for the realization of learning in other areas. Related research indicates that individuals' reading comprehension skills are closely related to success in many different areas, such as problem-solving (e.g., Grimm, 2008; Ulu, et al., 2016), mathematics (e.g., Göktaş & Gürbütürk, 2012; Willcutt et al., 2013), or in the field of science (e.g., Durgun & Önder, 2019; Hall et al., 2014).

Reading should also be considered in the context of economic development in the long run. Economists have demonstrated the relationship between reading skills and economic growth through different models. Schwerdt and Wiederhold's (2019) research showed that reading skills were one of the most important predictors of economic growth. The researchers emphasized that the relationship between these two variables has become more powerful than ever. Inevitably, individuals who have reached a sufficient level in terms of reading will have higher success in the later stages of education, and they will have a positive effect on the national economy. It is also known that individuals with underdeveloped reading skills are more likely to leave school early or be unemployed (Lundetræ, 2011; OECD, 2010).

Considering the importance of reading in terms of both individual and social development, school systems are expected to educate individuals who are competent in reading skills. Therefore, the level of students' reading skills and discovering how to develop them effectively have always been important research topics. Globally, especially today when there is economic competition, countries are implementing a range of large-scale assessments to evaluate their students' reading skills. The Programme for International Student Assessment (PISA) carried out by the Organisation for Economic Co-operation and Development (OECD) and the Progress in International Reading Literacy Study (PIRLS) carried out by the International Association for the Evaluation of Educational Achievement (IEA) can be cited as examples. These assessments present scientific data for the attending countries so they can make decisions to improve their educational policies. In addition to cognitive assessments concerning students' reading skills, detailed information regarding factors that affect learning

including school resources, students' attitudes, teaching practices, and home environment is acquired in these periodical assessments. Although criticism of international measurement practices continues to increase, these practices do have a significant effect on education systems (e.g., Breakspear, 2012). Through these measurement practices, detailed scientific data relating to reading skills are presented to the participating countries. By using large-scale data sets, countries can regulate and revise their education programs.

In related literature, studies regarding the relationship between reading skills and socioeconomic level, learning strategies, and affective characteristics such as attitude, self-efficacy, or other language skills have stood out. For example, in the study by Reilly et al. (2019), gender differences were examined in reading and writing achievement over three decades in the United States using data taken from the National Assessment of Educational Progress. It was found that the differences between genders were small-to-medium for reading, and medium-sized for writing, and were stable over time. Also, Solheim and Lundstrøm (2018) studied gender differences by examining PISA and PIRLS data for reading. Their results showed that the magnitude of the gender differences depended on text type, item format, aspects of reading, and implementation.

Many studies have revealed a high correlation between students' socioeconomic levels and academic success (Sirin, 2005). For instance, in the studies conducted based on data collected through PISA (Gulleroğlu et al., 2014; Giambona & Porcu, 2015; Shala & Grajčević, 2018; Yıldırım, 2012), it was indicated that students' reading skills improve in line with the parents' level of education and that factors such as the number of books at home, a personal room, internet connection, and computers have a positive impact on students' reading skills.

Learning strategies and methods are other variables used by researchers to examine the relationship between reading and writing. Belet and Yaşar (2007) determined the effectiveness of learning strategies on reading comprehension and writing skills using an experimental model. According to their findings, reading comprehension skills and writing skills in the Turkish course were developed using learning strategies. The study by Jian (2016) investigated students' reading strategies and comprehension of illustrated texts. It was found that high-ability young readers had specific capabilities in reading comprehension and their comprehension was monitored. Maltepe and Güntekin (2017) also studied the effect of learning strategy (the mind map technique) on reading and writing skills at the fifth grade. It was found that using the mind map technique increased students' reading comprehension and writing achievement.

The relationship between reading skills and affective characteristics such as attitudes towards reading, interest, and habits has been addressed in many studies (e.g. Lau, 2018; Preece & Levy, 2018; Steensel et al., 2019). In these studies, it was emphasized that affective characteristics, along with other areas, had positive correlation with reading skills.

The results of studies examining the relationship between reading skills and the other language skills such as writing and listening support the idea of a positive relationship among all language skills and emphasize the fact that reading skills are important in terms of improving other language skills (e.g., Cheng and Matthews, 2016; Juriati et al., 2018).

Writing Skills

Today, rapidly developing technology and the digital world require greater interpersonal communication and, as a result, the use of written expression has increased rapidly. Writing is a narrative skill gained through formal education, and it is directly related to the listening, speaking, and reading skills (Ministry of National Education of Turkey (MoNE), 2019). Writing is the most difficult and complex of the four skills that constitute basic language education (Bryne, 1988; Eryaman, 2008), because writing is directly related to thinking, and it requires the use of high-level skills. Composing a text is the process of putting ideas in order and involves both cognitive and social behaviors. As such, writing skills are the last link in the four basic language skills (Göçer, 2014).

Writing activities implemented within the scope of a mother-tongue curriculum aim to gain a certain level of expression that will help students to facilitate their daily life. In daily life, there are many situations in which people have to write articles in different contexts such as petitions, short messages, e-mails, CVs, or accident reports to various institutions. In addition, writing skills improve students' mental skills such as thinking development, editing information, effective use of language, and communication (MoNE, 2019). Given that writing involves different thinking processes, it is inevitable that it will influence individuals' academic or business success. Accordingly, different studies showed that individuals' success in different fields was closely related to writing skills (Graham & Perin, 2007; Lan et al., 2011). Therefore, the development of the writing skill has become one of the main objectives that students should gain starting with the first year of primary education. The development of this skill is an educational activity that should be carried out within the framework of an educational program.

The Present Study

School learning is based mainly on activities involving comprehension and written expression. Therefore, comprehension and written expression skills play an essential role in many courses in the education process. The development of an individual's reading comprehension skills enriches his/her vocabulary, and this affects the individual's writing and speaking skills. It enables the individual to write and speak better and more effectively (Sever, 2004). Reading and writing have an essential place in the social life of individuals as well as in school learning. Schools are expected to educate individuals who develop themselves, know their place and importance in society, understand what they read, and express their feelings and thoughts in writing. It is expected that a student in the fifth grade of primary school will be able to summarize an article consisting of 200-300 words and explain what is experienced and observed in a few paragraphs (Kavcar et al., 2002). The ability of individuals to use these basic skills effectively depends on the acquisition of these skills starting in primary education. However, studies showed that Turkish students at different levels from primary education to higher education had difficulty in reading comprehension and in expressing themselves in writing (TEDMEM, 2016). This situation indicates that there are important problems in reading comprehension and writing skills in schools.

It is essential to develop students' reading and writing skills, and to understand the nature of these two skills, it is crucial to establish the relationship between them. To serve this aim, statistically-appropriate techniques should be used when examining the relationships between variables. For instance, in non-experimental research design, the relationship between the two variables can be influenced by other unknown variables (confounding variable) and the resulting relationship can lead to skewed results. In this case, these variables should be handled with different approaches. One of these approaches is to statically control of the variables (Frölich, 2008). Cheema and Galluzzo (2013), for example, emphasized that the inconsistency between the results of previous research on mathematics achievement is due to demographic characteristics such as gender, ethnicity, or socioeconomic level not being factored in, and stressed the necessity of controlling of demographic characteristics to interpret the results correctly.

Many studies demonstrated that girls perform better than boys in terms of reading skills. For example, according to PIRLS 2011 and 2016 data, in many participating countries, female students' average reading skill scores were higher than males (Mullis et al., 2012; Mullis et al., 2017). Similarly, according to PISA 2009 results, there is a 43-point difference between male and female students in terms of the average score of reading skills (OECD, 2010). The results of the research showed that there were also differences in favor of girls in terms of writing skills (e.g., Camarata & Woodcock, 2006; Scheiber et al., 2015). However, there were also research findings that showed no significant differences between girls and boys in terms of writing skills (e.g., Çetin, 2012; Jones & Myhill, 2007). Studies in which reading and writing skills were handled in the context of socioeconomic level indicators showed that students with high socioeconomic levels had better reading and writing performance (e.g., Araújo & Costa, 2015; Loh & Krasen, 2015; Yıldırım, 2012). Many studies have

focused on the direct and indirect effects of socioeconomic characteristics on student performance (e.g., Gülleroğlu et al., 2014; Puglisi et al., 2017; Şirin, 2005). In Turkey, there is no such a study examining the relationship between reading and writing after some variables are statically controlled. Therefore, in the study, the gender and socioeconomic level of students were factored in while examining the bidirectional relationships between reading and writing skills. The predictive power of reading and writing skills was examined.

METHOD

The research employs a correlation survey model to determine the relationship between the variables and make predictions (Tabachnick & Fidel, 2007).

Sample of the Study

A total of 240 fifth-grade students from 10 primary schools in four different districts of Ankara in Turkey participated in the study. These schools were chosen using the convenience sampling method, considering ease of implementation and accessibility. Of the students in the study group, 51.7% are girls and 48.3% are boys.

Data Collection

Choosing the Reading Text

A text was chosen to evaluate students' comprehension and writing skills and an achievement test that includes questions relating to the text was developed. The choice of texts is a critical step in evaluating student achievement. The students comprehend the text based on the topic, prior knowledge, and the level of difficulty (Mullis et al., 2009). Therefore, students' developmental levels, interests, recognition of the words in the text, and grade are also taken into consideration when choosing the text. In addition, it was necessary to have well-written text with enough depth and difficulty to prepare an adequate number of questions. The level of legibility and difficulty of the chosen text were examined for this purpose.

The readability and appropriateness of the text to the educational level can be determined using various calculations (Gobbledegook formula, Gunning-Fog Index formula, ARI formula, Flesh reading Ease Score, Ateşman formula, Çetinkaya formula, etc.). Therefore, to evaluate the appropriateness of the text used, the readability of the text for Turkish was examined using both the calculations developed by Ateşman (1997) and by Çetinkaya (2010). While Ateşman's formula informs us about the difficulty of readability, Çetinkaya's formula provides information in terms of suitability for grade. According to Ateşman's (1997) and Çetinkaya's (2010) calculation, the text was medium difficulty and suitable for the fifth grade so that students could independently read the selected text in the classroom.

Finally, in the selection of the text, three experts in Turkish language education and two Turkish language teachers were asked to examine the text in terms of the criteria mentioned above. Based on the expert opinions and calculations, it was decided to use a real story as a text. It was called Satı Kadın, after the first woman member of the Turkish Parliament, and the story told about her first encounter with Mustafa Kemal Atatürk, the founder of the modern Turkish Republic. A paragraph from the text was given as an example:

“In the hot summer season of 1934, we were on the road to Kızılcahamam. We were with Atatürk in a closed, covered car. The villagers had come out along the way and on the roadside, students were lined up with their teachers. The village headman and peasants, men and women alike, were together...”

Reading Comprehension and Writing Test

After selecting the appropriate reading text, open-ended questions were developed to evaluate the comprehension and written expression skills of the students. The questions were prepared by taking into consideration the comprehension processes used within the scope of PIRLS and the current fifth-grade Turkish curriculum. PIRLS's classification of comprehension processes is described from simple thinking to complex thinking (Mullis et al., 2009):

1. Finding (interpreting) thoughts that are not clearly explained in the text
2. Associating the events in the text with personal information and experience
3. Examining and evaluating the content and language of the text

Furthermore, the MoNE (2019) fifth-grade Turkish curriculum was examined, and it was also taken into consideration that the questions included the gains related to writing skills in the curriculum. To this end, five competencies were measured in accordance with the purpose of the research. These are given below:

1. Applying writing strategies.
2. Using capital letters and punctuation correctly.
3. Revising the writing.
4. Using consonants correctly when they write.
5. Writing coherently and using the appropriate linking words

To ensure the content and appearance validity of the developed achievement test, we consulted three experts in the field of Turkish language education, two Turkish language teachers, and three assessment and evaluation experts to receive their feedback on the difficulty, comprehensibility, and measurability of the questions. Three open-ended questions measuring different thinking processes were used in the research.

Holistic Grade-Scoring Rubric for Assessing Reading Comprehension

To evaluate students' reading comprehension performances, a holistic rubric was prepared for each question. The following steps were taken into consideration in developing the rubric (Kutlu et al., 2017).

1. Scoring of students' answers from “fully correct answer” to “partially correct answer”,
2. The students identify “false” and “meaningless” answers that cannot be associated with the text
3. Writing a description of the content corresponding to each score and including examples of possible responses,
4. Defining behavior codes and looking at the distribution of students according to their responses.

The difficulty level and the thinking processes of the questions determined based on expert opinion were taken into consideration when scoring student responses. Thus, the first two questions were evaluated over 15 and the last question over 20 points. The highest score that students can get

from the achievement test is 50. In the next step, the definitions of response behaviors corresponding to the scores for each question are clearly written. The opinions of the two Turkish language teachers were taken on the adequacy and appropriateness of these definitions and the scores corresponding to the definitions. Some adjustments were made to the definitions in line with expert opinions. To understand the inter-rater reliability of the rubric, 50 students were randomly selected among the students who participated in the study. The responses of these students were scored independently of the two raters. Intra-class correlation coefficients were calculated for each question using the Two-Way Mixed-Effects Model and presented in Table 2.

Table 2. Intra-class correlation of questions

Questions	Intraclass Correlation
Question 1	0.808**
Question 2	0.946**
Question 3	0.911**

** p<0.00

When Table 2 is examined, it is seen that the intra-class correlation coefficient calculated for each question is above 0.80. The rubrics used to score each item are perfectly reliable (Shrout, & Fleiss, 1979). Pearson correlation coefficient was calculated for the raters' reliability of the total scores for the three items and presented in Table 3.

Table 3. Pearson correlation coefficients between raters' scores

Question 1	Rater 1
Rater 2	0.595**
Question 2	Rater 1
Rater 2	0.870**
Question 3	Rater 1
Rater 2	0.836**

** p<0.00

When Table 3 is examined, there is a moderate (0.595) relationship between the scores for Question 1, while a high-level relationship was obtained for Question 2 (0.870) and Question 3 (0.836). This shows that the raters made consistent evaluations (Koo & Li, 2016).

This holistic rubric, developed to mark students' responses for the relevant test questions, was used. An instance of the rubric used to calculate students' scores on reading comprehension is presented in Table 4.

Example question: Please identify two of Satı Kadın's personal qualities mentioned in the text. How do these qualities help Satı Kadın when she becomes a deputy?

Table 4 Holistic rubric for question1 to evaluate student's reading score

Behaviour Identification Code	Answers	Score
	Fully Correct Answer	
10	The student writes two of Satı Kadın's personal qualities as mentioned in the text and states how each quality helped her. Example answer: Two of Satı Kadın's personal qualities mentioned in the text are "courage and self-confidence." These qualities help Satı Kadın in the following ways: Courage: Lets her speak her mind without being afraid. Confident/Self-confidence: Lets her believe that her ideas are correct.	15
	Partially Correct Answer	
11	The student writes both of Satı Kadın's personal qualities as mentioned in the text but only states how one of them helped her. Example answer:	10

	She is courageous and hospitable. As she is courageous, she can speak her mind without being afraid of anyone.	
13	The student writes only one of Satı Kadın's personal qualities mentioned in the text and states how this quality helped her. Example answer: Confident/Self-confidence: Lets her believe her ideas are correct.	7
15	The student writes down two of Satı Kadın's qualities but does not state how they helped her. Example answer: She is courageous and clever.	5
17	The student writes down one of Satı Kadın's qualities but does not state how this helped her. Example answer: She is courageous. She is talkative.	2
	Wrong Answers	
31	The student writes down qualities that do not help Satı Kadın when she becomes a deputy. Example answer: Brunette / good /a woman.	0
32	The student lists qualities of Satı Kadın not mentioned in the text. Example answer: She is a helpful and hard-working woman.	0
50	Blank	0
	Other Answers	0
60		0

Following this holistic rubric, the maximum score a student can receive is 15 and the minimum score is 0. The student's partially correct responses also varied between 2 and 10 points depending on the accuracy of the answer.

Preparation of Analytic Rubric for Evaluation of Written Expression

To evaluate the writing skills of the students, the analytic rubric developed by Author 1 and Author 2 (2019), was used. The following criteria were used:

1. Content: Relationship of words, sentences, idioms, etc. with content
2. Discourse: Use of idioms, transition words, and explanations to enrich the speech
3. Clarity: Repetition of words and thoughts, clear explanations
4. Spelling Rules: Compliance with spelling rules, correct spelling, and separation of words
5. Use Context-Appropriate Language: Use of appropriate language for a given task based on context
6. Grammar: Suffixes, appropriate use of verbs and subject pronouns.

For each criterion, the performance level was scored from 1 (entry level) to 4 (fully successful). A student with a score of 4 showed exactly the expected performance in the relevant criterion whereas 1 point means that the students showed poor performance. Students can earn a maximum 24 points and a minimum 6 points for each question. For three questions, the students are thus expected to score from 18 to 72.

For the validity of the relevant scoring rubric, expert opinion was obtained on the appropriateness of the criteria and the adequacy of the definitions; the rate of agreement between the expert opinions varied between 87% and 100%. Correlation coefficients between raters ranging from 0.617 to 0.919 were calculated as proof of reliability in different text types (Bilican-Demir & Yıldırım, 2019). Within the scope of the research, inter-rater agreement was calculated for the reliability of the rubric. The responses of 50 randomly selected students were scored by two raters and the calculated intraclass correlation coefficients are given in Table 5.

Table 5. Intra-class correlation coefficient between raters

Questions	Intraclass Correlation
Question 1	0.829**
Question 2	0.890**
Question 3	0.727**

**p<0.00

Table 5 shows that the correlation coefficients are over 0.70, which means that the analytic rubric used to score each problem is highly reliable (Shrout, & Fleiss, 1979). Pearson correlation coefficients between raters were also calculated and shown in Table 6.

Table 6. The correlations among the raters

Question 1	Rater 1
Rater 2	0.707**
Question 2	Rater 1
Rater 2	0.800**
Question 3	Rater 1
Rater 2	0.573**

**p<0.00

According to Table 6, the correlation coefficients for Question 1 (0.707) and Question 2 (0.800) are sufficient, while the correlation coefficient calculated for Question 3 (0.573) is moderate. However, this does not prevent the raters from scoring on their own (Koo & Li, 2016).

The analytic rubric, which was developed to score students' responses for the relevant test questions, was used. For the instance of this rubric, please see Appendix 1. In addition, a Student Information Questionnaire was prepared to collect students' demographic information. In the questionnaire, students were asked their gender, their parents' education level, and the number of books at home as these are considered to be indicators of the socioeconomic level variable. This information is important for the reading comprehension and writing skills. In the process of developing the questionnaire, two experts in Turkish language teaching were asked about the suitability and comprehensibility of the questions for the research purpose.

Research data were collected by the researchers with the permission of the Turkish teachers in the practice classes. During a one-hour session, students were given the test including the reading text and relevant questions. During the application, they were asked to read the text carefully and answer the questions as best they could. A questionnaire was given to collect the students' demographic information before applying the text and questions. Data regarding students' gender, parents' educational background, and the total number of books at home were collected using the questionnaire. Parents' educational background and the number of books at home were used as an indicator of students' socio-economic status. These two variables, which changed in accordance with these implementations, were also used in this study.

Data Analysis

Hierarchical multiple linear regression analysis was conducted to reveal the relationship between the students' reading comprehension and writing skills and to determine how much these variables predict each other. In the model, the gender and socio-economic level were kept constant.

In addition, for each analysis, the regression assumptions of linearity, homoscedasticity, and normality of residuals were assessed and met. Excessive multicollinearity among the predictors was not evident, with no inter-item correlations exceeding $r = 0.50$ and all VIF values < 10 .

FINDINGS

First, the indicators relating to students' gender and socioeconomic levels were taken into consideration to investigate the extent to which the written expression can predict reading comprehension skills. The results of hierarchical multiple regression analysis are given in Table 7.

Table 7. Results of regression analysis of reading comprehension performance when students' gender and socioeconomic level variables are taken into consideration

Variables	B	β	t	p
Gender	3.079	0.176	3.107	0.002
Education level of mother	0.643	0.084	1.461	0.002
Education level of father	-0.081	-0.012	0.206	0.837
Number of books	-0.049	-0.007	-0.125	0.900
Writing performance	0.831	0.651	11.455	0.000
Constant	-20.317			0.000

$F_{(5, 234)} = 26.775$ $p < 0.001$
 $R = 0.60$
 $R^2 = 0.350$

According to Table 7, the hierarchical multiple regression model established to determine the extent to which writing comprehension predicts reading comprehension performance was found to be statistically significant. ($F_{(5, 234)} = 26.775$; $p < 0.01$). According to the results of the analysis, the multiple regression coefficient showing the relationship between the students' reading comprehension achievement scores and the variables in the model is $R = 0.60$. The correlation between reading comprehension and writing is positive and moderate ($r = 0.59$). The variables explained for 36% of the total variance in students' reading comprehension performance. Most of the variance in reading comprehension achievement is explained by the success of writing in this model (0.357). In addition, students' writing scores are a statistically significant predictor of reading comprehension scores ($p < 0.001$).

Pratt index (Pratt, 1987) was computed for examining the effect of the writing score on the reading comprehension score, and this shows the relative importance of the predictor in terms of the proportion of variance explained. This revealed that the writing score was the most important predictor of the reading comprehension score (Pratt index = 1.00). According to the standardized regression coefficient (β), one-unit increase in student's writing performance leads to a 0.65-unit increase in reading comprehension performance when other variables are held constant. Table 8 shows the results of the hierarchical multiple regression analysis of the extent to which the students' writing scores are predicted by achievement in reading comprehension.

Table 8. Results of multiple regression analysis of writing performance when students' gender and socioeconomic level variables were held constant

Variables	B	β	t	p
Gender	-4.678	-0.342	-7.065	0.000
Education level of mother	-0.744	0.123	-7.065	0.019
Education level of father	0.093	0.017	0.328	0.744
Number of books	-0.162	-0.028	-0.581	0.562
Reading Comprehension Performance	0.432	0.552	11.455	0.000
Constant	36.579			0.000

$F_{(5, 234)} = 25.830$ $p < 0.01$
 $R = 0.678$
 $R^2 = 0.46$

The hierarchical multiple regression model, which was established to determine the variables predicting students' writing achievement scores, was found to be statistically significant ($F_{(5, 234)} = 25.83$; $p < 0.01$). Accordingly, the multiple regression coefficient showing the relationship between the students' writing scores and the variables included in the model is $R = 0.68$. Together, the variables explain 46% of the variance in students' writing scores. While the students' gender and socioeconomic status indicators contribute to 16% of the variance, 30% is explained by the writing achievement. In addition, students' writing achievement scores were a statistically significant predictor of reading comprehension achievement scores ($p < 0.01$). When other variables are held constant, a one-unit increase in reading comprehension success increases written expression performance by 0.55 units. The reading comprehension achievement score is the most important predictor of written expression achievement score (Pratt index = 0.69).

DISCUSSION, RESULTS, AND RECOMMENDATIONS

The study investigated how the comprehension and writing skills of fifth-grade students predict each other. At the same time, the gender and socioeconomic level were statistically kept under control. The findings of the study showed that reading comprehension and writing achievement scores were important predictors of each other. According to the study, it was determined that the students with high writing scores had higher reading comprehension scores and the students with high reading scores had higher writing scores. It is not possible to separate and measure the elements based on language skills. If an individual has a high level of ability in language learning, s/he will be successful in all aspects of language (Hughes, 1990). Many findings show significant and strong relationships between reading and writing skills (e.g., Fitzgerald & Shanahan, 2010; Juriati et al., 2018). Furthermore, some studies examined whether reading has an influence on writing or whether there are bidirectional influences between them (e.g., Abbott et al., 2010; Shanahan & Lomax, 1988).

The findings of this study indicated that some common and similar characteristics are involved in the development of reading and writing skills. When looking from a theoretical perspective, both reading and writing use the same cognitive, linguistic, and discourse resources to some extent. The models for reading and writing have the same constituent components playing a role in the cognitive processes of reading and writing (Schoonen, 2019). Fitzgerald (1992) stated that there are four different types of information that an individual must use when reading and writing. These are metaknowledge, domain knowledge about substance and content, knowledge about universal text attributes, and procedural knowledge and skill to negotiate reading and writing. During reading and writing, individuals are known to reconstruct or compose a series of messages by activating very different processes (such as creating schemes, predicting, constructing meanings, or using strategies to obtain information, etc.). Thus, individuals actively use their previous knowledge in their minds during reading and writing (Shanahan, 1984). The development of one skill naturally supports the other skill due to the activation of a series of similar and common cognitive processes and structures. The relevant research findings support the idea that transfer of information is used during writing or reading and that these two skills have common cognitive processes.

The meaningful and strong relationship between reading and writing skills can also be explained by the presence of other variables that mediate this relationship (Shanahan, 1984). For example, individuals' reading skills are supported by vocabulary (Stæhr, 2008). In other words, limited word knowledge causes individuals to have inadequate reading skills (Beck et al. 1982). In this respect, vocabulary is one of the best-known predictors of reading skill (Beck & McKeown, 1991). The development of an individual's reading comprehension skills enriches his/her vocabulary. This also affects the individual's writing skills and allows him to write better and more effectively. In addition, it was seen that students' word recognition skills improved with writing activities (Santa & Høien, 1999) and that word merging activities during writing supported reading skills (Straw, & Schreiner, 1982). It is known that individuals with advanced writing skills have a rich vocabulary (Sever, 2004).

According to the findings of the research, when the mutual effects of reading and writing skills are taken into consideration, it may be suggested that a common teaching program is developed and used that enables the development of these two skills together instead of waiting for the development of reading skills. In Turkey, the time allocated for Turkish classes is six hours per week. Teachers allocate this workload as follows: two hours for readings; two hours for writing and two hours for language and expression. These interrelated structures are discussed separately in the classroom. In the classroom, in particular, teachers might engage in activities for common thinking processes (e.g., phonemic segmentation) for the development of these two skills, rather than focusing on reading and writing skills separately. Students can read aloud or play rhythmic games.

By reducing the number of reading texts in Turkish textbooks and increasing their quality, students can be given writing exercises based on the subjects of the texts. In this way, students' reading comprehension and writing skills can be improved. Developing reading comprehension and writing skills is highly relevant to providing regular and accurate feedback to students. It would be appropriate for teachers to use scoring that requires the use of a multi-grade scoring key, and to give feedback to students at different levels of response, considering their level of learning.

Research shows that wealth of vocabulary contributes positively to the development of both reading and writing skills. Plans should be made for the development of vocabulary in children from an early age. Reading texts should be selected to include new words that will improve students' vocabulary. Teachers should be able to emphasize new words in lessons and enable students to associate them with various case studies.

Study Limitations

Some limitations of this study should be considered when interpreting the findings. First, the data set is cross-sectional. Since this study is not an experimental model, it is not correct to talk about the causal effect of the relationships between reading and writing skills. However, some possible variables were statistically controlled. These two skills can be measured in more detail with variables not covered in this study using a multiple reading (i.e., word recognition, sentence comprehension, passage comprehension) and writing measures (i.e. Syntactic complexity and qualitative and quantitative measures of spelling and organization) approach. Parental education levels were statistically checked as an indicator of students' socioeconomic levels. In other studies, it is important to use more representative and detailed indicators for the socioeconomic level to demonstrate the validity of the relationship between the two skills. In addition, when examining the relationship between these two variables, researchers should consider common moderate variables such as IQ or verbal ability.

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Effect of Digital Writing Workshop Activities on Writing Motivation and Development of Story Writing Skills*

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Abstract

The aim of this study is to determine the effect of digital writing workshop activities on fourth grade primary students' story writing skills and writing motivation. The study was carried out in Ankara province during the 2017-2018 academic year. A true experimental design, one of the quantitative research methods, was used in the study. The study group of the research consisted of a total of 30 students (15 in the experimental group and 15 in the control group) studying in the fourth grade of primary school. The Motivation to Write Scale, the Story Elements Evaluation Scale, and the 6+1 Analytical Writing and Evaluation Scale were used as data collection tools for the study. The experimental implementation process lasted 14 weeks. During the implementation, students were asked to write stories using a different digital platform at each stage of the writing process. In the study, t-test for independent groups and ANOVA test were used for the data analysis. The SPSS software program was used for analysis of the data. The findings obtained in the study reveal that with regard to the use of story elements by students who participated in the digital writing workshop implementation and in the dimensions of ideas, organisation, word choice, sentence fluency and spelling in their stories, there was a significant difference in favour of the experimental group. This situation reveals that the digital writing workshop implementation was effective for the improvement of the students' story writing skills. However, it was determined that there was a significant decrease in the writing motivation scores of the experimental group students who participated in the digital writing workshop, whereas there was no significant change in the writing motivation scores of the students in the control group. This situation reveals that, contrary to expectations, the digital writing workshop activities decreased the students' writing motivation.

Key words: Digital Writing Workshop, Story Writing Skills, Writing Motivation, Primary School Students

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INTRODUCTION

Throughout their lives, there are two main aims of people's modes of communication and linguistic activities. One of these is to understand the message given in material that is read or listened to; the other is to convey what is seen and heard to another party as clearly and understandably as possible (Temizkan & Sallabaş, 2009). In order to carry out these aims, individuals need to possess the four basic language skills. However, each individual's interest, wishes and attitudes towards the writing skill, which is very important for individuals' mutual communication and social life, is not the same. Certain variables, such as education received, family environment, and personal characteristics are effective in the emergence of this difference related to writing (Göçer, 2014a).

Writing skill is considered important from two aspects, namely as writer-based and reader-based (Göçer, 2014b). Writing skill is an important skill that needs to be acquired and developed by an individual; for the writer, in terms of sharing what appears in his mind following the things he has read, observed and experienced; and for the reader, in terms of being nourished, having his imagination shaped, and having his life philosophy formed by what he has read.

In learning and developing writing skill, an individual's writing motivation is important. A student's characteristics such as his wish to write, positive attitude towards writing, and effort for producing a good piece of writing are important for his motivation to write. For development of writing motivation, situations such as stimulating students' interest and willingness towards writing, enabling students to have many writing experiences during the process of acquiring the writing habit, and providing students with adequate feedback are important (Karatay, 2014, p.23).

Situations such as problems and negative conditions experienced by students in the writing process, writing processes in which students are not active, and not providing adequate feedback lead to students developing a negative attitude towards writing and a decrease in their writing motivation. In such circumstances, the student is unwilling to write and perceives writing as a difficult skill (Eryaman, 2008). Boscolo & Gelati (2007) reported that students' willingness to write was generally on the decline and that writing exercises were mostly perceived by students as boring, monotonous and difficult. The main reason why writing motivation was not at the desired level can be considered to be because the writing exercises did not attract the students' interest.

Considering that today's children grow up in the digital age, traditional writing methods do not attract children's interest. Today's students, who are called digital natives, grow up using digital media tools like the internet, computers and mobile phones, and have a different way of learning and processing information than the learning styles of their teachers, who mostly grew up in environments where printed resources were used. It is important to know the characteristics of people who learn as digital natives in order to offer them a more effective learning environment. For an effective learning environment, it is necessary to be familiar with the role of technology in students' and teachers' everyday lives (Bilgiç, Duman & Seferoğlu, 2011).

For digital natives, it can be said that speed, visuality and entertainment are important when they are accessing information. At the stage of accessing the desired information, it is observed that digital natives wish to access it rapidly, that there should be visual items, and that its content should include entertaining elements (Karabulut, 2015, p.17). The teaching of writing for these children is approached within the scope of new literacy theory.

New literacy is generally defined as all of the research made for discovering literacy practices created by digital technologies such as blogs, messaging systems, social networks and continually developing technologies (Lankshear & Knobel, 2006; Leu, Leu & Coiro, 2004). New literacy, which is especially important for education, requires certain skills for interpreting information acquired from the internet and other communication technologies (Kiili, Laurinen and Marttunen, 2008; Lankshear & Knobel, 2006).

According to the theory of new literacy, the skills that individuals need to possess are listed as follows:

1. *The new literacies include new skills, strategies, habits and social experiences required by modern information-communication technologies:* Kulikowich (2008, p.179) stated that the new literacies expect students to exhibit a series of processes and performances in order to solve a problem or complete an assignment. According to Leu, Kinzer, Coiro and Cammack (2004), individuals, groups and societies can be successful in the future if they can define the most important problems in the 21st century, access useful information as quickly as possible, evaluate information in the most effective way, synthesise information in the most suitable way while developing the best solutions, and transmitting these solutions to other individuals as clearly as possible.
2. *The new literacies are located at the urban, economic and personal involvement centres in globalising societies:* By force of the new literacies in adaptation to the digital world, Bennett, Matton and Kervin (2008) gave the name “digital natives” to the people of this era. They stated that digital natives possess multidirectional knowledge and skills related to information technologies and that as a result of their growth and experiences together with technology, they possess different learning styles to students of other generations.
3. *The new literacies change as the technologies that define them change:* The fact that visuality has come to the fore in literacy indicates a period in which, as Leu and Kinzer (2000) state, literacy has now changed in accordance with the context of technology.
4. *The new literacies are multidirectional and in order to understand them, need to be regarded in a multidirectional way:* The studies conducted with regard to literacies reveal that new literacy not only evaluates printed texts, but can also evaluate digital material with the new perspectives of the information and communication technologies. According to Teale, Leu, Labbo and Kinzer (2002), the new literacies include word-processor literacy, e-mail literacy and internet literacy.

The new literacies have led to digital writing processes gaining in importance in addition to the traditional writing processes. Digital writing is defined as compositions created to be read or displayed on a computer or other device connected to the internet (National Writing Project, 2010, p.7). Just as digital writing affects our ways of thinking and communication, it also affects our thinking with regard to what writing is and how it is written. The act of writing in digital environments cannot be discussed only in terms of sentences and paragraphs. Since these environments have a multiple structure made up of visual components such as sound, video and graphics, they exhibit a very different structure to that of paper-based writing (Grabill, 2005).

As well as qualities such as increasing students’ interest in lessons and developing their communication skills, digital writing applications surpass traditional writing skills and enable many of the 21st century literacy skills to be put into effect (Gakhar & Thompson, 2007; Robin, 2006; Sylvester & Greenidge, 2010; Verdugo & Belmonte, 2007). Besides these skills, digital writing applications are effective methods for improving writing skills, which are one of the basic language skills (Bogard & McMackin, 2012; Borneman & Gibson, 2011; Daigle, 2008; Dogan, 2007; Gakhar & Thompson, 2007; Gregory & Steelman, 2009; Jonassen, 2003; Kajder, 2004; Kulla-Abbott, 2006; Kulla-Abbott & Polman, 2008; Royer & Richards, 2008; Sylvester & Greenidge, 2010).

The digital writing workshop, which is included among the digital writing applications, combines the new literacies and digital writing tools in teaching the writing process (Hicks, 2009). The digital writing workshop includes the stages of pre-writing preparation, collaborative writing and peer correction, and publication. At the pre-writing preparation stage, it is seen that by doing mini-lessons, students’ participation in pre-writing activities improves their writing quality (Cunningham & Cunningham, 2010). Also at this stage, the student does research related to the subject he is to write

about. At the collaborative writing and peer correction stage, students create a product in a group and give each other feedback during their activities. However, giving feedback in digital environments is different from face-to-face communication, and it takes a lot more time for answers offered in these environments to generate feedback. There are various methods that teachers, students and even people outside class can use to provide feedback in the form of publishing, tagging and commenting. Various tools used in the digital writing workshop make it possible for students to write together in writing domains (Johnson, 2014). At the publication stage, students share the work that they have prepared in domains, such as class blogs, wikis and podcasts, with the reader on digital platforms.

In studies carried out on the subject of digital writing (Serkan & Kılıçkiran, 2018; Yamaç, 2015; Baki, 2015; Foley, 2013; Campbell, 2012), it is seen that digital applications developed students' writing skills, enabled them to produce better-quality texts, and contributed to the development of their new literacy skills. In her study, Toney (2017) examined third grade students' practices in creating a multimodal text in a digital writing workshop. In the study, it was concluded that the digital compositions created by the students were of good quality and that they found favour in communicating their multimodal texts. It was seen that in their independent writing activities, they used multimodal text items in their writing. In their study, Eubanks, Yeh and Tseng (2017) examined the effect of a 21st century writing workshop implementation on second grade primary students' Chinese writing skill and attitude towards writing. As a result of the study, it was concluded that fears towards writing decreased in students who used iPads in the writing workshop. Furthermore, it was stated that following the writing workshop implementation, students' attitudes towards writing and their writing skills improved. Rheault (2015) investigated how a blog writing and digital writing workshop affected students' real/authentic writing experiences. As a result of the study, it was determined that the interactive writing activities increased students' willingness to write and developed their writing performances.

It is seen that studies related to digital writing workshops have generally been made abroad and that research into this subject is lacking in our country. Moreover, in the studies that have been made, the writing motivation dimension is not given enough attention. In this respect, there is a need to examine how digital writing workshops contribute to the development of primary students' writing skills and affect their writing motivation in our country.

Aim of the Study

In this study, the effect of digital writing workshop activities on fourth grade primary students' writing motivation and story-writing skills is investigated. In line with this main aim, answers were sought to the following questions:

1. Is there a significant difference in the story-writing scores of the experimental group subjected to the digital writing workshop application and those of the control group receiving lessons in line with the curriculum according to the joint effect of the group-measurement factors?
2. Is there a significant difference in the writing motivation scores of the experimental group subjected to the digital writing workshop application and those of the control group receiving lessons in line with the curriculum according to the joint effect of the group-measurement factors?

METHODOLOGY

Research Model

A true experimental design, one of the quantitative research methods, was used in the study. In this experimental design, the process was designed according to the “pretest/posttest model with control group”. In the study, with the aim of determining the students’ motivation to write, the “Motivation to Write Profile” scale was applied at the start of the process as a pretest. At the same time, to determine their levels in relation to story writing, students were asked to write stories related to the subjects given. A period of one lesson hour was given to each group for each application. A 14-week experimental application process was begun with the students in the experimental group based on the digital writing workshop activities. On completion of the process, posttests were applied to both the experimental group and the control group.

Study Group

The study group consisted of a total of 30 students attending the fourth grade of a private school in Ankara province during the 2017-2018 academic year. In selecting the school for the implementation, attention was paid to transport facilities, a continually available internet connection and a laboratory or classroom having an adequate number of computers. At the same time, care was taken to ensure that the students who were to take part in the study also possessed technological tools (computer, tablet, etc.) for conducting the research process outside school. The fourth-grade students were required to write stories about the determined subjects. After the stories had been written, students displaying similar characteristics according to the data obtained were assigned randomly to the experimental and control groups. Next, to determine whether or not the groups showed normal distribution, a normality test was performed. As a result of the normality test, it was concluded that the groups showed normal distribution.

Following the analysis, it was seen that there was no difference in pretest scores for story writing and writing motivation between students in the experimental group and those in the control group.

Table 1. Mean and Standard Deviation Values Related to Pretest Scores in Story Writing and Writing Motivation of Students in Experimental and Control Groups

	Group	n	\bar{X}	Sd
Story Components Pretest	Experimental	15	6.93	2.4
	Control	15	7.53	2.3
6+1 Analytical Writing Pretest	Experimental	15	17.9	5.6
	Control	15	18.6	5.2
Writing Motivation Pretest	Experimental	15	56.5	4.1
	Control	15	55.5	6.3

When Table 1 is examined, it is seen that pretest scores of each group were similar to each other. It can be said that the groups were balanced.

The distribution according to gender of students in the experimental and control groups included in the study group of the research is shown in Table 2 below.

Table 2. Data Related to Study Group

Groups	Female		Male		Total
	f	%	f	%	
Experimental Group	7	46.6	8	53.3	15
Control Group	8	53.3	7	46.6	15
Total	15	50	15	50	30

When Table 2 is examined, it is seen that the experimental and control groups each consisted of 15 students. In the experimental group, 46.6% of students were girls and 53.3% were boys, while in the control group, 53.3% of students were girls and 46.6% were boys. When the study group of the research is seen, it can be said that gender distribution was normal, and that the two groups were similar to each other in this respect.

Data Collection Tools

The Motivation to Write Profile (Motivation to Write Scale), the 6+1 Analytical Writing and Evaluation Scale, and the Story Elements Evaluation Scale were used as data collection tools in the study.

Motivation to Write Profile (Motivation to Write Scale)

Developed by Codling and Gambrell (1997) the scale was designed to assess writing motivation of students from 2nd grade up to 6th grade. It consists of two sections. The first part was designed under the heading of “*scale for determining writing task value and writing self-concept*”, while the second part consists of face-to-face interviews. The scale is made up of a 14-item “writing task value” factor and a 12-item “writing self-concept” factor. The writing task value dimension is divided into three sub-groups, namely narrative writing (3 questions), expository writing (3 questions) and general writing (8 questions). The writing self-concept dimension is similarly divided into three sub-groups, namely narrative writing (4 questions), expository writing (4 questions) and general writing (4 questions). The scale items are arranged as four-response Likert-type questions. Total scores are calculated by scoring the options for items with positively oriented questions from positive to negative as “4-3-2-1”, and by scoring the options for items having negatively oriented questions in the opposite direction.

The study for adapting the Motivation to Write Scale into Turkish was conducted by the researcher in 2018. 230 students attending fourth grade of primary school took part in the adaptation study. The validity and reliability studies were conducted in line with the students’ answers. To determine the construct validity of the Motivation to Write Scale, confirmatory factor analysis (CFA) was performed. The confirmatory factor analysis was carried out with the AMOS (Analysis of Moment Structures) software. As a result of the CFA of the scale, it was determined that the correlation coefficient calculated for the observed variables (items) of the factors (writing task value, writer self-efficacy) ranged between .23 and .75 and that this was significant. Values of RMSEA= .07, RMR= .05, GFI= .83 and CFI= .81 were found. Considering the values obtained as a result of the CFA, it is seen that the fit values of the model were at acceptable levels.

6+1 Analytic Writing and Evaluation Scale

Developed as the 6+1 Analytic Writing and Evaluation Model by Education Northwest (2006), the scale was adapted to Turkish by Özkara (2007). In the scale, the characteristics necessary for a good-quality piece of writing are given under 7 headings. The headings included in the scale are ideas, organisation, wording, word choice, sentence fluency, spelling and presentation. The pieces of writing produced by the students were evaluated and scored as 5, 3 and 1 by two researchers by considering the criteria for the characteristics found in the 6+1 Analytic Writing and Evaluation Scale. According to the scale, the maximum score that can be obtained from a story is 35.

Story Elements Evaluation Scale

The Story Elements Evaluation Scale was developed by Harris and Graham (1996) and adapted to Turkish by Coşkun (2005). In the scale, 8 components that make up a story (main character,

location, time, initiating event, aim, approach, conclusion and reaction) are rated with certain score intervals. According to the scale, the maximum score that can be obtained from a story is 19.

Data Analysis

In the analysis of the research data, arithmetic means, frequencies, percentages, standard deviation, and t-test were used. The data obtained in the study were analysed by using SPSS 20.0 statistical software. In the hypotheses and questions related to the study, .05 was set as the level of significance. At the stage of determining group equivalence in the study, t-test was used, and to determine whether or not there were significant differences in story-writing scores according to groups, ANOVA for repeated measures was used.

Experimental Research Implementation Process

During the implementation of the research, within the scope of the digital writing platform application, each stage of the writing process (preparation, planning, creating a draft, review, redaction and publication) was carried out using a digital platform. Before beginning the implementation, information about the study was given to the students in the experimental group. The digital platforms used in the study were chosen by taking the stages of the writing process into consideration. The implementation of the experimental design was devised in two stages under the headings of planning and application.

Planning

At the planning stage of the research, the following activities were carried out:

- Parental notification
- Determination of experimental and control groups
- Determination of study plan
- Identification of digital platforms to be used in the implementation

Before the student groups were determined, parents of the fourth grade students were informed about the implementation by giving a presentation. After the notification was given to parents, their children were handed out a petition form to ask them whether or not they wished to take part in the research. All parents signed the petition form.

While the experimental and control groups were being determined, all of the fourth grade students (32 persons) were given 4 topics and asked to write stories. The stories written by the students were assessed according to two different scales and the scores were transferred to the SPSS 20.0 software program. As a result of the t-test that was made, the two groups were formed in such a way that there were no differences between them.

The period determined for implementation of the experimental design was planned as 4 lesson hours per week over a 14-week period. During the 4-lesson-hour period applied each week, the lessons were designed as one lesson hour allocated to giving information on the subject of how the story should be written, and the next two lesson hours for students to do practice on digital platforms. The final lesson hour was designated as the group hour, and would be carried out on the basis of students exchanging ideas with their friends in the group about the work they had done and giving each other feedback.

The operation of the writing process was planned as specified in the table below:

Table 3. Applications Used During Writing Process

Stage of Writing Process	Application Used	Operation
Preparation	Spider Scribe	Students individually create a mind map related to the topic they have chosen.
Creating a draft	Edmodo	In the virtual classroom they belong to, students share the drafts of the stories they have written with their friends in the group.
Review	Story Jumper	In line with the feedback they have received, students make additions to their stories and write them up.
Redaction	Wikispaces	Students make the final revisions of their stories on their own pages.
Publication	Emaze	Students make the final versions of their stories into a presentation and share them.

Implementation

At the implementation stage of the research, the following activities were carried out:

- Implementation process
- Teaching story writing skills/operation of the lesson (example lesson plan)
- Completion of the experimental study

Before beginning the experimental study, a story writing form prepared by the researcher was distributed to students in the experimental and control groups. By reading the story writing topics included in the form, the students were asked to write stories about a topic they had selected over a 60-minute period. At a different time, the “Motivation to Write Scale” was also applied to the students. The scores that the students obtained from their stories and the scale were recorded as “*pretest scores*”. During the implementation, the lessons for the experimental group were conducted on the basis of the digital writing workshop application, while the lessons in the control group were taught by the classroom teacher according to the primary school Turkish curriculum. After the experimental study was completed, the story writing form distributed in the pretest was again handed out to the fourth grade primary students in the experimental and control groups. As in the pretest, students again wrote stories in the posttest about a topic included in the form or about any topic they wished. After a certain time, the students responded to the Motivation to Write Scale. In the posttest, students were again each given a period of 60 minutes in which to write their stories. The scores that the students obtained from their stories and the scale were recorded as “*posttest scores*”.

FINDINGS

The mean scores (\bar{X}) and standard deviations (Sd) of students in the experimental and control groups related to the results they obtained in the pretest and posttest for story writing and in the Motivation to Write Scale are included in Table 4.

Table 4. Descriptive Statistical Results Related to Pretest and Posttest Scores for Story Writing and Writing Motivation

	Group	N	\bar{X}	Sd
Story Elements Pretest	Experimental	15	6.9	2.4
	Control	15	7.5	2.3
6+1 Analytic Writing Pretest	Experimental	15	17.9	5.6
	Control	15	18.6	5.2
Writing Motivation Pretest	Experimental	15	56.5	4.1
	Control	15	55.5	6.3
Story Elements Son Posttest	Experimental	15	12.5	3.7
	Control	15	7.6	2.5

6+1 Analytic Writing Posttest	Experimental	15	27.2	6.1
	Control	15	18.2	7.1
Writing Motivation Posttest	Experimental	15	54.5	5.6
	Control	15	55.4	5.2

When Table 4 is examined, it can be understood that the story writing scores of students in the experimental group were higher for both scales in the posttest. However, it is seen that for writing motivation there was no increase in the posttest, and that writing motivation scores of students in the experimental group actually decreased.

Findings Related to the First Research Question

Is there a significant difference in the story-writing scores of the experimental group subjected to the digital writing workshop application and those of the control group receiving lessons in line with the curriculum according to the joint effect of the group-measurement factors?

Table 5.Independent Groups t-test for Story Writing Scores

Group	N	\bar{X}	Ss	Sd	T	p
Pretest Experimental	15	24.8	1.93	28	-.479	.636
Pretest Control	15	26.13	1.79			

As can be seen in Table 5, no statistically significant difference could be found between pretest story writing scores according to groups ($t_{(28)}=-.479$; $p=.636$).

Table 6.Two-Factor ANOVA Results for Repeated Measures Related to Pretest-Posttest Story Writing Scores of Experimental and Control Groups

Source of Variance	KT	Sd	KO	F	p
Between Groups	3897.15	29			
Group (E/C)	608.01	1	608.01	5.17	.03
Error	3289.13	28	117.46		
Within Groups	2366.5	30			
Measure (Pretest-Posttest)	799.35	1	799.35	32.29	.00
Group* Measure	874.01	1	874.01	35.30	.00
Error	693.13	28	24.75		
Total	6263.65	59			

When Table 6 is examined, a statistically significant difference was found between story writing scores of the experimental and control groups [$F_{(1-28)}= 5.17$, $p<0.05$]. When the table is examined in terms of the scale time variable (pretest-posttest), a statistically significant difference was found between story writing scores [$F_{(1-28)}= 32.29$, $p<0.05$]. As can be understood from Table 6, when the table is examined with regard to the joint effect of the scale time (pretest-posttest) and group (experimental and control) variables, a statistically significant difference was found between story writing scores [$F_{(1-28)}= 35.30$, $p <0.05$].

The change in pretest-posttest story writing scores according to groups is shown in Figure 1.

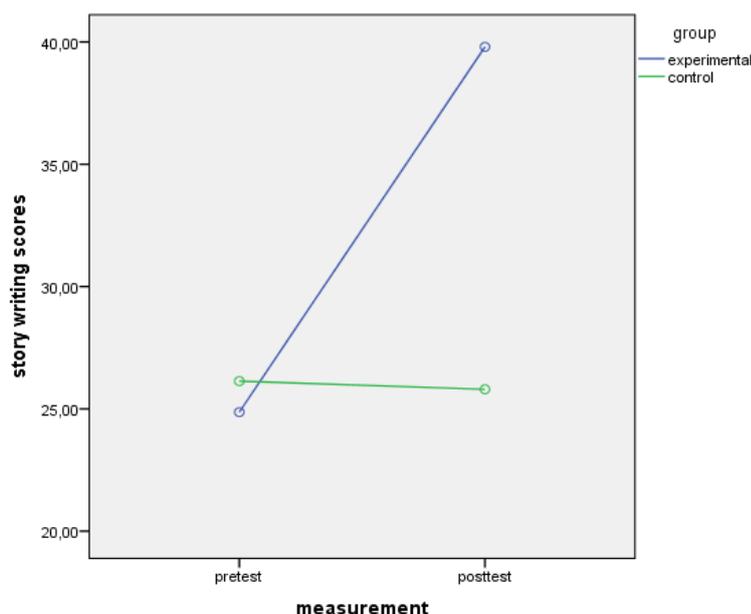


Figure 1. Graph showing change in story writing scores according to groups and scale time

It is seen in the graph that in the pretest, story writing scores of the two groups were similar to each other, whereas in the posttest, story writing scores were higher in the experimental group. To understand whether or not the change in scores in the experimental and control groups was significant, t-test for dependent groups and t-test for independent groups were performed.

Table 7. Dependent Groups t-test for Story Writing Skills Scores

Group	\bar{X}	Ss	Sd	<i>t</i>	<i>p</i>
Pretest Experimental	24.86	1.93	14	-8.69	.000
Posttest Experimental	39.80	2.43	14		
Pretest Control	26.13	1.79	14	.174	.864
Posttest Control	25.80	2.45	14		

As can be seen in Table 7, a statistically significant difference was found between pretest and posttest scores in the experimental group ($t_{(14)}=-8.69$; $p=.000$). In the control group, however, a statistically significant difference could not be found between pretest and posttest scores ($t_{(14)}=.174$; $p=.864$). According to these results, it can be said that the experimental study applied to the experimental group had a positive effect on the students' story writing skills.

Findings Related to the Second Research Question

Is there a significant difference in the writing motivation scores of the experimental group subjected to the digital writing workshop application and those of the control group receiving lessons in line with the curriculum according to the joint effect of the group-measurement factors?

Table 8. Independent Groups t-test for Writing Motivation Scores

Group	N	\bar{X}	Ss	Sd	<i>T</i>	<i>P</i>
Pretest Experimental	15	56.53	1.05	28	.57	.56
Pretest Control	15	55.40	1.64			

When Table 8 is examined, no statistically significant difference could be found between writing motivation scores according to groups ($t_{(28)}=.57$; $p=.56$).

Table 9. Two-Factor ANOVA Results for Repeated Measures Related to Pretest-Posttest Writing Motivation Scores of Experimental and Control Groups

Source of Variance	KT	Sd	KO	F	P
Between Groups	1249.73	29			
Group (E/C)	11.26	1	11.26	.25	.61
Error	1238.46	28	44.23		
Within Groups	374.00	30			
Measure (Pretest-Posttest)	29.40	1	29.40	2.89	.10
Group* Measure	60.00	1	60.00	5.90	.02
Error	284.60	28	10.16		
Total	1623.73	59			

When Table 9 is examined, a statistically significant difference could not be determined between writing motivation scores of the experimental and control groups [$F_{(1-28)} = .25$, $p > 0.05$]. When the table is examined in terms of the scale time variable (pretest-posttest), a statistically significant difference could not be found between writing motivation scores [$F_{(1-28)} = 2.89$, $p > 0.05$]. As can be understood from Table 9, when the table is examined with regard to the joint effect of the scale time (pretest-posttest) and group (experimental and control) variables, a statistically significant difference was found between writing motivation scores [$F_{(1-28)} = 5.90$, $p < 0.05$].

The change in pretest-posttest writing motivation scores according to groups is shown in Figure 2.

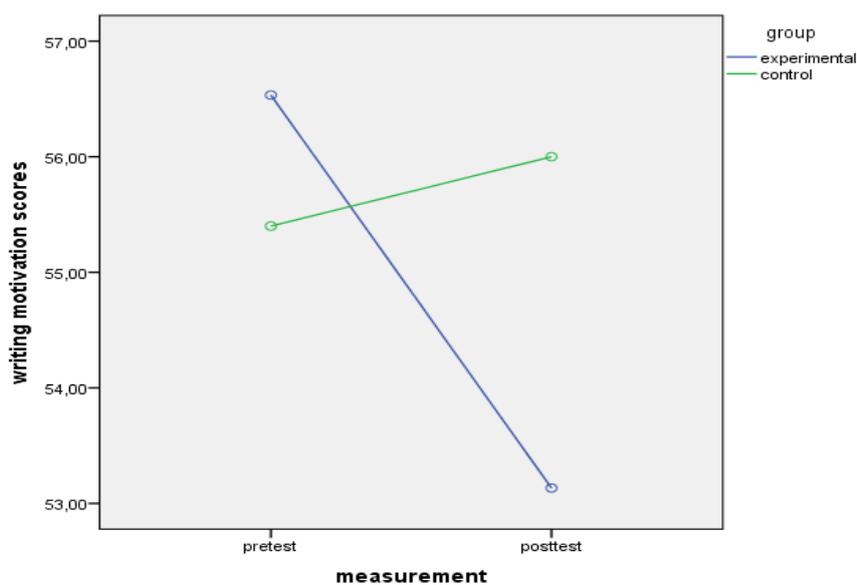


Figure 2. Graph showing change in writing motivation scores according to groups and scale time

Although there was not a great difference between pretest writing motivation scores, it is seen that the posttest writing motivation scores in the control group emerged as higher, and that the writing motivation scores in the experimental group decreased. To understand whether or not the change in scores in the experimental and control groups was significant, t-test for dependent groups and t-test for independent groups were performed.

Table 10. Dependent Groups t-test for Writing Motivation Scores

Group	\bar{X}	Ss	Sd	t	p
Pretest Experimental	56.53	1.05	14	2.75	.01
Posttest Experimental	53.13	1.36	14		
Pretest Control	55.40	1.64	14	-.55	.59
Posttest Control	56.00	1.24	14		

As can be seen in Table 10, a statistically significant difference was found between pretest and posttest scores in the experimental group ($t_{(14)}=2.75$; $p=.01$). However, this difference is due to the fact that writing motivation scores in the experimental group decreased. In the control group, however, a statistically significant difference could not be found between pretest and posttest scores ($t_{(14)}=-.55$; $p=.59$). According to this situation, it can be said that the activities carried out during the experimental study did not have an effect on the students' writing motivation scores.

CONCLUSION AND DISCUSSION

In the study, with the aim of determining how the digital writing workshop implementation affected story writing skills, the students' story writing performance was assessed twice, once at the beginning and once at the end of the process. The stories were evaluated in terms of the students' use of story elements and the quality of their stories. It was seen in the final assessment that the use of story elements in the students' stories had increased significantly. In terms of the students' writing quality, it was revealed that ideas, organisation, word selection, sentence fluency and spelling had all improved.

In story writing in the traditional way using a paper and pencil, the writer states everything textually. In stories written in interactive environments, however, the "writer" uses computer tools to create visual elements of an imaginative world (Carbonaro, Cutumisu, McNaughton, Onuczko, Roy, Schaeffer, Szafron, Gillis & Kratchmer, 2005). In this process, known as digital writing, texts appear which are created to be read or displayed on a computer or another device connected to the internet (National Writing Project, 2010, p.7). While making up stories in a digital environment, students create multimodal texts by combining multimedia components like writing, pictures and music (Grabill, 2005). In her digital writing workshop study conducted with third grade primary students, Toney (2017) concluded that digital writing workshops are an effective practice for creating multiform texts. The better the written text of a story created in a digital environment is, the better its form produced with digital applications will be. Therefore, for a good digital story created in a digital writing workshop, students first and foremost need to create good-quality written texts.

Other studies revealing that digital writing workshops and digital applications develop writing skills (Dayan & Girmen; 2018; Eubanks, Yeh & Tseng; 2017; Kulla-Abbott, 2006; Rheault, 2015; Toney, 2017; Yamaç, 2015; Xin, 2013; Zurcher, 2018) show *consistency* with the findings obtained in this study. According to Kulla-Abbott (2006), thanks to digital stories, students better understand the processes of reflection, organisation and feedback. In a study carried out by Xin (2013), it was determined that with digital stories, students experienced improvements in the total number of words, number of complete sentences and number of correct words in their writing. In Zurcher's (2018) writing workshop study carried out with preschool students, it was concluded that both the writing workshop and interactive writing were effective in developing students' basic writing skills. When the studies conducted in the literature are taken into consideration, thanks to students' creation of multiform texts, stories written in a digital environment enable them to create more comprehensive and detailed texts by developing the quality of their writing, the number of words and the story elements.

With the aim of determining how the digital writing workshop implementation affected their writing motivation, the students' writing motivation was assessed twice with the "Motivation to Write Scale", once at the beginning and once at the end of the process. It was revealed that the writing motivation of students who took part in the digital writing workshop activities decreased significantly.

It was determined that scores decreased for both the students' writing task value and writing self-concept, which expresses how they perceive themselves as a writer. For the students in the control group, however, it was concluded that there was no significant change in their writing motivation. While students were creating their first stories at the start of the process, the thought that they could work in a digital environment by adding multimedia items like pictures and music to their stories rather than activities in which they wrote stories using traditional paper and pencil, and that their digital stories would be seen in different environments via the internet, made them enthusiastic about the digital story creation process. However, it was seen that at the second and third story writing stages, the students had difficulty with the applications they were using and that their motivation decreased as the process advanced.

Digital tools selected in educational applications are important for students' participation in tasks and for their motivation. However attractive the features of digital tools might be, students may sometimes prefer not to use these tools. The theory of self-determination is defined as individuals' determination of their behaviour with their own personal beliefs and value judgements, rather than with external factors (social norms, group pressure, etc.), and as individuals' making their decisions by themselves (Budak, 2000). In other words, it means individuals' experiencing a feeling of choice in initiating and organising their own behaviour (Deci, Connell & Ryan, 1989). Certain elements of the theory of self-determination explain how a digital tool affects a student's participation in a task. In the self-determination theory, three basic psychological needs, named autonomy, competence and relatedness, are found.

Of the needs, autonomy is discussed as an individual's initiating his own actions and making his own choices (Andersen, 2000; Williams, Grow, Freedman, Ryan & Deci, 1996). The autonomy need enables a person to direct his activities himself (Reis, Sheldon, Gable, Roscoe & Ryan, 2000). When the autonomy need is considered in terms of the digital writing workshop, it is seen that the possibility for students to choose for themselves the technological applications they are to use will increase their motivation. In the study, however, since the digital applications that the students would use were different at each stage of the writing process, they were determined by the researcher, and the students had to write their stories by using the digital applications that were determined for them. In this process, other alternative digital applications were not offered to them. The applications which were selected by the researcher and which the students were obliged to use seemed not to attract the interest of some students, and caused some students to have difficulty while using them. If a task is very easy or very difficult, students cannot be motivated to be successful (Granito & Chernobilsky, 2012). Students are motivated when they become excited about a task or when they consider the task that they perform to be worthwhile (Linnenbrink & Pintrich, 2003). The fact that the digital applications *were not chosen* by the students limited the need for autonomy, which is important in terms of motivation. The situation led to a decrease in students' motivation. Previous studies (Bao & Lam, 2008; Ree, Nicks & Hamm, 2003) reveal that, irrespective of students' age, giving students the choice of the tasks they are to do and the tools they are to use increases their motivation.

According to self-determination theory, another need that affects students' motivation is competence. The competence need is a person's state of having control over his own life, ability to cope with his problems effectively, and possessing skills for being able to make changes to his behaviour and environment (Deci & Ryan, 1985). In other words, it is about feeling competent when coping with one's environment (Ingledeu, Markland & Sheppard, 2004). At the beginning of the digital writing workshop implementation process, the students' technological literacy was low. Together with the start of the experimental research process, the students both began to learn about digital applications and to acquire some new literacy skills. While the students were creating stories in the digital environment, the researcher assessed the students' competences and gave feedback after every stage of the process. Positive feedback given to students helps students to preserve their feelings of competence and enable them to be motivated, whereas with negative feedback or feedback in which deficiencies are expressed, students' feelings of competence decrease and their motivation is undermined (Ryan & Deci, 2009). Students' difficulty in performing various writing tasks in some applications may have decreased their perceptions of competence. Since students were unable to

obtain feedback from their classroom teachers about the written products they created in the lessons with regard to the quality of their writing, it was seen that they did not have knowledge about their writing performance, either. The students were not conscious about what sort of writers they were. While many students regarded themselves as “a very good writer” in the writing motivation scale pretest applied at the start of the process, it was seen that the answers they gave to the same item had changed to “I regard myself as a bad writer” at the end of the process. Therefore, the explanations that the researcher gave during the process, related to the aspects that needed to be developed in assessments of writing performance, gave students the opportunity to gain awareness and to become knowledgeable about their own competence.

The relatedness need means an individual’s experiencing a sense of belonging to the society he lives in and relating the things that he does to his own life (Kowal & Fortier, 1999). Accordingly, the relevance for a child of a task that is done or a task that is to be completed expresses the fact that it is associated with his own life. The students did not regard the digital writing workshop as an activity expected of them as part of their school activities and lessons, or by their teachers. This situation affected their perspectives on the activities and they did not consider the digital writing workshop to be sufficiently meaningful for themselves. This also hampered the students’ motivation for the tasks they performed.

Another reason why the students’ writing motivation decreased during the digital writing workshop was that they *lacked sufficient experience* related to digital tools and applications. In a study by Martin (2011), two groups, labelled as digital natives and digital immigrants, were given training related to the use of technology in class, and no difference could be found between the two groups in relation to competence for using technological tools. Martin explained this situation as the fact that no matter how much students belong to the digital age, if they do not have *previous knowledge or life experiences* related to how digital tools and applications are used, then using these tools has no meaning and students cannot be motivated for the tasks that they perform.

During the experimental research process, certain difficulties were experienced in the use of digital applications. The written products that were created were realised in an online environment and were recorded there. The problems and difficulties that were experienced had an effect on the students’ motivation and decreased their willingness to work.

Another reason for the decrease in writing motivation may be the fact that the students were subjected to an intensive programme due to receiving full-day education at a private school. During the process, students frequently stated that they could not spare any time for the activities due to exams, ceremonies or social activities, and that this intensive process made them tired.

Recommendations

- Due to the conditions of the present day, it has become imperative for students to acquire new literacy skills. The importance of digital writing applications, which are considered to be an alternative for students with writing difficulty or who are bored with writing, should be emphasised in the curriculum and be integrated into lessons. The need to integrate new reading and writing practices, such as reading and writing in digital environments, using the internet effectively as a learning tool, and creating multiform texts, into the curriculum is regarded as essential. In this way, teachers can also use digital applications as an effective tool for developing writing skills.

- Students can be encouraged to store the work that they do inside and outside school in digital environments. Teachers can reach a much larger target group by storing their students’ work in electronic portfolios. Furthermore, they can provide students with the opportunity to increase their motivation by including in the lessons applications such as wiki writing, blog writing or multimodal text preparation, especially with the aim of monitoring students’ development in the process.

- In this study, a different digital application was used at each stage of the writing process. The digital applications used were selected for their suitability for the writing process by taking the characteristics of the process into consideration. In future studies, other digital applications can be included that are equivalents of the applications used.

- The digital platforms used during the research process were operated on one single type of text (the story). These applications can also be used for different types of text (poems, informative texts, diaries, etc.). Moreover, the design of the research model can also be changed.

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