



# International Journal of Progressive Education

**IJPE**  
INASED Published®

IJPE ISSN (Print) : 2834-7919

IJPE ISSN (Online) : 1554-5210

---

[ijpe.inased.org](http://ijpe.inased.org)

---

# IJPE

International Journal of  
**Progressive Education**

Volume 19      Number 5      October 2023

DOI: 10.29329/ijpe.2023.603



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

**International Journal of Progressive Education**

**Frequency:** Six times a year.

**ISSN:** 2834-7919 / **E-ISSN:** 1554-5210

**Owner & Publisher:** International Association of Educators

**Indexing/Abstracting:**

1. **H.W. Wilson (Education Full Text):** <https://www.ebsco.com/m/ee/Marketing/titleLists/eft-coverage.htm>
2. **EBSCO Publication:** <http://www.ebsco.com>
3. **Cabell's Directory of Publishing:** <http://www.cabells.com>

**2023 Subscription Rates**

- \$120 Association Member USA (Canada: \$130; Rest of World: \$140)
- \$140 Individual USA (Canada: \$150; Rest of World: \$170)
- \$110 Student USA (Canada: \$120; Rest of World: \$140)
- \$240 Library/Institution USA (Canada: \$260; Rest of World: \$360)
- Single Issues and Back Issues: \$35 USA (Canada: \$45; Rest of World: \$55)

If you wish to subscribe for the printed edition of IJPE, please contact the Customer Service department at [secretary@inased.org](mailto:secretary@inased.org)

**Editor**

Hakan Dedeoglu

Hacettepe University, Turkey

**Associate Editors**

Bertram Chip Bruce

University of Illinois at Urbana-Champaign, USA

Chen Xinren

Nanjing University, China

**Managing Editor**

Mustafa Yunus Eryaman

Çanakkale Onsekiz Mart University, Turkey

**Editorial Review Board (Board of Referees)**

Peggy Placier

University of Missouri-Columbia, USA

Yang Changyong

Southwest China Normal University China

Sharon Tettegah

University of California, Santa Barbara USA

Fernando Galindo

Universidad Mayor de San Simón, Bolivia

Susan Matoba Adler

University of Hawaii, USA

Carol Gilles

University of Missouri-Columbia, USA

Julie Matthews

University of the Sunshine Coast, Australia

Cushla Kapitzke

Queensland University of Technology, Australia

Catalina Ulrich

Universitatea din Bucuresti, Romania

Juny Montoya

Universidad de Los Andes, Bogotá, Colombia

Kwok Keung HO

Lingnan University, Hong Kong

CHAN, Raymond M C

Hong Kong Baptist University

Winston Jumba Akala

University of Nairobi, Kenya

Pragasit Sitthitikul

Walailak University, Thailand

Funda Savasci

Istanbul University, Turkey

Sheila L. Macrine

University of Massachusetts Dartmouth, USA

Raul Alberto Mora Velez

University of Pontificia Bolivariana, Columbia

Van-Anthoney Hall

University of Illinois at Urbana-Champaign, USA

Pauline Sameshima

Lakehead University, Canada

Bongani Bantwini

University of Venda, South Africa

Martina Riedler

Çanakkale Onsekiz Mart University, Turkey

John L. Pecore

University of West Florida

Levent Cetinkaya

Çanakkale Onsekiz Mart University, Turkey

Yasser A. Al-Hilawani

Yarmouk University, Jordan

**Assistant Managing Editors**

Nihat Gurel Kahveci

Istanbul University, Turkey

Alex Jean-Charles

Missouri State University, USA

Olgun Sadık

Indiana University, USA

Orhun Kaptan

Istanbul University

Mehmet Emrah Kuru

Çanakkale Onsekiz Mart University, Turkey

**Advisory Board**

Naomi Tsunematsu

Hiroshima University, Japan

Lu Youquan

East China Normal University, China

Ma Hemin

East China Normal University, China

Chrispen Matsika

Georgia College&State University

Jeylan Woliye Hussein

Alemaya University, Ethiopia

The views expressed in this publication are not necessarily those of the Editor or the Editorial Review Board, nor the officers of the International Association of Educators (INASED). Copyright, 2023, International Association of Educators (INASED). ISSN 2834-7919 / E-ISSN 1554-5210

## TABLE OF CONTENTS

Volume 19, Number 5  
October 2023

### Articles

- 1 Comparison of Often Used Analysis Methods for Rank-Ordered Data**  
Author: *Süleyman Demir*
- 14 Teaching Sequential Text Writing at Primary School by Using the Read-to-Write Strategy**  
Author: *Ömer Erbasan*
- 26 Transmission of Family Culture "The Case of Grandmother, Mother and Granddaughter"**  
Authors: *Emine Arslan Kılıçoğlu, Büşra Ergin & Esra Ergin*
- 41 Development of the Inventory of Orientations in Curriculum Theories (IOOICT) for Pre-Service Teachers**  
Author: *Ersin Türe*
- 59 Study of Variables Predicting Teachers' Organizational Happiness Levels with Ordinal Logistical Regression Analysis**  
Authors: *Mehmet Sabir Çevik & Methi Çelik*
- 81 School Adjustment in the Early Years: Children's Social-Emotional Problems in Different Countries and Applied Solutions**  
Author: *Nuray Koç*
- 97 Am i a Competent Researcher?: Reflections from Novice Researchers**  
Authors: *Buket Turhan Türkan, İnanç Eti & Betül Karaduman*
- 110 Evaluation of the Digital Story in Values Education Project**  
Authors: *Gökçe Becit & Ozan Coşkunserçe*
- 126 Investigation of Pedagogical Content Knowledge of In-service and Pre-Service Pre-school Teachers in Pre-school Mathematics**  
Authors: *Zehra Bilgen & Yasemin Abalı Öztürk*
- 153 Translation of the MOOC Student Satisfaction Survey to Turkish: A Scale Adaptation and Validation Study**  
Authors: *Emre Uygün & Kürşat Cesur*
- 172 Mathematical Reasoning Skills as a Predictive of Number Sense**  
Authors: *Ahsen Seda Bulut & Okan Kuzu*
- 186 Effective School Leadership as a Predictor of School Culture**  
Author: *Bayram Bozkurt*
- 199 An Analysis of Handwriting Legibility of First Grade Students by School Starting Age**  
Authors: *İlhan Polat & Cengiz Kesik*

- 207     Nurturing Young Minds and Bodies: Exploring Critical Media Literacy Through Healthy Food Adventures**  
*Authors: Şerife Cengiz & Tolga Kargın*
- 225     Gender Equality in Math-Themed Picture Books: The Example of “Math Matters”**  
*Authors: Özge Nurlu Üstün & Serap Uzun*

## Comparison of Often Used Analysis Methods for Rank-Ordered Data

**Süleyman Demir<sup>i</sup>**  
Sakarya University

### Abstract

This study aims to compare the findings obtained from Rank-Ordered Judgments Scaling (ROJS), Placket-Luce Model (PLM), and Many Facet Rasch Model (MFRM) methods based on ranking judgments, which are often used in the analysis of rank-ordered data. For this purpose, one hundred senior students studying at the Faculty of Education and Faculty of Theology of Sakarya University were asked to rank pedagogical formation courses from the course they thought would be the most useful in their professional lives to the course they thought would be the least useful. The obtained data were analyzed using ROJS, PLM, and MFRM methods. When the obtained data were analyzed according to the ROJS, PLM, and MFRM, it was found that the course considered the least useful and the least preferred was the Instructional Technologies course. According to the raters, it was found that the most preferred and the most useful courses were Teaching Practice (I and II) in MFRM and ROJS, while in PLM, it was found to be the Classroom Management course. All other courses except the first-ranked course were sorted similarly in all models; the scale values in ROJS, logit values in MFRM, and worth in PLM were similar.

**Keywords:** Rank Ordered Data, Many Facet Rasch Model, Placket Luce Model, Judgment Scaling

**DOI:** 10.29329/ijpe.2023.603.1

**Submitted:** 13/03/2023

**Accepted:** 18/09/2023

**Published:** 16/10/2023

---

<sup>i</sup> **Süleyman Demir**, Assist. Prof. Dr., Department of Educational Measurement and Evaluation, Sakarya University, ORCID: 0000-0003-3136-0423

**Email:** suleymand@sakarya.edu.tr

## INTRODUCTION

In social sciences and educational sciences, rank-ordered data are often used to determine the preferences or judgments of individuals. It is used in ordinal data as well as rank-ordered data in research. While ordinal data are the basis for sorting the respondents in the research group, rank-ordered data are the basis for sorting the options presented to the respondents. In rank-ordered data, respondents are mostly in the role of raters, judges, or referees. Therefore, in such studies, 'rater' is used instead of 'respondent.' In rank-ordered data, it may be asked to rank all  $n$  options ( $1^{\text{st}}$  to  $n^{\text{th}}$ ) offered to raters, or it may be asked to rank the first three ( $1^{\text{st}}$  to  $3^{\text{rd}}$ ). The following have been determined using rank-ordered data; qualities that a teacher should have (Anil & Güler, 2006), addictive substances (Kan, 2008), teacher competencies (Özer & Acar, 2011), factors affecting exam success (Bal, 2011), professional problems of teachers (Ekinci et al., 2012), teachers' assessment and evaluation method and tool preferences (Altun & Gelbal, 2014), pre-service teachers' social activity preferences (Polat & Göksel, 2014), pre-service teachers' internet usage preferences (Albayrak Sarı & Gelbal, 2015), patients' treatment preferences (Shakir et al., 2021), culturally sensitive teacher characteristics (Sarıdaş & Nayir, 2021), reasons for choosing university (Koçak & Çokluk-Bökeoğlu, 2021), urban mobility problems and transportation solutions (Kijewska et al., 2022). The studies conducted show that there are quite a lot of areas of use for rank-ordered data.

It is observed that ordered data are often analyzed based on ranking judgments, a scaling method. Scaling is defined as determining the psychological responses of stimuli in the physical dimension (Baykul and Turgut, 1992). On the other hand, rank-ordered judgment scaling (ROJS) allows the stimuli presented to the raters to be displayed on a scale based on the evaluator's judgments and the distances between the stimuli to be determined. For the analysis of rank-ordered data based on ranking judgments, the following steps can be followed:

- A sequence frequency table is created for the judgments of the raters.
- A ratios matrix is obtained using each sequence frequency in the sequence frequency table.
- The ratio in each cell in the ratio's matrix is converted into a Unit Normal Deviations Matrix using the unit normal distribution function.
- The scale values for each stimulus are obtained by averaging the values in each column of the Unit Normal Deviations Matrix.
- All scale values are shifted to standardize the scale values so that the smallest scale value is zero (Anil & Inal, 2017; Baykul & Turgut, 1992).

Since there is no program or open code for analyzing rank-ordered data based on ranking judgments, researchers must perform statistical calculations manually or using the Microsoft Excel calculation tool.

Another method used to analyze rank-ordered data is the Plackett-Luce Model (PLM), which was developed by Plackett (1975) based on Luce's axiom (Luce, 1959) (based on the probability of choosing  $n$  an item among the number of stimuli  $i^{\text{th}}$ ). In PLM, the probabilities of ranking the stimuli in a particular order are used to estimate the worth of stimuli related to each stimulus and express the importance of the stimulus. The fact that the value is high indicates that this stimulant is more important than other stimulants. Maximum probability or Bayesian methods are used for estimating the worth of stimuli (Turner et al., 2021). The value obtained from the analysis is divided by the standard error, and standard z scores are calculated for each stimulus. According to the statistically significant standard z scores, information is obtained that stimulants differ from the average (Finch, 2022; Turner et al., 2021). The analyses related to PLM can be performed in R using the PlackettLuce function developed by Turner et al. (2021) (Finch, 2022).



According to both ROJS and PLM, the raters' judgments are used to analyze the rank-ordered data. Another method used to analyze the evaluator's judgments is the Many Facet Rasch Model (MFRM). According to Linacre (1994), when analyzing the MFRM, all sources of variance (individual abilities, raters, criteria, etc.) being included in the analysis, it is possible to reach measurement results that are free from these sources of variance (Linacre, 1994). In other words, the measurement results of the students with MFRM can be determined independently of the raters and the criteria (or questions) (Farrokhi & Esfandiari, 2011; Linacre, 1994). With MFRM, it is possible to analyze multi-category (polytomous) data obtained using Likert Scale, Semantic Differential Scale, and Open-ended items (Ilhan, 2016; Knoch & McNamara, 2015; Linacre, 1994), as well as rank-ordered data (Linacre, 1994) and paired comparison data (Linacre, 1994; Linacre, 2006). MFRM analyses can be performed with the Facets program developed by Linacre (2014) and the R package that Robitzsch et al. (2022) prepared.

In order for the findings obtained as a result of the analyses to be more accurate, the most important point is to select the analysis method to be used correctly. In case there is more than one method to perform the analysis, it is necessary to choose the one that gives the most accurate results and is the most economical and practical from the user's point of view. When the literature is examined, it is seen that although the PLM and ROJS models are used only in rank-ordered data (Baykul & Turgut, 1992; Guilford, 1954; Finch, 2022; Turner et al., 2021), the MFRM model can also be used in dichotomous and Likert type data (Linacre, 1994; Linacre, 2006). Although each method can be used on rank-ordered data, no findings have been found in the literature regarding the differences in the mathematical infrastructures of these models, how they will affect the analysis results, and the differences or similarities between the analysis results. This study aims to compare the findings obtained from the ROJS, PLM, and MFRM methods, which are often used in the analysis of rank-ordered data.

## **METHOD**

### **Participants and the data**

To achieve the purpose of the study, it was asked to rank the pedagogical formation courses that the students of the faculty of education and the faculty of theology took during their undergraduate education. The research data consists of one hundred senior students who are studying at the Faculty of Education and Faculty of Theology of Sakarya University during the 2022-2023 academic term. In determining the students who would be included in the research group, the criterion of having taken courses other than the Guidance and Special Education courses (Guidance and Special Education courses are not included in the eighth semester of undergraduate class plans, students have not taken these courses yet or they are not included because they are taking the data collection process). Eight pedagogical formation courses given jointly to the students at the faculty of education and the faculty of theology were presented (Introduction to Education, Educational Psychology, Teaching Principles and Methods, Classroom Management, Measurement and Evaluation, Teaching Practices (I and II), Special Teaching Methods, Instructional Technologies). Before applying the data collection tool, ethics committee approval was obtained with the decision of Sakarya University Educational Research and Publication Ethics Committee dated 02.15.2023 and numbered E-61923333-050.99-222305. Students have ranked the pedagogical formation courses so that "1" is for the course they think will be the most useful in their professional life, and "8" is for the course they think will be the least useful.

### **Data Analysis**

In this section, the findings related to ROJS, PLM, and MFRM, which are used in the analysis of the data, are given in the following sections.

### Rank-ordered judgment scaling

The ROJS model is a method first developed by Guilford (1954). According to this model, the scale values of stimulants are obtained based on the data obtained as rank ordered. In order to obtain the scale values, first of all, the Ranking Matrix (1) is created, which contains the ranking made by the m-score raters for n stimuli. The rankings matrix shows the ranking result of  $l^{th}$  raters and  $j^{th}$  stimuli.

$$\begin{bmatrix} & S_1 & S_2 & S_j & S_n \\ J_1 & R_{11} & R_{12} & \dots & R_{1n} \\ J_2 & R_{21} & R_{22} & \dots & R_{2n} \\ J_l & \dots & \dots & R_{lj} & \dots \\ J_m & R_{m1} & R_{m2} & \dots & R_{mn} \end{bmatrix} \quad (1)$$

Using the ordering matrix, the Sequence Frequencies Matrix (2) is created, which contains the sequence frequencies of the stimuli. The Sequence Frequencies Matrix,  $F_{ik}$ ,  $k^{th}$  represents the frequency of the stimulus being displayed in  $i^{th}$  order by the raters.

$$\begin{bmatrix} & S_1 & S_j & S_k & S_n \\ 1 & F_{11} & F_{1j} & F_{1k} & F_{1n} \\ 2 & F_{21} & F_{2j} & F_{2k} & F_{2n} \\ i & F_{i1} & F_{ij} & F_{ik} & F_{in} \\ n & F_{n1} & F_{nj} & F_{nk} & F_{nn} \end{bmatrix} \quad (2)$$

After this stage, the rank-ordered data can be scaled by converting it into a scaling method based on binary comparisons. This transformation is calculated as how much higher the order of a stimulus is than the order of other stimuli. In other words, for two different stimuli, such as  $S_j$  and  $S_k$ ,  $S_j$  stimulus is preferred more than  $S_k$  stimulus in  $i^{th}$  order,  $\left(n(S_{ij} > S_{ik})\right)$  is calculated as follows (3):

$$n(S_{ij} > S_{ik}) = F_{ij} \cdot (F_{k < i} + (1/2)F_{ik}) \quad (3)$$

The probability that the  $S_j$  stimulus is preferred over the  $S_k$  stimulus is obtained (4) by summing the calculated  $n(S_{ij} > S_{ik})$  for each row and dividing  $(m^2)$  by the square of the rater number.

$$\begin{bmatrix} & S_1 & S_2 & \dots & S_j & \dots & S_n \\ S_1 & & P_{12} & & P_{1j} & & P_{1n} \\ S_2 & P_{21} & & & P_{2j} & & P_{2n} \\ \vdots & & & & & & \\ S_j & P_{j1} & P_{j2} & & & & P_{jn} \\ \vdots & & & & & & \\ S_n & P_{n1} & P_{n2} & & P_{nj} & & \end{bmatrix} \quad (4)$$

The  $(z_{jk})$  values corresponding to the areas under each ratio  $(P_{jk})$  unit normal distribution function in the ratios matrix are calculated using the conversion tables (Edwards, 1957, pp: 246-247). Scale values are obtained by averaging the  $n-1$   $z$  values of each stimulus (Anil & İnal, 2017; Baykul & Turgut, 1992; Edwards, 1957; Guilford, 1954). It shows that as the scale values of stimulants increase, stimulants are given a relatively higher rank value to other stimulants. In other words, it is relatively less preferred to other stimulants.

### **Plackett-Luce Model**

The Plackett-Luce model (PLM) was developed using the Luce axiom (Luce, 1959). The Luce axiom is based on the probability of choosing  $i^{th}$  item among  $n$  stimuli set ( $S$ ). This possibility is as follows;

$$P(i:S) = \frac{a_i}{\sum_{i \in S} a_i} \quad (5)$$

When  $K$  raters are asked to rank  $n$  stimuli, the rater must first choose the first stimulus among  $n$  stimuli and then choose the second stimulus among the remaining  $n-1$  stimuli. This process continues until the selection of the last stimulus. The probability of ranking the stimuli in a certain order ( $w$ ) (where  $A_i = i$  is the vector of alternative rankings which is selected in  $j^{th}$  rank) is defined as follows:

$$P(w) = \prod_{i=1}^n \frac{a_{ij}}{\sum_{i \in A_j} a_i} \quad (6)$$

The estimation of the worth of stimuli for each stimulus based on this probability can be made by Maximum Likelihood or Bayesian Estimation methods. PLM analyses can be performed in R with the PlackettLuce function written by Turner (2022). With the PlackettLuce function, the worth of stimuli is calculated in two ways. In the first method, one of the stimulants is taken as a reference. The value of the stimulus is fixed to zero for the stimulus taken as a reference. For stimulants other than reference, the worth of stimuli is estimated depending on the reference. The second method is also taken as a reference to the mean of values. For all stimulants, worth is estimated as a mean of values reference. Since the value estimated by both methods is calculated based on reference, the interpretation of stimuli is relative (Finch, 2022).

In addition to the worth of stimuli, the standard error is also calculated for each worth. These standard errors are used to evaluate the significance of the worth of stimuli. If the value is estimated by referring to the first stimulus, it is determined whether the other stimuli differ significantly from the

referenced stimulus. If the worth is estimated by reference to the mean of values, it is determined whether all stimulators have a significant difference according to the mean of values (Finch, 2022; Turner, 2022).

### ***Many Facet Rasch Models***

MFRM is an extended version of the one-parameter Item Response Theory model, also known as the Rasch model. The model (7) developed by Rasch (1980) is used for two categories of substances and consists of the facets of substance difficulty and individual ability.

$$\log(P_{ni1}/P_{ni0}) = B_n - D_i \quad (7)$$

The model developed by Rasch was later adapted by Andrich (1978) for Likert-type substances and by Masters (1982) for partial credit items (Linacre, 1994). Linacre (1994) developed the MFRM by adding variance sources likely to affect the measurement results, such as raters' judgments, to the model adapted for partial credit items (İlhan, 2016). Different models can be created according to the variance sources added in MFRM. An example of a three-facet model is given below (8).

$$\log(P_{nijk}/P_{nij(k-1)}) = B_n - D_i - C_j - F_k \quad (8)$$

In this model;

$P_{nijk}$  : Probability of  $j^{th}$  raters giving k value to  $i^{th}$  item of  $n^{th}$  individual

$P_{nij(k-1)}$  : The probability of  $j^{th}$  raters giving the k-1 value to  $i^{th}$  item of  $n^{th}$  individuals

$B_n$  : the ability of  $n^{th}$  individual

$D_i$  :  $i^{th}$  difficulty of the item

$C_j$  : the firmness/generosity of the  $j^{th}$  raters

$F_k$  : the difficulty of the step up from  $(k-1)^{th}$  category to  $k^{th}$  category (İlhan, 2016; Linacre, 1994).

Linacre (1994) has developed a formula (9) that can be used for MFRM for rank-ordered data based on the seventh formula. The function of the ranking of  $n$  stimulants of K rater in a  $(S_1, S_2, ..., S_n)$  certain order is determined by  $(\log(R(n)))$

$$\log(R(n)) = \log \left( \frac{\prod_{r=1}^K \prod_{j=1}^n \prod_{k=j+1}^n X_{rjk} * \exp(S_j) + X_{rkj} * \exp(S_k)}{\sum_{s=1}^{n!} \prod_{j=1}^n \prod_{k=j+1}^n X_{sjk} * \exp(S_j) + X_{rskj} * \exp(S_k)} \right) \quad (9)$$

$X_{rjk}$  : It is equal to 1 if the k rater gives a higher rank value to the stimulus  $(S_j)$  than the stimulus  $(S_k)$ , and 0 if it gives a smaller rank value.

$X_{rkj}$  : It is equal to 1 if the k rater gives a higher rank value to the stimulus ( $S_k$ ) than the stimulus( $S_j$ ), and 0 if it gives a smaller rank value.

## FINDINGS

### *The findings of the Rank-Ordered Judgement Scaling Model*

In order to be able to analyze the data with the ROJS Model, the calculated frequency statistics regarding the order in which each stimulant is preferred are given in Table 1.

**Table 1: Frequency matrix of the stimuli**

Rank	A	B	C	D	E	F	G	H
1	13	8	4	13	4	49	5	4
2	7	22	14	29	6	7	12	3
3	6	10	22	22	12	7	12	9
4	9	11	15	12	20	5	17	11
5	13	7	19	12	20	4	13	12
6	11	17	12	6	11	14	13	16
7	9	16	9	4	13	7	23	19
8	32	9	5	2	14	7	5	26

A=Introduction to Education, B=Educational Psychology, C=Teaching Principles and Methods, D=Classroom Management, E=Measurement and Evaluation, F=Teaching Practices (I and II), G=Special Teaching Methods, H=Instructional Technologies.

When Table 1 is examined, it is seen that 13 students prefer the Introduction to Education course, 8 students who prefer the Educational Psychology course, 4 students who prefer Teaching Principles and Methods course, 13 students who prefer the Classroom Management course, 4 students who prefer Measurement and Evaluation course, 49 students who prefer Teaching Practices (I and II) course, 5 students who prefer Special Teaching Methods course, 4 students who prefer Instructional Technologies course. The Ratios Matrix in Table 2 is obtained by determining how much the ranking of each stimulus is greater than the ranking of other stimuli using formula 3.

**Table 2: The Ratios Matrix**

	A	B	C	D	E	F	G	H
A		0.395	0.364	0.268	0.443	0.270	0.414	0.536
B	0.605		0.479	0.350	0.570	0.320	0.540	0.667
C	0.636	0.521		0.336	0.588	0.348	0.512	0.729
D	0.732	0.651	0.664		0.750	0.420	0.714	0.819
E	0.557	0.430	0.412	0.250		0.278	0.468	0.616
F	0.731	0.680	0.652	0.580	0.722		0.706	0.783
G	0.586	0.460	0.488	0.286	0.532	0.294		0.646
H	0.464	0.333	0.271	0.181	0.384	0.218	0.354	

A=Introduction to Education, B=Educational Psychology, C=Teaching Principles and Methods, D=Classroom Management, E=Measurement and Evaluation, F=Teaching Practices (I and II), G=Special Teaching Methods, H=Instructional Technologies.

When Table 2 is examined, the value in each cell shows the probability that the stimulator in the row will be preferred over the stimulator in the column. While the probability that the Introduction to Education course will be preferred over the Educational Psychology course is 0.395, the probability that the Educational Psychology course will be preferred over the Introduction to Education course is 0.605. The unit normal deviations matrix in Table 3 is obtained using each ratio in the ratios matrix. By taking the average of the values in each row, the average values for each stimulus are calculated. Scale values are obtained by moving the smallest of the average values so that it is zero.

**Table 3: Unit Normal Deviations Matrix and Scale values**

	A	B	C	D	E	F	G	H
A		-0.266	-0.347	-0.620	-0.143	-0.614	-0.217	0.091
B	0.266		-0.052	-0.387	0.176	-0.468	0.101	0.431
C	0.347	0.052		-0.422	0.222	-0.390	0.030	0.610
D	0.620	0.387	0.422		0.675	-0.202	0.565	0.913
E	0.143	-0.176	-0.222	-0.675		-0.589	-0.081	0.294
F	0.614	0.468	0.390	0.202	0.589		0.541	0.781
G	0.217	-0.101	-0.030	-0.565	0.081	-0.541		0.375
H	-0.091	-0.431	-0.610	-0.913	-0.294	-0.781	-0.375	
Mean	0.265	-0.008	-0.056	-0.423	0.163	-0.448	0.070	0.437
Scale Value	0.713	0.440	0.392	0.026	0.611	0.000	0.519	0.885

A=Introduction to Education, B=Educational Psychology, C=Teaching Principles and Methods, D=Classroom Management, E=Measurement and Evaluation, F=Teaching Practices (I and II), G=Special Teaching Methods, H=Instructional Technologies.

When Table 3 is examined, it is seen that the lowest scale value belongs to the Teaching Practices (I and II) course, while the highest scale value belongs to the Instructional Technologies course. In other words, it seems that the course that students think will be most useful for their professional lives is the Teaching Practices (I and II) course, while the course they think will be least useful is the Instructional Technologies course.

### *The Findings of the Plackett Luce Model*

In order to analyze the data with PLM, the PlackettLuce package (Turner, 2022) was used. When the mean of values is taken as a reference in Table 4, the calculated values of worth, standard error, z-value, and significance are given for each stimulus.

**Table 4: Value, standard error, z-value, and significance values calculated when referencing the mean of values (PLM\_M)**

	Worth	Std.Error	z	p
Introduction to Education (A)	-0.578	0.119	-4.835	0.000
Educational Psychology (B)	-0.037	0.110	-0.339	0.734
Teaching Principles and Methods (C)	0.192	0.107	1.796	0.073
Classroom Management (D)	0.725	0.109	6.636	0.000
Measurement and Evaluation (E)	-0.198	0.109	-1.818	0.069
Teaching Practices (I and II) (F)	0.587	0.115	5.105	0.000
Special Teaching Methods (G)	-0.084	0.107	-0.784	0.433
Instructional Technologies (H)	-0.608	0.114	-5.307	0.000

According to Table 4, the lowest worth belongs to the Instructional Technologies course, and the highest belongs to the Classroom Management course. It is seen that the course that students think will be the least useful for their professional lives is the Instructional Technologies course, while the course that they think will be the most useful is the Classroom Management course. In addition, it is observed that Introduction to Education and Instructional Technologies courses are statistically significantly lower than the mean of values, and Classroom Management and Teaching Practices (I and II) courses are statistically significantly higher than the mean of values. Educational Psychology, Teaching Principles, Methods, Measurement, Evaluation, and Special Teaching Methods courses do not differ statistically significantly from the mean values. Table 5 gives the values of worth, standard error, z-value, and significance calculated for each stimulus when the first stimulus is taken as a reference (It was not calculated for this system because the Introduction to Education course was taken as a reference).

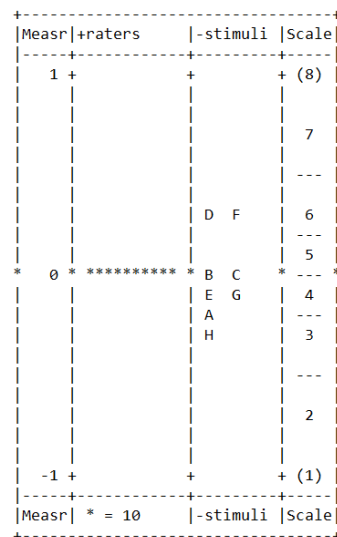
**Table 5: Value, standard error, z-value, and significance values calculated when the first stimulus is referenced (PLM\_1)**

	Worth	Std..Error	z	p
Introduction to Education (A)	NA	NA	NA	NA
Educational Psychology (B)	0.540093	0.168824	3.199146	0.001378
Teaching Principles and Methods (C)	0.768925	0.171223	4.490785	0.000007
Classroom Management (D)	1.302245	0.17619	7.39112	0.000000
Measurement and Evaluation (E)	0.378987	0.172769	2.193612	0.028263
Teaching Practices (I and II) (F)	1.164565	0.182648	6.375995	0.000000
Special Teaching Methods (G)	0.49366	0.172498	2.861834	0.004212
Instructional Technologies (H)	-0.03025	0.177226	-0.1707	0.864463

According to Table 5, the lowest worth belongs to the Instructional Technologies course, and the highest belongs to the Classroom Management course. Similar to the previous findings, it is seen that the course that students think will be the least useful for their professional lives is the Instructional Technologies course. In contrast, the course that they think will be the most useful is the Classroom Management course. It is observed that the worth of Educational Psychology, Teaching Principles and Methods, Classroom Management, Measurement and Evaluation, Teaching Practices (I and II), and Special Teaching Methods courses is statistically significantly higher than the worth of the Introduction to Education course. The worth of the Instructional Technologies course does not differ statistically significantly from the worth of the Introduction to Education course.

### *The findings of Many Facet Rasch Model*

Before the data analysis with MFRM, the ratio of unexpected results or extreme values was examined in order to assess the model data fit. The ratio of unexpected results or extreme values outside the range of  $\pm 2$  and  $\pm 3$  by Linacre (2014) should be less than 5% and 1%, respectively. When the analysis results are examined, the rate of those outside the range of  $\pm 2$  is 3.25%, and those outside the range of  $\pm 3$  is 0.00%. Accordingly, model data fit is provided for analysis with MFRM. Figure 1 shows the data calibration map obtained as a result of analyzing the judgments related to the ranking of eight courses by 100 raters.



**Figure 1: Data calibration map<sup>1</sup>**

In the data calibration map, the columns contain information about the facets. As you go down from top to bottom in the rater column, the strictness of the raters increases. The stimuli column shows that stimulants' preference order increases as they go down from top to bottom. In other words, the

<sup>1</sup> A=Introduction to Education, B=Educational Psychology, C=Teaching Principles and Methods, D=Classroom Management, E=Measurement and Evaluation, F=Teaching Practices (I and II), G=Special Teaching Methods, H=Instructional Technologies.

preference rates decrease. The data calibration map shows that all raters have the same rigidity/generosity on the rater facet (All raters rated from 1 to 8 when rating the stimuli). On the stimuli facet, it shows that stimulus-D (Classroom Management) and stimulus-F (Teaching Practices (I and II)) are most preferred compared to other stimuli, and stimulus-H (Instructional Technologies) is preferred the least compared to other stimuli.

In Figure 2, the analysis results regarding the ranking of the stimuli by the raters are shown. The logit value of stimulus-F is 0.30; the logit value of the stimulus-D is 0.27, and the logit value of the stimulus-H is -0.28.

Total Score	Total Count	Obsvd Average	Fair-M Average	Model Measure	S.E.	Infit MnSq	ZStd	Outfit MnSq	ZStd	Estim. Discrm	Correlation PtMea	PtExp	N stimulus
313	100	3.13	3.13	.30	.05	1.65	4.2	1.65	4.2	.86	.00	.00	F
325	100	3.25	3.25	.27	.05	.75	-2.1	.75	-2.1	1.06	.00	.00	D
428	100	4.28	4.28	.04	.05	.68	-3.8	.68	-3.8	2.83	.00	.00	C
447	100	4.47	4.47	.00	.05	1.04	.4	1.04	.4	.39	.00	.00	B
477	100	4.77	4.77	-.06	.05	.82	-2.0	.82	-2.0	1.78	.00	.00	G
501	100	5.01	5.01	-.11	.05	.79	-2.3	.79	-2.3	1.33	.00	.00	E
531	100	5.31	5.31	-.17	.05	1.39	3.3	1.39	3.3	.76	.00	.00	A
578	100	5.78	5.78	-.28	.05	1.01	.1	1.01	.1	1.00	.00	.00	H
450.0	100.0	4.50	4.50	.00	.05	1.02	-.3	1.02	-.3		.00		Mean (Count: 8)
87.4	.0	.87	.88	.19	.00	.32	2.7	.32	2.7		.00		S.D. (Population)
93.5	.0	.93	.94	.20	.00	.34	2.9	.34	2.9		.00		S.D. (Sample)

Model, Populn: RMSE .05 Adj (True) S.D. .18 Separation 3.88 Strata 5.50 Reliability .94  
Model, Sample: RMSE .05 Adj (True) S.D. .20 Separation 4.16 Strata 5.88 Reliability .95  
Model, Fixed (all same) chi-square: 117.0 d.f.: 7 significance (probability): .00  
Model, Random (normal) chi-square: 6.6 d.f.: 6 significance (probability): .36

A=Introduction to Education, B=Educational Psychology, C=Teaching Principles and Methods, D=Classroom Management, E=Measurement and Evaluation, F=Teaching Practices (I and II), G=Special Teaching Methods, H=Instructional Technologies.

**Figure 2: The results of the analysis of the order of stimulants by the raters**

When Figure 2 is examined, stimulus-F (Teaching Practices (I and II)) and stimulus-D (Classroom Management) were preferred the most, and stimulus-H (Instructional Technologies) and stimulus-A (Introduction to Education) were preferred the least. The separation ratio calculated for the stimulus facet, the reliability coefficients between 3.88 and 0.94, and the chi-square statistics being significant ( $X^2=117.00$   $sd=7$ ,  $p<0.05$ ) show that the stimuli are differentiated from each other at a statistically significant level.

**Table 6: Rankings obtained according to ROJS, PLM, and MFRM**

	ROJS		MFRM		PLM_M		PLM_I	
1.	F	0.000	F	0.300	D	0.725	A	NA
2.	D	0.026	D	0.270	F	0.587	D	1.302
3.	C	0.392	C	0.040	C	0.192	F	1.165
4.	B	0.440	B	0.000	B	-0.037	C	0.769
5.	G	0.519	G	-0.060	G	-0.084	B	0.540
6.	E	0.611	E	-0.110	E	-0.198	G	0.494
7.	A	0.713	A	-0.170	A	-0.577	E	0.379
8.	H	0.885	H	-0.280	H	-0.608	H	-0.030

A=Introduction to Education, B=Educational Psychology, C=Teaching Principles and Methods, D=Classroom Management, E=Measurement and Evaluation, F=Teaching Practices (I and II), G=Special Teaching Methods, H=Instructional Technologies, NA= No Answer.

When TTable 6 is examined, in ROJS and MFRM models, stimulus-F (Teaching Practices (I and II)) was preferred the most, and stimulus-H (Instructional Technologies) was preferred the least. In PLM models, stimulus-D (Classroom Management) was preferred the most, and stimulus-H (Instructional Technologies) was preferred the least.



## DISCUSSION AND RESULTS

This research aims to compare the findings obtained from the ROJS, PLM, and MFRM methods, which are often used in analyzing rank-ordered data. For this purpose, the raters were asked to rank the pedagogical formation courses they took during their undergraduate education in the form of the course that they thought would be the most useful in their professional lives and the course that would be the least useful. When the obtained data were analyzed according to the ROJS, PLM, and MFRM, it was found that the course considered the least useful and the least preferred course was the Instructional Technologies course. In future studies, studies can be conducted to investigate why students prefer the "classroom management" course or the "teaching practice" course.

It was found that the most preferred course that was considered by the raters was Teaching Practice (I and II) courses in MFRM and ROJS, while Classroom Management courses were found to be in PLM. As can be seen in Table 1, the reason for this difference is that although Teaching Practice (I and II) courses were preferred by many raters in the first place, they were not preferred in the 2nd, 3rd, 4th, and 5th ranks. Although the raters who prefer the Classroom Management course in the first place are relatively few, the number of raters who prefer it in the 2nd, 3rd, 4th, and 5th places is high. This may be why the classroom management course is in the first place while the teaching practice course is in the second place in PLM. All other courses except the first-ranked course were sorted in the same way in all models, and the scale values in ROJS, logit values in MFRM, and worth in PLM were obtained similarly. In this case, it can be said that the analysis results of all three models are similar.

Like the findings obtained in this study, the logit values calculated in the Rasch analysis and scale values calculated in the ROJS analysis made by Wainer et al. (1978) were close to each other. In addition, a study conducted by Güler et al. (2018) found that the scale values obtained by the scaling method based on binary comparisons and the logit values obtained from MFRM were similar. Similar studies in the literature also support the finding obtained from this study that different methods yield similar results. It can be said that the reason why similar results were obtained in the MFRM and ROJS models in this study and the existing studies in the literature is that both models perform analyses in a single stage, and the order in which a stimulus is selected is included in the analysis with equal probability.

Based on the research findings, comparable results will be obtained when all three models are used to analyze bank-ordered data. Although all three models give comparable results, there are some advantages and disadvantages. Although using the Microsoft Office Excel program to analyze the data with the ROJS method makes it easier for researchers to access the program, the formulas must be rewritten each time to analyze the data. In order to analyze the data with MFRM, it is performed with the FACET program developed by Linacre (2014) or the R package prepared by Robitzsch et al. (2022), and the analyses are performed via syntax. In order to analyze the data with PLM, it is performed with the PlacketLuce R package developed by Turner et al. (2021). While the significance of the differences between the stimuli cannot be evaluated in ROJS and MFRM, the significance of the stimuli according to the mean and the 1<sup>st</sup> stimulus can be assessed in PLM. In addition, in PLM, it can also be determined whether there is a difference between one stimulus and another. For this purpose, one of the two stimulants to be evaluated should be determined as a reference and analyzed. Researchers should consider the advantages and disadvantages of the models when using these models.

**Conflicts of Interest:** No potential conflict of interest was declared by the authors.

**Funding Details:** This study was not supported by any funding agency

**CRedit Author Statement:** The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

**Ethical Statement:** Ethical permission was taken from the Sakarya University Educational Research and Publication Ethics Committee. 15.02.2023 and numbered E-61923333-050.99-222305

## REFERENCES

Albayrak-Sarı, A. & Gelbal, S. (2015). İkili karşılaştırmalar yargılarına ve sıralama yargılarına dayalı ölçekleme yaklaşımlarının karşılaştırılması [A comparison of scaling procedures based on pair-wise comparison and rank-order judgments scaling]. *Journal of Measurement and Evaluation in Education and Psychology*, 6(1), 126-141. <http://dx.doi.org/10.21031/epod.30288>.

Altun, A. & Gelbal S. (2014). Öğretmenlerinin kullandıkları ölçme ve değerlendirme yöntem veya araçlarının ikili karşılaştırma yöntemiyle belirlenmesi [Determining teachers' measurement tools or techniques via pair-wise comparison method]. *Eğitimde ve Psikolojide Ölçme ve Değerlendirme Dergisi*, 2(2), 200-209. <https://doi.org/10.21031/epod.09064>.

Anıl, D. & Güler, N. (2006). İkili karşılaştırma yöntemi ile ölçekleme çalışmasına bir örnek [An example of the scaling study by pair-wise comparison method]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 30, 30-36. <http://efdergi.hacettepe.edu.tr/yonetim/icerik/makaleler/722-published.pdf>.

Bal, Ö. (2011). Seviye Belirleme Sınavı (SBS) başarısında etkili olduğu düşünülen faktörlerin sıralama yargıları kanunuyla ölçeklenmesi. *Eğitimde ve Psikolojide Ölçme ve Değerlendirme Dergisi*, 2(2), 200-209. <https://dergipark.org.tr/tr/download/article-file/65975>.

Ekinci, A., Bindak, R. & Yıldırım, C. (2012). İlköğretim okulu yöneticilerinin öğretmenlerin mesleki sorunlarına empatik yaklaşımlarının ikili karşılaştırmalar metodu ile incelenmesi [A research regarding the empathic approaches of school managers about professional problems of teachers by pairwise comparisons method]. *Gaziantep Üniversitesi Sosyal Bilimler Dergisi*. 11(3), 759-776. <https://dergipark.org.tr/tr/download/article-file/223316>.

Farrokhi, F., & Esfandiari, R. (2011). A many-facet Rasch model to detect halo effect in three types of raters. *Theory and Practice in Language Studies*, 1(11), 1531-1540. <http://dx.doi.org/10.4304/tpls.1.11.1531-1540>

Finch, H.. (2022). An introduction to the analysis of ranked response data. *Practical Assessment, Research & Evaluation*, 27(7), 1-20. <https://scholarworks.umass.edu/pare/vol27/iss1/7/>

Güler, N., İlhan, M. & Taşdelen-Teker, G. (2018). İkili karşılaştırmalarla ölçekleme yöntemi ile Rasch analizinden elde edilen ölçek değerlerinin karşılaştırılması [Comparing the scale values obtained from pairwise comparison scaling method and rasch analysis]. *İnönü Üniversitesi Eğitim Fakültesi Dergisi*, 19(1), 31-48. <http://dx.doi.org/10.17679/inuefd.400386>.

İlhan, M. (2016). A comparison of the results of many-facet Rasch analyses based on crossed and judge pair designs. *Educational Sciences: Theory & Practice*, 16(2), 579-601. <http://dx.doi.org/10.12738/estp.2016.2.0390>.

Kan, A. (2008). Yargıcı kararlarına dayalı ölçekleme yöntemlerinin karşılaştırılması üzerine ampirik bir çalışma [A comparison of scaling methods based on judge decisions: an empirical study]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 35, 186-194. <http://www.efdergi.hacettepe.edu.tr/yonetim/icerik/makaleler/552-published.pdf>.

Kijewska, K., França, J. G. C. B., de Oliveira, L. K., & Iwan, S. (2022). Evaluation of urban mobility problems and freight solutions from residents' perspectives: a comparison of Belo Horizonte (Brazil) and Szczecin (Poland). *Energies*, 15(3), 710. <https://doi.org/10.3390/en15030710>.

Knoch, U., & McNamara, T. (2015). Rasch analysis. In L. Plonsky, (Ed.), *Advancing quantitative methods in second language research* (pp. 275–304). Routledge.

Koçak, D. & Çokluk-Bökeoglu, Ö. (2021). Üniversite Tercih Nedenlerinin İkili Karşılaştırma ve Sıralama Yargıları Yöntemleri ile Ölçeklenmesi [Scaling university preferences with pair-wise comparison method and rank-order judgments method]. *MANAS Sosyal Araştırmalar Dergisi*, 10(3), 1580-1591 . DOI: <https://doi.org/10.33206/mjss.874504>

Linacre, J. M. (1994). *Many-Facet Rasch Measurement*. Chicago: Mesa Press.

Linacre J. M. (2006). Rasch Analysis of Rank-Ordered Data. *Journal of Applied Measurement*, 7(1), 129-136. <https://pubmed.ncbi.nlm.nih.gov/16385155/>.

Linacre, J. M. (2014). A user's guide to FACETS Rasch-model computer programs. <http://www.winsteps.com/a/facets-manual.pdf>

Özer, Y. & Acar, M. (2011). Öğretmenlik mesleği genel yeterlikleri üzerine ikili karşılaştırma yöntemiyle bir ölçekleme çalışması. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi*, 3(40), 89-101.

Robitzsch, A., Kiefer, T., & Wu, M. (2022). TAM: Test Analysis Modules. R package version 4.1-4, <https://CRAN.R-project.org/package=TAM>.

Sarıdaş, G. & Nayir, F. (2021). Kültürel değerlere duyarlı öğretmen özelliklerinin sıralama yargılarıyla ölçeklenmesi [Scaling Culturally responsive teacher characteristics with ranking judgments]. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 53, 355- 377. <https://doi.org/10.9779.pauefd.827009>.

Shakir, M. K. M., Brooks, D. I., McAninch, E. A., Fonseca, T.L., Mai, V. Q., Bianco, A. C. & Thanh, D. H. (2021). Comparative effectiveness of levothyroxine, desiccated thyroid extract, and levothyroxine+liothyronine in hypothyroidism. *The Journal of Clinical Endocrinology & Metabolism*, 106(11). <https://doi.org/10.1210/clinem/dgab478>.

Turner, H., Kosmidis, I., Firth, D., & van Etten, J. (2021). Modelling rankings in R: The Plackettluce package. *Computational Statistics*, 35, 1027-1057. <https://doi.org/10.1007/s00180-020-00959-3>.

## Teaching Sequential Text Writing at Primary School by Using the Read-to-Write Strategy

Ömer Erbasan<sup>i</sup>  
Trakya University

### Abstract

The number of informative books and their content variety is increasing. Today, students are exposed to informative texts more than ever before. Some learning outcomes in the Turkish Language Curriculum encourage students to discover the differences between text types and to write informative texts. This curriculum also recommends the inclusion of various types of informative text in the coursebooks. Yet, the number of studies on the development of informative text writing skills in Turkey is quite limited, and the need for research to help support students' ability to write informative texts is clear. As such, the present study was conducted to determine the effectiveness of the "read-to-write" strategy, which is an informative text writing strategy, in teaching primary school students to write sequential informative texts. Applying the quasi-experimental method with pre-test post-test control group, the study was carried out in a village primary school in Afyonkarahisar. 33 primary school third grade students, 17 in the experimental group and 16 in the control group, participated in the study. The implementation of the research continued for 5 weeks and took 15 course hours. Before and after the intervention, the students were instructed to write sequential texts. A rubric prepared by Clark and Neal (2018) was used to collect the data. The six-item scoring key revealed the quality of the written texts. The collected data were analyzed with the help of a data analysis program using dependent samples t-test and independent samples t-test. The results clearly show that the read-to-write strategy is effective in writing sequential text type texts. After the intervention, the average of the scores of the students in the experimental group in which the read-to-write strategy was used increased significantly compared to the pre-intervention whereas no significant difference could be identified in the mean scores of the informative texts written by the students in the control group before and after the intervention. Finally, based on the research findings, various implications and suggestions are presented for educators and researchers.

**Keywords:** Read-to-Write Strategy, Informative Text, Writing, Primary School

**DOI:** 10.29329/ijpe.2023.603.2

**Submitted:** 18/08/2023

**Accepted:** 11/09/2023

**Published:** 16/10/2023

---

<sup>i</sup> Ömer Erbasan, Faculty of Education, Trakya University, ORCID: 0000-0001-7852-2747

**Email:** omererbasan@trakya.edu.tr

## INTRODUCTION

Reading and writing are among the key fundamental skills that should be acquired by primary school students, as these skills form the basis of others. A student's success in reading and writing is a predictor of his/her success at school as well (Kızgın & Baştuğ, 2020; Yılmaz, 2011), and therefore, a student who is successful in reading and writing can be expected to be successful in other subjects as well.

The Turkish Language Curriculum (2019a) is structured in such a way that it includes knowledge, skills and values to help students acquire the habit of reading and writing, by instilling love of the Turkish language in them. Thus, a great deal of effort and time is spent in primary school to help students acquire reading and writing skills. In the 30-hour primary school weekly curriculum, Turkish lessons are planned for 10 hours a week in the 1st and 2nd grades, and 8 hours in each of the 3rd and 4th grades (MEB, 2021). However, recent research findings indicate that the intended outcome levels in primary school reading and writing are not achieved (Erbaşan, 2022; Ergen & Batmaz, 2019). According to the 2018 PISA results, Turkey fell behind the average of OECD countries with 466 points in reading comprehension (MEB, 2019b). However, to date, no national study aiming to determine the literacy status of students has been conducted.

Writing is a complex skill to develop (Graham, 2006), as it requires a large number of cognitive processes (Graham, Berninger, & Abbott, 2012). It is a difficult skill for students to practice as it includes many other skills such as reading, thinking and expressing (Ungan, 2007). Being able to write effectively can be difficult for many children (Graham, Harris, & Mason, 2005), and thus, writing practices should not be limited to the first literacy teaching and should be developed from an early age. Since it is critical for academic and professional success, writing education should be given due importance from an early age.

### **What should primary school students write?**

Text types are generally classified into 3 main groups as narrative, informative, and poetry. According to the Turkish Language Curriculum (2019a), primary school students are expected to write texts in all these three types, with the acquisition of "writing a poem" appearing in the 2nd grade for the first time, "writing a narrative text" in the 3rd grade for the first time, and "writing an informative text" in the 4th grade for the first time. This official curriculum states that one hour a week should be devoted to writing practice in the Turkish course under the heading "Writing exercises at the 3rd and 4th grade levels" (MEB, 2019a: 14). Although very little time is allocated for writing study in the program, inclusion of learning outcomes in all text types is helpful. However, whether enough work is done to improve the writing skills of students in all text types at the primary school level is a question that begs an answer.

Although no national study could be found that reveals how much time is devoted to writing practice at primary school level or which text type is highlighted as important, research shows that narrative, rather than informative texts are paid attention in primary schools (Erbaşan, 2022). Duke's (2000) research revealed that very little attention is given to informative texts at early ages. After the publication of this study, the number of studies demonstrating the importance of teaching informative texts at an early age has increased (Jeong, Gaffney, & Choi, 2010; Moss & Newton, 2002; Ness, 2011). Duke (2000) revealed that first graders spend only 3.6 minutes a day on informative texts, which falls below 2 minutes in schools with low socio-economic level. Further, Yopp (2006) found that until the third grade, reading activities in primary school are mostly carried out with narrative texts.

Students should be exposed to informative texts at an early age to gain familiarity with informative texts that are more prominent in upper grades (Moss, 2005). The idea that students do not prefer informative texts at an early age is not supported by research. On the contrary, Smolkin and Donovan (2003) found that especially boys are interested in informative books at an early age. Many

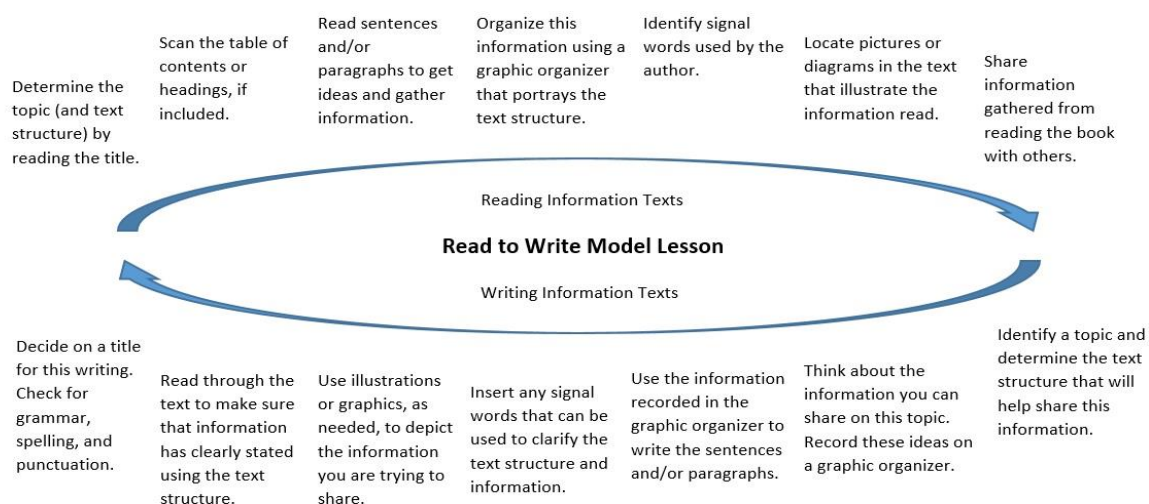
studies have revealed that students prefer informative texts at an early age (Duke & Kays, 1998; Duke & Tower, 2004; Filipenko, 2004; Smolkin & Donovan, 2003; Yopp & Yopp, 2006).

Informative texts are generally classified into five groups (description, chronological order, comparing and contrasting, cause-effect relationship, and problem solving) (Akyol, 2020), whose structures have some variation. For example, there are certain sets of words that can be associated with each text structure. For the chronological order type informative texts, words such as “firstly”, “later”, “later” and “finally” can be given as examples of sequence words. Research indicates that informative text structures and sequencing words should be taught to students from an early age (Clark, Jones, & Reutzell, 2013; Reutzell, Jones, & Clark, 2016; Duke & Pearson, 2002; Williams, Hall & Lauer, 2004; Williams et al. , 2007).

The number of studies on instructional text teaching in Turkey is rather low. Kana and Şener (2021) conducted an action research in which they taught secondary school students the structural features of informative texts. Beydoğan (2011) found out that mental preparation supported by mind map increases the quality of informative texts of university students. Another study concluded that the cooperative learning method improved the informative text writing skills of secondary school students (Ercan, 2019). However, no study aimed at teaching chronological order type informative texts could be detected. The structure of informative texts in the comparing-contrasting, cause-effect relationship and problem-solving type is more challenging than the chronological order type. In the teaching of informative texts, the ordering type texts are easier due to their structure for the primary school period. For this reason, employing the read-to-write strategy, this study aimed to develop primary school students' ability to write chronological order type informative texts.

### Read-to-write strategy

The read-to-write strategy is used to teach primary school students to write an ordering-type informative text (Clark & Neal, 2018). As can be seen in Figure 1, the strategy is structured in two stages as reading and writing. The reading phase can be considered as the phase of recognizing the structural features of informative texts. At this stage, students read the titles of the texts and try to determine the subject of the text, and what type of text it is. The contents of the book and the titles in the text, if any, are examined. While reading the book, the structure of the text is visualized with the help of a graphic organizer. Since the text to be read is in the ordering (sequencing) type, the sequence words in the text are identified. If available, the images and graphics in the text are examined as well. Finally, the information collected while reading the book is shared with other students.



**Figure 1. The Read-To-Write Circular Strategy (Clark & Neal, 2018).**

The implementation steps of the writing phase, which is the second phase of the strategy, are designed as the opposite of those of the reading phase. Before students write their texts, they determine the subject and text structure they will write. They save the information about the subject they have determined in a graphic organizer. They convert the information recorded in the graphic organizer into sentences and paragraphs. They use sequence words to order their sentences and paragraphs. They use graphics or images to clarify information. To ensure that the information about the subject discussed in the text is clearly presented, they read the text from beginning to end and make the necessary corrections. They decide on a suitable title for their text. Finally, they check the text for grammar, spelling, spelling and punctuation.

## METHOD

### Research design

This study, conducted to determine the effectiveness of the read to write strategy in teaching primary school students to write ordering-type informative texts, was carried out with a quasi-experimental design with pre-test post-test control group.

### Study Group

The research was carried out with 33 third grade students studying in a village primary school in the city of Afyonkarahisar. One of the two equivalent classes in the school was determined by drawing lots, and assigning one as the experimental group and the other as the control group. Information about the study group is presented in Table 1.

**Table 1. Demographics of the study group**

Group	Boy	Girl	Total
Experimental	8	9	17
Control	8	8	16

There were 17 students in the experimental group and 16 students in the control group. Participation in the research was voluntary.

### Intervention process

The intervention process of the research had 3 steps: pre-intervention, strategy implementation, and post-intervention.

Before the intervention, the students in the experimental and control groups were asked to write ordering-type informative texts with their current knowledge. For this, students were presented with two options, and they were asked to choose one of these options and write their texts within 20 minutes. The options offered were as follows:

1. Write about how you get ready for school.
2. Write about how a game you like is played.

While the students were writing their texts, no support was given by the teacher and they were asked to do their best with their current knowledge.

The implementation of the read to write strategy took 5 weeks, 3 hours a week, and a total of 15 course hours. It was carried out according to the read-to-write circular strategy shown in Figure 1.

After the intervention, the pre-intervention procedure was repeated. At the end, the students were asked to write a text about the other subject they did not write about before the intervention. The students were not supported by the teacher during writing.

### Data Collection Tools

A rubric prepared by Clark and Neal (2018) was used to collect data.

**Table 2. Informative text rubric**

Item	Criterion	Score
Sequence Words Indicating Text Structure: The student uses sequence words to indicate the order in the text. For example first, second, next, then and last.	Five or more sequence words were used.	5
	Four sequence words were used.	4
	Three sequence words were used.	3
	Two sequence words were used.	2
	One sequence word were used.	1
	No sequence word was used.	0
		X.30
Number of words: The student uses this number of words in his/her text.	51 or more words were written.	5
	40-49 words were written.	4
	30-39 words were written.	3
	20-29 words were written.	2
	10-19 words were written.	1
	0-9 words were written.	0
		X.20
Uses capital letters at the beginning of a sentence.	Yes	5
	No	0
		X.10
Uses punctuation at the end of the sentence.	Yes	5
	No	0
		X.10
Uses an introductory sentence.	Yes	5
	No	0
		X.15
Uses a concluding sentence.	Yes	5
	No	0
		X.15

As can be seen in Table 1, there are six items in the rubric. The use of sequence word item in the rubric is important in showing how ordering-type informative texts are organized. Although the number of words used does not exactly show the quality of the text, it is still an important predictor. The weights of the items are as follows: the use of sequence words (30%), the number of words (20%), the use of capital letters at the beginning of the sentences (10%), the use of punctuation at the end of the sentence (10%), the use of introductory sentences (15%), and the use of concluding sentences (15%).

### Data Analysis

The SPSS data analysis program was used in the analysis of the scores. The normality of the distribution of the data was determined by looking at the Shapiro-Wilk values since the number of observations was below 30. The normality was interpreted by looking at the skewness and kurtosis values of the distribution of the data, and the distribution of the pretest, posttest and posttest-pretest scores of the groups was determined to be normal. The skewness and kurtosis coefficients of the data in the study are between +1 and -1. Morgan, Leech, Gloeckner, and Barret (2004: 49) state that values between +1 and -1 for the skewness coefficient can be accepted as a measure of normal distribution.

Since the distribution of the data was normal, the independent samples t-test was used to compare the pre-test and post-test scores, and the dependent samples t-test (paired) was used to



determine whether there was a significant difference between the pre-test and post-test scores of the same group.

## RESULTS

In the current research conducted to determine the effectiveness of the read-to-write strategy in teaching ordering-type informative text writing, the informative text writing skills of the experimental and control groups were measured with a rubric before the intervention. In Table 3, the pre-intervention scores of the experimental and control groups are presented.

**Table 3. Pre-intervention average scores**

Group	Student	Sequence words indicating text structure	No. of words	Capitalization of sentences	Punctuation	Introductory sentence	Concludi ng sentence	Total
Experimental	1	0,3	0,4	0	0,5	0	0	1,2
	2	0,9	0,4	0,5	0,5	0	0	2,3
	3	0,6	0,4	0	0	0,75	0,75	2,5
	4	0	0,2	0	0	0	0	0,2
	5	0,6	0,4	0,5	0,5	0	0,75	2,75
	6	1,2	0,6	0,5	0	0,75	0,75	3,8
	7	0,3	0,4	0,5	0	0	0	1,2
	8	0,9	0,6	0	0,5	0	0	2
	9	0,6	0,2	0	0	0	0	0,8
	10	0,9	0,6	0,5	0	0,75	0,75	3,5
	11	0,6	0,6	0	0	0	0	1,2
	12	1,2	0,8	0,5	0,5	0,75	0,75	4,5
	13	0,9	0,6	0	0,5	0	0,75	2,75
	14	0,3	0,4	0	0,5	0	0	1,2
	15	0	0	0,5	0	0	0	0,5
	16	0,6	0,4	0	0,5	0,75	0	2,25
	17	0	0,2	0,5	0	0	0	0,7
	Mean	0,58	0,42	0,23	0,23	0,22	0,26	1,96
Control	1	0,6	0,4	0,5	0	0,75	0	2,25
	2	0,3	0,2	0	0	0	0	0,5
	3	0,9	0,4	0,5	0,5	0,75	0,75	3,8
	4	0,6	0,4	0	0,5	0	0	1,5
	5	0,3	0,2	0,5	0	0,75	0	1,75
	6	0,9	0,4	0,5	0	0,75	0	2,55
	7	0,6	0,2	0	0	0	0,75	1,55
	8	0	0	0,5	0,5	0,75	0	1,75
	9	0,6	0,4	0,5	0	0	0	1,5
	10	1,2	0,8	0,5	0,5	0,75	0,75	4,5
	11	0,6	0	0	0	0	0	0,6
	12	0,3	0,2	0,5	0	0,75	0	1,75
	13	0,9	0,2	0,5	0	0	0	1,6
	14	0,9	0,4	0,5	0,5	0,75	0	3,05
	15	0,6	0	0	0	0	0	0,6
	16	0,3	0,2	0,5	0	0,75	0	1,75
	Mean	0,6	0,27	0,34	0,15	0,42	0,14	1,93

As shown in Table 3, the mean score of the experimental group was 1.96 and the mean score of the control group was 1.93 before the intervention. Considering that the scoring is done out of 5, it can be said that the students' ability to write informative texts was not sufficient. Examining the criteria, it is observed that the students do not use the sequence words in their texts enough, they write short texts, there are problems in starting the sentence with a capital letter and using punctuation marks at the end of the sentence, and the introductory sentence and the conclusion sentence are not used often enough in the texts. The results of the independent sample t-test performed to determine any significant difference between the mean scores of the experimental group and the control group are presented in Table 4.

**Table 4. Pre-intervention independent sample t-test results**

	Group	N	Mean	S	sd	t	p
Pretest	Exp.	17	1,96	1,23	31	,059	,953
	Control	16	1,93	1,10			

As can be seen in Table 4, the t-test revealed no significant difference between the mean scores of the informative texts of the groups before the intervention ( $p>0,05$ ). Therefore, the groups were equivalent to each other before the intervention.

During the intervention, the informative text writing activities were carried out by applying the read-to-write strategy with the experimental group while this strategy was not used in the control group. When the intervention was completed, informative texts were written by both groups and their levels were measured by using a rubric. In Table 5, the average scores of both groups after the intervention are presented.

**Table 5. Post-intervention average scores**

Group	Student	Sequence words indicating text structure	No. of words	Capitalization of sentence	Punctuation	Introductory sentence	Concluding sentence	Total
Experimental	1	0,9	0,8	0,5	0,5	0,75	0,75	4,2
	2	0,9	0,6	0,5	0,5	0,75	0	3,25
	3	0,9	0,8	0,5	0,5	0,75	0,75	4,2
	4	0,6	0,4	0	0	0	0,75	1,75
	5	1,2	0,6	0,5	0,5	0,75	0,75	4,3
	6	1,5	1	0,5	0,5	0,75	0,75	5
	7	0,9	0,6	0,5	0,5	0,75	0	3,25
	8	1,5	0,8	0,5	0,5	0,75	0,75	4,8
	9	0,9	0,6	0,5	0	0	0	2
	10	1,2	0,8	0,5	0,5	0,75	0,75	4,5
	11	1,2	0,8	0,5	0,5	0,75	0,75	4,5
	12	1,5	1	0,5	0,5	0,75	0,75	5
	13	1,2	0,8	0,5	0	0,75	0,75	4
	14	0,9	0,6	0,5	0,5	0	0,75	3,25
	15	0,6	0,6	0,5	0	0,75	0	2,45
	16	0,9	0,6	0,5	0,5	0	0,75	3,25
	17	0,6	0,6	0	0,5	0,75	0,75	3,2
	Mean	1,02	0,70	0,44	0,38	0,57	0,57	3,7
Control	1	0,6	0,6	0,5	0,5	0,75	0	2,95
	2	0,3	0,2	0	0	0	0	0,5
	3	0,9	0,6	0,5	0,5	0,75	0,75	4
	4	0,6	0,4	0	0,5	0	0	1,5
	5	0,3	0,2	0,5	0,5	0,75	0	2,25
	6	0,6	0,4	0,5	0	0	0	1,5
	7	0,6	0,2	0	0	0	0,75	1,55
	8	0	0	0,5	0,5	0,75	0	1,75
	9	0,3	0,2	0	0	0	0	0,5
	10	1,2	0,8	0,5	0,5	0,75	0,75	4,5
	11	0,6	0,2	0	0	0	0	0,8
	12	0,6	0,2	0	0	0,75	0	1,55
	13	0,9	0,4	0,5	0	0,75	0	2,55
	14	0,9	0,4	0,5	0,5	0,75	0,75	3,8
	15	0,6	0,2	0	0	0	0	0,8
	16	0	0,2	0,5	0	0,75	0	1,45
	Mean	0,5625	0,325	0,28125	0,21875	0,421875	0,1875	1,99

As can be seen in Table 5, the average score of the experimental group after the intervention was 3.7, and the mean score of the control group was 1.99. In addition, the students in the

experimental group are observed to show improvement in all criteria compared to the pre-intervention. While the number of sequence words increased in the post-intervention texts of the experimental group students, the number of words they used in their texts also increased. In addition, there is improvement in using sentence-initial capital letters, using end-of-sentence punctuation marks, and using introductory and concluding sentences. The results of the independent sample t-test performed to determine whether there was a significant difference between the mean scores of the experimental group and the control group are presented in Table 6.

**Table 6. Post-intervention independent sample t-test results**

	Group	N	Mean	S	sd	t	p
Post test	Experimental	17	3,70	1,00	31	4,329	,000
	Control	16	1,99	1,24			

As can be seen in Table 6, the t-test performed shows a significant difference in favor of the experimental group regarding the informative text writing scores after the intervention ( $p < 0,05$ ). The results of the dependent samples t-test regarding the difference between the mean scores of the groups before and after the intervention are presented in Table 7.

**Table 7. Comparison of intra-group mean scores**

Group	Post test – Pre test	N	X	S	sd	t	p
Experimental	Pre test	17	1,96	1,23	16	9,015	,000
	Post test	17	3,70	1,00			
Control	Pre test	16	1,93	1,10	15	,434	,671
	Post test	16	1,99	1,24			

As can be seen in Table 7, there is a significant difference between the score averages of the students in the experimental group before and after the intervention in favor of the post-intervention ( $p < 0,05$ ). No significant difference could be found between the mean scores for the informative texts written by the students in the control group before and after the intervention ( $p > 0,05$ ).

Considering these results holistically, it was concluded that the read-to-write strategy was effective in teaching ordering-type informative text writing.

## DISCUSSION, CONCLUSION AND SUGGESTIONS

This study was conducted to determine the effectiveness of the read-to-write strategy in teaching primary school students to write ordering-type informative texts. Based on the results obtained by the research, it was concluded that the strategy was effective in teaching informative text writing. In the informative texts of the students in the experimental group, improvements were observed in the number of sequence words, the total number of words, the number of capital letters used at the beginning of sentences, the number of introductory and concluding sentences, and the use of punctuation marks. This is significant in terms of showing that students can write better texts when sample texts are shown to them, and the characteristics of the type of writing expected from them are clearly presented. Relevant research also points at the necessity of modeling and using strategies, especially when students write in unusual genres (Clark & Neal, 2018; De La Paz, Owen, Harris, & Graham, 2000; Helsel & Greenberg, 2007).

Several factors can be said to influence children's ability to produce high-quality texts. Particularly when working with younger age groups, one of the most crucial factors among these is serving as a model to them. The finest model for good writing is, in fact, a well-crafted text. Students find it easier to understand what is expected of them through texts. Through excellent texts, students can grasp what constitutes a good text, the elements that make these texts proficient, the preferred sequencing words, how punctuation marks are utilized, and how introductory and concluding

sentences are written (Clark & Neal, 2018). Students encounter informative texts less frequently compared to stories (Raby, 2006). Consequently, they require more exposure to exemplary texts in order to write well. It can be argued that the read-to-write strategy is effective in this regard. Jam and Shahin (2012) state that this strategy brings forth prior knowledge, establishes a background, and focus attention. Indeed, prior knowledge about the topic to be written and familiarity with keywords related to a text often lead to more successful writing.

Reviewing the research literature on the read-to-write strategy, it is clear that most research supports our findings. Clark and Neal (2018) also found that this strategy improves the quality of the texts written by learners. Rosmawan (2016) used the reading strategy for writing, and also concluded that the strategy improves the composition writing skills of 8th grade students.

Our findings also indicate that when adequate guidance is provided and effective strategies are used, children can write high-quality informative texts even at the primary school level. In the past, while the thought that students could not write informative texts at an early age was common (Wollman-Bonilla, 2000), research conducted in the 2000s revealed that this was not true. Smolkin and Donovan (2003) state that especially boys are interested in informative books at an early age. In their study with primary school students, Kletzien and Szabo (1998) found that contrary to what teachers think, children prefer informative books to read when given the chance to choose, as much as stories. Many other studies have also revealed that students can write informative texts at an early age when they are guided (Donovan, 2001; Erbasan, 2022; Duke, 2000; Pappas, Varelas, Gill, Ortiz & Keblawe-Shamah, 2009).

Research efforts to help develop informative text writing skills at an early age still remain quite few and far between in Turkey. While our research demonstrates the effectiveness of a strategy to improve students' ability to write informative texts at an early age, it is clear that more research is needed in this domain. Scientific inquiries examining whether the read-to-write strategy can be used as an effective tool in teaching how to write other types of informative text would also be enlightening.

**Conflicts of Interest:** No potential conflict of interest was declared by the author.

**Funding Details:** No funding or grant was received from any institution or organization for this research.

**CRedit Author Statement:** Author 1: Conceptualization and methodology, writing-original draft preparation, visualization, investigation, formal analysis, writing-review & editing, supervision.

**Ethical Statement:** Ethics committee approval within the scope of the research has been obtained from the Afyon Kocatepe University ethics committee of scientific research with the decision numbered 2022/299 on 26.10.2022.

## REFERENCES

- Akyol, H. (2020). *Programa Uygun Türkçe Öğretim Yöntemleri* (10th ed.). Pegem Akademi.
- Beydoğan, H. Ö. (2011). Zihin haritası destekli bilişsel hazırlığın öğrencilerin bilgilendirici yazma yeterliği üzerine etkisi. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 12(4), 1-23.
- Clark, S. K., & Neal, J. (2018). Teaching second-grade students to write sequential text. *The Journal of Educational Research*, 111(6), 764-772.

- Clark, S. K., Jones, C. D., & Reutzel, D. R. (2013). Using text structures of information books to teach writing in the primary grades. *Early Childhood Education Journal*, 41(4), 265–271. doi: 10.1007/s10643-012-0547-4
- De La Paz, S., Owen, B., Harris, K. R., & Graham, S. (2000). Riding Elvis's motorcycle: Using self-regulated strategy development to plan and write for a state writing exam. *Learning Disabilities Research & Practice*, 15, 101–109.
- Donovan, C. A. (2001). Children's development and control of written story and informational genres: Insights from one elementary school. *Research in the Teaching of English*, 35(3), 394–447.
- Duke, N. K. (2000). 3.6 minutes per day: The scarcity of informational texts in first grade. *Reading Research Quarterly*, 35(2), 202–224. <https://doi.org/10.1598/RRQ.35.2.1>
- Duke, N. K., & Kays, J. (1998). "Can I say 'once upon a time'?: Kindergarten children developing knowledge of information book language. *Early Childhood Research Quarterly*, 13(2), 295–318. [https://doi.org/10.1016/S0885-2006\(99\)80041-6](https://doi.org/10.1016/S0885-2006(99)80041-6)
- Duke, N. K., & Pearson, P. D. (2002). Effective practices for developing reading comprehension. In A. E. Farstrup & S. J. Samuels (Eds.), *What research has to say about reading instruction* (3rd ed., pp. 205–242). International Reading Association.
- Duke, N. K., & Tower, C. (2004). Nonfiction texts for young readers. J. V. Hoffman & D. L. Schallert (Ed.), *The texts in elementary classrooms* (pp. 125–144). Lawrence Erlbaum Associates.
- Erbasan, Ö. (2022). *Yazma stratejilerinin özel yetenekli öğrencilerin bilgilendirici metin yazma becerilerine etkisi*. Unpublished doctoral dissertation, Hacettepe Üniversitesi.
- Ercan, İ. (2019). *İş birlikli öğrenme yönteminin ortaokul öğrencilerinin bilgilendirici metin yazma becerilerine ve yazma tutumlarına etkisi*. Unpublished master's thesis, Kırıkkale Üniversitesi.
- Ergen, Y., & Batmaz, O. (2019). İlkokul 4. sınıf öğrencilerinin okuduğunu anlama stratejilerini kullanma düzeyleri ile okuduğunu anlama başarıları arasındaki ilişki. *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi*, (49), 130–147.
- Filipenko, M. (2004). Constructing knowledge about and with informational texts: Implications for teacher-librarians working with young children. *School Libraries Worldwide*, 10(1/2), 21.
- Graham, S. (2006). Writing. In P. Alexander & P. Winne (Eds.), *Handbook of educational psychology* (pp. 457–478). Erlbaum.
- Graham, S., Berninger, V., & Abbott, R. (2012). Are attitudes toward writing and reading separable constructs? A study with primary grade children. *Reading & Writing Quarterly*, 28(1), 51–69.
- Graham, S., Harris, K. R., & Mason, L. (2005). Improving the writing performance, knowledge, and self-efficacy of struggling young writers: The effects of self-regulated strategy development. *Contemporary Educational Psychology*, 30, 207–241.
- Helsel, L., & Greenberg, D. (2007). Helping Struggling Writers Succeed: A Self-Regulated Strategy Instruction Program. *The Reading Teacher*, 60, 752–760.
- Jam, B., & Shahin, L. (2012). Investigating the efficiency of two writing strategies among Iranian EFL learners: Translated writing vs. reading to write. *Journal of Research in Applied Linguistics*, 3(2), 67–81.

- Jeong, J., Gaffney, J. S., & Choi, J. O. (2010). Availability and use of informational texts in second-, third-, and fourth-grade classrooms. *Research in the Teaching of English*, 44, 435–456.
- Kana, F., & Şener, G. E. (2021). Yazma tekniklerinin ortaokul öğrencilerinin bilgilendirici metin yazma becerisine etkisi. *Milli Eğitim*, 50(231), 353-382.
- Kızgın, A., & Baştuğ, M. (2020). Okuma motivasyonu ve okuduğunu anlama becerisinin akademik başarıyı yordama düzeyi. *Journal of Language Education and Research*, 6(2), 601-612.
- Kletzien, S. B., & Szabo, R. J. (1998, December). *Information text or narrative text? Children's preferences revisited*. In National Reading Conference, Austin, TX.
- MEB (Millî Eğitim Bakanlığı) (2019a). *Türkçe Dersi Öğretim Programı (İlkokul ve Ortaokul 1, 2, 3, 4, 5, 6, 7 ve 8. Sınıflar)*. MEB.
- MEB (2019b). *PISA 2018 sonuçlarına göre Türkiye, her 3 alanda performansını artıran tek ülke*. Retrieved August 14, 2022 from <https://www.meb.gov.tr/pisa-2018-sonuclarina-gore-turkiye-her-3-alanda-performansini-artiran-tek-ulke/haber/19842/tr>
- MEB (2021). *İlköğretim Kurumları (İlkokul ve Ortaokul) Haftalık Ders Çizelgesi'nde Değişiklik Yapılması*. Sayı: 49. Retrieved August 17, 2022 from [https://ttkb.meb.gov.tr/meb\\_iys\\_dosyalar/2022\\_01/19093950\\_ilkogretim-hdc-karar-ve-eki-2022-2023.pdf](https://ttkb.meb.gov.tr/meb_iys_dosyalar/2022_01/19093950_ilkogretim-hdc-karar-ve-eki-2022-2023.pdf)
- Moss, B. (2005). Making a case and a place for effective content area literacy instruction in the elementary grades. *The Reading Teacher*, 59(1), 46–55. <https://doi.org/10.1598/RT.59.1.5>
- Moss, B., & Newton, E. (2002). An examination of the informational text genre in basal readers. *Reading Psychology*, 23(1), 1-13. <https://doi.org/10.1080/027027102317345376>
- Morgan, G. A., Leech, N. L., Gloeckner, G. W., & Barrett, K. C. (2004). *SPSS for introductory statistics: Use and interpretation*. Psychology Press.
- Ness, M. (2011). Teachers' use of and attitudes toward informational text in K–5 classrooms. *Reading Psychology*, 32(1), 28-53. <https://doi.org/10.1080/02702710903241322>
- Pappas, C.C., Varelas, M., Gill, S., Ortiz, I., & Keblawe-Shamah, N. (2009). Multimodal books in science-literacy units: Language and visual images for meaning making. *Language Arts*, 86(3), 201-217.
- Raby, S. R. (2006). Children's literature in the elementary schools: Which books are being chosen for literacy instruction. Unpublished master's thesis, Brigham Young University.
- Reutzel, D. R., Jones, C. D., Clark, S. K., & Kumar, T. (2016). The Informational Text Structure Survey (ITS2): An exploration of primary grade teachers' sensitivity to text structure in young children's informational texts. *Journal of Educational Research*, 109(1), 81–98. doi: 10.1080/00220671.2014.918927
- Rosmawan, H. (2017). The analysis of student's writing before and after the implementation of read-to-write approach. *CaLLs (Journal of Culture, Arts, Literature, and Linguistics)*, 2(1), 1-16.
- Smolkin, L. B., & Donovan, C. A. (2003). Supporting comprehension acquisition for emerging and struggling readers: The interactive information book read-aloud. *Exceptionality*, 11(2), 25–38. [https://doi.org/10.1207/S15327035EX1101\\_3](https://doi.org/10.1207/S15327035EX1101_3)

- Ungan, S. (2007). Yazma becerisinin geliştirilmesi ve önemi. *Erciyes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 23(2), 461-472.
- Yılmaz, M. (2011). İlköğretim 4. sınıf öğrencilerinin okuduğunu anlama seviyeleri ile Türkçe, Matematik, Sosyal Bilgiler ve Fen ve Teknoloji derslerindeki başarıları arasındaki ilişkinin belirlenmesi. *Dumlupınar Üniversitesi Sosyal Bilgiler Dergisi*, 29, 9-14.
- Yopp, R. H., & Yopp, H. K. (2006). Informational texts as read-alouds at school and home. *Journal of literacy Research*, 38(1), 37-51. [https://doi.org/10.1207/s15548430jlr3801\\_2](https://doi.org/10.1207/s15548430jlr3801_2)
- Williams, J. P., Hall, K. M., & Lauer, K. D. (2004). Teaching expository text structure to young at-risk learners: Building the basics of comprehension instruction. *Exceptionality*, 12, 129–144.
- Williams, J. P., Nubla-Kung, A. M., Pollini, S., Stafford, K. B., Garcia, A., & Snyder, A. E. (2007). Teaching cause—effect text structure through social studies content to at-risk second graders. *Journal of Learning Disabilities*, 40, 111–120.
- Wollman-Bonilla, J. E. (2000). Teaching science writing to first graders: “Genre learning and recontextualization.” *Research in the Teaching of English*, 35(1), 35-65.

## **Transmission of Family Culture "The Case of Grandmother, Mother and Granddaughter"\***

**Emine Arslan Kılıçoğlu<sup>i</sup>**  
Kto Karatay University

**Büşra Ergin<sup>ii</sup>**  
Selcuk University

**Esra Ergin<sup>iii</sup>**  
Kto Karatay University

### **Abstract**

Culture is the guide that enables us to understand and describe the formation process, qualities and conditions of society, which is expressed as a structure that contains systems and norms. Tradition, on the other hand, allows us to observe the reflections of culture in society and individuals. Traditions maintain their continuity in society by reinforcing cultural values and norms. In this sense, the transmission of values and culture between generations is possible with the family, the smallest subsystem of society. In this respect, the family contributes to the progress of societies. As a role model for children, the family institution guides future generations to learn their culture in shaping societies. In this context, the main purpose of the study is to examine the communication and interaction between grandmothers, grandmothers' daughters and grandmothers' granddaughters living in the same family chain in the transmission of family culture. For this purpose, face-to-face and online interviews were conducted with three generations, 30 grandmothers, 30 mothers and 30 granddaughters, who are in constant interaction. These interviews were carried out with three different interview forms prepared by the researchers to be applied to each group separately. The phenomenological method was used in the study, which was planned in a qualitative design. The data obtained were processed and analysed in MAXQDA program. Themes were formed by the analyses. As a result, it was thought that increasing studies on intergenerational culture transmission and intergenerational communication and interaction would provide new generations with awareness of family culture.

**Keywords:** Generation, Grandmother, Mother, Granddaughter, Cultural Transmission, Family Culture

**DOI:** 10.29329/ijpe.2023.603.3

**Submitted:** 10/06/2023

**Accepted:** 01/09/2023

**Published:** 16/10/2023

-----  
\* This research was presented as an oral presentation at the 12th International Scientific Research Congress (UBAK) held on 17-18 December 2021.

<sup>i</sup> **Emine Arslan Kılıçoğlu**, Lecturer, Child Development Program, KTO Karatay University, ORCID: 0000-0001-8319-2404

<sup>ii</sup> **Büşra Ergin**, Assist. Prof. Dr., Department of Pre-School Education, Selcuk University, ORCID: 0000-0001-5177-7096

<sup>iii</sup> **Esra Ergin**, Research Assist, Department of Child Development, KTO Karatay University, ORCID: 0000-0002-3810-4142

**Correspondence:** esraergin.42@gmail.com



## INTRODUCTION

The existence of societies that have emerged with the history of humanity and that contain norms and systems, the qualities they possess and the culture of the period they belong to are transferred to future generations through traditions that can be described as a mirror of culture. Although traditions, which can be expressed as social elements, deteriorate over time, they continue to function as cultural reinforcements. In this sense, the transmission of values and culture between generations is possible through the family, which is the smallest subsystem of society. In this respect, the family contributes to the progress of societies. As a role model for children, the family institution guides future generations to learn their culture in shaping societies. In other words, the family institution forms culture, culture forms tradition, and together they form daily life (Burç, 2018). The reason why daily life experiences are affected by culture and tradition is the perception of society and vital needs that every social formation has had from the past to the present (Berger & Luckmann, 2008; Burç, 2018).

Today, with modernisation, the family, which is the key point of culture transmission, has passed from traditional family dynamic to nuclear family. Depending on this change, the issue of individualization of family members within the nuclear family structure has come to the fore. The concept of "individualization" is that family members have a sense of "I" rather than a sense of "we". This has caused family members' own expectations and wishes to take precedence over the expectations of the family, and thus, with the advancing technology, the number of lonely and alienated individuals who do not spend quality time in the family has increased (Çapcıoğlu, 2018). Rationality, a concept that comes with modernization, has led the modern individual to prioritize himself/herself in his/her preferences instead of having a collective identity or collective preferences. In this understanding, the individual demands unlimited freedom in his/her own preferences and is reluctant to share this freedom with his/her relatives (Touraine, 2014). However, the "traditional extended family", which is the family structure that includes many family members and is dominated by extensive kinship ties, includes comprehensive networks such as parents-children, grandparents, cousins (Canatan & Yıldırım, 2013). A family dynamic that gives importance to role and experience sharing, culture of living together and value transmission within the family is dominant in the extended family structure, which is built on traditional values. After the industrial revolution, individuality has been more prominent, although the existing values in the nuclear family model, which has increased in number, are tried to be preserved and transferred to other generations (Çapcıoğlu, 2018). Factors such as industrialization, mechanization in agriculture, educational needs, internal and external migrations, increased participation of women in business life, the expansion of communication and transportation networks and the changes in the urban structure have been effective in the increase in the nuclear family structure. The effect of this on the family institution and individuals is seen as late marriages, low number of family members, marriage decisions, spouse selection, first meeting styles in marriage, the change of the balance in the distribution of roles between spouses and the increase in the effectiveness of the qualities idealized by modernity on individuals (Canatan & Yıldırım, 2013). When the 2010-2014 data of the World Values Survey is examined, it is observed that there is a change in the beliefs and values of the traditional family in our country, which ranks first among the countries that attach importance to values. When the data of the Turkish Statistical Institute [TUIK] are analysed, it has been determined that with the increasing single person or nuclear family structure, there is an increase in the preferences of grandparents for nursing homes in their old age (Çapcıoğlu, 2018; TUIK, 2021).

The meaningful communication established by grandparents in the society with their grandchildren and children is effective in connecting them to life (Arpacı & Tezel, 2015). Especially with the women's involvement in the working life, parents entrust the care of their infants or their supervision in the presence of a caregiver, to their grandmothers due to their safety. This situation is associated with the role of grandparents in child development (Hazer, 2012; Yavuzer, 2005), the value given to grandparents, the trust shown in their life experience and the cultural value judgments of the society (Çiftçi, 2008). In this way, the grandparent provides material and moral support to the nuclear family by undertaking the care of the grandchild. In addition, studies indicate that caring for

grandchildren provides positive social and psychological benefits to grandparents and contribute to their life satisfaction (Durak, 2016). In his study on grandparents, Kartal (2010) stated that grandparents who take care of grandchildren tend to be less depressed. This can be explained by the fact that elderly individuals who take care of their grandchildren can feel themselves as part of the society and gain a sense of belonging, as stated in the United Nations Principles for the Elderly (1991) (Ministry of Family and Social Policies, 2014). The time spent by grandparents with their children and grandchildren is beneficial for themselves and their children. Bandura states that imitation, observation and modelling processes are required for learning (Santrock, 2011). Vygotsky, the pioneer of sociocultural theory, emphasises the necessity of interpersonal interaction for learning and cultural transmission (Kibar, 2008). Therefore, children learn values such as good-bad, right-wrong, justice, honesty, tolerance, modesty, respect, love, responsibility, benevolence at an early age by modelling and observing family members and spending quality time with them (Altan & Tarhan, 2018). At this point, grandparent-grandchild interaction is very important in transmitting cultural values and knowledge (Aydin, 2010; Canatan, 2008; İçli, 2008; Sweeting et al., 2005).

In their study, Tunca and Durmuş (2019) determined that raising grandchildren has a positive effect on grandmothers, and that grandparents are a supportive factor in marital and spousal relationships, and they also contribute to their grandchildren's affective and cognitive development. In another study examining the reflections of grandmother-mother and grandmother-granddaughter interaction, it was stated that grandmother was an important factor in supporting the parenting role of the mother. In addition, it was found that the increasing quality of the grandmother's relationship with the mother strengthened the grandmother-grandchild interaction (Choi & An, 2020). In the study conducted by Uğur (2018), it was stated that grandmothers not only provide the basic needs of their grandchildren, but also support their personality development. In addition, while it was stated that the grandmothers conveyed their experiences in line with their own experiences, they also benefit from the current pedagogical knowledge under the influence of the middle generation. When an evaluation is made in this context, the fact that the definition of "responsible parent" is attributed not only to parents but also to grandparents indicates the need for them (Uğur, 2018). In this context, based on the importance of the existing relationship in the triangle of grandmother-mother-granddaughter in the transmission of family culture, this study aims to examine the views of grandmother-mother-granddaughter, who have a decisive role in the transmission of family culture, about family culture. In line with this main purpose, the following questions were sought to be answered:

1. What are the views of grandmothers, mothers and granddaughters on the basic qualities of being a family?
2. What are the family perceptions of grandmothers and mothers, who left the family of origin, before and after having children?
3. Do the views on the transmission of family culture vary according to generational differences?

## **METHOD**

In this section, explanations about the research design, study group, data collection process and analyses are given.

### **Research Design**

The study was carried out in the "phenomenological" design, which is one of the qualitative research methods. In this design, it is generally aimed to describe individual perceptions, i.e. perspectives, which are generally directed towards a certain phenomenon (Yıldırım & Şimşek, 2005). In the phenomenological design, it is important to focus on phenomena that we do not have detailed information about, although we have a general awareness of a subject. From this point of view, phenomena can sometimes be events that we encounter in life, sometimes our perceptions and

experiences, or concepts and situations (Yıldırım & Şimşek, 2005). In this context, the phenomenological design was used to obtain information about the experiences and perceptions of three generations, namely grandmother, mother and granddaughter, the concepts of family institution and cultural transmission, which are important values in our lives. The study was approved by the KTO Karatay University Faculty of Medicine Non-Pharmaceutical and Medical Device Studies Ethics Committee (Project number: 2021/001). Faculty of Medicine Non-Pharmaceutical and Medical Device Studies Ethics Committee (Project number: 2021/001). Declaration of Helsinki was complied with at all stages of the study. Consent form was obtained from the individuals participating in the study.

### **Study Group**

In studies conducted with the phenomenological design, the interviewees, groups and other sources of data should be selected from among those who have experienced and can explain the phenomenon in question, and who can express the details with their feelings and thoughts (Yıldırım & Şimşek, 2005). Therefore, 90 people from three generations, 30 grandmothers, 30 daughters of the same grandmother, and 30 daughters (grandchildren) of the same grandmother's daughter, were included in the study. While determining the study group, criterion sampling method, one of the purposive sampling methods, was used. Specific criteria for determining the study group are as follows;

1. Participating grandmothers and mothers should be the birth parents of the individuals,
2. Participating grandmothers and mothers should be in regular contact/interaction with each other and with their grandchildren.

### **Data Collection**

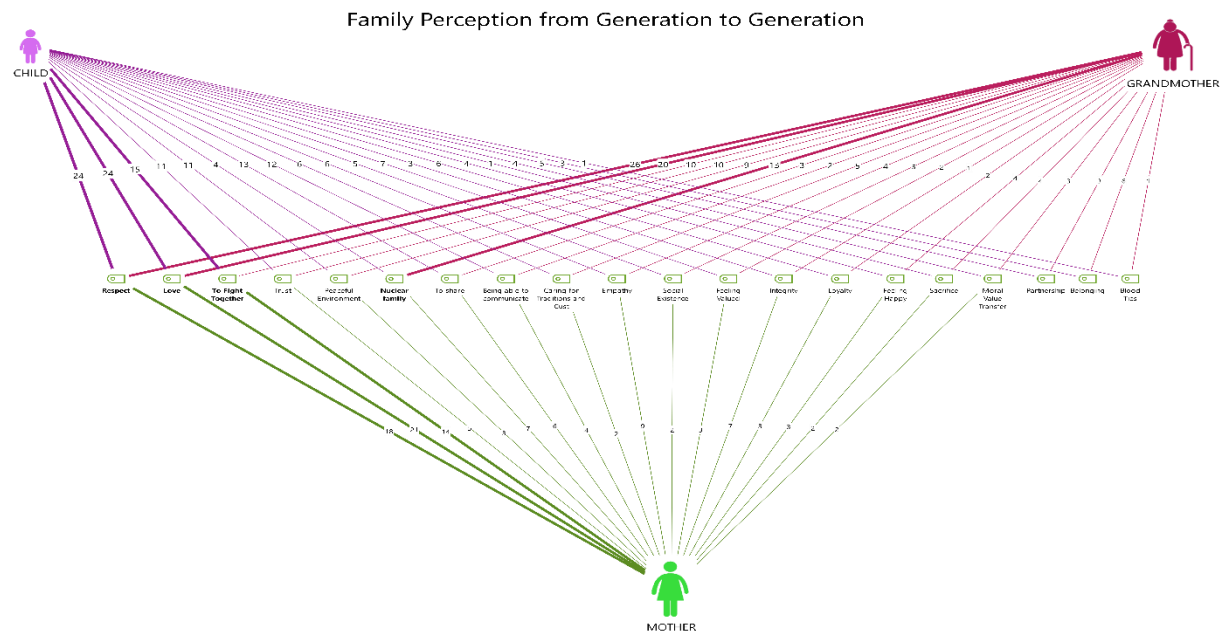
In order to collect data in the study, a personal information form developed by the researchers, which includes demographic information, and three different semi-structured interview forms, which are expressed in clear language and contain similar questions, were used to determine the perceptions of the participants in different groups about the same qualities and situations. The interview form was finalized after pilot interviews were carried out with three grandmothers, three mothers and three granddaughters in accordance with the criteria of the study group and the views of experts in the relevant field. The interviews, which were conducted on a voluntary basis and lasted an average of 30 minutes with each participant, were recorded. The research data were collected between July and November 2021.

### **Analysis of Data**

The records created during the interviews were converted into written documents without any changes or corrections, and codes were given to three generations separately by numbering according to the order of application (GM1, GM2, GM3; M1, M2, M3; GD1, GD2, GD3, etc.). A total of 110 pages of data were obtained from 90 interviews. MAXQDA program was used to analyse the data. In the analysis of qualitative data, the answers given by the three generations were first coded in the focus of the participants' own answers. Then, the answers of all interviewees were divided into groups and the sub-codes were reviewed and categorically evaluated with the answers of other interviewees. Similar data were brought together within the framework of certain concepts, codes and themes, and then organised and interpreted.

## **RESULTS**

*Findings on the comparison of the views of grandmothers, mothers and granddaughters on the basic qualities of being a family*



**Figure 1. Three-generation code matrix of grandmothers, mothers and granddaughters' views on the basic qualities of being a family**

There are 20 different subcodes in the matrix, which consists of the answers of grandmothers, mothers and granddaughters on the basic quality of being a family. While 17 of the subcodes of the three generations intersect in the answers of grandmothers, mothers and granddaughters, 3 of them intersect in the answers of grandmothers and granddaughters.

Code System	GRANDMOTHER	MOTHER	CHILD	SUM
Family Perception from Generation to Generation	26	18	24	68
Respect	20	21	24	65
Love	10	14	15	39
To Fight Together	10	5	11	26
Trust	13	7	4	24
Nuclear family	9	3	11	23
Peaceful Environment	3	6	13	22
To share	4	9	6	19
Empathy	2	4	12	18
Being able to communicate	5	2	6	13
Caring for Traditions and Cust	2	3	7	12
Feeling Valued	5	2	5	12
Social Existence	2	3	6	11
Loyalty	4	3	4	11
Feeling Happy	1	7	3	11
Integrity	6		3	9
Belonging	3	2	4	9
Moral Value Transfer	3		5	8
Partnership	4	2	1	7
Sacrifice	1		1	2
Blood Ties	133	111	165	409
SUM				

**Figure 2. Three-generation code system of the views of grandmothers, mothers and granddaughters on the basic qualities of being a family**

The codes in the code system of grandmothers, mothers and granddaughters regarding the basic qualities of being a family are as follows: respect (f=68), love (f=65), to fight together (f=39), trust (f=26), nuclear family (f=24), peaceful environment (f=23), to share (f=22), empathy (f=19), being able to communicate (f=18), caring for traditions and customs (f=13), feeling valued (f=12),

social existence (f=12), loyalty (f=11), feeling happy (f=11), integrity (f=11), belonging (f=9), moral value transfer (f=9) partnership (f=8), sacrifice (f=7) and blood ties (f=2). The 3 most frequently repeated sub-codes in the participants' answers are respect (f=68), love (f=65) and to fight together (f=39). The most frequently repeated codes of the grandmothers are respect (f=26), love (f=20), nuclear family (f=13), to fight together (f=10) and trust (f=10). The most frequently repeated codes of the mothers are love (f=21), respect (f=18) and to fight together (f=14). The sub-codes most frequently repeated codes of the granddaughters are respect (f=24), love (f=24), to fight together (f=15), to share (f=13), being able to communicate (f=12), peaceful environment (f=11) and trust (f=11). The least repeated sub-code is blood ties (f=2). Sample statements of the participants are given below.

“When you found a family, everyone should respect each other.”...(GM10)

“Respect is unquestionably necessary. Although it may be your mother, father, or husband, respect should always be shown. Everyone has a certain limit and it should not be exceeded.”...(GM11)

“The prerequisite for being a family is that everyone is respectful to each other.”...(M10)

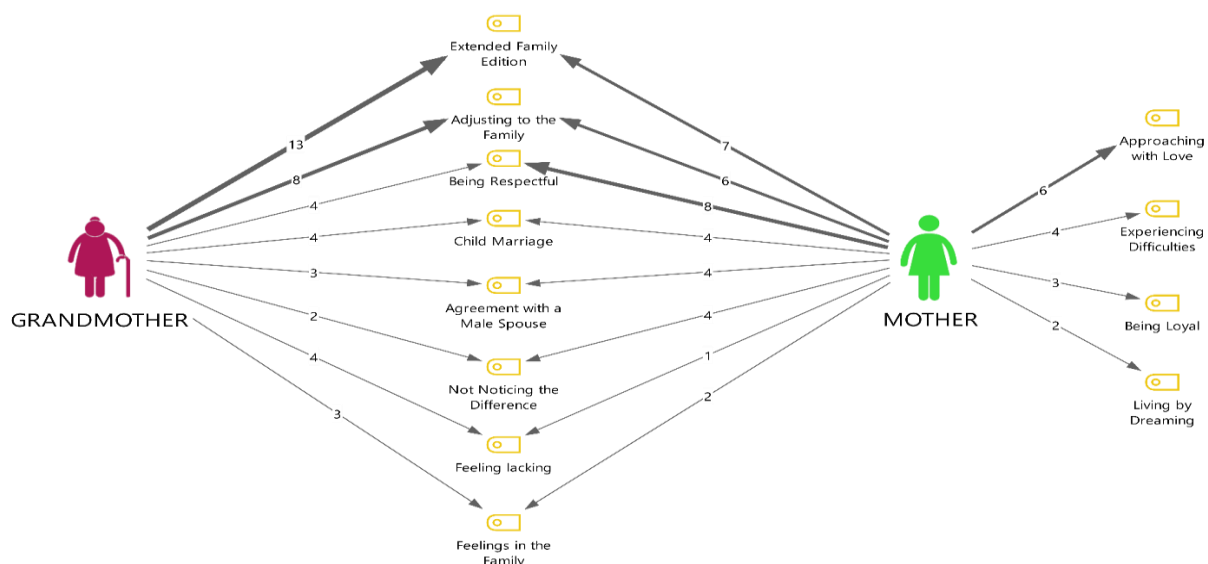
“To be a family, family members must respect each other and approach each other with love.”...(M12)

“It is to live in a family environment with our traditions and customs, within the framework of respect”...(GD7)

“Raising good children is to teach them respect, love and struggle together. Even children should have a say in a home.”...(GD18)

***Findings on the comparison of the family perceptions of grandmothers and mothers separated from the family of origin before and after having children***

### Two-Cases Model for Emotion-State Before Becoming a Mother



**Figure 3. Two case models of grandmothers' and mothers' perceptions of family before having children**

It is seen that there are 8 codes in the intersecting sub-codes related to the family perceptions of grandmothers and mothers before they have children: living in an extended family, adapting to the family, being respectful, marrying at a young age, getting along with the spouse, having no differences, feeling incomplete, feeling belonging to the family. In mothers, the sub-codes of approaching with love, experiencing difficulties, being loyal and living by dreaming were excluded from the intersection sub-codes. Among these subcodes, the most frequently repeated subcodes for grandmothers were living in an extended family and adapting to the family, while for mothers, the most frequently repeated subcodes were being respectful, living in an extended family and adapting to the family. Sample statements of the participants are given below.

“I used to live with my mother-in-law, I didn't know what family means. I was a child, I used to fill the stove bucket, burn it, do housework, look after the sheep, cook. It was like labor, not marriage, or family.”...(GM2)

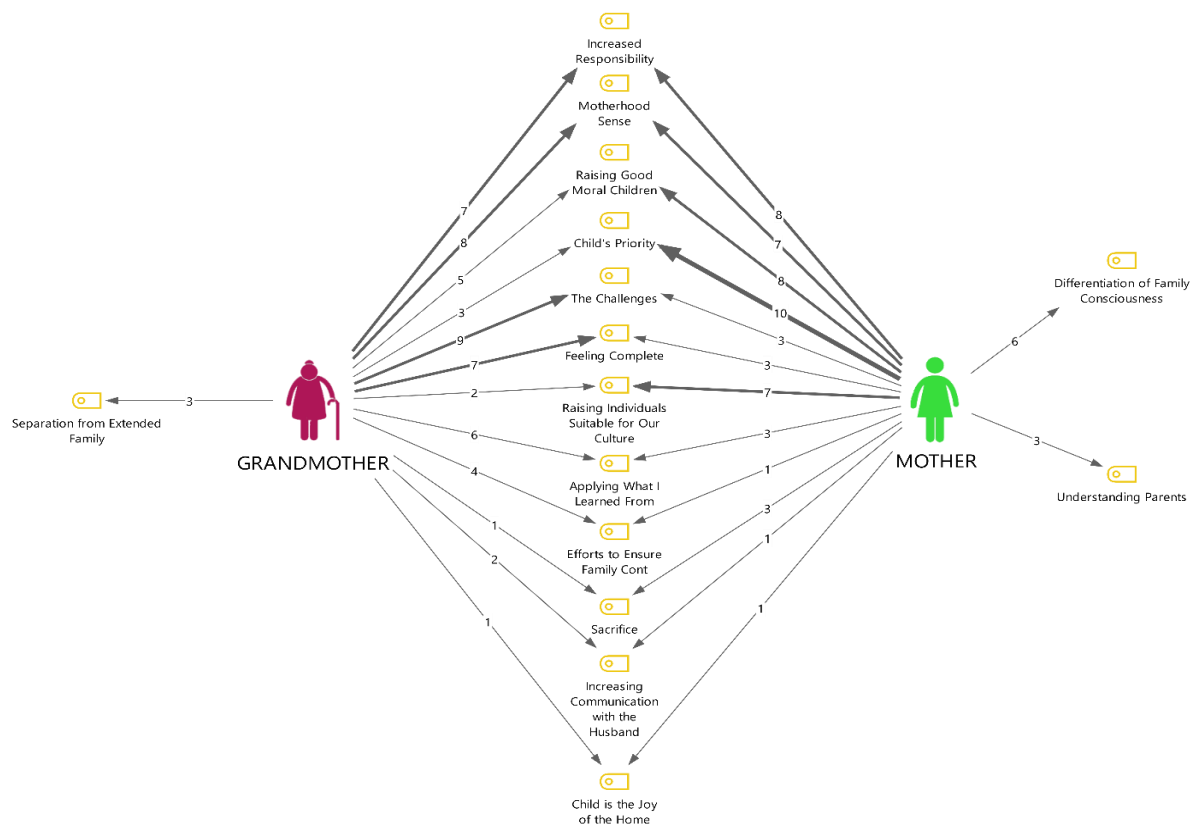
“I was just a child because I got married at the age of 14.”...(GM3)

“For me, family was a home consisting of two people.”...(GM28)

“It was to obey my husband.”...(GM30)

“Before I had a child, I did not understand what marriage meant. I said, "Is this what marriage is?" I thought of family as my parents and siblings. My mother said, "You got married, you have a family too. When I said "You are my family," she said "You will understand in the future.”...(M11)

## Two-Cases Model for Emotion-State After Becoming a Mother



**Figure 4. Two case models of grandmothers' and grandmothers' daughters' (mothers') perceptions of family after having children**

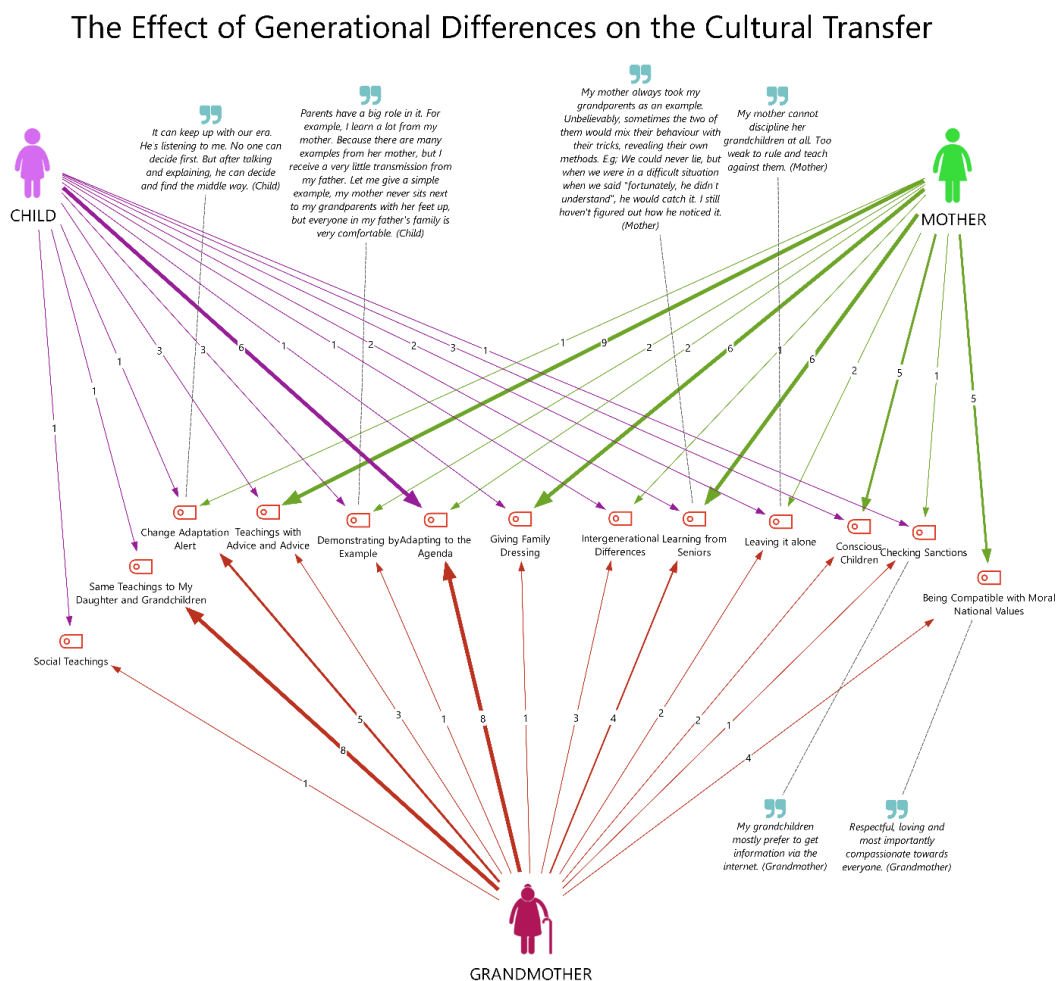
12 codes were found in the intersecting sub-codes regarding the family perceptions of grandmothers and mothers after having children: increased responsibility, sense of motherhood, raising children with good morals, prioritizing the child, challenges, feeling complete, raising individuals in accordance with our culture, applying what I learnt (from my mother), efforts to ensure the continuity of the family, sacrifice, increase in communication with the spouse, child is the joy of the house. The sub-codes of separation from the extended family in grandmothers, differentiation in family consciousness and understanding parents in mothers were excluded from the intersection sub-codes. Among these sub-codes, the most frequently repeated sub-codes for grandmothers were challenges, sense of motherhood, increased responsibility and feeling complete, while the most frequently repeated sub-codes for mothers were prioritizing the child, increased responsibility, raising children with good morals, the sense of motherhood and raising individuals in accordance with our culture. Sample statements of the participants are given below.

“After having children, we realised that the concept of family is more important as our responsibilities increased.”... (GM24)

“It is the delicious taste inside the walnut shell.”... (M4)

“My perspective on life changed. She was a part of my life, I started to think of everything for her.”... (M18)

### ***Findings on the comparison of views on the transmission of family culture according to generational differences***



**Figure 5. Three-generation code matrix of family culture transmission according to generational differences**



There are 13 different sub-codes in the matrix, which consists of the answers of grandmothers, mothers and granddaughters regarding the transmission of family culture according to generational differences. 10 of the subcodes of the three generations intersect in the answers of grandmothers, mothers, and granddaughters. While 2 of the other codes intersect in the answers of grandmothers and granddaughters, 1 intersect in the answers of grandmothers and mothers.

Code System	GRANDMOTHER	MOTHER	CHILD	SUM
▼ The Effect of Generational Differences on the Cultural Transfer				0
☑ Checking Sanctions	1	1	1	3
☑ Being Compatible with Moral National Values	4	5		9
☑ Giving Family Dressing	1	6	1	8
☑ Same Teachings to My Daughter and Grandchildren	8		1	9
☑ Leaving it alone	2	2	2	6
☑ Change Adaptation Alert	5	1	1	7
☑ Adapting to the Agenda	8	2	6	16
☑ Demonstrating by Example	1	2	3	6
☑ Teachings with Advice and Advice	3	9	3	15
☑ Social Teachings	1		1	2
☑ Conscious Children	2	5	3	10
☑ Learning from Seniors	4	6	2	12
☑ Intergenerational Differences	3	1	1	5
Σ SUM	43	40	25	108

**Figure 6. Three-generation code system of cultural transmission according to generational differences**

The codes in the code system consisting of the answers of grandmothers, mothers and granddaughters regarding the transmission of family culture according to generational differences are as follows: adapting to the agenda (f=16), through recommended teachings (f=15), learning from elders (f=12), raising conscious children (f=10), being compatible with moral national values (f=9), applying the same teachings to my daughter and grandchildren (f=9), disciplining the family (f=8), being ready for change (f=7), setting free (f=6), demonstrating by example (f=6), intergenerational differences (f=5), checking sanctions (f=3), social teachings (f=2). The 2 most frequently repeated sub-codes in the participants' answers were adapting to the agenda (f=16) and through recommended teachings (f=15). The most frequently repeated codes of the grandmothers were applying the same teachings to my daughter and grandchildren (f=8) and adapting to the agenda (f=8), while the most frequently repeated codes of the mothers were through recommended teachings (f=9), disciplining the family (f=6), and learning from elders (f=6). The most frequently repeated sub-code by the granddaughters is adapting to the agenda (f=6). The least repeated sub-code among the sub-codes obtained is social teachings (f=2). Sample statements of the participants are given below.

“I taught my children what I learnt. I always told them ‘this is appropriate, this is the proper way to do it’, and they got used to it day by day.”...(GM2)

“In the extended family my daughter grew up in, her moral and national values were passed on by her elders. The fact that she spent time with our elders reduced our responsibilities to some extent. It enabled her to benefit from the experiences of the elders and to get along better with them.”...(GM5)

“In order to transmit the family culture, we should apply the traditions and customs we learnt from our mothers and ensure continuity to apply them to our own children.”...(GD7)

“Family culture is the legacy left to us by our elders. It is to incorporate the behaviours and discourses reflected by them into our lives.”...(GD12)

## CONCLUSION AND DISCUSSION

This study aims to examine the views of grandmothers, mothers and granddaughters living in the same family chain, about family culture. Therefore, in the study, answers were sought by considering the basic qualities of being a family, family perception, and cultural transmission methods.



In the light of the findings obtained, the results of the study were discussed in the context of the relevant literature.

When the views of the participants on the basic qualities of being a family were analysed, it was determined that the three generations mentioned common elements. The concepts that grandmothers, mothers and granddaughters frequently mentioned in their answers were love, respect and to fight together. The least frequently mentioned concept was blood ties. A woman who leaves her family of origin through marriage enters a new process of adaptation. This process is a multidimensional and educational process that enables generations to transmit culture to each other. It is considered as the beginning of many changes. Individuals' evaluations of this process may differ according to their previous experiences. For some, it is a period of time full of difficulties to be overcome, while for some it is a normal course of life (Marshall, 1999). Socially transmitted culture, depending on its own way of existence, evolves marriage and thus the family institution in its favour (Benedict, 2003). In Turkish society, traditions and culture construct the individual and social dimensions of marriage, which means the bonding of families as well as individuals. In this way, family culture becomes an indispensable quality of life. Love, which is an essential emotion for individuals to show closeness to each other and to realize internal bonding, contributes to the development of positive behaviors such as satisfaction, understanding and sacrifice in individuals. The concept of respect, which can be defined as a positive view towards the opinions and behaviors of individuals, is a culture as well as being an emotion. For this reason, unconditional and unrequited love and respect are the cornerstones for the protection and maintenance of family unity based on interaction (Özgüven, 2000; Satir, 2018). In a healthy family model, in case of any problem, family members should come together to seek solutions and overcome difficulties by making decisions together. The first of these steps is to face the problem and accept the existence of the problem. Acceptance will ensure the continuation of healthy communication between family members and prevent possible conflicts. In other words, by making decisions together, the experiences of the family are shaped in line with common values (Yiğit Sezgin, 2009). However, due to the decrease in the importance given to experience today, the need for traditional methods and knowledge has also decreased. While various factors such as globalization and technology have changed the social order, they have also made it inevitable for family structures to change. Depending on the changing economic, social and cultural conditions, the methods of education within the family have also changed with the participation of women in working life. Extended families, which are the most important environment in which traditional transmission and education are provided, have decreased rapidly (Oğuz, 2008). Undoubtedly, grandparents are the most valuable teachers of extended families, where education is provided without a specific plan and program. As models, they provide information to the next generations about their experiences and actions. Today, day care centers and nurseries have replaced grandparents who support mothers in education and care. The existence of educational institutions in our lives has enabled individuals in the same family to develop different perceptions and perspectives. Thus, the transmission of family culture has gained importance in the development of common values and thoughts of the family. In a study conducted at Akdeniz University, the fact that university students differ in their understanding of elders and grandparents according to their family culture (Tufan, 2007) reveals the importance of culture transmission to the next generations. While it was seen that grandmothers and mothers focused on common elements in the answers given about the basic quality of being a family, it was noteworthy that the third generation granddaughters also had the same opinion with them. This result is an indication that cultural transmission within the family still continues today. In this sense, it is understood that the family pattern, in which children's first socialization experiences take place, is the main actor in their lives.

In the statements of the grandmothers and mothers regarding their perceptions of family before having children, it is seen that there are common elements such as living in an extended family, adapting to the family, being respectful, marrying at a young age, getting along with the spouse, having no differences, feeling incomplete, feeling belonging to the family. In their statements after having children, there are common elements such as increased responsibility, sense of motherhood, raising children with good morals, prioritizing the child, challenges, feeling complete, raising individuals in accordance with our culture, applying what I learnt (from my mother), trying to ensure

the continuity of the family, sacrifice, increased communication with the spouse, child is the joy of the house. When their statements before having children are analysed, it is emphasised that the process of adaptation begins with marriage, and a sense of completeness is formed with the development of a sense of belonging in the individual. The mentioned adaptation process includes the interaction with the spouse and the spouse's family, the position of the woman in the new family, even problems and power struggles that may occur within the family (Sorokin, 2005). In this process, the woman first tries to realise her newly established family. Then she wants to expand her family in line with her cultural and social acts. She also wants the family she is trying to build to contribute to her own existence, belonging and self-realisation. All these needs basically depend on the quality of interpersonal experiences (Özmete, 2010). In studies in which women describe their feelings before and after having children differently, it is stated that the feeling of not belonging to the marriage and family and the separation anxiety are high in women who do not have children (Turgut, 2016). In the findings of the study, it is seen that grandmothers and mothers focused on the difficulties of having a child, increased sense of responsibility, prioritising the child and concerns about raising the child. This process, which can be attributed to different meanings from culture to culture, is expressed by women as the most fundamental factor in developing the sense of belonging to the family. Individuals who see themselves as complete want to provide a peaceful environment for their children during their growth process by developing healthy relationships. In fact, in Turkish culture, this intense anxiety experienced by parents develops a sense of dedication (Canatan & Yıldırım, 2013). In the study conducted by Demirutku (2007) on child raising styles and internalization of values, it was concluded that parent-child value similarities and value priorities are related to raising style. In addition, it is emphasized in the literature that the information that individuals have acquired from their parents is the main determinant in the acquisition of parenting roles. This situation is also seen as a determinant of the quality of the close relationships developed by the individual and his/her adaptation to marriage (Botha et al., 2009; Falcke et al., 2008; Luecken et al., 2009; Martinson, 2005; Topham et al., 2005).

In the findings of the study, it is seen that grandmothers, mothers and granddaughters emphasized the codes of adapting to the agenda and through recommended teachings regarding the transmission of family culture. They emphasised social teachings the least in their statements. Today, studies on culture transmission focus on grandparent-grandchild interaction. Communication barriers between mothers and grandchildren cause conflicts within the family, which puts the responsibility of transmitting cultural elements to the next generation on grandparents. In fact, socially accepted leaders undertake the task of being a mediator in the family (Özabacı & Erkan, 2014). Today, the responsibility of caring for and educating the child, shared by the grandparent with the mother, contributes to the grandparent in terms of communication, personal skills and keeping up with the period in the context of lifelong learning (Altan & Tarhan, 2018). The channels created in grandparent-grandchild communication support the child's positive personality traits (Miller, 2008; Santrock, 2011). Çiftçi (2008) pointed out that living in the same family with individuals from different generations provides different benefits for each individual. Canatan (2008) stated that this situation is functional in ensuring social continuity and preventing the disappearance of values. In short, experience sharing has an important role in the process of transferring shared values, beliefs, traditions, relationships and symbol systems from generation to generation. As Bandura and Vygotsky emphasised, children learn through interaction (Kibar, 2008; Miller, 2008).

The society, which is a complex and concrete form of the culture of living together, is a cultural element. The human part of the existence is composed of family-society-culture. Therefore, the family, the cornerstone of human culture, which educates individuals and brings them into society, is a qualified school in this sense. In the changing and transforming world order, interactions within the family still maintain their importance, depending on the family's ability to protect and maintain the social culture.

There are several limitations of the study. One of these is that face-to-face interviews could not be conducted with some of the grandmothers due to the pandemic period. Interviews were conducted as video calls or telephone interviews via Whatsapp application. Another limitation is that

consecutive interviews could not be conducted with the families since grandmothers, mothers and grandchildren living in the same family chain live in different villages and central districts.

### **Suggestions for Future Research**

Within the scope of our study carried out in the context of grandmother-mother-granddaughter, our suggestions for future research and researchers in line with our findings on the elements that are sub-headings of family culture are as follows;

1. The concepts that stand out in the basic qualities of being a family, namely love, respect and struggling together, were expressed by all three generations. This is an indication that there is still a common understanding in terms of common values or values emphasised within the family. Therefore, the undeniable influence of the main actors within the family pattern on young generations emerges. In line with this finding, our recommendation for future research and researchers is to plan studies in which grandparents are included in studies carried out in different family-oriented subject areas. In addition, in studies designed for family involvement in child education and development, different studies focusing on grandparents' awareness of educational activities can be conducted. In addition, the effectiveness of the programmes offered by training grandparents on a skill or subject for the education of the child can be evaluated in the context of the transfer of knowledge between generations.
2. The concepts of extended family, family ties, belonging, responsibility and continuity, which come to the fore in terms of family perception, show that all three generations need to be together and supported. In this sense, our recommendation for future research and researchers is to carry out studies that will contribute to strengthening the existing family connections in our society, protecting family unity and ensuring the sustainability of the family phenomenon. In this sense, it can be emphasised that the concept of family, which has been the focus of many different disciplines for years, should be addressed in various aspects.
3. "Adapting to the agenda" and "recommended teachings" are the prominent concepts related to culture transmission methods. These concepts show that although the cultural structure and understanding of societies change, all three generations try to adapt to each other. In this direction, our recommendation for future studies and researchers is to provide trainings on current child rearing approaches suitable for all ages and educational levels. In order for children to develop understanding towards their parents and grandparents, programmes and activities should be organised where they can receive education and participate in activities together.

**Conflicts of Interest:** No potential conflict of interest was declared by the authors.

**Funding Details:** No funding or grant was received from any institution or organization for this research.

**CRedit Author Statement:** Author 1: Conceptualization and methodology, writing-original draft preparation, visualization, investigation Author 2: formal analysis, writing-review & editing, supervision Author 3: Conceptualization and methodology, investigation

**Ethical Statement:** The study was approved by the KTO Karatay University Faculty of Medicine Non-Pharmaceutical and Medical Device Studies Ethics Committee (Project number: 2021/001). Declaration of Helsinki was complied with at all stages of the study. Consent form was obtained from the individuals participating in the study.

## REFERENCES

- Aile Sosyal Politikalar Bakanlığı Engelli ve Yaşlı Hizmetleri Genel Müdürlüğü, (2014). *United Nations Elderly Guidelines*. <https://www.aile.gov.tr/eyhgm/mevzuat/uluslararası-mevzuat/> [Erişim Tarihi 03.05.2021]
- Altan, S., & Tarhan, S. (2018). Grand parents to grandchild: Value and skill transfer in life long learning. *Bartın University Journal of Educational Research*, 2(1), 26-42.
- Arpacı, F., & Şahin, F. T. (2015). The views of elderly individuals regarding elderly-child interaction. *The Journal of Turkish Social Research*, 1(1), 231-246.
- Aydın, M. Z. (2010). Okulda değerler eğitimi. *Eğitime Bakış*, 6(18), 16-19.
- Benedict, R. (2003). *Patterns of culture*. N. Şarman (Çev.), Payel Yayınları.
- Berger, P. L., & Luckmann, T. (2008). *The social construction of reality: A treatise in the sociology of knowledge*. V. S. Öğütle (Çev.), Paradigma Yayıncılık.
- Botha, A., Berg, H. S. V. D., & Venter, C. A. V. (2009). The Relationship between family of origin and marital satisfaction. *Journal of Interdisciplinary Health Science*, 14(1), 441-447. doi: 10.4102 / hsag.v14i1.441
- Burç, P. E. (2018). A socio-cultural overview of everyday life through marriage and family phenomenons. *Gazi Üniversitesi Sosyal Bilimler Dergisi*, 5(13), 135-141.
- Canatan, A. (2008). Social values and elderly people. *Elderly Issues Research Journal*, 2008(1), 62-71.
- Canatan, K., & Yıldırım, E. (2013). Ailenin tanımı, türevleri ve işlevleri. Canatan, K., & Yıldırım, E. (Ed.), *Aile sosyolojisi içinde* (s.53-63), Açılım Kitap.
- Choi, H. J., & An, J. S. (2020). Effect of grandmother-mother relationship on grandmother-grandchildren ties: Focusing on the mediating effect of coparenting. *Family and Environment Research*, 58(2), 149-161.
- Çapcıoğlu, İ. (2018). Individualizing family in the globalizing society. *Turkish Studies*, 13(2), 19-34.
- Çiftçi, A. (2008). *Ailede yaşlı bireyler*. V. Aile Şurası Aile Destek Hizmetleri Bildirileri. T.C. Başbakanlık Aile ve Sosyal Araştırmalar Genel Müdürlüğü, Ankara.
- Demirutku, K. (2007). *Parenting styles, internalization of values, and the self-concept*. Yayımlanmamış Doktora Tezi, Orta Doğu Teknik Üniversitesi.
- Durak, M. (2016). Yaşlılık döneminde psikososyal ve bilişsel gelişim. Bacanlı, H., & Işık Terzi, Ş. (Ed.), *Yetişkinlik ve yaşlılık gelişimi ve psikolojisi içinde* (s. 275-310), Acilim Kitap.
- Falcke, D., Wagner, A., & Mosmann, C. P. (2008). The relationship between family-of-origin and marital adjustment for couples in Brazil. *Journal of family psychotherapy*, 19(2), 170-186. doi: 10.1080 / 08975350801905020
- Hazer, O. (2012). Factors affecting the perception of the qualities of grandparents by adolescents. *Journal of Faculty of Letters*, 29(1), 123-141.
- İçli, G. (2008). Elderly people and adults. *Elderly Issues Research Journal*, 2008(1), 29-38.

- Kartal, A. (2010). *Büyükanne ve büyükbabalarda torun bakmanın depresyon ve yaşam kalitesine etkisi*. Pamukkale Üniversitesi, Bilimsel Araştırma Projeleri Koordinasyon Birimi.
- Kibar, B. (2008). *The evaluation of functions of families, social-emotional development level and behavior problems of 5-6 years children growing up with and without their grandmothers*. Yayımlanmamış Yüksek Lisans Tezi, Marmara Üniversitesi.
- Luecken, L. J., Kraft, A., & Hagan, M. J. (2009). Negative relationships in the family of origin predict attenuated cortisol in emerging adults. *Hormones and Behavior*, 55(3), 412-417. doi: 10.1016/j.yhbeh.2008.12.007
- Marshall, G. (1999). *Sosyoloji sözlüğü*. O. Akinhay & D. Kömürcü (Çev.), Bilim ve Sanat Yayınları.
- Martinson, V. K. (2005). *How coming to terms with difficulties in the family of origin positively influences adult children's relationship/marital quality*. (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses, (Order No. AAT 3194366).
- Miller, P. H. (2008). *Gelişim psikolojisi kuramları*. İmge Yayınları.
- Oğuz, M. Ö. (2008). *Türkiye'nin somut olmayan kültürel mirası*. Kültür ve Turizm Bakanlığı Yayınları.
- Özabacı, N., & Erkan, Z. (2014). *Aile danışmanlığı, kuram ve uygulamalara genel bir bakış*. Pegem Akademi.
- Özgüven, İ. E. (2000). *Evlilik ve aile terapisi*. PDRM Yayınları.
- Özmete, E. (2010). Aile yaşam kalitesi dinamikleri: Aile iletişimi, ebeveyn sorumlulukları, duygusal, duygusal refah, fiziksel/materyal refahın algılanması. *Uluslararası Sosyal Araştırmalar Dergisi*, 3 (11), 455-465.
- Santrock, J.W. (2011). *Life-Span Development*. Nobel Yayınları.
- Satir, V. (2018). *İnsan yaratmak: Aile terapisinin başyapıtı*. S. Yeniçeri (Çev.), Beyaz Yayınları.
- Sorokin, P. (2005). *Altruistic love*. A. Krich (Der.) & M. Harmancı (Çev.), Say Yayınları.
- Sweeting, H., Ross, N., Hill, M., & Cunningham-Burley, S. (2005). *Grandparents and teen grandchildren: Exploring intergenerational relationships*. Edinburgh: ESRC, Centre for Research on Families and Relationships.
- Topham, G. L., Larson, J. H. & Holman, T. B. (2005). Family of origin predictors of hostile conflict in early marriage. *Contemporary Family Therapy*, 27(1), 101-121. doi: 10.1007/s10591-004-1973-2
- Touraine, A. (2014). *Critique of modernity*. H. Uğur Tanrıöver (Çev.), Yapı Kredi Yayınları.
- Tufan, İ. (2007). *Modernleşme hareketi bağlamında Türkiye'de kuşaklar arasındaki ilişkiler; modernleşme hareketi genç ve yaşlı kuşakların ilişkilerine nasıl bir etki yapıyor?* İsmail Tufan Gerontoloji Enstitüsü.
- Tunca, A., & Durmuş, E. (2019). Investigation of grandmothers' grandchild rearing experiences. *Selçuk University Journal of Faculty of Letters*, (41), 209-226.
- Turgut, İ. (2016). *Çocuk sahibi olan ve olmayan evli kadınların ayrılma anksiyetesi ve yaşam doyumu düzeylerinin incelenmesi*. Yayımlanmamış Yüksek Lisans Tezi, Beykent Üniversitesi.

Türkiye İstatistik Kurumu [TÜİK], *Nüfus ve demografi verileri*.  
<https://data.tuik.gov.tr/Kategori/GetKategori?p=nufus-ve-demografi-109&dil=1>, [Erişim  
Tarihi: 03.05.2021]

Uğur, S. B. (2018). Childhood perception and child rearing practices shaped from past to present.  
*Süleyman Demirel University Faculty of Arts and Sciences Journal of Social Sciences*, 1(45),  
227-247.

Yavuzer, H. (2005). *Ana-baba ve çocuk*. Remzi Kitabevi.

Yıldırım, A., & Şimşek, H. (2005). *Sosyal bilimlerde nitel araştırma yöntemleri*. Seçkin Yayıncılık.

Yiğit Sezgin, A. (2009). *Ömür boyu evliliğin sırları*. Ares Kitap.

## Development of the Inventory of Orientations in Curriculum Theories (IOCT) for Pre-Service Teachers

Ersin Türe<sup>i</sup>

Erzincan Binali Yildirim University

### Abstract

It is known that pre-service teacher training has an impact on orientations, beliefs, and views on teaching and teaching practices. In addition, it was determined that the curriculum theory orientations scale for teachers developed by Türe & Bıkmaz (2023) was not suitable for the sample of undergraduate students of the faculty of education. Because there are structural differences between the teacher sample and the undergraduate student sample. Faculty of Education undergraduate students are individuals who continue to be trained with the aim of training teachers. On the other hand, the pre-service teachers of the sample in which the scale could be developed and applied was selected from third and fourth-year undergraduate students who had completed the course on “Curriculum”. Therefore, the aim of this study is to develop a measurement tool that will determine the curriculum theory orientations of undergraduate students studying in education faculties. In this study, a measurement tool was developed to determine the orientations of pre-service teachers regarding curriculum theories. The IOCT for prospective teachers consists of three scales: OSPCT, OSDCT and OSCECT. OSPCT for pre-service teachers consists of two factors 19 items; OSDCT for pre-service teachers consists of two factors 12 items and OSCECT for pre-service teachers consists of three factors, 19 items. It has been revealed that the structure and items of the scales in the IOCT developed for pre-service teachers differ from the structure and items of the scales in the IOCT developed for teachers by Türe & Bıkmaz (2023).

**Keywords:** IOCT for Pre-Service Teachers, Curriculum Theory Orientations, Pre-Service Teacher

**DOI:** 10.29329/ijpe.2023.603.4

**Submitted:** 28/08/2023

**Accepted:** 28/09/2023

**Published:** 16/10/2023

---

<sup>i</sup> **Ersin Türe**, Assist. Prof. Dr., Education Sciences, Erzincan Binali Yildirim University, ORCID: 0000-0001-8110-575X

**Email:** ersinture@gmail.com

## INTRODUCTION

The achievements of teacher candidates during their teacher education process are among the most significant variables that will underpin their future teaching careers. Theoretical courses and practices in teacher education programs prepare prospective teachers for their future professional lives. Theoretical lessons and practices provide prospective teachers with reflections on their professional lives. These reflections turn into theoretical foundations on which pre-service teachers will continue their professional lives and implement their curriculums.

Studies show that the theories accepted by teachers (Chant, 2002; Cornett, 1990) and their beliefs about the curriculum (Peacock, 2001) shape their instructional decisions and teaching practices. Because teachers' beliefs and theories are one of the most important factors determining curriculum practices (Pajares, 1992; Hasweh, 2003). For this reason, it is important which theoretical orientations pre-service teachers advance in their training process. Curriculum orientation of pre-service teachers shapes their perspectives on the objectives, expected learning outcomes, content, activities carried out, and evaluation processes related to the curriculum. On the other hand, curriculum specialists and teachers, in other words, theorists, and practitioners, do not see eye to eye with each other (Klein, 1992; Donmayer, 1989; McCutcheon, 1985; Vallance 1982). Therefore, to comprehend the tension between theory and practice and the issues of understanding between curriculum specialists and teachers, it is necessary to have knowledge about the theoretical development of teacher candidates.

Determining the variables involved in the formation of teachers' theories will also affect teacher educators' strategies for teacher training (Clark & Peterson, 1986). In addition, it has been stated that pre-service teachers should be supported by teacher educators in the development of internal models related to theory and practice (Harste, Leland, Schmidt, Vasquez, & Ociepka, 2002). It is stated that there is a relationship between reflective thinking levels and the personal theory formation process (Killion, Joellen, & Todnem, 1991). This process may lead to changes in the approach to reflective thinking skills; in other words, it can also contribute to developing pre-service teachers' high-level thinking skills.

In the literature, measurement tools aiming to identify theoretical orientations toward curriculum have been developed. Based on the classification made by McNeil (1977), the "Curriculum Orientation Inventory (COI)" developed by Cheung (2000) and revised by Cheung and Wong (2002) is classified five dimensions as "academic, cognitive processes, technological, humanist, and social restructuring". COI was modified by Rice & Mahlios (2003). It was observed that when the developed measurement tool was adapted to different cultures, some items shifted between factors (Jenkins, 2009). Building on the classification of curriculum theorists into prescriptive, descriptive, and critical-exploratory by Marsh and Willis, 2003; Türe (2017) and Türe & Bıkmaz (2023) developed an orientation inventory of curriculum theories for teachers. In this inventory, three separate scales were developed for prescriptive, descriptive, and critical-exploratory theorists.

According to the literature, it is evident that scales related to curriculum orientations were developed and adapted for teachers by researchers such as Cheung & Ng, 2000; Crummey, 2007; Reding, 2008; Brown, Lake, & Matters, 2011. In Turkey, Eren (2010) adapted the Cheung & Wong (2002) inventory for pre-service teachers. Then, different studies were carried out on pre-service teachers with this inventory (Bay, Gündoğdu, Ozan, Dilekçi, & Özdemir, 2012; Tanrıverdi & Apak, 2014; Yeşilyurt, 2012; Abakay, Şebin & Şahin, 2013). Developing a specific inventory for pre-service teachers in the context of curriculum theories will be useful for changes in the teacher training system.

### **The Philosophical and Theoretical Origins of the Orientation Inventory (IOCT) on Curriculum Theories for Pre-Service Teachers**

Marsh and Willis (2003) classified curriculum theorists into three categories based on groupings made by Macdonald (1971) and Jackson (1992). From this point of view Marsh and Willis



(2003) classified curriculum theorists into the following categories: prescriptive, descriptive and critical-exploratory.

**Table 1. Classification of Paradigms/Perspectives on Curriculum Theories**

Prescriptive	Descriptive	Critical-Exploratory
Social needs- child-centered	Pragmatists	Biographical
Social needs- reconstruction		Phenomenological
Philosophical-academic rationalism		Existential/ psychoanalytic
Social Effectiveness		Gender analysis and feminist pedagogy
Rational/ technical		Cultural reproduction
		Social Reproduction
		Literary artist
		Postmodernism/poststructuralism
		Racist

Source: Marsh and Willis, (2003)

Table 1 provides a classification of curriculum theorists with different approaches. It can be said that prescriptive theorists focus on society, descriptive theorists focus on the individual and more specific groups, and critical-explanatory theorists focus on taking a stance against social and individual inequalities. This study aims to develop the “The Inventory of Orientations in Curriculum Theories (IOCT)” for pre-service teachers.

## METHOD

This section provides information about the study group of the research and the development stages of the inventory. In this context, clustering analysis was performed in the QDA Miner qualitative analysis program to obtain the items during the development phase of IOCT for pre-service teachers. Expert opinions were sought for the obtained items, and the content validity ratios of the items were calculated. Subsequently, validity and reliability analyses of the draft items were performed. For exploratory factor analysis, the SPSS program was used, and for confirmatory factor analysis, the Mplus package program was utilized.

### Study Group

In the 2022-2023 academic year, a study group was formed among the pre-service teachers who received undergraduate education at the Faculty of Education. The fact that the undergraduate students of the education faculty in the study group achieved the curriculum course was used as a criterion. Data were obtained from the study groups to perform exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) during the scale development process (Erkuş, 2012).

A study group of 293 participants was used in the EFA. In the CFA process, study groups consisting of 469 for the Orientation Scale for Prescriptive Curriculum Theories (OSPCT), 466 for the Orientation Scale for Descriptive Curriculum Theories (OSDCT) for pre-service teachers, and 465 for the Orientation Scale for Critical-Explanatory Curriculum Theories (OSCECT) for pre-service teachers were created.

### Item Pool Writing Process of IOCT for Pre-Service Teachers

When reviewing the literature, the main source of the items to be included in a measurement tool is the item pool of IOCT for teachers developed by Türe (2017) and Türe & Bıkmaz (2023). Since the new scale is intended for pre-service teachers, a comprehensive process was undertaken, including re-examination, qualitative clustering analysis using available resources, solicitation of expert opinions, and interviews with a group of 15 pre-service teachers to assess the clarity of the items. The updated literature review was incorporated into the classification framework originally established by Marsh and Willis (2003). Within this context, the works of prescriptive, descriptive, and critical-explanatory theorists were re-evaluated, and new contributions were integrated into the framework. In

the process of composing the items in the inventory, firstly, the sources obtained after the literature review were analyzed by qualitative clustering. As a result of this analysis, dendrograms (clustering charts) belonging to 3 separate document files were obtained. The words in each clustering chart were called from the documents in various combinations. The sentences obtained were converted into items and added to the item pool obtained by Türe (2017) and Türe & Bıkmaz (2023). During this process, sentences that posed challenges in terms of comprehension due to the analysis were re-examined with the assistance of language and subject matter experts. The author conducted a thorough review and editing of all items tailored for pre-service teachers. Following the completion of the item writing process, the items underwent expert validation.

Content Validity Rate is also used as an estimator for content or construct validity. The content validity rates are obtained by collecting the opinions of the experts on the items. For the inventory, opinions were obtained from 6 experts who specialized in 2 measurement and evaluation, 3 curriculum and instruction, and 1 Turkish education. In line with the opinions of 6 specialist, items with a CVR value less than 0.99 were excluded from the item pool.

The scale items were prepared in a 5-point Likert type as 'I totally disagree', 'I do not agree', 'I agree moderately', 'I agree' and 'I totally agree'. Then, the draft item pool form was applied to 15 undergraduate students to determine whether the items were understood or not. As a result of the arrangements made, 46 items were included in the item pool of Orientations Related to Prescriptive Curriculum Theories Scale for pre-service teachers, 38 items were included in the item pool of Orientations Related to Descriptive Curriculum Theories Scale for pre-service teachers, and 51 items were included in the item pool of Orientation Scale Related to Critical-Explanatory Curriculum Theories for pre-service teachers. Then, the inventory was applied to the study groups to perform exploratory factor analysis and confirmatory factor analysis.

## RESULTS

### **Findings Related to the Psychometric Properties of the Scales in the IOCT for Pre-service Teachers**

The psychometric properties of the Orientation Scales Regarding the Prescriptive, Descriptive and Critical-Explanatory Curriculum Theories in IOCT are given below.

### **Testing the Requirements of the IOCT for Pre-service Teachers for Factor Analysis of the Data Sets of OSPCT, OSDCT and OSCECT**

Exploratory factor analysis was performed to reveal the construct validity of the inventory's OSPCT, OSDCT and OSCECT. Since exploratory factor analysis is a parametric test, it is necessary to reveal whether the requirements are met. In this context, it was examined whether the data met the requirements of normality, multivariate normality, linearity, extreme value and multicollinearity. Descriptive statistics of the study group and OSPCT; skewness = .324, kurtosis = .712 for OSDCT; and skewness= .145, kurtosis= .397 values for OSCECT show that normality is achieved. To determine the extreme values, the total scores were converted into standardized z scores. Data exceeding -4 and +4 values were accepted as extreme values. Mahalanobis distances were tested by using regression in order to determine the versatile extreme values, which is another study. Outliers exceeding the critical chi-square value for OSPCT were deleted from the resulting values.

It has also been examined whether there is a multicollinearity problem in the data pattern. The values of VIF for OSPCT are 1.42 and 1.45; the values of VIF for OSDCT are 1.65, 1.28; the OSCECT was 1.21, 1.18, and it was observed that  $VIF < 10$ . Tolerance values for independent variables are .523 and .221 for OSPCT; It was determined that the values of .329, .852 for OSDCT, and .719, .321 for OSCECT were greater than .10. State condition indices (CI) were 6.18 and 21.36 for OSPCT; it was determined that they were between 3.12 and 13.23 for OSDCT and 7.31 to 14.28 for OSCECT and were less than 30. It can be said that this is another sign that there is no multicollinearity problem.

The shapes of the diagrams in the matrix created for multivariate normality and linearity analysis were found to be close to ellipse. In this context, it was seen that the multivariate normality and linearity assumptions were also met. On the other hand, linear, logarithmic, inverse, quadratic and cubic values of variable distributions were examined. Among these values, the linearity score being higher than the others can be seen as another proof.

Factor analysis began by examining the suitability of the dataset, which was assessed using the Kaiser-Meyer-Olkin (KMO) measure. The KMO values obtained were as follows: .940 for OSPCT, .892 for OSDCT, and .758 for OSCECT. For the dataset to be deemed suitable for factor analysis, the KMO value should ideally be above .50 (Büyüköztürk, 2003; Özdamar, 2013). Furthermore, the Bartlett Test, which serves the same purpose, yielded the following results: [ $\chi^2 = 2549,561$ ;  $p < 0.01$ ] for OSPCT, [ $\chi^2 = 4704,359$ ;  $p < 0.01$ ] for OSDCT, and [ $\chi^2 = 3480,817$ ;  $p < 0.01$ ] for OSCECT. These values indicate that factor analysis can indeed be conducted on the specified datasets.

### EFA Results Regarding OSPCT for Pre-service Teachers

As a result of the exploratory factor analysis, 6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 25, 26, 28, 29, 30, 40, 41, 42, 43, 44 and 45 items were excluded from the scale because they had a low item-total correlation, did not show sufficient factor load (those with a factor load below .400) and deteriorated their factor structures.

**Table 2. Factor Analysis of OSPCT for Pre-service Teachers Primary Factor Load Values and Item Total Correlation Results**

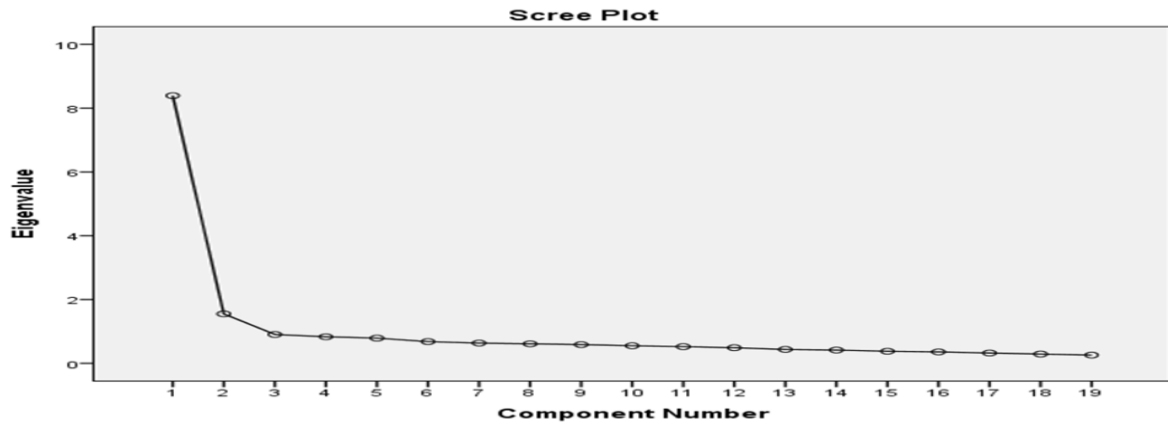
Item No.	First Factor Load Value	Item-Total Correlation	Item No.	First Factor Load Value	Item-Total Correlation
M16	.684	.468	M38	.733	.613
M24	.684	.484	M39	.685	.500
M27	.731	.558	M46	.666	.470
M31	.651	.432	M1	.586	.520
M32	.719	.528	M2	.653	.654
M33	.638	.430	M3	.676	.623
M34	.692	.479	M4	.515	.478
M35	.726	.620	M5	.569	.454
M36	.666	.558	M7	.596	.594
M37	.708	.576			

According to Table 2., it was determined that because of the exploratory factor analysis, the primary factor loads of the remaining items in the scale did not fall below .515 and the item-total correlations did not fall below .430. It is seen that the primary factor loading values of the items included in the scale vary between .515 and .731. It was determined that the item-total correlations ranged between .430 and .623. The anti-image correlation values of the items are given in Table 3.

**Table 3. Anti-image Correlation Values of the Items of OSPCT for Pre-Service Teachers**

Item No.	Anti-Image Correlation Values	Item No.	Anti-Image Correlation Values
M16	.951	M38	.937
M24	.959	M39	.945
M27	.939	M46	.937
M31	.958	M1	.889
M32	.947	M2	.907
M33	.955	M3	.935
M34	.945	M4	.918
M35	.951	M5	.949
M36	.936	M7	.937
M37	.946		

According to Table 3., it was determined that the anti-image correlation values of the items ranged between .889 and .959. It is seen that the anti-image values of the items in the scale do not fall below .50. According to Özdamar (2013), this situation shows that the contribution of the load values of the items to the factor structure is high. The Scree Plot graph obtained from the exploratory factor analysis is presented in Figure 1.



**Figure 1. Scree Plot of OSPCT**

In Figure 1, it is seen that a flattening started in the graph after the second factor, and this continues. This shows that there is no new factor after the flattening point of the graph (Büyüköztürk, 2003). Accordingly, the graph gives the idea that the scale consists of two factors.

**Table 4. Factors Obtained from Varimax Rotation of OSPCT for Pre-service Teachers and Loads of Items Underneath These Factors**

	Factors			
	1	2	Cronbach Alpha Value	Percentage of Variances Explained
M16	.544		.915	44,160
M24	.628			
M27	.681			
M31	.579			
M32	.642			
M33	.604			
M34	.568			
M35	.765			
M36	.737			
M37	.733			
M38	.755			
M39	.657			
M46	.633			
M1		.684	.825	8,156
M2		.770		
M3		.728		
M4		.576		
M5		.627		
M7		.746		
Variance Explained by Two Factors = 52,315 %				
Cronbach Alpha = .926				

When the table 4. is examined;

The remaining items were placed under two factors. After these processes, it was seen that there were 19 items on the scale. The variance explained by the items under the first factor is % 44.160; The variance explained by the second factor was % 8,156 and the total explained variance rate of the scale was % 52,315. The Cronbach–Alpha internal consistency coefficient of the first factor of the scale was .915; The Cronbach-Alpha internal consistency coefficient of the second factor was .825 and the Cronbach-Alpha internal consistency coefficient of the scale was found to be .926. In this case, it can be said that all items have a high contribution to reliability (Özdamar, 2013).

- Items 16, 24, 27, 31, 32, 33, 34, 35, 36, 37, 38, 39 and 46 constitute a sub-dimension (first sub-dimension),
- Items 1, 2, 3, 4, 5 and 7 constitute a sub-dimension (second sub-dimension),

The inventory was finalized as a result of the exploratory factor and reliability analysis on *OSPCT for Pre-Service Teachers*. According to this;

- Items 16, 24, 27, 31, 32, 33, 34, 35, 36, 37, 38, 39 and 46, *items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, Renumbered 12 and 13*. The sub-dimension formed by these items is " *The deterministic structure of curriculum*",
- Items 1, 2, 3, 4, 5 and 7 have been renumbered *items 14, 15, 16, 17, 18 and 19*. The sub-dimension formed by these items was named the " *Social reproduction function of curriculum*" sub-dimension.

#### **EFA Results of the Inventory Related to OSDCT for Pre-Service Teachers**

For Pre-service teachers As a result of the exploratory factor analysis of OSDCT, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 26, 27, 28, 30, 31, 32, 33, 34, 36, and 37 items were excluded from the scale because they had a low item-total correlation, did not show sufficient factor load (those with a factor load below .400) and deteriorated their factor structures. Item factor load values and item-total correlations are given in Table 5, and the anti-image correlation values of the items are given in Table 6.

**Table 5. Factor Analysis Primary Factor Load Values and Item Total Correlation Results of OSDCT for Pre-service Teachers**

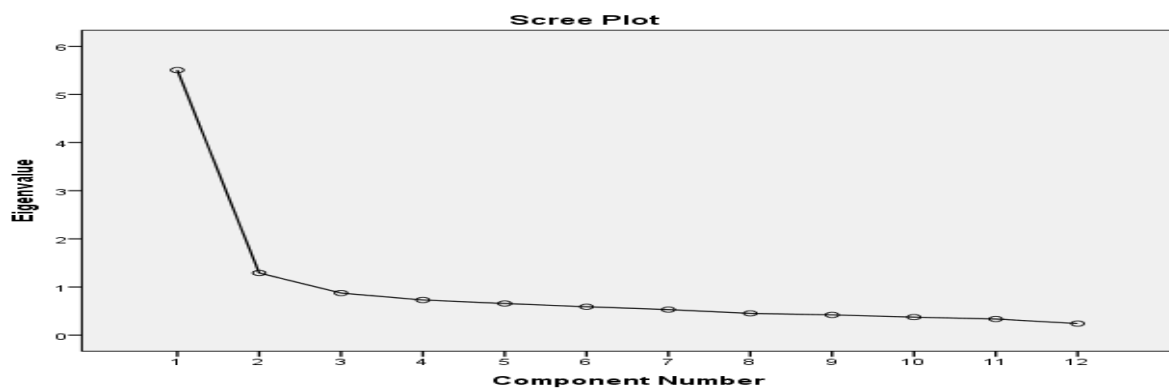
Item No.	First Factor Load Value	Item-Total Correlation	Item No.	First Factor Load Value	Item-Total Correlation
M1	.705	.507	M29	.603	.487
M2	.680	.521	M35	.666	.517
M5	.595	.494	M38	.612	.495
M10	.677	.447			
M16	.670	.583			
M22	.712	.623			
M23	.688	.704			
M24	.761	.779			
M25	.746	.741			

According to the Table 5, it was determined that the primary factor loads of the remaining items in the scale did not fall below .595 and the item-total correlations did not fall below .447 as a result of the exploratory factor analysis. It is seen that the primary factor loading values of the remaining items vary between .595 and .761. The item-total correlations vary between .447 and .779.

**Table 6. Anti-image Correlation Values of the Items of OSDCT for Pre-service Teachers**

Item No.	Anti-Image Correlation	Item No.	Anti-Image Correlation
M1	.889	M29	.913
M2	.887	M35	.929
M5	.911	M38	.930
M10	.947		
M16	.890		
M22	.936		
M23	.910		
M24	.872		
M25	.888		

According to the Table 6, it was determined that the anti-image correlation values of the items ranged between .872 and .947. These results show that the contribution of the load values of the items to the factor structure is high.



**Figure 2. Scree Plot Chart of OSDCT for Pre-service Teachers**

In Figure 2. it is seen that a flattening started in the graph after the second factor and this continues. It shows that there is no new factor after the point where the graph starts to flatten (Büyüköztürk, 2003). Accordingly, the graph gives the idea that the scale can consist of two factors.

**Table 7. Factors Obtained from Varimax Rotation of OSDCT for Pre-Service Teachers and Loads of Items Underneath These Factors**

	Factors		Cronbach Alpha Value	Percentage of Variances Explained
	1	2		
M1	.590		.815	30,013
M2	.666			
M5	.576			
M10	.522			
M16	.742			
M29	.682		.860	26,639
M35	.676			
M38	.687			
M22		.732		
M23		.818		
M24		.842		
M25		.819		

Variance Explained by Three Factors = % 56,652

Cronbach Alpha = .866

The remaining items were placed under two factors. After these processes, it was seen that there were 12 items on the scale. The variance explained by the items under the first factor is %30,013; The variance explained by the second-factor was % 26.639, and the total explained variance rate of the scale was % 56.652. The Cronbach–Alpha internal consistency coefficient of the first factor

of the scale was .815; The Cronbach-Alpha internal consistency coefficient of the second factor was .860 and the Cronbach-Alpha internal consistency coefficient of the scale was found to be .866. In this case, it can be said that all items have a high contribution to reliability (Özdamar, 2013).

According to the Table 7:

- Items 1, 2, 5, 10, 16, 29, 35 and 38 constitute the first sub-dimension (first sub-dimension),
- Items 22, 23, 24, and 25 constitute the second dimension (second sub-dimension).

The inventory was finalized as a result of the exploratory factor and reliability analysis on *OSDCT for Pre-Service Teachers*. According to this;

- Items 1, 2, 5, 10, 16, 29, 35 and 38' are renumbered as items 1, 2, 3, 4, 5, 6, 7 and 8. The sub-dimension formed by these items is "*The nature and structure of the Curriculum*",
- Items 22, 23, 24 and 25 have been renumbered as items 9, 10, 11, and 12. The sub-dimension formed by these items was named "*The role of the teacher in the context of curriculum*" sub-dimension.

#### **EFA Results of the Inventory Related to OSCECT for Pre-service Teachers**

OSCECT for pre-service teachers As a result of the exploratory factor analysis using the factor analysis method, 1, 2, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 20, 23, 24, 26, 27, 28, 30, 32, 33, 34, 35, 36, 37, 39, 40, 43, 47, 48, 50 and 51 numbered items have low item-total correlation, they do not show sufficient factor load (those with a factor load below .400) and factor structures It was decided to exclude them from the scale due to Item factor load values and item-total correlations are given in Table 7, and the anti-image correlation values of the items are given in Table 8.

**Table 8. Factor Analysis Primary Factor Load Values and Item Total Correlation Results of OSCECT for Pre-service Teachers**

Item No.	First Factor Load Value	Item-Total Correlation	Item No.	First Factor Load Value	Item-Total Correlation
M12	.680	.641	M31	.744	.557
M13	.652	.685	M37	.777	.547
M14	.633	.727	M40	.702	.532
M16	.628	.486	M41	.757	.582
M30	.653	.472	M43	.688	.567
M33	.600	.425	M44	.752	.639
M24	.760	.582	M45	.769	.693
M25	.787	.625	M46	.739	.617
M27	.542	.421	M47	.697	.568
M29	.750	.567			

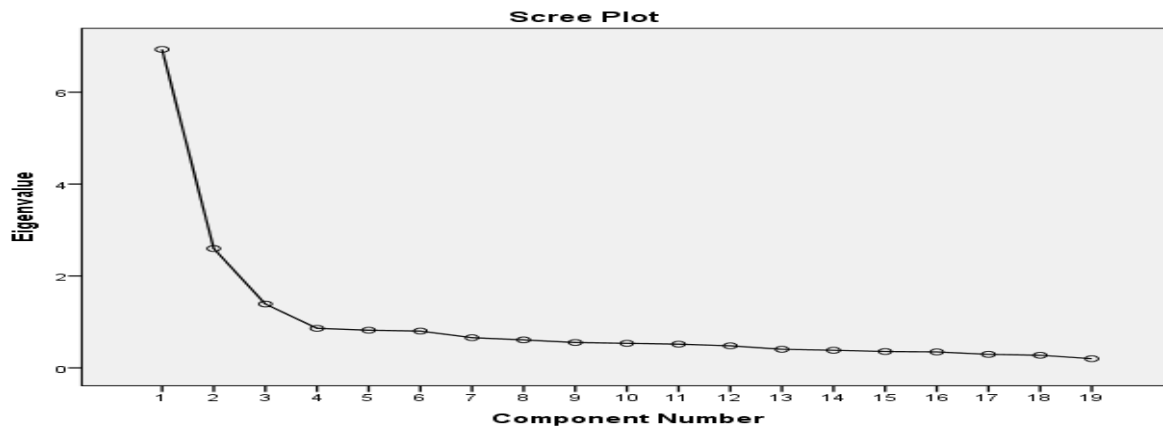
According to Table 8, it was determined that as a result of the exploratory factor analysis, the primary factor loads of the remaining items in the scale did not fall below .542 and the item-total correlations did not fall below .421. It is seen that the primary factor loading values of the items vary between .542 and .787. The item-total correlations vary between .421 and .727.

**Table 9. Anti-image Correlation Values of OSCECT's Items**

Item No.	Anti-Image Correlation	Item No.	Anti-Image Correlation
M12	.923	M31	.765
M13	.896	M37	.944
M14	.887	M40	.913
M16	.937	M41	.931
M30	.929	M43	.934
M33	.922	M44	.905
M24	.738	M45	.880
M25	.748	M46	.927
M27	.866	M47	.938
M29	.761		

According to Table 9; it was determined that the anti-image correlation values of the items varied between 0.738 and 0.944. This result shows that the contribution of the load values of the items to the factor structure is high.

The Scree Plot obtained because of the exploratory factor analysis and given in Figure 3 gives the impression that the scale has three factors.



**Figure 3. Scree Plot Chart Showing the Factor Count of OSCECT**

In the figure, after the third factor, the graph shows that a flattening has started and continues. Accordingly, the graph gives the idea that the scale may consist of three factors. In exploratory factor analysis, the "Varimax" rotation method was applied to the data set to show whether there are sub-dimensions in the scale and if there are sub-dimensions, which items are gathered under which sub-dimensions (Büyüköztürk, 2003; Özdamar, 2013). The applied "Varimax" rotation results are shown in Table 9.



**Table 10. For Pre-service teachers Factors Obtained from Varimax Rotation of OSCECT and Loads of Substances Underneath These Factors**

	Factors			Cronbach Alpha Valu	Percentage of Variances Explained
	1	2	3		
M44	.754				
M45	.791				
M46	.752				
M37	.746			.906	20,026
M43	.734				
M47	.729				
M40	.678				
M41	.659				
M14		.834			
M13		.774			
M12		.745			
M16		.617		.836	17,750
M30		.561			
M33		.498			
M25			.787		
M24			.760		
M29			.749	.788	13,673
M31			.742		
M27			.449		

Variance Explained by Three Factors = %57.449

Cronbach Alpha = .875

According to the Table 10. the remaining items were placed under three factors. After these processes, it was seen that there were 19 items in the scale. The variance explained by the items under the first factor is % 20.026; The variance explained by the second factor is %17.750; the variance explained by the third factor. The total explained variance rate of the scale was %57.449, of which 13.673. The Cronbach–Alpha internal consistency coefficient of the first factor of the scale was .906; Cronbach–Alpha internal consistency coefficient of the second factor was .836; The Cronbach–Alpha internal consistency coefficient of the second factor was .788 and the Cronbach–Alpha internal consistency coefficient of the scale was .875. In this case, it can be said that all items have a high contribution to reliability (Özdamar, 2013).

Thus, the total score for the scale was obtained.

- Items 37, 40, 41, 43, 44, 45, 46 and 47 constitute a sub-dimension (first sub-dimension),
- Items 12, 13, 14, 16, 30 and 33 constitute a sub-dimension (second sub-dimension),
- It was determined that items 24, 25, 27, 29 and 31 constitute a sub-dimension (third sub-dimension).

For Pre-service teachers, the inventory was finalized because of the exploratory factor and reliability analysis performed on the OSCECT.

- Items 37, 40, 41, 43, 44, 45, 46 and 47 have been renumbered as items 1, 2, 3, 4, 5, 6, 7 and 8. The sub-dimension formed by these items, "*Characteristics of learners in the education process*",
- Items 12, 13, 14, 16, 30 and 33 have been renumbered as items 9, 10, 11, 12, 13 and 14. The sub-dimension created by these items is "*Awareness of implicit and established oppression, discrimination and inequality*".

- Items 24, 25, 27, 29 and 31 have been renumbered items 15, 16, 17, 18 and 19. The sub-dimension formed by these items was named as the sub-dimension of "*Awareness of deterministic curriculum*".

### **Testing the Requirements of the IOCT for Pre-service Teachers for Confirmatory Factor Analysis of the Data Sets of OSPCT, OSDCT and OSCECT**

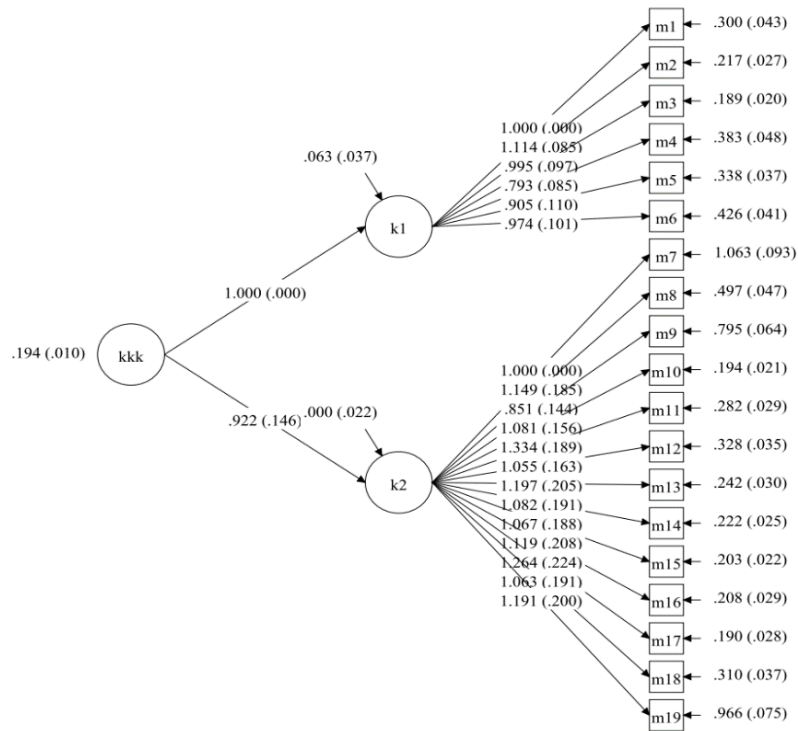
OSPCT, which is the first scale of the inventory, confirmatory factor analysis was performed to determine whether the resulting structure was confirmed or not. Since confirmatory factor analysis is a parametric test, it is necessary to reveal whether the requirements are met. In this context, it was examined whether the requirements of normality, multivariate normality, linearity, extreme value and multicollinearity were met.

When the descriptive statistics of the study group were examined, skewness= -.263 and kurtosis= -.171 for OSPCT; The values of skewness= .281, kurtosis= -.573 for OSDCT, and skewness= -.198, kurtosis= .072 for OSCECT indicate that normality is achieved. To determine the extreme values, the total scores were converted into standardized z scores. Data exceeding -4 and +4 values were accepted as extreme values. Another study is to determine multidirectional extreme values. Mahalanobis distances were tested using Regression to determine multi-directional extreme values. Outliers exceeding the critical chi-square value were deleted from the resulting values.

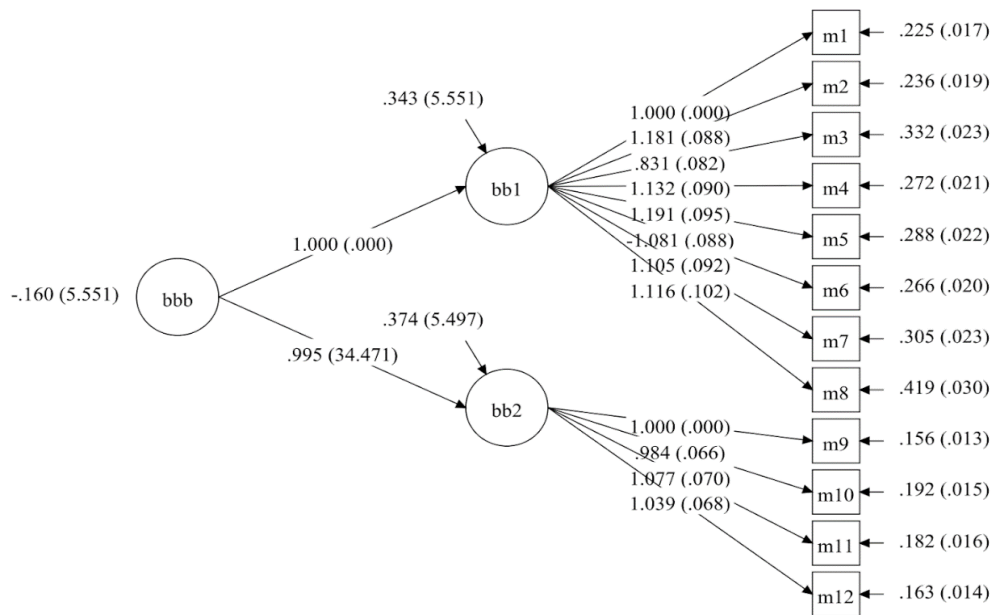
It has also been examined whether there is a multicollinearity problem in the data pattern. In this context, variance increase factors (VIF), tolerance values for independent variables, and state condition index (CI) were examined. VIF values for OSPCT are 1.014 and 1.120; It can be said that there is no multicollinearity problem since it is between 1.542 and 1.426 for OSDCT and between 1.123 and 1.196 for OSCECT and these values are  $VIF < 10$ . Tolerance values for independent variables are .875 and .941 for OSPCT; It was found between .705 and .802 for OSDCT and between .845 and .935 for OSCECT. The fact that these values are greater than .10 can be said to indicate that there is no multicollinearity problem. 11,337 and 12,564 for CI's OSPCT; 13.456 and 18.124 for OSDCT and 7.653 and 14.127 for OSCECT between them were determined. The fact that these values are less than 30 can be shown as another sign that there is no multicollinearity problem. To examine the multivariate normality and linearity, the matrices formed from the scatter diagram were examined. It has been revealed that the shapes of the diagrams in the matrix are close to the ellipse. On the other hand, linear, logarithmic, inverse, quadratic and cubic values of variable distributions were examined. High linearity scores among these values can be seen as another proof. These values show that confirmatory factor analysis can be performed on data sets.

### **Confirmatory Factor Analysis Results of OSPCT, OSDCT, and OSCECT for Pre-service Teachers**

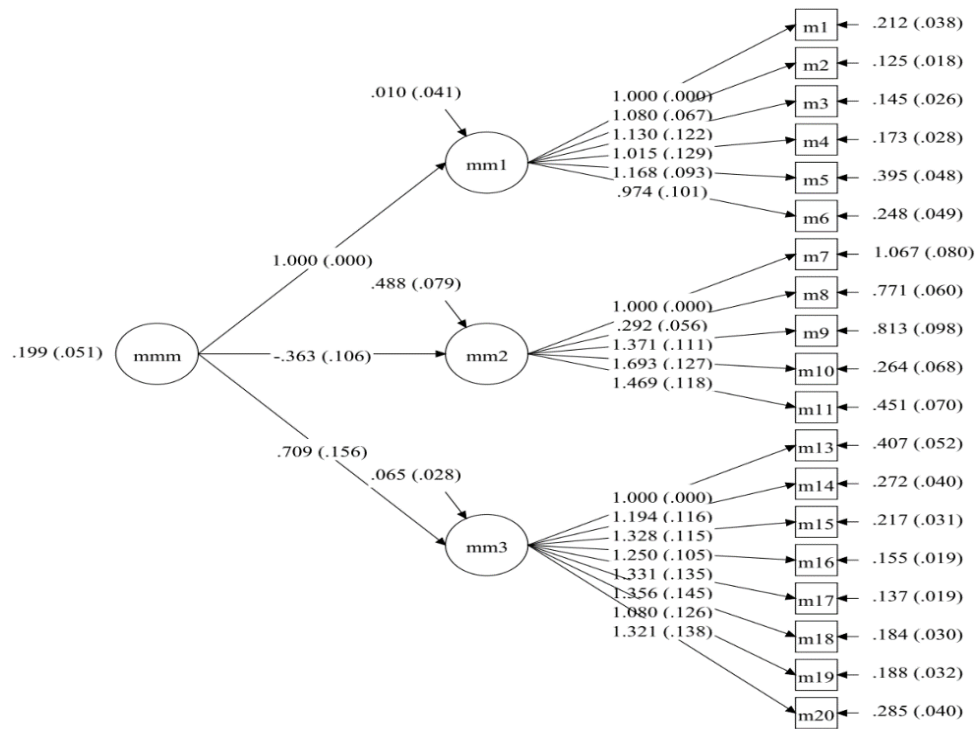
Confirmatory factor analysis was performed by applying the developed scale to different samples. Figures 5, 6 and 7 show the models resulting from Confirmatory Factor Analysis.



**Figure 4. Confirmatory Factor Analysis Model of OSPCT for Pre-service Teachers**



**Figure 5. Confirmatory Factor Analysis Model of OSDCT for Pre-Service Teachers**



**Figure 6. Confirmatory Factor Analysis Model for OSCECT for Pre-Service Teachers**

According to the Figure 4, it is seen that the Chi-square and degrees of freedom values obtained because of CFA for OSPCT are  $\chi^2=428.812$ , ( $sd=150$ ,  $p<.01$ ) and a ratio of  $\chi^2/sd= 2.86$  was obtained. When Figure 5 is examined, it is seen that the Chi-square and degrees of freedom values obtained because of CFA for OSCECT are  $\chi^2=198.270$ , ( $sd=52$ ,  $p<.01$ ) and the ratio is  $\chi^2/sd= 3.81$ . When Figure 6 is examined, it is seen that the Chi-square and degrees of freedom values obtained because of CFA for OSCECT are  $\chi^2=389.323$ , ( $sd=149$ ,  $p<.01$ ) and a ratio of  $\chi^2/sd=2.61$  was obtained.

The fact that these ratios are below 4 indicates an acceptable fit (Jöreskog and Sörbom, 1993; Sümer, 2000; Kline, 2005). In this study, it can be said that the fit between the model obtained as a result of CFA and the data is acceptable.

The fit values obtained because of CFA are summarized in Table 11.

**Table 11. Fit Indices Obtained as a result of CFA.**

	$\chi^2$	$h_d$	$\chi^2/s_d$	RMSEA	SRMR	TLI	CFI
OSPCT	428.812	150	22.86	.064	.059	.855	.872
OSDCT	198.270	52	3.81	.079	.042	.917	.935
OSCECT	389.323	149	2.61	.060	.086	.888	.903

It can be said that one of the most used indices of lack of fit in CFA is RMSEA. The fact that the RMSEA index is .05 and less than this value is an indicator of model-data fit; however, it is stated that this value can be accepted up to .08 (Browne & Cudeck, 1993; Hu & Bentler, 1999; Şimşek, 2007; Vieira, 2011). The RMSEA value in this study was .064 for OSPCT; The values of .079 for OSDCT and .060 for OSCECT can be accepted as an indicator of fit for these models.

It can be said that the SRMR value lower than “0.08” in CFA (Şimşek, 2007) is acceptable for the model to be compatible with the real data. As a result of CFA, the concordance values for OSPCT were SRMR= .059; SRMR= .042 for OSDCT and SRMR= .086 for OSCECT. According to these results, it can be said that the data fit of the models is acceptable.

TLI and CFI values of .95 and above in DFA indicate that model data fit corresponds to “perfect fit”, CFI values close to .90 (Hu & Bentler, 1998) and TLI values above .85 (Doğan, 2013). It is an indicator that it is acceptable (Bentler, 1990; Sümer, 2000; Şimşek, 2007). As a result of the analysis, TLI=.855, CFI=.872 for OSPCT; TLI=.917, CFI=.935 for OSDCT and TLI=.888, CFI=.903 for OSCECT. According to these results, it can be said that the data fit of the models is acceptable.

The main purpose of CFA is to show the level of fit of a defined model with the data obtained (Sümbüloğlu & Akdağ, 2009). In this context, it can be said that the two-dimensional structure of OSPCT and OSDCT and the three-dimensional structure of OSCECT are acceptable according to the fit statistics obtained from confirmatory factor analysis.

## CONCLUSION AND DISCUSSION

In this study, a measurement tool was developed to determine the orientations of pre-service teachers regarding curriculum theories. A new culture-specific measurement tool has been developed that can contribute to the teacher training process. The IOCT for prospective teachers consists of three scales: OSPCT, OSDCT and OSCECT. OSPCT for pre-service teachers consists of 19 items, OSDCT for pre-service teachers consists of 12 items and OSCECT for pre-service teachers consists of 19 items. The highest score that can be obtained from OSPCT for pre-service teachers is 95, and the lowest is 19. The highest score that can be obtained from OSDCT for pre-service teachers is 60 and the lowest is 12; The highest score that can be obtained from the OSCECT for pre-service teachers is 95 and the lowest is 19. All three scales are evaluated within themselves. Thus, it can be determined to what extent a teacher has a prescriptive, descriptive, or critical-explanatory curriculum orientation.

The reason why Marsh and Willis (2003) classification for curriculum specialists/theorists was used in this study is that this classification is thought to have a stronger distinction. This inventory was carried out on pre-service teachers who took the Curriculum course. Therefore, having taken the Curriculum course during the application process of the inventory should be accepted as a criterion. This is because, for the development of an orientation towards curriculum theories, pre-service teachers need to have experienced the concept of curriculum for at least one semester.

When the Turkish literature is examined, it is seen that Eren (2010) adapted the "Educational Programs Orientation Inventory" to Turkish culture through teacher candidates. This inventory, which was later adapted to Turkish culture, was used in the sample of pre-service teachers by Bay, Gündoğdu, Ozan, Dilekçi & Özdemir (2012), Tanrıverdi & Apak (2014), Yeşilyurt (2012), Abakay, Şebin & Şahin (2013), Eren & Çetin (2018) and Şahin (2020). It is noteworthy that in research conducted in Turkey, a measurement tool developed on a sample of teachers, whose structure varies in different cultures, is used in the sample of teacher candidates.

In the studies conducted in the field of education in Turkey, it is seen that the samples generally concentrate on the pre-service teachers studying at the faculties of education. For this reason, a measurement tool has been developed to determine the orientations of pre-service teachers regarding curriculum theory in Turkey.

It has been revealed that the structure and items of the scales in the IOCT developed for pre-service teachers differ from the structure and items of the scales in the IOCT developed for teachers by Türe (2023) and Türe & Bıkmaz (2023). Because there are structural differences between the teacher sample and the undergraduate student sample. Faculty of Education undergraduate students are individuals who continue to be trained with the aim of training teachers. On the other hand, the participants of the sample in which the scale could be developed and applied were selected from third and fourth-year undergraduate students who had completed the course on “Curriculum”. Due to the structural differences of the participants, the IOCT for Pre-service teachers, the sample of which was undergraduate students of the Faculty of Education. For this reason, the item pool of the scales in the inventory was prepared again.

As a result of the analysis conducted on the data collected from the undergraduate student sample, it was reported that the number of factors of the scales and the number of items in the factors changed. Therefore, IOCT was developed for teachers by Türe (2023) and Türe & Bıkmaz (2023) has one-dimensional structure of OSPCT and OSDCT and the three-dimensional structure of OSCECT. But in this study, IOCT was developed for per-service teachers by researcher has the two-dimensional structure of OSPCT and OSDCT and the three-dimensional structure of OSCECT. Therefore, the importance of creating a new scale specifically tailored to pre-service teachers can be emphasized.

**Conflicts of Interest:** No potential conflict of interest was declared by the authors.

**Funding Details:** The authors did not receive any funding or financial support for the research, authorship, and/or publication of this article.

**CRedit Author Statement:** The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

**Ethical Statement:** It was accepted with the decision numbered 11/17 taken at the session numbered 11, dated 30 November 2022, of the EBYU Human Research Educational Sciences Ethics Committee.

## REFERENCES

- Abakay, U., Şebin, K. ve Şahin, M.Y. (2013). Curriculum Orientation of Pre-Service Physical Education Teachers. *Life Sci J*, 10 (3): 2161-2166.
- Bay E, Gündoğdu K, Ozan C, Dilekçi D. ve Özdemir D., (2012). İlköğretim Öğretmen Adaylarının Program Yaklaşımlarının Analizi. *Uluslararası Eğitim Programları ve Öğretim Çalışmaları Dergisi*; 2(3), 15-28.
- Brown, G. T. L., Lake, R. and Matters, G. (2011). New Zealand and Queensland teachers' conceptions of curriculum: Potential jurisdictional effects of curriculum policy and implementation. *Curriculum Perspectives*, 31(3), 33-48.
- Büyüköztürk, Ş. (2003). *Sosyal bilimler için veri analizi el kitabı istatistik, araştırma deseni spss uygulamaları ve yorum*, Ankara: PegemA Yayıncılık.
- Chant, R. H. (2002). The impact of personal theorizing on beginning teaching: Experiences of three social studies teachers. *Theory and Research in Social Education*, 30 (4), 516-540.
- Cheung, D. (2000). Measuring teachers' meta-orientations to curriculum: application of hierarchical confirmatory factor analysis. *Journal of Experimental Education*, 68, 149-165.
- Cheung, D. and Ng, P. H. (2000). Science teachers' beliefs about curriculum design. *Research in Science Education* (30), 357-75.
- Cheung, D. ve Wong, H. W. (2002). Measuring teacher beliefs about alternative curriculum designs. *Curriculum Journal*, 13 (2), 225-248.
- Clark, M. C. ve Peterson, P. L. (1986). *Teachers' thought processes*. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (255-298). New York: Macmillan
- Cornett, J. W. (1990). Teacher thinking about curriculum and instruction: A case study of a secondary social studies teacher. *Theory and Research in Social Education*, 18 (3), 248-273.

- Crummey, M. (2007). Curriculum orientations of alternative education teachers. University of Kansas. ProQuest Dissertations and Theses, Retrieved from <http://search.proquest.com/docview/-304860138?accountid=8403>
- Dommoier, R. (1989). Theory, practice and the double-edged problem of idiosyncrasy. *Journal of Curriculum and Supervision*, 4, 257-270.
- Eren, A., (2010). Öğretmen adaylarının program inançlarının görünüm analizi. *Kastamonu Eğitim Dergisi*, 18(2), 379-388.
- Erkuş, A. (2011). *Davranış bilimleri için bilimsel araştırma süreci*. Ankara: Seçkin Yayıncılık.
- Harste, J., Leland, C., Schmidt, K., Vasquez, V. and Ociepka, A. (2002). Practice makes practice, or does it? The relationship between theory and practice in teacher education.(An educology of teacher education.). *International Journal of Educology*, 16, (2), 116-191.
- Hasweh, M. Z. (2003). Teacher accommodative change. *Teaching and Teacher Education*, 19, 421-434.
- Henson, K. (1995). *Curriculum development for education reform*. New York: Harper Collins College.
- Hu L. T. and Bentler P.M. (1999). Cut off criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, (6)1, 1-55
- Jackson, P. W. (1992). Conceptions of Curriculum and Curriculum Specialists in: P.W.Jackson, (Ed.) *Handbook of Research on Curriculum: A project of the American Educational Research Association*, Part 1, Macmillan: New York.
- Jenkins, S. B. (2009). Measuring teacher beliefs about curriculum orientations using the modified-curriculum orientations inventory. *Curriculum Journal*, 2 (20), 103-120.
- Klein, F. (1992). A Perspective on the gap between curriculum theory and practice. *Theory Into Practice*, 31 (3), 191-197.
- Killion, J. P. and Guy R. T. (1991). A process for personal theory building. *Educational Leadership*, 48 (6), 14-16.
- Macdonald, J. B. (1971). Curriculum theory. *The Journal of Educational Research*, 64, 196-200.
- Marsh, J. C. and Willis, G. (2003). *Curriculum: Alternative approaches, ongoing issues*. Prentice Hall: New Jersey.
- McNeil, J. D. (1977). *Curriculum: A comprehensive introduction*. New York, NY: Harper-Collins.
- McCutcheon, G. (1985). Curriculum theory/curriculum practice: A gap or the Grand Canyon? In A. Molnar (Ed.), *Current thought on curriculum* (45-52). Alexandria, VA.
- Miller, D. L. (2011). Curriculum theory and practice: What's your style? *Phi Delta Kapan*, 92, 32-39.
- Ornstein, A. C. and Hunkins, F. P. (1998). *Curriculum: Foundation, principles, and issues*. Pearson Education Inc.: Boston
- Özdamar, K. (2013). *Paket programlar ile istatistiksel veri analizi* (9. Baskı). Nisan Kitabevi: Eskişehir.

- Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy product. *Review of Educational Research*, 62, (3), 307-332.
- Peacock, M. (2001). Pre-service ESL teachers' beliefs about second language learning: A longitudinal study. *System*, 29 (2), 177-195.
- Peercy, M. M. (2012). Problematizing the theory-practice gap: How ESL teachers make sense of their preservice education. *Journal of Theory and Practice in Education*, 8 (1), 20-40.
- Reding, C. (2008). *Curricular orientations of catholic school teachers and administrators*. University of Kansas. ProQuest Dissertations and Theses, Retrieved from <http://search.proquest.com/docview/-304616634?accountid=8403>
- Rice, S., & Mahlios, M.C., (2004). Teachers' Views of Curriculum Orientations: The Hedgehog V. the Fox. Paper presented at the American Educational Studies Association Annual Meeting, Kansas City
- Stipek, D. J., Givvin, K. B., Salmon, J. M. and MacGyvers, V. L. (2001). Teachers beliefs and practices related to mathematics instruction. *Teaching and Teacher Education*, 7 (2), 213-226.
- Sümbüloğlu K. ve Akdağ B. (2009). *İleri biyoistatistiksel yöntemler*. Ankara: Hatipoğlu
- Sümer, N. (2000). Yapısal eşitlik modelleri: Temel kavramlar ve örnek uygulamalar. *Türk Psikoloji Yazıları*, (3)6, 49-73
- Şimşek, Ö.F. (2007). *Yapısal eşitlik modellemesine giriş: Temel ilkeler ve LISREL uygulamaları*. İstanbul: Ekinoks Yayınları
- Tanrıverdi, B. ve Apak, Ö. (2014). Pre-service teachers' beliefs about curriculum orientations. *Procedia - Social and Behavioral Sciences*, 116, 842 – 848.
- Türe, E. (2017). *Öğretmenlerin eğitim programı teorilerine ilişkin yönelimleri ve öğrenme-öğretme sürecine yansımaları*. (Unpublished doctorate dissertation). Ankara Üniversitesi, Ankara, Türkiye.
- Ture, E. & Bikmaz, F. (2023). Development Study of The Inventory of Orientations in Curriculum Theories (IOCT) (From Qualitative Cluster Analysis to Quantitative Confirmatory Factor Analysis). *Educational Policy Analysis and Strategic Research*, 18(2), 107-132. doi: 10.29329/epasr.2023.548.6
- Vallance, E. (1982). The practical uses of curriculum theory. *Theory into Practice*, 21 (1), 4-10.
- Vieira A.L. (2011). *Preparation of the analysis. Interactive LISREL in practice*. London: Springer
- Yeşilyurt, E. (2013). Program Geliştirme Dersinin Öğretmen Adaylarının Program Geliştirmeye İlişkin Bilişsel Farkındalık Düzeyine Etkisi. *Kuramsal Eğitimbilim Dergisi*, 6 (3), 316-342.



## Study of Variables Predicting Teachers' Organizational Happiness Levels with Ordinal Logistical Regression Analysis

**Mehmet Sabir Çevik<sup>i</sup>**

National Ministry of Education

**Methi Çelik<sup>ii</sup>**

National Ministry of Education

### Abstract

This study aims to determine the variables that predict teachers' organizational happiness levels. The study is quantitative in the predictive correlational type, which is one of the general screening models. The data of the study were analysed with ordinal logistic regression. The sample group of the study consists of 605 teachers working in pre-school, primary, secondary and high schools in Çankaya district of Ankara province with the stratified sampling method. "Organizational Happiness Scale" and "Empowering Leadership Scale" were used as assessment tools in the study. The organizational happiness level of teachers, which is the dependent variable of the study, was defined as a three-category variable in the form of low, medium and high with the K-means clustering algorithm. In the study, it was determined that only marital status, socio-economic level of the school and empowering leadership behaviours predicted teachers' organizational happiness levels significantly. The order of importance regarding the predictive level of the predictor variables, from the largest to the smallest, is the school with a high socio-economic level, the school with a medium level of empowering leadership behaviours, marital status and socio-economic level. Based on the results obtained, various suggestions have been made in the research to improve the socio-economic environment of schools as educational organizations and to support the behaviour of school administrators to empower teachers.

**Keywords:** Organizational Happiness, Empowering Leadership, Educational Organizations, Regression, Sequential Logistic (Ordinal) Regression.

**DOI:** 10.29329/ijpe.2023.603.5

**Submitted:** 26/04/2022

**Accepted:** 31/08/2023

**Published:** 16/10/2023

---

<sup>i</sup> **Mehmet Sabir Çevik, Dr.,** Siirt City Centre Yunus Emre Primary School, National Ministry of Education, ORCID: 0000-0002-8817-4747

**Correspondence:** sahic1980@gmail.com

<sup>ii</sup> **Methi Çelik, Dr.,** Çankaya District Directorate of National Education, National Ministry of Education, ORCID: 0000-0003-3806-4985

## INTRODUCTION

Organizations need many material and moral resources in their life cycle. While the main material resources in organizations are equipment and materials; the main element of moral resources is human. The fact that organizations consist of people has made the human element more important in organizational processes. The human element, unlike other elements, contains negative emotions such as "hopelessness, pessimism, intolerance and selfishness", as well as positive emotions such as "sacrifice, love, respect, honesty and helpfulness". Well-being in the individual sense is one of the positive emotions that come to the fore due to the concept, content and characteristics of the concept expressed as "organizational happiness" in relation to the organization. As a matter of fact, Frey and Stutzer (2013) draw attention to the general happiness level of individuals in organizational happiness, Chaiprasit and Santidhiraku (2011) to the network of relations between employees, Paschoal and Tamayo (2008) to the self-realization of organizational members, Warr (2011) to the feeling of satisfaction in individuals, Arslan (2018) to the emergence of personal potential, while Bessant and Tidd (2007) to the concept of organizational happiness by associating it with increased productivity. Therefore, the issue of organizational happiness is among the current issues in terms of organizational efficiency and effectiveness (Robertson and Cooper, 2011).

One of the questions that organizations are trying to find answers is how to make employees happier. This is because organizational happiness allows employees to perform better and is a key to organizational effectiveness (Nelson and Knight, 2010; Wright, Bonett and Sweeney, 1993). In other words, members of the organization want to work in organizations where they are happy and provided with good conditions (Gavin and Mason, 2004). Therefore, various studies can be mentioned to determine the variables or factors that affect the organizational happiness of individuals. In the light of the data obtained within the framework of the research findings, it is claimed that organizational decisions and practices (Fisher, 2010), organizational trust and commitment (Pryce Jones, 2010), life satisfaction (Walker and Schimmack, 2008), attitude towards work (Salas-Vallina, López-Cabrales, Alegre and Fernández, 2017), organizational virtue (Ozen, 2018), organizational socialization (Tosten, Avci and Sahin, 2017), stress (Lapierre and Allen, 2006), labour demands (Macky and Boxall, 2008), organizational justice (Greenberg and Colttqui, 2005; Ledford, 1999) are effective on organizational happiness. Some studies report that many demographic factors such as economic, social, personality and cognitive factors are effective in the formation and development of organizational happiness (Macleod, Coates and Hetherston, 2008; Savi, 2010; January, 2010). De Jonge and Schaufeli (1998) and Eckhaus (2018) state that besides demographic variables, one of the main antecedents of organizational happiness is the leadership style depicted by organizational managers. Özgenel and Canulansı (2021), on the other hand, see organizational happiness as one of the issues that leaders should care about the most because it increases work efficiency. Therefore, it can be said that one of the basic antecedents of organizational happiness levels of organizational members in general, and of teachers working in educational organizations in particular, is the "empowering leadership" style as a type of leadership expected from school administrators as well as demographic variables.

Empowering leaders enable the employees to realize their own potential, focus on the development of leadership characteristics by assigning appropriate duties and responsibilities to the employees (Pearce and Sims, 2002; Sims, Faraj and Yun, 2009). Empowering leadership practices involve the common sharing of power by providing the necessary organizational support to employees (Amundsen and Martinsen, 2014). Empowering leadership behaviours pave the way for the establishment of positive attitudes and behaviours among the employees of the organization, preventing bureaucratic restrictions within the organization and increasing the feelings of trust of the employees. Moreover, empowering leadership behaviours also help organizational employees to make sense of their work (Ahearne, Mathieu, & Rapp, 2005; Zhang & Bartol, 2010). The literature shows that empowering leadership behaviours exhibited both in educational organizations and in other organizations outside of educational organizations have positive effects on positive organizational outcomes such as "organizational justice, school effectiveness, organizational citizenship, job performance, job satisfaction, psychological contract, organizational commitment and organizational trust" (Argon, 2014; Bolat, Bolat and Seymen, 2009; Çelik and Konan, 2020; Dijke, Cremer, Mayer

and Quaquebeke, 2012; Gümüş, 2013; Günbayı, Dağlı and Kalkan, 2013; Hassan, Glenn, Mahsud, Yukl and Prussia, 2013; Kırıl, 2020; Koçak and Burgaz, 2017; Somech, 2005; Sweetland and Hoy, 2000; Vecchio, Justin and Pearce, 2010). When all these research studies are reviewed, it can be concluded that empowering leadership behaviours can have an impact on teachers' organizational happiness levels as a positive organizational variable.

The main building blocks of educational organizations are teachers. The fact that teachers feel happy in the schools where they work can contribute to being more beneficial to their students and those around them. In other words, a happy teacher can make extra efforts for the school by acting in accordance with the purpose and vision of the school (Bulut & Demirhan, 2020). School happiness can be determinant in terms of teachers' socio-emotional development (Talebzadeh & Samkan, 2011), quality of educational organizations (Karnak, 2020) and academic success (Bulut, 2015). On the other hand, organizational happiness of teachers is also necessary for learning-teaching processes and classroom practices (Uzun & Kesicioğlu, 2019). According to Bogler (2001), the decisions and practices of school administrators in the management processes and their attitudes or behaviours towards teachers can ensure the organizational happiness of teachers. Bird and Markle (2012) point out that happy teachers and happy schools provide life satisfaction in teachers and create healthy communication channels with colleagues and parents. In a nutshell, the happiness of teachers can be considered as a very important factor in the education process. In light of this information, it can be said that the most important output of a school with happy and productive teachers will be healthy, productive and happy individuals who will create a good society (Gavin and Mason, 2004). In the literature, there is no research finding that examines the effects of demographic variables and empowering leadership behaviours on teachers' organizational happiness levels. Therefore, it is thought that determining the effects of various demographic and organizational variables on teachers' organizational happiness levels will contribute to the field. It is because studies examining the effects of many variables on teachers' organizational happiness can contribute to the production of more valid information. Current study is also thought to be important because it reveals demographic variables, as well as whether the empowering leadership behaviours of school administrators have an impact on teachers' organizational happiness levels. Accordingly, the study aims to determine whether some demographic variables and empowering leadership behaviours significantly reduce teachers' organizational happiness levels.

## CONCEPTUAL FRAMEWORK

### Organizational Happiness

The concept of happiness means that individuals experience more positive emotions than negative emotions and have higher levels of satisfaction with life (Fisher, 2010). The concept of happiness, which corresponds to the concept of well-being, can also be defined as the emotional, psychological, social and personal satisfaction of individuals (Snyder and Lopez, 2006). The concept of organizational happiness is that employees in organizational life experience positive emotions more intensely or more often (Brief and Weiss, 2002). According to Daniels (2000), organizational happiness is the sum of all emotions experienced in the organization. Weserat, Sharif and Majid (2015) use the concept of organizational happiness in terms of the level of satisfaction of employees in business life. Similarly, Bakker and Demerouti (2013) define organizational happiness as the level of satisfaction of the work of employees and the tasks they carry out within the organization. In fact, it can be understood that the explanations and definitions about organizational happiness in the literature indicate the positive feelings of the members of the organization towards the job they work, the positive general opinion about their profession and their organization, and the state of satisfaction towards the organization that they are happy to be an employee of.

Warr (2007) examines organizational happiness under the headings of "positive emotions, negative emotions and realization of potential" in order to better understand it as a whole. Positive emotions; includes positive emotions such as pleasure, joy, satisfaction, contentment and happiness (Frey and Stutzer, 2001). Positive emotions are important for employees to be energetic in the

workplace and to perform their work with joy and happiness. It is because individuals with positive feelings can enjoy their work and life more (Weiss and Cropanzano, 1996). The extent of negative emotions refers to feelings such as inability to be happy, hatred, lovelessness, anger, doubt and pessimism (Bulut, 2015). Negative emotions can cause dissatisfaction, sadness and anxiety in employees (Warr, 2007). Another dimension of organizational happiness, the realization of potential is related to the cognitive aspects of the individual. Realization of potential is when employees perform according to their abilities and use their potential in jobs they enjoy (Golparvar and Abedini, 2014). According to Paschoal and Tamayo (2008), the more appropriate work an individual does according to their own competencies, the happier they will be, and happiness is proportional to individuals' ability to use their own potential. Therefore, it can be said that the positive feelings dimension of organizational happiness corresponds to the desired feelings in the employees, the negative feelings dimension corresponds to the dissatisfied feelings, and the dimension of realization of the potential corresponds to acting according to the potential.

Organizational happiness is a highly determining variable in achieving organizational goals. In other words, the organizational performance of happy individuals is greater than that of unhappy individuals, and happy individuals identify more with their work (Wesarat, Sharif and Majid, 2015). Individuals who can identify with their work show the ability to act both energetically and dynamically in the workplace (Kjerulf, 2015). According to Arslan and Polat (2017), the fact that the positive emotions of the employees are more dominant than the negative emotions in organizational life can benefit organizations in different ways. For example, while creativity and organizational effectiveness are high in organizations with happy employees; lower rates of indifference and absenteeism (Helliwell, Layard and Sachs, 2013). In addition, (Frey & Stutzer, 2001; Gavin & Mason, 2004) organizations that want to achieve organizational happiness are expected to share work according to their employees' capacities and potential. It is because success is achieved in organizations with happy employees in a shorter time, and all employees can easily come together in the face of difficulties and show the ability to act together.

### **Empowering Leadership**

The increasing acceleration of international competition, entrepreneurship and creativity on a global scale has paved the way for the emergence of new concepts in management and business (Koçel, 2001). The concept of empowerment has become one of these concepts and while becoming one of the indispensable issues for organizations over time (Appelbaum and Honeggar, 1998). Empowerment provides the employees of the organization with the opportunity to take their own actions and decisions (Erstad, 1997). Shah and Ward (2003) define empowerment as practices that lead to the continuous improvement of all aspects of organizational employees. The concept of "empowering leadership" was tried to be explained by the researchers in line with the meanings loaded into the concept of empowerment. For instance; Lee, Willis, and Tian (2017) define "empowering leadership" as the behaviour exhibited to support and empower subordinates; Ahearne, Mathieu, and Rapp (2005) define it as a practice that encourages autonomy in work environments by providing trust among employees; İmamoğlu and Turan (2019) define it as sharing the management power with the employees; Pearce, Conger and Locke (2008) define it as the development of leadership skills of employees by giving responsibility and authority; Vu (2020) define it as the exercise and transfer of legitimate power to subordinates. It can be said that the common point of the definitions of empowering leadership is to share the authority and responsibility with the subordinates and to ensure the autonomy of the members of the organization. Under the classification of empowerment leadership by Konczak, Stelly and Trusty (2000), responsibility, independent decision-making, information sharing, authorisation, coaching and skills development for innovative performance stand out. Responsibility is expressed as obligations to fulfil the duties undertaken by the employees of the organization (Cevahir, 2004). Independent decision making is when employees have the authority to make decisions without the approval of a senior organization manager (Brower, 1995). Information sharing is the ability of organizational employees to access the information they need without any restrictions (Konczak et al., 2000). Authorisation is the opportunity provided to the employees of the organization for the realization of a job (Steel and Konan, 2020). Coaching for innovative

performance is supporting the professional development of organizational members in various ways (McConnell, 1994). Skills development is that organization managers provide appropriate conditions and opportunities to improve the skills of employees (Konczak et al., 2000). It can be concluded that all these classifications are aimed at supporting all aspects of employees and ensuring appropriate conditions in organizational life.

Empowering leadership behaviours in organizations are considered to be important because they provide positive individual and organizational results (Zhang and Bartol, 2010). In the literature, it has been determined that empowering leadership behaviours are effective on variables such as organizational justice (Dijke et al., 2012), job satisfaction (Bixby, 2016); Dağlı & Kalkan, 2021), self-efficacy (Ahearne et al., 2005; Dağlı & Kalkan, 2021), organizational commitment (Cevahir, 2004; Gümüş, 2013; Konczak et al., 2000), information sharing (Srivastava, Bartol & Locke, 2006), psychological contract (Koçak & Burgaz, 2017), psychological empowerment (Arslantaş, 2007), organizational citizenship (Zhu, 2011) and organizational performance (Somech, 2005; Şama & Kolamaz, 2011). In the context of educational organizations, there are studies showing that empowering leadership behaviours are effective on school effectiveness, teacher motivation, academic success, professional burnout, job satisfaction, school climate, organizational citizenship and organizational commitment (Bogler & Somech, 2004; Çelik & Konan, 2020; Davis & Wilson, 2000; Kaya & Altinkurt, 2018; Lee & Nie, 2015; Sweetland & Hoy, 2000; Yangaiya & Magaji, 2015). It can be considered that empowering leadership style in educational organizations is an important factor that can predict teachers' organizational happiness levels.

This study aims to determine the variables that predict teachers' organizational happiness levels. In line with this main objective, answers will be sought to the following questions.

1. Does gender, marital status, education level, type of school, professional seniority, duration of service at the school, age, education background, branch, socio-economic level of the school (SED), type of employment, number of teachers at school, whether they have received professional or personal development seminars in the last 6 months, and empowering leadership variable significantly predict the probability of teachers' happiness levels falling into lower or higher categories?
2. What is the order of importance of the predictive variables regarding the level of prediction?

## METHOD

### Research model

The study is quantitative in the predictive correlational type, which is one of the general screening models. Predictive correlation type studies are studies that examine whether a variable predicts another variable based on the relationships between variables (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz and Demirel, 2012; Fraenkel, Wallen & Hyun, 2012). In the study, ordinal logistic regression analysis of the predictor variables, which allows to explain the predicted variable, was used within the framework of the predictive correlational model. Ordinal logistic regression analysis is logistic regression analysis used since the predicted variable is categorical and ordinal (Leech, Barrett, & Morgan, 2005; Tabachnick & Fidell, 2013). In this context, the predictor variables such as gender, marital status, education level, school type, educational status, branch, socio-economic level (SED) of the school, type of employment, whether or not to take a personal or professional development seminar were included in the analysis as discrete variables; and professional seniority, length of service at school, age, number of teachers at school, and empowering leadership variables were analysed as continuous variables. The dependent variable of teachers' organizational happiness level was defined in the study as a three-category variable as low, medium and high by the K-means clustering algorithm.

### Population and sample

The population of the research consists of 7617 teachers working in preschool, primary, secondary and high schools in Ankara province Çankaya district in 2021-2022 education year. The sample of the study was determined by *the stratified random sampling method*, which is one of the probability sampling methods. Stratified random sampling method is the inclusion of all groups in the population in the sampling with their ratios in the population (Neuman & Robson, 2014). The reason for choosing the stratified random sampling method in the research is to ensure that all groups in the population are represented in the sample. The sample size was also determined by using the sample sizes table. Accordingly, it was determined that the population of 7617 teachers could be represented by 366 teachers at 5% sampling error and  $\alpha=.05$  significance level (Rea ve Parker, 1997). In determining the layer weight, the number of teachers working in different education levels (preschool, primary school, secondary school and high school) in Ankara province Çankaya district was taken into consideration. In this context, the layer weight of the study was calculated as  $366/7617=0.0480$ . Table 1 contains the population by layer weight and the number of teachers in the sample.

**Table 1. The Number of Teachers in The Population and Sample of The Study**

Levels of Teaching	Universe Number of Teacher	Number of Teachers Required to Sampling by Layer Weight	Sample Number of Teacher
Pre school	156	8	63
Primary School	1720	82	134
Secondary School	2448	118	210
High School	3293	158	198
Total	7617	366	605

*\*The number of participants that should be in the sample was determined according to the 0.0480 layer weight.*

As can be seen in Table 1, the number of sample participants of the study should be 366. However, in order to increase the generalizability of the research, the scale was distributed to 655 teachers. Of the scales distributed, 605 were found to be suitable for analysis. Accordingly, it is seen that the sample size of 605 people is quite sufficient in terms of layer weight. Other information about the research is provided in Table 2.

**Table 2. Information on The Study (n=605)**

Variant	Category	n (%)	$\bar{X}$	Ss	Median
Gender	Female	476 (78.7)			1.00
	Male	129 (21.3)			
Marital Status	Married	510 (84.3)			1.00
	Single	60 (9.9)			
	Divorced	35 (5.8)			
Teaching Grade (Level)	Pre school	63 (10.4)			3.00
	Primary School	134 (22.1)			
	Secondary School	210 (34.7)			
	High school	198 (32.7)			
Type of School	Formal	590 (97.5)			1.00
	Private	15 (2.5)			
Education Background	Bachelor's Degree	483 (79.8)			1.00
	Postgraduate	122 (20.2)			
Department	Pre-school	61 (10.1)			3.00
	Elementary School Teacher	112 (18.5)			
	Branch Teacher	432 (71.4)			
Socio-Economic Level of the School (SELS)	Low	83 (13.7)			2.00
	Medium	431 (71.2)			
	High	91 (15.0)			
Type of Employment	Tenured	583 (96.4)			1.00
	Contract	22 (3.6)			
Status of Taking Professional or Personal Seminars in the Last 6 Months	I got it	480 (79.3)			1.00
	No	125 (20.7)			

Professional Seniority	20.98	8.73	22.00
Duration of Teaching at the School	6.58	5.13	5.00
Age	45.54	8.41	47.00
Number of Teachers	43.00	19.69	44.00
Empowering Leadership	3.46	.77	3.58

\*IQR: Interquartile Range

As table 2 shows, it has been determined that while 476 (78.7%) of teachers are female and 129 (21.3%) are male; 510 (84.3%) are married, 60 (9.9%) are single and 35 (5.8%) are divorced; 63 (10.4%) are preschool, 134 (22.1%) are in elementary schools, 210 (34.7%) are in secondary schools and 198 (32.7%) are in high school; 590 (97.5%) are employed in state and 15 (2.5%) are in private education institutions; 483 (79.8%) undergraduates and 122 (20.2%) graduates; 61 (10.1%) are preschool teachers, 112 (18.5%) are classroom teachers, and 432 (71.4%) are branch teachers; 83 (13.7%) are in low socio-economic school, 431 (71.2%) are in medium-level schools and 91 (15%) are in high socio-economic level schools; 583 (96.4%) permanent teachers and 22 (3.6%) contract teachers; 480 (79.3%) of them received professional or personal seminars in the last 6 months, 125 (20.7%) of them did not receive professional or personal seminars in the last 6 months. In addition, the average professional seniority of the teachers was calculated as 20.98 (Sd=8.73, Median=22.00), and the average of service time at the school where they were assigned was 6.58 (Sd=6.58, Median=5.13), the mean age was 45.54 (Ss=8.41, Median=47.00), the average number of teachers at the school was 43 (Ss=19.69, Median=44.00), and the mean of empowering leadership behaviours was 3.46 (Ss=.77, Median=3.58).

### Data Collection Tools

The data of this study were collected through the “Organizational Happiness Index (OHI) and the Empowering Leadership Questionnaire (ELQ)”. At the front of the scales is the "Personal Information Form" developed by the researchers for the demographic information of the teachers (gender, marital status, teaching level, school type, education status, branch, socio-economic level of the school (SED), form of employment, occupational or personal seminar taking status in the last 6 months, professional seniority, duration of service at the school in charge, age and number of teachers in the school).

*Well-Being at Work Scale (WBWS)*: WBWS was developed by Demo and Paschoal (2013) to measure teachers' organizational happiness levels. Arslan and Polat (2017) adapted this scale from English to Turkish. WBWS consists of 3 dimensional and 29 substances. The "positive emotions" dimension of the scale consists of 9 items (items 1, 4, 6, 8, 10, 12, 14, 17 and 19), the "negative emotions" dimension of the scale consists of 12 items (items 2, 3, 5, 7, 9, 11, 13, 15, 16, 18, 20 and 21) and “realizing the potential” consists of 8 items (items 22, 23, 24, 25, 26, 27, 28, and 29) and all items in the "negative emotions" dimension are scored in reverse. While the Cronbach's Alpha reliability coefficient of the whole scale is .96, which is 5-point Likert type and answered as "(1) Never, (2) Rarely, (3) Quite, (4) Frequently, and (5) Always"; the reliability coefficient of Cronbach's Alpha was reported as .94 for positive emotions, .95 for negative emotions, and .92 for potential realization. Confirmatory factor analysis (CFA) results of WBWS were also found to be within statistically appropriate ranges ( $\chi^2/sd=3.95$ , RMSEA=.09, SRMR=.061, CFI=.97, GFI=.77, NNFI=.97). (Arslan & Polat, 2017). Within the scope of this study, the reliability and validity study of WBWS was retested. Cronbach's Alpha reliability coefficient was determined as .96 for the whole scale, .95 for positive emotions, .95 for negative emotions, and .93 for potential realization. The CFA results of the scale also confirm the 3-dimensional structure of 29 items ( $\chi^2/sd=4.37$ , RMSEA=.074, SRMR=.053, CFI=.93, TLI=.92) (Byrne, 2010; Hoyle & Panter, 1995; Kline, 2011).

*Empowering Leadership Questionnaire (ELQ)*: ELQ was developed by Konczak, Stelly, and Trustyt (2000) to measure the empowering leadership behaviours of managers. Konan and Çelik (2018) adapted the scale into Turkish for educational institutions. The "authorisation" dimension of the ELQ, which consists of 3 dimensions and 17 items, consists of 3 items (items 1, 2 and 3), the “responsibility” dimension consists of 3 items (items 4, 5 and 6) and the “support” dimension consists

of 11 items (items 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17). The scale is 5-point Likert-type and is answered as “(1) Never, (2) Rarely, (3) Sometimes, (4) Often, and (5) Always”. The Cronbach's Alpha reliability coefficient of the ELQ was determined as .76 in the empowerment dimension, .82 in the responsibility dimension, and .80 in the support dimension of the scale. In addition, the CFA results of the ELQ were found to be within statistically appropriate ranges ( $\chi^2/df=2.54$ , RMSEA=.054, SRMR=.032, CFI=.95, GFI=.92, NNFI=.98) (Konan & Çelik, 2018). For this study, the reliability and validity study of the ELQ was re-examined. Cronbach's Alpha reliability coefficient was found to be .94 in the whole scale, .89 in the empowerment dimension, .75 in the responsibility dimension and .96 in the support dimension. The CFA results of the ELQ for this study also show that the 3-dimensional 17-item structure ( $\chi^2/df=4.82$ , RMSEA=.079, SRMR=.046, CFI=.96, TLI=.95) was confirmed (Byrne, 2010; Hoyle & Panter, 1995; Kline, 2011).

### **Data collection and analysis**

Face-to-face and online forms were used to collect the research data. Before the assessment tools were filled in, teachers were told about the purpose and content of the research, and participated on a voluntary basis. Teachers were informed that there was no risk factor in any process of the research and that the results to be obtained would be used for scientific purposes. The ethical research principles were followed by declaring to the teachers that they could stop participating in the research at any time.

In the study, 655 scales were distributed to the teachers working in preschool, primary, secondary and high schools according to the layer weight of the study ( $366/7617=0.0480$ ). In order to make the scale forms ready for analysis, 34 scale data with erroneous or missing data were determined. In the study, it was observed that the missing data showed a random distribution and less than 5%. Therefore, new values were assigned according to the serial averages via the EM expectation maximization algorithm instead of the missing data in the scale. In addition, 16 data of which Z score was not in the range of -3 and +3 were also deleted in the study. Thus, analyses were carried out with 605 scale data.

After the study, data were made available for analysis and the general assumptions of ordinal logistic regression were checked. Accordingly, it was observed that each of the subgroups formed as a result of transforming the organizational happiness variable, which is the dependent variable, into a categorical variable, was of sufficient sample size, there were no missing and extreme values, and the participants were included in only one category. In the study, it was also tested whether there was a multicollinearity problem between the predictor variables. The correlation coefficients between the predictor variables vary between .34 and .88, the VIF values between 1.04 and 2.88, the tolerance values between .35 and .97, and the Durbin-Watson value being 1.29, which means that there is no multicollinearity problem. Since the relationships between the predictor variables are less than .90, VIF values are less than 10, Durbin-Watson values are less than 4, and tolerance values are greater than .20, indicating that there is no multicollinearity problem. These results prove that the assumptions of ordinal regression analysis are met.

The explanatory power of the model established for ordinal regression analysis was interpreted with McFadden, Cox & Snell and Nagelkerke  $R^2$  values. In addition, the dependent variable by teachers' organizational happiness level was defined as a three-category variable as low, medium and high with the K-means clustering algorithm and heterogeneous data were divided into homogeneous sub-sets. Table 3 shows the results of the K-means clustering analysis.



**Table 3. K-Means Clustering Analysis Results**

Variant	Cluster	n	%	$\bar{X}$	Ss
Predicted Variable	Low	151	25	2.16	.38
(Organizational	Medium	261	43.1	3.79	.33
Happiness)	High	193	31.9	4.21	.35

As seen in Table 3, organizational happiness level, which is the dependent variable, is divided into 3 sets. The number of teachers with low happiness level in the first set was 151 (25%;  $\bar{X}$  = 2.16; Ss = .38), the number of teachers with moderate happiness level in the second set was 261 (43.1%;  $\bar{X}$  = 3.79; Ss = .33), and the number of teachers with high happiness level in the third set was 193 (31.9%;  $\bar{X}$  = 4.21; Ss = .35). Thus, the organizational happiness level of teachers was divided into 3 categories as "low, moderate and high" and included in the model.

All data analyses of the study were performed with Jamovi 2.2.5 statistical package programs and the research findings were interpreted according to the significance levels of .01 and .05.

## FINDINGS

### Findings on model fit values

Within the scope of ordinal logistic regression analysis in the study, the fit values of the model established in order to determine whether the predictor variables significantly predict the probability of the teachers' happiness level to be in the lower or higher categories are provided in Table 4.

**Table 4. Model Fit Values**

General Model Test					
Deviation	AIC	BIC	$\chi^2$	df	p
1150	1192	1284	149	19	< .001

As can be seen in Table 4, according to the initial model established without the dependent variables of the research, the model in which all the dependent variables of the research were included was found to be significant ( $\chi^2 = 149$ ; df=19; p< .001). In other words, adding the dependent variables of the study to the model is significant and the model for the research increases fit.

The results of the Omnibus test, which shows whether each predictor variable is included separately in the initial model and is a significant predictor variable for the dependent variable, are provided in Table 5.

**Table 5. Omnibus Test Results Of The Study**

Predictive Variables	$\chi^2$	df	p
Gender	0.01893	1	0.891
Marital Status	10.69763	2	0.005*
Teaching Grade (Level)	7.62043	3	0.055
Type of School	0.93899	1	0.333
Professional Seniority	0.75720	1	0.384
Duration of Teaching at the School	1.29671	1	0.255
Age	0.00177	1	0.966
Educational Background	0.18510	1	0.667
Department	1.63097	2	0.442
Socio-Economic Level of the School (SELS)	11.74269	2	0.003*
Employment	3.98e-4	1	0.984
Number of teachers at School	0.41772	1	0.518
Status of Taking Professional or Personal Seminars in the Last 6 Months	0.66285	1	0.416
Empowering Leadership	88.39922	1	< .001*

\*p<.01

As can be seen in Table 5, when the  $\chi^2$  values obtained for the predictor variables were examined, it was determined that when the predictive variables of marital status ( $p=0.005<.01$ ), socio-economic level of the school ( $p=0.003<.01$ ) and empowering leadership ( $p<.001$ ) were added to the initial model, the intended model differed significantly from the initial model. However, it was found that marital status did not differ significantly from the initial model of the intended model in variables other than the socio-economic level of the school and empowering leadership.

### Findings on Pseudo R<sup>2</sup> Values

In the study, pseudo R<sup>2</sup> values, which express the ratio of predictor variables to explain the predicted variable, were also calculated. Pseudo R<sup>2</sup> values represent the variance rate explained in logistic regression analyses, and this means that the research model shows a good fit as these values grow numerically (Hair, Black, Babin, Anderson, & Tatham, 2006). Table 6 shows the pseudo R<sup>2</sup> values.

**Table 6. Pseudo R<sup>2</sup> Values**

Negelkerke	McFadden	Cox veSnell
.154	.115	.079

As can be seen from Table 6, the predictor variables of the study explain the dependent variable at a rate of 15.4% according to Negelkerke's R<sup>2</sup>, 11.5% according to McFadden's R<sup>2</sup>, and 7.9% according to CoxveSnell's R<sup>2</sup>. Accordingly, the rate of explaining the dependent variable of the predictor variables varies between 7.9% and 15.4%.

### Findings on The Parameters of The Research Model

The findings of the ordinal regression analysis of the predictor variables regarding the organizational happiness level of teachers are shown in Table 7.

**Table 7. Ordinal Regression Analysis Findings On Model Parameters**

Predictor variables / Thresholds	B	SE	Z	p	Exp(B) Odds Oranı	95% Confidence Interval	
						Lower	Upper
Low-Medium	2.72	0.771	3.53	<.001*	15.2		
medium-high	4.98	0.792	6.29	<.001*	145.2		
Gender:							
male –female	0.02839	0.20679	0.1373	0.891	1.029	0.6860	1.54
Marital Status							
Single – Married**	0.85010	0.28192	3.0154	0.003*	2.340	1.3547	4.10
Divorced – Married	0.50020	0.34555	1.4476	0.148	1.649	0.8414	3.28
Level of Teaching:							
Primary– Pre School	0.77856	1.00286	0.7763	0.438	2.178	0.2992	17.00
Secondary– Pre School	0.66051	0.96428	0.6850	0.493	1.936	0.2817	13.90
High School – Pre school	0.15775	0.96819	0.1629	0.871	1.171	0.1691	8.47
Type of School:							
Private – Formal/Government	-0.60454	0.62716	-0.9639	0.335	0.546	0.1562	1.85
Proffesional Seniority	0.01831	0.02099	0.8721	0.383	1.018	0.9771	1.06
Teaching Period at School/ Length	-0.01947	0.01710	-1.1387	0.255	0.981	0.9483	1.01
Age	9.17e-4	0.02138	0.0429	0.966	1.001	0.9600	1.04
Educational Background							
Post -graduate – Bachelor's Degree	0.09143	0.21247	0.4303	0.667	1.096	0.7225	1.66
Department/Branch:							

Elementary School Teacher. – Pre School Teacher.	-1.22608	1.03498	-1.1846	0.236	0.293	0.0353	2.26
in field teacher. – pre school teacher	-0.84867	0.96546	-0.8790	0.379	0.428	0.0593	2.93
Socio-Economic Level of the School (SED):							
Medium – low**	0.61868	0.24198	2.5567	0.011*	1.856	1.1571	2.99
high – low	1.08223	0.32142	3.3670	< .001*	2.951	1.5769	5.57
Employment :							
Contract – tenured	0.00947	0.47336	0.0200	0.984	1.010	0.3983	2.56
Number of teachers at school	-0.00358	0.00553	-0.6462	0.518	0.996	0.9857	1.01
Status of receiving seminars							
No – Yes I got it	-0.16426	0.20179	-0.8140	0.416	0.849	0.5709	1.26
Empowering Leadership	1.04066	0.11624	8.9530	< .001*	2.831	2.2614	3.57

\*p< .05; \*\*Reference Category; SE: Standard Error

As seen in Table 7, only marital status ( $p < .05$ ), socio-economic level of the school ( $p < .05$ ) and empowering leadership behaviours ( $p < .05$ ) were found to be significant predictors of teachers' organizational happiness levels. It was determined that gender ( $p > .05$ ), education level ( $p > .05$ ), school type ( $p > .05$ ), professional seniority ( $p > .05$ ), duration of service at school ( $p > .05$ ), age ( $p > .05$ ), educational status ( $p > .05$ ), branch ( $p > .05$ ), type of employment ( $p > .05$ ), number of teachers at school ( $p > .05$ ) and status of receiving seminars ( $p > .05$ ) were not significant predictors of teachers' organizational happiness levels.

Based on the odds ratio values reported in Table 7, single teachers are 2.340 times more likely to have a high level of organizational happiness than male teachers; the probability of teachers with a medium socio-economic level of school to be at a high level of organizational happiness is 1.856 times more than teachers with a lower socio-economic level, it is 2.951 times more likely that teachers with a high socio-economic level of school will have a high level of organizational happiness than teachers with a low socio-economic school. In the empowering leadership variable, a one-unit increase increases the likelihood of teachers' organizational happiness to be at a high level 2.831 times.

The change rate in the dependent variable in Table 7 can also be expressed as a percentage (%). In this context, the percentage change in the dependent variable can be interpreted using the formula  $[(\text{Exp}(B) - 1) \times 100]$  (Çokluk, Şekercioğlu & Büyüköztürk, 2021). Therefore, as can be seen from Table 7, it was determined that the probability of single teachers' organizational happiness being at a high level increased by 134% compared to male teachers  $[(2.340 - 1) \times 100 = 134]$ ; the organizational happiness of the teachers whose school is at the middle socio-economic level increases by 85.6% compared to the teachers whose school is at the low socio-economic level  $[(1.856 - 1) \times 100 = 85.6]$ ; the organizational happiness of the teachers whose school is at a high socio-economic level increases by 195.1% compared to the teachers whose school is at a low socio-economic level  $[(2.951 - 1) \times 100 = 195.1]$ ; on the other hand, a one-unit increase in the empowering leadership variable increased the probability of teachers' organizational happiness being at a high level  $[(2.831 - 1) \times 100 = 183.1]$  by 183.1%.

When the significance of regression coefficients is examined in Table 7, the order of importance regarding the predictive level of the predictor variables is as follows: school with high socio-economic level from large to small (Odds Ratio=2.951), empowering leadership behaviours (Odds Ratio= 2.831), marital status (Odds Ratio=2.340) and school with medium socio-economic level (Odds Ratio= 1.856).

## RESULTS, ARGUMENT AND SUGGESTIONS

This study aims to determine whether marital status, education level, school type, professional seniority, duration of service at the school, age, educational background, branch, socio-economic level (SED) of the school, type of employment, number of teachers at the school, whether or not they have taken a professional or personal development seminar in the last 6 months, and empowering leadership

behaviours are effective on the possibility of teachers' organizational happiness levels to fall into lower or higher categories. In addition, the order of importance regarding the predictive level of predictive variables was also tried to be determined in the study.

Teachers' organizational happiness levels are grouped in three categories as low, medium and high. As a result of the research, it was found that only marital status, school socio-economic level (SED) and school administrators' empowering leadership behaviours had a significant effect on the likelihood of teachers' organizational happiness levels falling into the lower or upper categories. In other words, it was concluded that marital status, school socio-economic level (SED) and other variables other than school administrators' empowering leadership behaviours did not have a decisive effect on the likelihood of teachers' organizational happiness levels falling into the upper or lower categories.

In the study, it was observed that the likelihood of high levels of organizational happiness of single teachers in terms of marital status was significantly higher than that of married teachers. This result can be interpreted as that single teachers feel happier and more peaceful than married teachers in the schools they work in, that they can use their potential more in their professions and that their general satisfaction is higher. The fact that single teachers do not have important responsibilities such as family and children and that single teachers are at a relatively younger age may have had a more significant effect on the level of happiness towards school. In the literature, there are different research results on whether marital status is a determinant variable on organizational happiness. For example, in addition to the studies reporting that marital status has a significant effect on organizational happiness as in this study (Diener, Gohm, Suh & Oshi, 2000; Fritz, Walsh & Lyubomirsky, 2017; Kabal, 2019; Kangal, 2013; Korkut, 2019; Myers, 2000; Sancak, 2019; Segraves, 1982), there are also research results indicating that the marital status does not make a significant difference on organizational happiness (Arslan, 2021; Bayram, 2020; Blanchflower and Oswald, 2004; Bulut, 2020; Düzgün, 2016; Güzel, 2021; Moçoşoğlu & Kaya, 2018; Pazar, 2021; Sancak, 2019; Suhail and Chaudhry, 2004; Uğur, 2019). However, in the significant difference found in the marital status variable in the literature, it was determined that married participants were generally happier than single participants (Diener, Gohm, Suh & Oshi, 2000; Kangal, 2013; Korkut, 2019; Myers, 2000; Sevim, 2021; Stavrova, Fetschenhauer & Schlösser, 2012). Myers (2000) attributes the higher organizational happiness levels of married participants than single participants to the fact that spouses provide social support to each other and motivate each other in the face of adversity, and Korkut (2019) attributes the needs of married couples to love, respect, trust and loyalty. The fact that the present study was conducted in schools may have caused the level of organizational happiness in single teachers to be even higher, contrary to the literature. It is because the teaching profession is a profession that requires sacrifice, attention and extra effort. The fact that single teachers are more inclined to sacrifice, care and extra effort may have increased their level of happiness towards school.

Another important result of the study is that the socio-economic level (SED) of the school has a significant effect on the organizational happiness level of teachers. Accordingly, it was determined that the organizational happiness level of teachers working in secondary and high socio-economic schools was higher than that of teachers working in low socio-economic schools. The socio-economic level of the school is closely related to the socio-economic level of parents and the environment. In other words, the interests of the parents or the environment and the opportunities offered by the school may have made the working conditions of the teachers suitable. It is estimated that appropriate working environments positively affect teachers' organizational happiness. In the literature, it is stated in the research conducted by Özdemir and Kış (2019) that the socio-economic level of the school is effective on the organizational happiness levels of teachers; Aytas (2021), on the other hand, reports that the socio-economic level of the school is not a determining variable on teachers' organizational happiness levels. Although Özdemir and Kış's (2019) study revealed that the socio-economic level of the school had an effect on teachers' organizational happiness, it is noteworthy that unlike the current research, teachers working in schools with low socio-economic levels have higher levels of organizational happiness. Özdemir and Kış (2019) explain this situation with the sincerity that occurs between teachers in these schools due to the fact that teachers are assigned to schools in environments

where their first appointment places are mostly low in terms of socio-economic level. However, the general socio-economic levels of the school and students are also associated with many positive outcomes, especially academic achievement (Ataş & Karadağ, 2017; Hanushek, 2010; Jehangir, Glas and Berg, 2015; Kim, 2018; OECD, 2011, UNESCO, 2006). Similarly, Frey & Stutzer (2002) and Warr (2017) emphasize the importance of socio-economic level and environmental conditions in ensuring organizational happiness. Therefore, the fact that the socio-economic level of the school is effective on the organizational happiness of teachers in the research means that the study is supported by the literature.

In the study, it was determined that one of the variables that affect the likelihood of teachers' organizational happiness levels being in the upper category is the empowering leadership behaviours of school administrators. Accordingly, the fact that school administrators authorize teachers, support them in solving problems, provide appropriate environments in decision-making, and exhibit supportive behaviours about new ideas may result in an increase in teachers' organizational happiness levels. According to Perace & Sims (2002), empowering leaders enable the development of leadership qualifications in employees by sharing tasks according to their potential. Similarly, Zhang & Bartol (2010) point out that empowering leadership creates positive emotions in organizational employees and facilitates integration with work. In the context of educational organizations, it is stated that empowering leadership is important in the construction of effective schools, academic achievement, positive school climate and teacher motivation (Bogler & Somech, 2004; Çelik & Konan, 2020; Kaya & Altinkurt, 2018; Lee & Nie, 2015; Yangaiya & Magaji, 2015). In addition to the studies in the literature showing that empowering leadership is related to positive organizational outcomes (Dijke, Cremer, Mayer and Quaquebeke, 2012; Gümüş, 2013; Hassan, Glenn, Mahsud, Yukl and Prussia, 2013; Kırıl, 2020; Koçak and Burgaz, 2017; Somech, 2005; Sweetland and Hoy, 2000), there are also studies showing that various leadership styles significantly predict organizational happiness (Arslan, 2021; Aytaç, 2021; Cerit, 2010; Eker, 2021; Sevim, 2021; Şahin and Özgenel, 2020). Therefore, it can be seen as an expected result that empowering leadership significantly predicts organizational happiness in teachers. As a matter of fact, the high order of importance regarding the predictive level of empowering leadership in the current research supports this inference.

The present study has some limitations. First of all, the study is limited only to teachers working in Çankaya district of Ankara province. Therefore, the results of the study should be evaluated according to the participant groups with similar characteristics. Another limitation is the inclusion of the organizational happiness scale, which is the dependent variable of the study, in the analysis by taking only the general total, and the evaluation of teachers working in preschool, primary school, secondary school and high school together. Despite these limitations, various suggestions can be made to practitioners and researchers. Married teachers can be provided with conditions in which they can take more initiative in the schools where they work. In order to improve the socio-economic level of schools, social and cultural awareness studies for parents can be organized, and economic investments can be prioritized in low or disadvantaged regions. School administrators can encourage teachers for all activities by considering the suggestions of teachers. School administrators can increase teachers' authority for an empowering school environment. As suggestions for researchers, the research can be repeated with a wider and more comprehensive group of participants. The organizational happiness scale, which is the dependent variable of the study, can also be analysed according to sub-dimensions. Qualitative or mixed method researches can be used to comprehend the results of the study in detail and in a comprehensive manner. It can also be suggested to compare the results obtained by designing the study in a longitudinal manner with the results of cross-sectional research.

**Conflicts of Interest:** No potential conflict of interest was declared by the authors.

**Funding Details:** No funding or grant was received from any institution or organization for this research.

**CRedit Author Statement:** Author 1: Conceptualization and Methodology, Writing-Original draft preparation, Visualization, Investigation, Data Curation, Formal Analysis, Writing - Review & Editing, Validation. Author 2: Data Curation, Formal Analysis, Investigation, Resources, Visualization, Writing – Original Draft Preparation.

**Ethical Statement:** The authors followed the all ethical standards and the participants participated in the research freely with full information about what it means for them to take part, and that they gave consent before they took part in the research.

## REFERENCES

- Ahearne, M., Mathieu, J. E., & Rapp, A. (2005). To empower or not to empower your sales force? An empirical examination of the influence of leadership empowerment behavior on customer satisfaction and performance. *The Journal of Applied Psychology*, 90(5), 945-955. doi:10.1037/0021-9010.90.5.945
- Amundsen, S., & Martinsen, Ø. L. (2014). Empowering leadership: Construct clarification, conceptualization, and validation of a new scale. *Leadership Quarterly*, 25(3), 487-511. doi:10.1016/j.leaqua.2013.11.009
- Appelbaum, S. H., & Honegger, K. (1988). Empowerment: a contrasting overview of organizations in general and nursing in particular an examination of organizational factors, managerial behaviors, job design, and structural power. *Empowerment in Organizations*, 6(2), 29-50.
- Argon, T. (2014). Eğitim kurumlarında insan kaynaklarının desteklenmesi: Yönetici desteğine yönelik öğretmen görüşleri. *International Journal of Human Science*, 11(2), 691-729.
- Arslan, N. (2021). Öğretmenlerin okul müdürlerinin hizmetkâr liderlik davranışlarına ilişkin algıları ile örgütsel mutlulukları arasındaki ilişki. (Yayımlanmamış yüksek lisans tezi). Siirt Üniversitesi Sosyal Bilimler Enstitüsü, Siirt.
- Arslan, Y. (2018). Öğretmenlerin farklılıkların yönetimi yaklaşımlarına ilişkin algıları ile örgütsel mutluluk algıları arasındaki ilişki. (Yayınlanmamış doktora tezi). Kocaeli Üniversitesi, Sosyal Bilimler Enstitüsü, Kocaeli.
- Arslan, Y., & Polat, S. (2017). Adaptation of well-being Work scale to Turkish. *Kuram ve Uygulamada Eğitim Yönetimi*, 23(4), 603-622. doi: 10.14527/kuey.2017.019
- Arslantaş, C. C. (2007). Güçlendirici lider davranışının psikolojik güçlendirme üzerindeki etkisini belirlemeye yönelik görgül bir araştırma. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 7(2), 227-239.
- Ataş, D., & Karadağ, Ö. (2017). An analysis of Turkey's PISA 2015 results using two-level hierarchical linear modelling. *Journal of Language and Linguistic Studies*, 13(2), 720-727.
- Aytaş, M. S. (2021). Öğretmen algılarına göre okul yöneticilerinin liderlik stilleri ile öğretmenlerin örgütsel mutluluk algıları arasındaki ilişkinin incelenmesi: Şanlıurfa örneği. (Yayımlanmamış yüksek lisans tezi). Harran Üniversitesi Sosyal Bilimler Enstitüsü, Şanlıurfa.
- Bakker, A. B., & Demerouti, E. (2013). Job demands-resources model. *Revista de Psicología del Trabajo de las Organizaciones*, 29(3), 107-115.

- Bayram, S. (2020). *Öğretmenlerin örgütsel affedicilik algıları ile örgütsel mutluluk düzeyleri arasındaki ilişkinin incelenmesi*. (Yayımlanmamış yüksek lisans tezi). Recep Tayyip Erdoğan Üniversitesi Sosyal Bilimler Enstitüsü, Rize.
- Bessant, J., & Tidd, J. (2007). *Innovation and entrepreneurship*. London: Wiley.
- Bird, J. M., & Markle, R. S. (2012). Subjective well-being in school environments: Promoting positive youth development through evidence-based assessment and intervention. *American Journal of Orthopsychiatry*, 82(1), 61-66. DOI: 10.1111/j.1939- 0025.2011.01127.x
- Bixby, K. M. (2016). *The mediation of empowering leadership on psychological empowerment with organizational commitment and job satisfaction* (Unpublished doctoral thesis). Anderson University, USA.
- Blanchflower, G. D., & Oswald, J. A. (2004). Well-being over time in Britain and the USA. *Journal of Public Economics*, 88(8), 1359-1386.
- Bogler, R. (2001). The influence of leadership style on teacher job satisfaction. *Educational Administration Quarterly*, 37(5), 662-683.
- Bogler, R., & Somech, A. (2004). Influence of teacher empowerment on teachers' organizational commitment, professional commitment and organizational citizenship behavior in schools. *Teaching and Teacher Education*, 20(3), 277-289.
- Bolat, O. İ., Bolat, T., & Seymen, O. A. (2009). Güçlendirici lider davranışları ve örgütsel vatandaşlık davranışı arasındaki ilişkinin sosyal mübadele kuramından hareketle incelenmesi. *Balıkesir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 12(21), 215-239.
- Brief, A. P., & Weiss, H. M (2002). Organizational behavior: Affect in the work place. *Annual Review of Psychology*, 53, 279-307.
- Brower, M. J. (1995), Empowering teams: What, why, and how. *Empowerment In Organizations*, 3(1), 13-25.
- Bulut, A. (2015). *Ortaöğretim öğretmenlerinin örgütsel mutluluk algılarının incelenmesi: Bir norm çalışması*. (Yayımlanmış doktora tezi). Gaziantep Üniversitesi, Eğitim Bilimleri Enstitüsü, Gaziantep.
- Bulut, A. (2020). *Eğitim kurumlarında yönetsel tarz ve örgütsel mutluluk arasındaki ilişkinin incelenmesi*. (Yayımlanmamış yüksek lisans tezi). Uşak Üniversitesi Eğitim Bilimleri Enstitüsü, Uşak.
- Bulut, A., & Demirhan, G. (2020). Eğitim kurumlarında yönetsel tarz ve örgütsel mutluluk. *Anadolu Kültürel Araştırmalar Dergisi*, 4(2), 162-176.
- Büyükoztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2014). *Bilimsel araştırma yöntemleri*. Ankara: Pegem Akademi Yayıncılık.
- Byrne, B. M. (2010). *Structural equation modeling with Amos: Basic concepts, applications, and programming* (2nd ed.). New York, NY: Taylor and Francis Group.
- Çelik, O. T., & Konan, N. (2020). Okul müdürlerinin güçlendirici liderliği ile öğretmenlerin özyeterliliği ve örgütsel vatandaşlık davranışları arasındaki ilişki. *Eğitim ve Bilim*, 46(206)-241-261.

- Cerit, Y. (2010). The effects of servant leadership on teachers' organizational commitment in primary schools in Turkey. *International Journal of Leadership in Education*, 13(3), 301-317.
- Cevahir, H. (2004). *Güçlendirici liderlik davranışları ile örgütsel bağlılık ve iştatmini arasındaki ilişki üzerine bir araştırma*(Yayımlanmamış yüksek lisanstezi). Gebze Yüksek Teknoloji Enstitüsü Sosyal Bilimleri Enstitüsü, İstanbul.
- Çokluk, Ö., Şekercioğlu, G., & Büyüköztürk, Ş. (2021). *Sosyal bilimler için çok değişkenli istatistik: SPSS ve lisrel uygulamaları*. Ankara: Pegem Akademi Yayıncılık.
- Conger, J. A., & Kanungo, R. N. (1988). The empowerment process: Integrating theory and practice. *Academy of Management Review*, 13(3), 471-482. doi:10.2307/258093
- Dağlı, E., Kalkan, F. (2021). Okul müdürlerinin güçlendirici liderlik davranışları ile öğretmenlerin öz yeterlik algıları ve iş doyumu düzeyleri arasındaki ilişki. *Eğitim ve Bilim*, 46(208), 105-123.
- Daniels, K. (2000). Measures of five aspects of affective well-being at work. *Human Relations*, 53(2), 275-294. <https://doi.org/10.1177/a010564>
- Davis, J., & Wilson, S. M. (2000). Principals' efforts to empower teachers: Effects on teacher motivation and job satisfaction and stress. *The Clearing House*, 73(6), 349-353.
- De Jonge, J., & Schaufeli, W. B. (1998). Job characteristics and employee well-being: A test of Warr's Vitamin Model in health care workers using structural equation modelling. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 19(4), 387-407.
- Demo, G., & Paschoal, T. (2013). Well-Being at workscale: Exploratory and confirmatory validation in the United States comprising affective and cognitive components. *Proceeding XXXVII Encontro da ANPAD*, 7-11September 2013. Rio de Janeiro.
- Diener, E., Gohm, L. C., Suh, E., & Oishi, S. (2000). Similarity of the relations between marital status and subjective well-being across cultures. *Journal of Cross-Cultural Psychology*, 31(4), 419-436.
- Dijke, M. V., Cremer, D. D., Mayer, D. M., & Quaquebeke, N. M. (2012). When does procedural fairness promote organizational citizenship behavior? Integrating empowering leadership types in relational justice models. *Organizational Behavior and Human Decision Process*, 117, 235-248.
- Düzgün, O. (2016). *Ortaokulda görev yapmakta olan öğretmenlerin mutluluk düzeyleri ile sınıf yönetimi becerileri arasındaki ilişki* (Yayımlanmamış yüksek lisans tezi). Gaziosmanpaşa Üniversitesi Eğitim Bilimleri Enstitüsü, Tokat.
- Eckhaus, E. (2018). Measurement of organizational happiness. In: Kantola J., Barath T., Nazir S. (Eds) *Advances in human factors, business management and leadership. Advances in Intelligent Systems and Computing*, 594. [https://doi.org/10.1007/978-3-319-60372-8\\_26](https://doi.org/10.1007/978-3-319-60372-8_26)
- Eker, R. (2021). *Okul müdürlerinin öğretimsel liderlik davranışlarının okul mutluluğuna etkisinin öğretmen görüşlerine göre incelenmesi* (Yayımlanmamış Yüksek Lisans Tezi). İstanbul Sabahattin Zaim Üniversitesi, Lisansüstü Eğitim Enstitüsü, İstanbul.
- Erstad, M. (1997). Empowerment and organizational change. *International Journal of Contemporary Hospitality Management*, 9(7), 325-333.



- Field, A. (2009). *Discovering statistics using Spss* (Third edition). London: Sage Publications.
- Fisher, C. D. (2010). Happiness at work. *International Journal of Management Reviews*, 12, 384-412.
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education*. NY: McGraw-Hill.
- Frey, B. S., & Stutzer, A. (2002). Happiness, Economy and Institution, *Forthcoming in the Economic Journal*, 110(466), 918-938.
- Frey, B., & Stutzer, A. (2001). *Happiness and economics: How the economy and institutions affect human well-being*. New Jersey: Princeton University.
- Frey, B., & Stutzer, A. (2011). *Recent developments in the economics of happiness*. Cheltenham: Edward Elgar Publishing.
- Fritz, M. M., Walsh, L. C., & Lyubomirsky, S. (2017). Staying happier. In M. D. Robinson & M. Eid (Eds.), *The happy mind: Cognitive contributions to well-being* (pp. 95-114). New York: Springer.
- Gavin, J. H., & Mason, R. O. (2004). The virtuous organization: The value of happiness in the workplace. *Organizational Dynamics*, 33(4), 379-392.
- Golparvar, M., & Abedini, H. (2014). Relationship between meaning and spirituality at work with job happiness positive affect and job satisfaction. *Management Science Letters*, 4, 255-268.
- Greenberg, J., & Colquitt, J. A. (2005). *Handbook of organizational justice*. NJ: Erlbaum.
- Gümüş, A. (2013). *İlkokul yöneticilerinde güçlendirici liderlik davranışları ile öğretmenlerde örgütsel bağlılık ilişkisi: Psikolojik güçlendirmenin aracılık rolü (Ankara ili örneği)* (Yayımlanmamış yüksek lisans tezi). Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.
- Günbayı, İ., Dağlı, E., & Kalkan, F. (2013). İlköğretim okulu müdürlerinin destekleyici davranışları ile öğretmenlerin örgütsel vatandaşlık davranışları arasındaki ilişki. *Educational Administration: Theory and Practice*, 19(4), 575-602.
- Güzel, H. (2021). Psikolojik danışmanların psikolojik sağlamlıkları ile örgütsel mutlulukları arasındaki ilişkinin incelenmesi. (Yayımlanmamış yüksek lisans tezi). Recep Tayyip Erdoğan Üniversitesi Sosyal Bilimler Enstitüsü, Rize.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6. bs.). New Jersey: Pearson Prentice Hall.
- Hanushek, E. A. (2010). *Education production functions: Developed country evidence*. International Encyclopedia of Education, 401-411.
- Hassan, S., Glenn, J., Mahsud, R., Yukl, G., & Prussia, G. E. (2013). Ethical and empowering leadership and leader effectiveness. *Journal of Managerial Psychology*, 28(2), 133-146.
- Helliwell, J., Layard, R., & Sachs, J. (Eds.). (2017). *World Happiness Report 2017*. New York: Sustainable Development Solutions Network.
- Hoyle, R. H., & Panter, A. T. (1995). Writing about structural equation models. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 158-176). Thousand Oaks, CA, US: Sage Publications Inc.

- İmamoğlu, E. B., & Turan, A. D. (2019). Güçlendirici liderlik ile bilgi paylaşımı davranışı arasındaki ilişkide algılanan örgütsel desteğin aracı rolü: Bilişim sektöründe bir araştırma. *İşletme İktisadi Enstitüsü Yönetim Dergisi*, 87, 27-48.
- Jehangir, K., Glas, C., & Berg, S. (2015). Exploring the relation between socioeconomic status and reading achievement in PISA 2009 through an intercepts-and-slopes-as-outcomes paradigm. *International Journal of Educational Research*, 71, 1-15.
- Kabal, D. (2019). *Öğretmenlerin yaşam boyu öğrenme eğilimleri ve mutluluk düzeyleri üzerine bir çalışma (Kocaeli örneği)* (Yayımlanmamış yüksek lisans tezi). Sakarya Üniversitesi Eğitim Bilimleri Enstitüsü, Sakarya.
- Kangal, A. (2013). Mutluluk üzerine kavramsal bir değerlendirme ve Türk hane halkı için bazı sonuçlar. *Elektronik Sosyal Bilimler Dergisi*, 12(44), 214-133.
- Karnak, B. (2020). *Öğretmenlerin mesleki profesyonellikleri ile örgütsel mutlulukları arasındaki ilişki* (Yayımlanmamış yüksek lisans tezi). Pamukkale Üniversitesi, Eğitim Bilimleri Enstitüsü, Denizli.
- Kaya, Ç., & Altınkurt, Y. (2018). Öğretmenlerin psikolojik sermayeleri ile tükenmişlik düzeyleri arasındaki ilişkide psikolojik ve yapısal güçlendirmenin rolü. *Eğitim ve Bilim*, 43(193), 63-78.
- Kim, Y. (2018). The effects of school choice on achievement gaps between private and public high schools: Evidence from Seoul high school choice program. *International Journal of Educational Development*, 60, 25-32.
- Kıral, B. (2020). The relationship between the empowerment of teachers by school administrators and organizational commitments of teachers. *International Online Journal of Education and Teaching*, 7(1), 248-265.
- Kjerulf, A., (2015). *Sabah 9'dan akşam 6'ya happy hour*, İstanbul: Doğan Egmont Yayıncılık.
- Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guildford Press.
- Koçak, S., & Burgaz, B. (2017). Ortaöğretim kurumlarındaki psikolojik sözleşme üzerinde güçlendirici liderlik davranışlarının rolü. *Eğitim ve Bilim*, 42(191)-351-369.
- Koçel, T. (2001). *İşletme yöneticiliği*. İstanbul: Beta Basım Yayım Dağıtım.
- Konan, N., & Çelik O. T. (2018). Güçlendirici liderlik ölçeğinin eğitim örgütleri için Türkçe'ye uyarlaması: Geçerlik ve güvenirlik çalışması. *Kastamonu Education Journal*, 26(4), 1043-1054. doi:10.24106/kefdergi.434140
- Konczak, L. J., Stelly, D. J., & Trusty, M. L. (2000). Defining and measuring empowering leader behaviors: Development of an upward feedback instrument. *Educational and Psychological Measurement*, 60(2), 301-313.
- Korkut, A. (2019). *Öğretmenlerin örgütsel mutluluk, örgütsel sinizm ve örgütsel adalet algılarının analizi*. (Yayımlanmamış doktora tezi). İnönü Üniversitesi Eğitim Bilimleri Enstitüsü, Malatya.
- Lapierre, L. M., & Allen, T.D. (2006). Work-supportive family, family-supportive supervision, use of organizational benefits, and problem-focused coping: Implications for work-family

conflict and employee well-being. *Journal of Occupational Health Psychology*, 11(2), 169-181.

Ledford, G. E. (1999). Comment: Happiness and productivity revisited. *Journal of Organizational Behavior*, 20(1), 25-30.

Lee, A. N., & Nie, Y. (2015). Teachers' perceptions of school leaders' empowering behaviours and psychological empowerment: Evidence from a Singapore sample. *Educational Management Administration & Leadership*, 45(2), 260-283.

Lee, A. N., & Nie, Y. (2013). Development and validation of the school leader empowering behaviours (SLEB) scale. *The Asia-Pacific Education Researcher*, 22(4), 485-495.

Lee, A., Willis, S., & Tian, A. W. (2017). Empowering leadership: A meta-analytic examination of incremental contribution, mediation, and moderation. *Journal of Organizational Behavior*, 39(3), 306-325.

Leech, N. L., Barrett, K. C., & Morgan, G. A. (2005). *SPSS for intermediate statistics: Use and interpretation*: Lawrence Erlbaum.

Macky, K., & Boxall, P. (2008). High-involvement work processes, work intensification and employee well-being: A study of New Zealand worker experiences. *Asia Pacific Journal of Human Resources*, 46(1), 38-55.

MacLeod, A. K., Coates, E., & Hetherington, J. (2008). Increasing well-being through teaching goal-setting and planning skills: Results of a brief intervention. *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being*, 9(2), 185-196. <https://doi.org/10.1007/s10902-007-9057-2>

McConnel, J. (1993). On lemmings and leaders. *Journal For Quality and Participation*, 16, 10-14.

Moçoşoğlu, B., & Kaya, A. (2018). Okul yöneticileri ve öğretmenlerin örgütsel sessizlik ile örgütsel mutluluk düzeyleri arasındaki ilişki: Şanlıurfa ili örneği. *Harran Education Journal*, 3(1), 52-70.

Myers, D. G. (2000). The funds, friends, and faith of happy people. *American psychologist*, 55(1), 56-67.

Nelson, D. W., & Knight, A. E. (2010). The power of positive recollections: Reducing test anxiety and enhancing college student efficacy and performance. *Journal of Applied Social Psychology*, 40(3), 732-745.

Neuman, W. L., & Robson, K. (2014). *Basics of social research*. Toronto: Pearson Canada.

Ocak, M. (2010). Blend or not to blend: a study investigating faculty members perceptions of blended teaching. *World Journal on Educational Technology*, 2(3), 196-205.

OECD, (2011). *Against the odds: Disadvantaged students who succeed in school*. Available from [https://www.oecd-ilibrary.org/education/against-the-odds\\_9789264090873-en](https://www.oecd-ilibrary.org/education/against-the-odds_9789264090873-en) 04/03/2022 tarihinde alındı.

Özdemir, D. M., & Kış, A. (2019). Öğretmenlerin mutluluk düzeylerinin incelenmesi: Gaziantep İli örneği. *14. Uluslararası Eğitim Yönetimi Kongresi Tam Metin Bildiri Kitabı* içinde (s.191-196). Ankara: Ortadoğu Teknik Üniversitesi.

- Ozen, F. (2018). The impact of the perception of organizational virtue on the perception of organizational happiness in educational organizations. *Educational Policy Analysis and Strategic Research*, 13(4), 124-140. doi: 10.29329/epasr.2018.178.7
- Özgenel, M., & Canuyulası, R. (2021). Okul müdürlerinin paternalist liderlik davranışlarının örgütsel mutluluğa etkisi. *Eğitim ve Teknoloji*, 3(1) 14-31.
- Paschoal, T., & Tamayo, A. (2008). Construction and validation of work well-being scale. *Avaliação Psicológica*, 7(1), 11-22.
- Paschoal, T., & Tamayo, A. (2008). Construction and validation of work wellbeingscale. *Avaliação Psicológica*, 7(1), 11-22.
- Pazar, B. (2021). *Öğretmen özerkliği ve örgütsel mutluluk arasındaki ilişki*. (Yayımlanmamış yüksek lisans tezi). İstanbul Kültür Üniversitesi Lisansüstü Eğitim Enstitüsü, İstanbul.
- Pearce, C. L., & Sims Jr, H. P. (2002). Vertical versus shared leadership as predictors of the effectiveness of change management teams: An examination of aversive, directive, transactional, transformational, and empowering leader behaviors. *Group dynamics: Theory, Research, and Practice*, 6(2), 172-197.
- Pearce, C. L., Conger, J. A., & Locke, E. A. (2008). Shared leadership theory. *The Leadership Quarterly*, 19(5), 622-628.
- Pryce Jones, J. (2010). *Happiness at work*. USA: Wiley Blackwell.
- Rea, L. M., & Parker, R. A. (1997). *Designing and conducting survey research: A comprehensive guide*. San Francisco, CA: Josey-Bass Inc.
- Robertson, I., & Cooper, C. (2011). *Well-being: Productivity and happiness at work*. London: Palgrave Macmillan.
- Şahin, B., & Özgenel, M. (2020). Comparison of the predictive level of transformational, transactional and laissez-faire leadership style on school happiness, *International Journal of Educational Studies and Policy*, 1(1), 55-73.
- Salas-Vallina, A., López-Cabrales, Á., Alegre, J., & Fernández, R. (2017). On the road to happiness at work (HAW). *Personnel Review*. 46(2), 314-338.
- Şama, E., Kolamaz, C. (2011). Destekleyici ve geliştirici liderlik özellikleri ile örgütsel bağlılık arasındaki ilişki. *Türk Eğitim Bilimleri Dergisi*, 9(2), 313-342.
- Sancak, T. (2019). *Öğretmenlerin okullardaki mekân düzenlemelerine ilişkin memnuniyetleri ile mutluluk ve örgütsel bağlılıkları arasındaki ilişki*. (Yayımlanmamış yüksek lisans tezi). Sabahattin Zaim Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.
- Savi, F. (2010). The personality traits of parents and parents reports of adolescents problems. *Cypriot Journal Of Educational Sciences*, 5(3), 152-166.
- Segraves, R. T. (1982). Chapter 2: The relationship of marriage to psychological well-being. In R. T. Segraves (Ed.), *Marital Therapy: A combined psychodynamic-behavioral approach* (pp. 21-57). New York, USA: Plenum Publishing Corporation.
- Sevim, H. İ. (2021). Okullardaki dağıtımçı liderlik ile örgütsel mutluluk ve sinerjik iklim arasındaki ilişki. (Yayımlanmamış yüksek lisans tezi). Sütçü İmam Üniversitesi Sosyal Bilimler Enstitüsü, Kahramanmaraş.

- Shah, R., & Ward, P. T. (2003). Learn manufacturing: Context, practice bundles, and performance. *Journal of Operations Management*, 21(2), 129-149. doi:10.1016/S0272-6963(02)00108-0
- Sims, H. P., Faraj, S., & Yun, S. (2009). When should a leader be directive or empowering? How to develop your own situational theory of leadership. *Business Horizons*, 52(2), 149-158.
- Snyder, C., & Lopez, S. (2006). *Positive psychological assessment*. Washington, DC: American Psychological Association.
- Somech, A. (2005). Teachers' personal and team empowerment and their relations to organizational outcomes: Contradictory or compatible constructs? *Educational Administration Quarterly*, 41(2), 237-266.
- Srivastava, A., Bartol, K. M., & Locke, E. A. (2006). Empowering leadership in management teams: Effects on knowledge sharing, efficacy, and performance. *The Academy of Management Journal*, 49(6), 1239-1251. doi:10.2307/20159830
- Stavrova, O., Fetchenhauer, D., & Schlösser, T. (2012). Cohabitation, gender, and happiness: A cross-cultural study in thirty countries. *Journal of Cross- Cultural Psychology*, 43(7), 1063-1081.
- Suhail, K., & Chaudhry, R. H. (2004). Predictors of subjective well-being in an Eastern Muslim Culture. *Journal of Social and Clinical Psychology*, 23(3), 359-376.
- Sweetland, S. R., & Hoy, W. K. (2000). School characteristics and educational outcomes: Toward an organizational model of student achievement in middle schools. *Educational Administration Quarterly*, 36(5), 703-729.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6. bs.). New York: Pearson.
- Talebzadeh, F., & Samkan, M. (2011). Happiness for our kids in schools: A conceptual model. *Procedia-Social and Behavioral Sciences*, 29, 1462-1471.
- Tosten, R., Avci, Y. E., & Sahin, S. (2018). The relations between the organizational happiness and the organizational socialization perceptions of teachers: The sample of physical education and sport. *European Journal of Educational Research*, 7(1), 151-157. doi: 10.12973/eu- jer.7.1.151
- Uğur, S. (2019). *Öğrenen okul ile okul mutluluğu arasındaki ilişki*. (Yayımlanmamış yüksek lisans tezi). Van Yüzüncü Yıl Üniversitesi Eğitim Bilimleri Enstitüsü, Van.
- UNESCO, (2006). *EFA global monitoring report 2007: Strong foundations –early childhood care and education*. Paris: UNESCO.
- Uzun, T., & Kesicioğlu, O. S. (2019). Okulöncesi öğretmenlerinin örgütsel mutluluğu ile iş tatminleri ve örgütsel bağlılıkları arasındaki ilişkilerin incelenmesi. *Akdeniz Eğitim Araştırmaları Dergisi*, 29, 39-52.
- Vecchio, R. P., Justin, J. E., & Pearce, C. L. (2010). Empowering leadership: An examination of mediating mechanisms within a hierarchical structure. *The Leadership Quarterly*, 21, 530-542.
- Vu, H. M. (2020). Employee empowerment and empowering leadership: A literature review. *Technium: Romanian Journal of Applied Sciences and Technology*, 2(7), 20-28.
- Walker, S. S., & Schimmack, U. (2008). Validity of a happiness implicit association test as a measure of subjective well-being. *Journal of Research in Personality*, 42(2), 490-497.

Warr, P. (2007). *Work, happiness and unhappiness*. Lawrence Erlbaum Associates.

Warr, P. (2011). *Work, happiness, and unhappiness*. NJ: Psychology Press.

Warr, P. (2017). Happiness and Mental Health. *The Handbook of Stress and Health: A Guide to Research and Practice*, 57-74.

Weiss, H. M., & Cropanzano, R. (1996). Affective events theory: A theoretical discussion of the structure, causes and consequences of affective experiences at work. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior: An annual series of analytical essays and critical reviews*, Vol. 18, pp. 1–74). Elsevier Science/JAI Press.

Wesarat, P. O., Sharif, M. Y., & Majid, A. H. A. (2015). A conceptual framework of happiness at the workplace. *Asian Social Science*, 11(2), 78-88.

Wright, T. A., Bonett, D. G., & Sweeney, D.A. (1993). Mental health and work performance: Results of a longitudinal field study. *Journal of Occupational and Organizational Psychology*, 66(4), 277-284.

Yangaiya, S. A., & Magaji, K. (2015). The relationship between school leadership and job satisfaction of secondary school teachers: A mediating role of teacher empowerment. *People: International Journal of Social Sciences*, 1(1), 1239-1251.

Zhang, X., & Bartol, K. M. (2010). Linking empowering leadership and follower creativity: The influence of psychological empowerment, intrinsic motivation, and creative process engagement. *Academy of Management Journal*, 53(1), 107-128. doi:10.5465/AMJ.2010.48037118

Zhu, C. H. (2011). *The empirical research about the impact of empowering leadership to employees' organization citizenship behavior: The mediated moderation model* (Unpublished master's thesis). Shanghai University, Chinese.

## **School Adjustment in the Early Years: Children's Social-Emotional Problems in Different Countries and Applied Solutions**

**Nuray Koç<sup>i</sup>**

Bursa Uludag University

### **Abstract**

This research examined preschool children's social-emotional problems and school adjustment processes in different countries. Furthermore, this study compared the school adjustment programs and the teachers' solutions in other countries. A qualitative research method and case study design were used. The sample group consisted of 21 preschool teachers from Turkey, Italy, Lithuania, Hungary and Northern Ireland within the scope of the Erasmus+ project "Developing Social and Emotional Skills in Early Childhood" (SESDECE). A semi-structured interview form was used to obtain the research data. According to the data, it was revealed that separation anxiety, attachment disorder and poor communication with peers were the most common problems in the school adjustment process in all countries. It was determined that teachers in Turkey, Hungary, Lithuania and Northern Ireland used different adjustment programs and solutions during the adaptation. In contrast, teachers in Italy did not use a fixed adjustment program but enriched the first week's programs with activities such as meeting-adjustment activities. Teachers in all countries stated that school administrations support the process, but families should be more involved and a unique adjustment program should be applied to families.

**Keywords:** Early Childhood, Preschool, Social-Emotional Problems, School Adjustment, School Adjustment Program

**DOI:** 10.29329/ijpe.2023.603.6

**Submitted:** 06/03/2023

**Accepted:** 25/07/2023

**Published:** 16/10/2023

---

<sup>i</sup> **Nuray Koç**, Lecturer Dr., Child Development, Bursa Uludag University, ORCID: 0000-0002-8630-9548

**Email:** nuraykoc@uludag.edu.tr

## INTRODUCTION

Children interact with their immediate environment through their families since they are born. They leave this secure family environment for the first time when they start school. School is a new environment with new peer groups, teachers and principals for children. The first days of school are not only a process in which children have many new experiences but also a process to adapt to change and participate in society with their new identity (Dockett & Perry, 2002).

Schmerse & Zitzmann (2007) emphasized that the opportunities offered to children in early childhood at school will impact the child's reaching the highest level of potential in the following years. The new status and social-emotional experiences at school may reveal school adjustment problems in some preschool children. Due to most preschool children being separated from their families and alone in a different environment for the first time when they start school, school adjustment problems seen in preschool education mostly. In adapting to school, some children may have difficulties balancing themselves and the new school environment (Hyson, 2008). Children with school adjustment problems may struggle with communication, obeying rules, social relations and self-control (Campbell, 1995). Similarly, behaviors such as crying, separation anxiety, tantrums and school refusal can be seen in children in the first days of school (Dogan, Sabanciogullari & Aydin, 2008). In such unfavorable situations, the child will not be able to cope alone, so that he will expect the support of his family and teacher. Starting school is an adjustment process for the child, the family, and the teacher. Therefore, many factors such as parental attitudes, teacher attitudes, peer relations, the school's physical structure and environmental conditions can affect the adjustment process of children to school (Barger et al., 2019). The child's gender, health, age, development, temperament and behaviors constitute internal factors; on the other hand, relations with family and intimate environment, school environment and cultural differences constitute external factors (McBryde, Ziviani & Cuskelly, 2004; Yoleri, 2014). Cultural values and traditions also affect a child's school life. Since cultural expectations or norms can be effective in matters such as going to school, education, and career, especially children of immigrant families may have problems between their own culture and the culture of the new place they migrated (Birman & Espino, 2007; Tan & Goldberg, 2009). In addition to all these factors, another factor affecting children's adaptation is undoubtedly the pandemic process. Since the Covid-19 pandemic has changed the daily routine of all people, adults and children have had to adapt to new living conditions (Weir, 2020). Similarly, preschool children lived in isolation, away from their social environment and peers for a long time. After such a process, it has become inevitable for children who start school to have social and emotional problems such as being asocial, being selfish, and having digital addiction (Koc, 2022).

Considering the effects of the school adjustment process on the child, this process should be handled professionally. Many countries care about children's school adjustment and readiness, and they work on the school adjustment process at all levels of education. Because early childhood is the first step in preparing children for school before formal education; countries focus more on school adjustment during this period (Grimley & Bennett, 2000).

In recent years, various programs and applications have been used in the USA and other European countries to facilitate preschool children's adaptation process and prevent them from experiencing social-emotional problems. It has been observed that disadvantaged groups, such as those from different cultures and that have low socioeconomic status, are prioritized in the adjustment program (Pinar, 2021). Although the programs of European countries are composed of activities to facilitate adaptation to a different city or culture based on attachment theory (Pinar, 2021), the integration programs used by the USA mainly consist of practices for activities structured with family participation (Little et al., 2016).

In our country, the Ministry of National Education (MEB) has been implementing an adjustment program covering the first week of school to facilitate the adaptation processes of preschool children since the 2006-2007 academic year (MEB, 2022). In addition, since 2016 by the Ministry of National Education, with the financial support of UNICEF, Materials such as the School



Adjustment Program guide, teacher activity book, family activity, and handbook are also published (TEGM, 2019).

Although there are various activities to support the children in the transition and adaptation, there may be deficiencies in the school adjustment in our country and other countries. When these deficiencies are examined in detail, some are determined to be in school adjustment. These are using a practical and child-friendly school adjustment program, regularly involving the family, providing a moderate transition to bond with the child, and the teacher's ability to effectively solve crisis moments. Other studies in the literature examine teachers' opinions on the school adjustment of preschool children (Ferreira et al., 2021; Basaran, Gokmen & Akdag, 2014; Pekdogan, 2017; Ustundag & Turkoglu, 2017). However, preschool children's school adaptation processes must be examined in comparison to teachers' views in different countries. Therefore, this research is a critical study to meet this need in the literature. In addition, this research may contribute to the teachers being more prepared for possible social-emotional problems in the new education period and obtaining information about practices in the school adaptation process of other countries.

This research examines the social-emotional problems of preschool children in school adjustment, the school adjustment programs and teacher solutions in Turkey, Italy, Lithuania, Hungary and Northern Ireland. As a result, the research sought answers to the following questions:

- 1- What are children's social-emotional problems in school adjustment?
- 2- What kind of solution(s) are used for children's social-emotional problems during adapting to school?
- 3- What is the role of the school administration in school adjustment?
- 4- What are the elements (features) of an effective school adjustment program in preschool education?

## **METHODS**

This section contains information about the research model, participants, data collection tools, data collection procedure and data analysis.

### **Research Model**

The research is a descriptive study designed with qualitative research techniques. In this study, case study design which is one of the qualitative research models was applied. Case studies are studies in which a current phenomenon is studied within its real-life framework and the results of a specific situation are revealed (Yildirim & Simsek, 2008). In this direction, this study tried to determine the situation regarding the school adaptation processes of preschool children in different countries.

### **Participants**

In the study, maximum variation sampling, one of the purposive sampling methods, was used to examine the differences or similarities between the school adaptation processes of preschool children in different countries. The purpose of maximum variation sampling is to discover similarities and differences between situations with variation (Yildirim & Simsek, 2008). The study group of the research consisted of 21 preschool teachers from Turkey, Italy, Lithuania, Hungary and Northern Ireland. Participants were selected from schools in their countries by Turkey, the project coordinator country, within the scope of the European Union project (Erasmus+ KA201) titled "Developing Social and Emotional Skills in Early Childhood" (SESDECE).

Bursa Yildirim District Directorate of National Education is the project's coordinator, which covers December 2019-June 2023 and comprises five countries covered in this study (Turkey, Italy, Lithuania, Hungary and Northern Ireland). In addition, Bursa Uludag University is a partner and researcher in the project. The criteria used to determine the teachers participating in the project are being preschool teachers in their country and knowing at least an intermediate level of English. The teachers having one-to-one interaction with preschool children in different countries would effectively reveal the similarities and differences between the countries in school adjustment.

The study group in the research is a total of 21 teachers, seven from Turkey, five from Lithuania, three from Hungary, three from Italy and three from Northern Ireland. All schools that joined the project have female teachers in their preschool departments. Therefore, all of the teachers in the study group were women. The participants were 28-42 years old and all had bachelor's degrees. The teaching experience of the participants ranged from 7-20 years. All of the teachers in the study worked in public schools. While schools in Turkey and Lithuania were kindergartens, schools in Hungary, Italy and Northern Ireland also included primary schools. The teachers interviewed worked with children aged 48-72 months in the academic year in which the research was conducted.

### **Data Collection Tools**

The case study is included in qualitative research and general observation, interview, focus group and document analysis techniques are used to collect data (Creswell, 2007). The study used semi-structured interviews and focused group interview techniques as data collection tools in this direction. A semi-structured interview form was prepared to identify the solutions used by preschool teachers for school adaptation processes in their own countries. In order to ensure the validity of the prepared interview form, the opinions of a child development expert and an English education expert were taken, and some statements were corrected. Afterwards, the interview questions form was corrected, due to the pre-practice study conducted with three preschool teachers who were not included in the research. Research data were collected from the teachers using a semi-structured interview form of four open-ended questions.

### **Data Collection Procedure**

Since the research data would be collected within the project's scope, application was made for permission from the ethics committee before the project started. After the committee's approval, interviews were held with the teachers. The research data were collected with a semi-structured interview form in January 2022. Interviews were held with 21 preschool teachers selected from five different countries as participants in the project. While collecting the data, interviews were held in English, the common language, and some participants (3 people) stated that they would express themselves more comfortably in their native languages. Team coordinators who were more fluent in English in their country's team were also included in the interviews so that they would be able to express themselves while meeting with these participants. Individual interviews with the participants took approximately 20-25 minutes. These interviews were audio recorded with the permission of the participants. Besides the individual interviews, an online meeting was held with all the participants, and the data were collected by conducting a focus group meeting. As the participants interacted with each other in the focus group interview, they could add to their previous opinions in the individual interviews (Yildirim & Simsek, 2008). Thus, the research used semi-structured and focus group interviews to obtain high-quality data and increase the data's validity.

### **Data Analysis**

Firstly, the interviews were transcribed and organized for data analysis. An inductive type of content analysis was applied to the data. In inductive analysis, concepts and the relationships between these concepts are revealed from the data through coding (Yildirim & Simsek, 2018). Each interview form was coded as Turkey: TR, Lithuania: LI, Italy: IT and Northern Ireland: IR, Hungary: HU according to countries, and each participant was given TR1, TR2...Etc. The codes were given

according to their country. The final version of the code, categories and themes was created by consulting an expert in qualitative research.

Direct quotations from the interview were included for the research's external validity (transferability). In addition, the process was explained in detail. In order to increase the internal validity (credibility) of the research, the interview form was developed by examining the relevant literature and its consistency with the data of similar studies. In order to increase the external reliability (confirmability) of the research, care was taken not to make subjective judgments and the raw data and coding obtained were kept. In order to ensure the internal reliability (consistency) of the research, five randomly selected interview forms were recorded by an independent expert other than the researcher and the coding was compared. When the results were examined according to the difference and consensus formula of Miles and Huberman (2015), it was seen that the reliability level was 82%. A reliability level higher than 70% indicates that the assessment is reliable.

## FINDINGS

This section presented the themes and categories obtained from the data in tables. These were explained with frequency (f) values and quotations were included. The findings were formed according to the questions asked about adaptation to school. In this context, the question "What are children's social-emotional problems in school adjustment?" was asked to preschool teachers in different countries in the research. The answers given to the question are shown in Table 1.

**Table 1. Frequency Distribution of Themes, Categories and Codes Related to School Adjustment Problems of Preschool Children**

Themes	Categories	TR(f)	LI(f)	HU(f)	IR(f)	IT(f)	Total(f)
Social Problems	Not communicating with peers	4	2	2	2	2	12
	Not participating in plays or activities	4	2	1	1	2	10
	Lack of social skills such as cooperation, sharing	2	3	2	1	2	10
	Disobeying school rules	2	1	1	1	2	7
Emotional Problems	Separation anxiety	5	4	2	2	1	14
	Secure attachment	4	3	1	2	1	11
	Lack of managing emotions	3	3	2	1		9
	Low self-esteem	3	2	1	2		8
	Introversion	2	1	1	1	2	7
	Crying crises	3	2			1	6
	Anger out of control	2	2			2	6
	School fear	1	1			1	3
Habit and Education Problems	Sleeping and eating problems	2	2			1	5
	Difficulty coming to school regularly and willingly	1	2	1		1	5
	Lack of self-care skills	3				1	4
Academic Problems	Failure in cognitive activities	2	1	2		1	5
	Lack of attention	1				1	2

TR: Turkey, LI: Lithuania, HU: Hungary, IR: Northern Ireland, IT: Italy

According to Table 1, it was revealed that social problems, especially the problem of "Not communicating with peers" takes first place in school adjustment of children in all countries (f:12). Some teachers' views on the problem of not communicating with peers are given below:

**HU-2.** *"Children with adjustment problems cannot build deep relationships with their classmates. As such, they cannot adapt to the new environment and participate in the play. They are more disappointed than other children."*

**IT-1.** *"These children avoid communication and engagement with their peers and adults. They are also very reluctant to do things together with other children and obey the rules."*

When Table 1 was examined, it was revealed that "separation anxiety" was the most common emotional problem faced by all countries in the school adjustment process (f:14). This emotional problem was followed by secure attachment (f:11) and a lack of emotion management (f:9).

Considering the data, children's separation anxiety in all countries, mainly due to the inability to establish a secure attachment with the mother, adversely affects the school adjustment process. Some teachers' views on separation anxiety are given below:

**TR-6.** *"Some kids are more sensitive. Especially if the mother has raised her child by being overly dependent on herself, the child experiences separation anxiety at a high level. When the child comes to school for the first time, he does not want to relinquish his mother's hand and resists entering the classroom alone."*

**LI-5.** *"The child does not feel safe because she enters an unfamiliar environment. When she came to school, she separated from his family very difficult. She is afraid that her mother will not come to get her back. "*

**IR-1.** *"If a child has an attachment problem, the child's school adaptation process is difficult. If the child has an anxious family, it affects the child. Uncertainties at home, not talking openly and honestly about school before school starts trigger the child's separation anxiety."*

The second research question was, "What kind of solution(s) are used for children's social-emotional problems during adapting to school?" The answers given to the question are shown in Table 2.

**Table 2. Frequency Distribution of Themes, Categories and Codes of the Solutions to Children's Social-Emotional Problems**

Themes	Categories	TR(f)	LI(f)	HU(f)	IR(f)	IT(f)	Total(f)
Introduction and giving information	Face-to-face meetings with parents	7	5	3	3	3	21
	Playing introduction game with children	7	4	1	2		14
	Personal files introducing the student	5		3	3		11
	Informative mini brochures and booklets	5		3			8
	Implementing family meet-up activities	1			2		3
	Short video in which the teacher introduces himself and his class				2		2
Interesting activities	Class activities such as music, drama, yoga	4	4	1	2	3	14
	Emotion awareness activities	3	5	2	2		12
	Decorating the classroom and preparing small gifts	4			2	3	9
	Out-of-school activities such as camping that the family and the child will attend together	2		3	3	1	9
	Start the day with circle time activities		5	3	1		9
	School promotion days where the family and the child will attend together	1			3		4
	Game support configured with technology					3	3
	Caring for pets and plants in the classroom		2	1			3
Adjustment program	Weekly school adjustment program	7					7
	Kimochis		5				5
	Safe steps to school program			3			3
	Seesaw digital school platform				3		3
Mutual trust and cooperation	Sharing information with parents regularly	4	4	1	3	1	13
	Gradually increasing time spent at school	4			3		7
	Individual meetings with the child and family		4		2		6
	Responsibility agreement between school and family					3	3

TR: Turkey, LI: Lithuania, HU: Hungary, IR: Northern Ireland, IT: Italy

When Table 2 was examined, the solutions presented by preschool teachers in Turkey, Lithuania, Hungary, Italy and Northern Ireland in school adaptation were observed. According to the opinions of the teachers, the most common practices were respectively, parent meetings (f:21), meeting games (f:14), game-based activities such as music and drama (f:14), regular information sharing with parents (f:13) and emotional awareness activities. (f:12). Apart from these, it was also revealed that some countries used special harmonization programs and solutions.

The data obtained were collected in four themes. According to the first theme, "Introduction and giving information", all countries organize a parent meeting to inform parents when school starts. The frequency of these meetings varies from country to country. Similarly, all countries play introduction plays in the first week of school. According to the interviews with the teachers, different ways are used for meeting and informing. While Turkey and Hungary prefer to reach parents by distributing brochures and booklets to inform parents, teachers in Northern Ireland send a video that briefly introduces themselves and the class to their students before school starts. Parents' questions about the school are answered by communicating with families through a digital platform called Seesaw, which includes the entire school. The view of a teacher from Northern Ireland regarding this is as follows:

**IR-2.** *"Children come to school with many questions in their minds. Children especially wonder about their teacher. Our teacher shoots a short video about herself and her class and sends it to families. After watching this video, most children come to school more eager on the first day. Also, before the school starts, we create class groups and communicate with the families on the Seesaw school communication platform."*

When the studies conducted between countries on knowing and informing students were examined, it was seen that all countries received students' family and personal information during registration. However, the schools in Hungary filled out a file named "Who Am I?". This file detailed the child's personality and developmental characteristics, family information, and each child's interests. In Northern Ireland, a booklet called "Everything About Me" was filled out for each child, which provides information about the child in many different aspects, such as the favorite toy, name of the pet, and fears.

The second theme is "Interesting activities". According to this theme, almost all countries use class activities such as music, drama and out-of-school activities. Also, schools in Turkey, Italy and Northern Ireland decorate their classrooms, give small gifts Etc. They stated that they made the school more attractive in the first week by preparing it according to the data obtained from the interviews, Italy organizes an introductory party in the first week of school. In contrast, Northern Ireland organizes an "open school day" before the school opens and invites parents and children to examine the school and classes.

Among the countries, Lithuania, Hungary and Northern Ireland attach importance to starting the daily activities in the school adjustment process. They said they made activities together, such as chatting and dancing, so children could express their feelings and thoughts. The views of a teacher from Lithuania about the day-start activities are as follows:

**LI-3.** *"We have a ritual every morning with the children. When we come to school in the morning, we brew tea together, then everyone takes their tea and sits in our corner in the classroom. While sipping our tea, we talk about what they did at home last night, how they feel today and what we will do during the day."*

Considering the "Adaptation programs" theme in the table, it was revealed that Turkey implements the integration week program prepared by the Ministry of National Education, and Hungary implements the "Safe steps to schools" program. Furthermore, Lithuania

implements the "Kimochis" program and Northern Ireland uses the "Seesaw" platform. It was observed that Italy needs a school adjustment program that it follows regularly. Some of the teachers' views on integration programs are as follows:

**HU-3.** *"We use the "Safe steps to schools" program for children starting in kindergarten. The duration of the program is one month. In this program, the day begins by doing morning gymnastics with music. Then we make circle time activities. In circle time, we discuss topics that attract children's attention. Therefore, they can express their feelings. Sometimes we read stories and do drama activities. In other activities we do during the day, we apply them in a way that supports the child's communication skills."*

**IR-3.** *"For example, let's say a child had difficulty leaving his mother in the morning. As the child misses and wants to see his mother, at the same time, the mother is preoccupied with her child. We have a digital school platform called Seesaw that only school parents and teachers can access. The teacher uploads a photo of a happy memory of the child on that day. The mother can see, write comments, and the teacher can read the mother's comments to her child. It is a comforting event for both mother and child."*






**LI-1.** *"Plays are a great tool to bring children together and help them to adapt. We generally use plays involving all children in the adaptation process. We also use the Kimochis program with the help of our school psychologist. The Kimochis program is designed to help children recognize and manage their emotions and build positive relationships. The activities in this program, which has toys for emotions, really contribute to children's social-emotional skills when applied regularly."*

**TR-1.** *"We organize the activities during the adaptation week according to the age group, level of readiness, interests and needs of the children. We include introduction plays, music and drama activities in the program. Thus, we help them have fun and relax. We also include emotion awareness activities in the first weeks."*

Concerning the "mutual trust and cooperation" theme in the table, it was seen that regular information sharing with parents was tried to be made in all countries, and individual interviews in Lithuania and Ireland supported this situation. In Turkey and Northern Ireland, they were gradually increasing time spent at schools for children who have difficulties adapting. In order to increase mutual trust in the school, schools in Italy signed a joint responsibility agreement between the family and the school, as a different practice. The opinion of one of the teachers in Italy on this issue is as follows:

**IT-3.** *"After the child's registration at the beginning of the school, a joint responsibility agreement is made between school-family-child. In this agreement, the responsibilities of the school, family and child are written. Knowing their responsibilities on both sides teaches mutual trust and respect for each other's roles."*

Regarding the data in Table 2, the comparison of the adjustment programs and their contents used by the teachers of the five countries (Turkey, Italy, Lithuania, Hungary and Northern Ireland) examined in the research is given in Figure 1.

•TURKEY 	•HUNGARY 	•LITHUANIA 	•NORTHERN IRELAND 	•ITALY 
<b>•School Adjustment Program</b> •The Ministry of National Education gives the weekly school adjustment week program.  <b>•Program process</b> •One week  <b>•Program content</b> •Teacher and family adaptation guide •One-week activity plans •Family information meetings •Gradually increasing time spent at school	<b>•School Adjustment Program</b> •Safe steps to school program  <b>•Program process</b> •One month  <b>•Program content</b> •One monthly adjustment program •Engaging start of the day activities •Family information booklets •Out-of-school activities with the family •Personal introduction file names "Who Am I" for every child	<b>•School Adjustment Program</b> •Kimochis  <b>•Program process</b> •Until the end of the academic year  <b>•Program content</b> •Activities of the Kimochis program under the leadership of the guidance teacher •Information meetings for family •Engaging start of the day activities •Emotion awareness activities	<b>•School Adjustment Program</b> •Seesaw digital school platform  <b>•Program process</b> •Until the end of the academic year  <b>•Program content</b> •Teacher's activity plan •Engaging start of the day activities •Personal introduction file names "All About Me" for every child •Regular communication and interaction with family •Out-of-school activities with the family •Gradually increasing time spent at school	<b>•School Adjustment Program</b> •Program enriched with meeting and socializing activities prepared by the school  <b>•Program process</b> •One week  <b>•Program content</b> •1-week activity plans •Acquaintance party in the first week •Activities such as music and drama to keep the child active. •Game support configured with technology •Joint responsibility agreement between family-child-school

**Figure 1. Comparison of preschool school adjustment processes in Turkey, Italy, Lithuania, Hungary and Northern Ireland**

According to Figure 1, although the programs used between countries are different, there are similarities in activities with children and cooperation with families.

The third research question was, "What is the role of the school administration in school adjustment?" The answers given to the question are presented in Table 3.

**Table 3. Frequency Distribution of Themes, Categories and Codes Regarding the Role of School Management in School Adjustment**

Themes	Categories	TR(f)	LI(f)	HU(f)	IR(f)	IT(f)	Total(f)
Staff Support	Support the school guidance service	7	5	3	3	3	21
	Support the classroom assistant	1	5	3	3	1	13
School's Physical Conditions	Arrangement of the physical structure of the school and the class quotas for the new term	6	5	3	3	3	20
	Material supply	5	5	3	3	3	19
	Updating the school's technological equipment					3	3
Educational Studies	Parenting educations	5	5	3	3	1	17
	Receive academic support from local institutions		5		3		8
	Teacher educations	4		1			5
	Personnel educations		3				3

Orientation Studies	Organizing parent meetings	6	4	3	3	3	19
	Organizing and auditing the adjustment program	3	4	3	3		13
	School promotional activities (brochure, social media, Etc.)	7		3			10
	Complete completion of the child's identification forms			3	3		6
	Planning of acquaintance and adaptation activities for children	3				1	4
Individual Support	Active communication between principal-teacher	4	2	3	2	2	13
	Involving the teacher in decisions about the school	1	2	2	1		6
	Principal's trust in the teacher	2			1		3

TR: Turkey, LI: Lithuania, HU: Hungary, IR: Northern Ireland, IT: Italy

When Table 3 is examined, the solutions applied by the school administrations in Turkey, Lithuania, Hungary, Italy and Northern Ireland during the adaptation process to the school are found. According to the data obtained, the school administrations of the countries generally support the school guidance service (f:21), improvement of the physical conditions (f:20), material supply for the activities (f:19), parent meetings (f:19) and educational activities for the parents (f:17). Notably, the teachers in Hungary benefited the most from the support of the school administration and were more satisfied than in other countries. The opinion of a teacher in Hungary regarding the role of school administration is as follows:

**HU-1.** *Our school administration works with and supports us in developing the kindergarten adjustment program. Our school principal attends parent meetings every year. Since our school administration prefers to work with teachers and parents, he organizes joint special activities and parent education meetings yearly."*

According to the data, in addition to the support of the school guidance service, schools in Lithuania and Northern Ireland also receive academic support from local institutions. Although it was stated that training for teachers and families is generally organized in all countries, personnel training is planned only in Lithuania. The opinion of a teacher in Lithuania is as follows:

**LI-4.** *"Unfortunately, some families, especially the parents of students who need special education, may not be open to communication and cooperation. We get help from outside psychologists and our school guidance service in such cases. The school administration cooperates with the Kaunas Pedagogical Psychology Service. From this institution, our parents can also receive advice directly about their children's problems during the adaptation process to school."*

The fourth research question was, "What are the elements (features) of an effective school adjustment program in preschool education?" The answers given to the question are shown in Table 4.



**Table 4. Frequency Distribution of Themes, Categories and Codes of Teachers' Views on effective school adjustment program**

Themes	Categories	TR (f)	LI (f)	HU (f)	IR (f)	IT (f)	Total (f)
Family involvement	Parents' involvement in the adjustment process	6	5	1	3	3	18
	A special adjustment program for parents	3	5		1	3	12
Keeping the child active	Game-based activities	2	2	2	1	1	8
	Drama, music and sporting events	3				3	6
	Nature and outdoor activities	2				3	5
	Introduction and trust activities	4	1				5
	Engaging in joint activities with the immediate environment					3	3
Sensitivity to Individual Differences	Gradually accustoming children to school	3		1	2		6
	Individual adjustment programs for children with special education needs			2			2

TR: Turkey, LI: Lithuania, HU: Hungary, IR: Northern Ireland, IT: Italy

When Table 4 was examined, it was noted that preschool teachers in Turkey, Lithuania, Hungary, Italy and Northern Ireland mentioned a qualified school adjustment program should include activities that will keep the child active. Also, it should include individual differences and family participation. According to the data, teachers mainly focused on including parents in the adaptation process (f:18) to increase the program's quality.

When the "sensitivity to individual differences" theme in the table was examined, preschool teachers in Hungary expressed the opinion of preparing an individual school adaptation program for children who need special education. In addition, some teachers in Turkey and Northern Ireland suggested an adjustment program in which school time is gradually increased for children with adjustment problems.

When the data in the table was examined, the "family participation" theme was especially emphasized in all countries. In the interviews, almost all teachers stated parents' importance in adapting to school. Although countries tried to include parents in their current programs, especially Lithuanian teachers emphasized that a particular school adjustment program should be implemented for parents for the school adjustment program to be effective. Some of the teachers' views on the necessity of an adjustment program for parents are as follows:

**LI-2.** *"Although our school administration made individual meetings with parents and children at the beginning of the school during the school adjustment process, parents are not very involved. Teachers should apply a separate program to parents on issues such as cooperating with their children and managing emotions."*

**TR-4.** *"We cannot think about the adaptation process to school without families. Especially families who meet at school for the first time, like their children, need an adaptation program too. For this, teachers can plan a meeting with the families on the first day, and a program with sample activities in the children's education program can be prepared. Even a one-hour activity plan can be applied to families. For example, the program's name may be my mom and dad are kids."*

## DISCUSSION AND CONCLUSION

Various competencies, especially social-emotional skills, must be acquired to successfully experience the adaptation process to school in the preschool period (Zhang et al., 2018). Thanks to an effective school adaptation process in the preschool period, children gain many positive behaviors and necessary competencies and improve their academic success (Sylvester, 2007). Many studies have revealed that positive first experiences with school in the preschool period have a positive effect on the progress of the child and their future life success. On the other hand, children with school adjustment

problems may experience some psychological problems in the future (Dockett & Perry, 2016; Walker, 2009; Rimm-Kaufman & Pianta, 2000). Based on the opinions of teachers working in preschool institutions in Turkey, Italy, Lithuania, Hungary and Northern Ireland, the social-emotional problems experienced by preschool children in these countries during their adaptation to school and applied solutions were examined. According to the results of the research, it was revealed that the most common social-emotional problems in the school adjustment process in preschool children in all countries were separation anxiety, secure attachment and not communicating with peers.

As a consequence of the research results, it was observed that the nature of the emotional bond with the mother, mother-child communication and the mother's attitude was lying at the root of the separation anxiety problem in children. According to Jones, Lebowitz, Marin, and Stark (2015), the cause of separation anxiety in children is the thought of losing the mother. According to Jones, Lebowitz, Marin, and Stark (2015), the cause of separation anxiety in children is the thought of losing the mother. The bond that the child will establish with the mother will be effective in all the relations that the child will establish in his later years. Therefore, it could be argued that the adaptation process of the securely attached child would be more comfortable when he/she starts preschool. In the literature, many studies show that the bond established by the mother with the child and the parental attitude shown toward the child affect the child's adaptation to school (Connel & Prinz, 2002; Mo & Singh, 2008; Ozen-Altinkaynak & Akman, 2019; Sumer, Sayil & Berument, 2016).

In order to ensure adaptation to school, the child needs to acquire various social, emotional and self-regulation skills. Studies aimed at acquiring these skills in the adaptation process to school can contribute to children's adaptation to school in a shorter time and their love for school (Sepetci-Saribas & Gultekin-Akduman, 2019). When the applied solutions by the countries are examined, the general solutions are holding parent meetings, including activities such as icebreaker games, music, drama, yoga, doing emotional awareness studies and regular information sharing with parents are used. This situation shows that teachers in all countries prefer solutions that keep children and parents active in school adaptation.

According to the findings, it was found that teachers in Turkey enriched the adjustment program sent by the Ministry of National Education with activities such as meeting games and vigorous exercises. Besides, the "Kimochois" program was applied in the school adjustment process in Lithuania, the "Safe steps to schools" program was applied in Hungary and the "Safe steps to schools" program was applied in Northern Ireland. It was revealed that they used the school communication network called "Seesaw." It was revealed that Italy used a program prepared by each school itself, which included exciting activities such as decorating the classroom, music and dance. When the programs were examined, while Northern Ireland focused on informing the family and monitoring the child's adaptation process, Lithuania focused on recognizing, regulating and trusting their emotions. In addition, Hungary preferred a gradual program, and Turkey and Italy focused on exciting activities. Although there were intercultural differences, practices were carried out in a way that placed the child at the center of the adjustment programs implemented in all countries.

As a result of the data obtained, it was seen that the school administration supported the teachers in the adaptation process through the support of the guidance service, the arrangement of the physical environment, the organization of parent meetings and orientation studies. In addition, teachers suggested that parents should involve in the process for a qualified school adjustment program. Even a separate adjustment program should be applied to parents. This finding revealed the importance of including the family in the school adjustment process. Many studies have proved the effects of parents' attitudes on their children's school adjustment (Arabacioglu & Bagceli-Kahraman, 2021; Bulut, 2019; Barger et al., 2019; Pelletier & Brent, 2002; Ogelman et al., 2013). While parents enable their children to acquire the basic life skills expected by the school, it also facilitates or makes it difficult for the child to adapt to school in terms of their personality traits, school experiences, and expectations from their children and school (Magdalena, 2013). Polat & Atis Akyol (2019) also stated that situations such as wrong parental attitude, excessive dependence on the mother, being single-parent and frightening the child with school might negatively affect children's adaptation to school. Accordingly,

for the school adjustment process to be positive, it was revealed that a school adjustment program should be prepared and implemented for families like children's adjustment programs. This result showed that all countries in the study lacked an integration program in which both the child and the family would be active simultaneously.

Addressing the school adaptation process from an international perspective is essential for children's school readiness. In line with this research, it could be suggested that all countries enrich their current programs with good practices or prepare a new international school adjustment program. In addition, a risk analysis could be made on the social-emotional problems obtained from the countries' children within the research's scope. Another suggestion could be that experts create a digital platform where solutions for these problems, experiences and examples of activities are included and used jointly in many countries.

**Conflicts of Interest:** No potential conflict of interest was declared by the author.

**Funding Details:** No funding or grant was received from any institution or organization for this research.

**CRedit Author Statement:** Nuray Koç: Conceptualization, Methodology, Writing- Original draft preparation, Visualization, Investigation, Supervision. Validation, Writing- Reviewing and Editing.

**Ethical Statement:** Ethics committee approval, dated 26.11.2021 and numbered 2021/10, was obtained from Bursa Uludag University Social and Human Sciences Research Ethics Committee for this research. Scientific, ethical and citation rules were followed during the process of this research. Participation in the study was voluntary.

## REFERENCES

- Arabacığlu, B. & Bağçeli Kahraman, P. (2021). Okul öncesi dönem çocuklarının okula uyum düzeyleri ve ebeveyn tutumlarının farklı değişkenler açısından incelenmesi. *Türkiye Sosyal Araştırmalar Dergisi*, 25 (1), 175-192. <https://dergipark.org.tr/tr/pub/tsadergisi/issue/61177/671760>
- Barger, M. M., Kim, E. M., Kuncel, N. R., & Pomerantz, E. M. (2019). The relation between parents' involvement in children's schooling and children's adjustment: A metaanalysis. *Psychological bulletin*, 145(9), 855-890. <https://doi.org/10.1037/bul0000201>
- Başaran, S., Gökmen, B. & Akdağ, B. (2014). Okul öncesi eğitimde okula uyum sürecinde öğretmenlerin karşılaştığı sorunlar ve çözüm önerileri. *Uluslararası Türk Eğitim Bilimleri Dergisi*, 2, 197-223. <https://dergipark.org.tr/tr/pub/goputeb/issue/7322/95820>
- Birman, D. & Espino, S. R. (2007). The relationship of parental practices and knowledge to school adaptation for immigrant and nonimmigrant high school students. *Canadian Journal of School Psychology*, 22, 152-166. <http://dx.doi.org/10.1177/0829573507307803>
- Bulut, A. (2019). Okul öncesi eğitime başlangıçta yaşanan uyum sürecine ilişkin ebeveynlerin görüşleri. *OPUS-Uluslararası Toplum Araştırmaları Dergisi*, 13 (19), 656-681. DOI: 10.26466/opus.571801
- Campbell, S. B. (1995). Behavior problems in preschool children: A review of recent research. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 36 (1): 113-149. doi: 10.1111/j.1469-7610.1995.tb01657.x. PMID: 7714027

- Connel, C. ve Prinz, R. J. (2002). The impact of childcare and parent child interactions on school readiness and social skill development for low-income african american children. *Journal of School Psychology*, 40(2), 177-193. doi: 10.1016/S0022-4405(02)00090-0
- Cresswell, J.W. (2007). *Five Qualitative Approaches to Inquiry*. In J. W. Cresswell (Eds.) Qualitative inquiry and research design: Choosing among five approaches. Thousands Oaks: Sage Publications.
- Dockett, S. & Perry, B. (2016). *Okula geçiş algılar, beklentiler, deneyimler*. (Çev. N. Semra Erkan). Ankara: Nobel Yayıncılık.
- Dockett, S. & Perry, B. (2002). Who's ready for what? young children starting school. *Contemporary Issues in Early Childhood*, 3(1), 65-89. doi:10.2304/ciec.2002.3.1.9
- Doğan, S., Kelleci, M., Sabancıoğulları, S., & Aydın, D. (2008). Bir ilköğretim okulunda öğrenim gören çocuklarda ruhsal uyum sorunları. *TSK Koruyucu Hekimlik Bülteni*, 7(1), 47-52.
- Ferreira, M., Reis-Jorge, J. & Batalha, S. (2021). Social and Emotional Learning in Preschool Education - A Qualitative Study with Preschool Teachers. *International Journal of Emotional Education*, 13(1), 51-66. <https://doi.org/10.2478/jtes-2020-0003>
- Grimley, L.K. & Bennett J. (2000). Beginning school ready to learn: An international perspective. *School Psychology International*, 21(3), 322-335. <https://doi.org/10.1177/0143034300213008>
- Hyson, M. (2008). *Enthusiastic And Engaged Learners: Approaches To Learning In The Early Childhood Classroom*. New York: Teachers College Press.
- Jones, J. D., Lebowitz, E. R., Marin, C. E. & Stark, K. D. (2015). Family accommodation mediates the association between anxiety symptoms in mothers and children. *Journal of Child & Adolescent Mental Health*, 27(1), 41-51. doi: 10.2989/17280583.2015.1007866. PMID: 25958796
- Koç, N. (2022). Examination of the Social Skills of Primary School 1st Grade Children Who Lived Their Early Childhood Period in the Pandemic. *Journal of Inonu University Health Services Vocational School*, 10 (3),1016-1041. doi: 10.33715/inonusaglik.1155682
- Little, M., H., Vogel, C.,L.& Curran, F.C. (2016). Facilitating the transition to kindergarten: What ECLS-K data tell us about school practices then and now. *American Educational Research Association*, 2(3),1-18. <https://eric.ed.gov/?id=EJ1194396>
- McBryde, C., Ziviani, J. & Cuskelly, M. (2004). School readiness and factors that influence decision making. *Occupational Therapy International*, 11, 4, 193-208. <https://doi.org/10.1002/oti.211>
- Miles, M. B., & Huberman, A. M. (2015). *Nitel veri analizi*. (Çev. S. Akbababa Al-tun ve A. Ersoy). Ankara: Pegem Akademi.
- Magdalena, S. M. (2013). The effects of parental influences and school readiness of the child. *Procedia - Social and Behavioral Sciences*, 127, 733 - 737. doi:10.1016/j.sbspro.2014.03.345
- MEB Temel Eğitim Müdürlüğü (2022). *Milli eğitim bakanlığı okul öncesi eğitim programı*.

- Mo, Y., & Singh, K. (2008). Parents' relationships and involvement: Effects on students' school engagement and performance. *RMLE online*, 31(10), 1-11. <https://doi.org/10.1080/19404476.2008.11462053>
- Ogelman, H. G., Önder, A., Seçer, Z., & Erten, H. (2013). Anne tutumlarının 5-6 yaş çocuklarının sosyal becerilerini ve okula uyumlarını yordayıcı etkisi. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 29, 143-152. <https://dergipark.org.tr/tr/pub/susbed/issue/61807/924716>
- Özen Altınkaynak, Ş. & Akman, B. (2019). Okul öncesi dönemdeki çocukların okula uyum becerilerine anne baba tutumlarının etkisi. *Toplum ve Sosyal Hizmet*, 30(1), 19-36. doi: 10.33417/tsh.516679
- Pekdoğan, S. (2017). Sınıf Öğretmenlerinin İlkokula Hazırlık Sürecinde Okul Öncesi Eğitimden Beklentileri. *Yaşadıkça Eğitim*, 31(2), 11-22. <http://journals.iku.edu.tr/yed/index.php/yed/article/view/65>
- Pelletier, J., Brent, J. M. (2002). Parent participation in children 's school readiness: the effects of parental self –efficacy, cultural diversity and teacher strategies. *International Journal of Early Childhood*, 34, 45-60. <https://doi.org/10.1007/BF03177322>
- Polat, Ö. & Atış Akyol, N. (2019). Okula uyum ve ilkökula hazırbuluşluk içinde: *adım adım ilkökula başlamak, okula uyum ve erken okuryazarlık eğitimi*. Ö. Polat (Ed.). Ankara: Anı Yayıncılık.
- Pınar, Y. (2021). Ayrılık kaygısıyla başa çıkmaya yönelik bir model önerisi: akdeniz üniversitesi kreş ve anaokullarına uyum modeli (kaum-akdeniz). *Millî Eğitim Dergisi*, 50 (230). 29-56. <https://doi.org/10.37669/milliegitim.678341>
- Rimm-Kaufman, S.E. & Pianta, R.C. (2000). An ecological perspective on the transition to kindergarten: A theoretical framework to guide empirical research. *Journal of Applied Developmental Psychology*, 21(5), 491–511. [https://doi.org/10.1016/S0193-3973\(00\)00051-4](https://doi.org/10.1016/S0193-3973(00)00051-4)
- Schmerse, D. & Zitzman, S. (2021). Early school adjustment: Do social integration and persistence mediate the effects of school-entry skills on later achievement?. *Learning and Instruction*, 71. <https://doi.org/10.1016/j.learninstruc.2020.101374>
- Sepetci-Sarıbaş, M. & Gültekin-Akduman, G. (2019). 5-6 yaş çocuklarının okula uyum becerilerinin bazı aile özelliklerine göre incelenmesi. *Journal of World of Turks / Zeitschrift für die Welt der Türken*, 11(2), 271-293.
- Sylvester, P. R. (2007). *Early school adjustment: contributions of children's emotion self – regulation and classroom instructional and emotional supports*. (Unpublished Doctoral Thesis), University of Northern Carolina, USA.
- Sümer, N., Sayıl, M. ve Berument, S. K. (2016). Anne duyarlılığı ve çocuklarda bağlanma. İstanbul: Koç Üniversitesi Yayınları.
- Tan, E. T & Goldberg, W. A. (2009). Parental school involvement in relation to children's grades and adaptation to school. *Journal of Applied Developmental Psychology*, 30, 442-453. <https://doi.org/10.1016/j.appdev.2008.12.023>
- TEGM (2019). Okula Uyum Programı (Okul Öncesi). Temel Eğitim Genel Müdürlüğü. [https://tegm.meb.gov.tr/meb\\_iys\\_dosyalar/2019\\_09/06120432\\_Okula\\_Uyum\\_ProgramY\\_okul\\_onesi\\_2019-2020.pdf](https://tegm.meb.gov.tr/meb_iys_dosyalar/2019_09/06120432_Okula_Uyum_ProgramY_okul_onesi_2019-2020.pdf) Erişim tarihi:23.07.2022

- Üstündağ, N. & Türkoğlu, A. (2017). İlkokul birinci sınıf uyum ve hazırlık programının öğretmen görüşlerine göre değerlendirilmesi. *Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 9(25), 307-348. <https://dergipark.org.tr/tr/pub/adyusbd/issue/37216/429566>
- Walker, S. (2009). Sociometric stability and the behavioral correlates of peer acceptance in early childhood. *The Journal of Genetic Psychology*, 170(4), 339-358. doi: 10.1080/00221320903218364
- Weir, K. (2020). Life after covid-19: making space for growth. *American Psychological Association*, 51 (4).
- Yoleri, S. (2014). Preschool children's school adjustment: indicators of behaviour problems, gender, and peer victimisation. *Education 3-13: International Journal of Primary, Elementary and Early Years Education*, 43(6). 1-11. doi:10.1080/03004279.2013.848915
- Yıldırım, A. & Şimşek, H. (2008). *Sosyal bilimlerde nitel araştırma yöntemleri*. 7.Baskı, Ankara: Seçkin Yayıncılık.
- Zhang, D., Cui, Y., Zhou, Y., Cai, M. & Lui, H. (2018). The role of school adaptation and self-concept in influencing Chinese high school students' growth in math achievement. *Frontiers in Psychology*, 9, doi: 10.3389/fpsyg.2018.02356

## Am i a Competent Researcher?: Reflections from Novice Researchers\*

**Buket Turhan Türkkan<sup>i</sup>**  
Çukurova University

**İnanç Eti<sup>ii</sup>**  
Çukurova University

**Betül Karaduman<sup>iii</sup>**  
Çukurova University

### Abstract

This study aims to explore the methodological preferences, research practices, and research competencies of novice educational researchers. 11 novice researchers working at a state university in the southern part of Turkey were requested voluntarily. The data for the study were collected using a semi-structured interview. In the data analysis, inductive content analysis was used. The findings were organized into three themes: research method preference, research practices and applications, and novice researchers' research skills competencies. Novice researchers prefer three different research methods. Participants define the research problems according to personal interests, the needs of society, and literature review. The practices and applications of researchers in sampling, data collection, analysis, validity-reliability and ethics were revealed. Lastly, the research skill competencies were explored. The findings provide an understanding of the novice researchers' research process. In conclusion, novice researchers should be supported in their research skills.

**Keywords:** Educational Research, Methodological Preferences, Research Competency, Novice Researchers.

**DOI:** 10.29329/ijpe.2023.603.7

**Submitted:** 01/08/2022

**Accepted:** 01/09/2023

**Published:** 16/10/2023

\* A part of this study was presented at the 6th International Congress on Curriculum and Instruction (October 11-13, 2018, Kars, Türkiye).

<sup>i</sup> **Buket Turhan Türkkan**, Assist. Prof. Dr., Department of Educational Sciences, Çukurova University Faculty of Education, ORCID: 0000-0003-2528-4022

**Correspondence:** bturhan@cu.edu.tr

<sup>ii</sup> **İnanç Eti**, Research Assist Dr., Department of Preschool Education, Çukurova University Faculty of Education, ORCID: 0000-0001-9736-0944

<sup>iii</sup> **Betül Karaduman**, Research Assist Dr., Department of Mathematics and Science Education, Çukurova University Faculty of Education, ORCID: 0000-0001-7724-3930

## INTRODUCTION

Higher education policies are regarded by countries as agents for promoting social and economic growth as well as international competitiveness. The benchmark for academic success is raised by higher rates of scientific publications and PhD student completion (McAlpine & Amundsen, 2011). Doctoral students, also known as early career researchers, are expected to make contributions to new knowledge and innovation, and therefore play a critical role in developing the European Research Area (ERA) into a world-class capital of the global knowledge economy of the 21st century (Evans, 2010).

Doctoral education and early career research education were emphasized and included in the third cycle of the Bologna Process at the European Union Ministerial Conference in Berlin (Bologna Process: Berlin, 2003). The objective of incorporating highly trained people in the knowledge economy has led to an increase in doctoral education in the European Union in recent years (Balaban, 2017). Therefore, the importance and value bestowed on PhD education are constantly rising. Turkey has been a full member of the Bologna/EHEA European Higher Education Area since 2001, the number of doctoral students has increased by 8,5% in the last five years (Turkish National Higher Education Council, 2021).

The researcher identity is formed during doctoral education, and one of the goals of earning a PhD is to train professional researchers and independent scientists (Mantai, 2017). Doctoral students are more than simply students; they are colleagues, professionals, and even academic and administrative equals. Graduate students are commonly assigned to professional positions such as teaching and research assistantships, and they are no longer considered students (Gardner, 2009). In addition to studying for and completing their PhDs, doctoral students at universities participated in a variety of academic activities such as writing and submitting manuscript reviews, journal and conference papers, research funding applications, and collaborative book editing (Jazvac-Martek, Chen, & McAlpine, 2011). According to Kamler and Thomson (2014), PhD candidates develop new identities as researchers and prospective academics when they participate in such scholarly writing.

Early-career researchers' experiences commonly mirror the dominant culture of the research system (Christian et al., 2021). The preferences and practices of these new researchers also affect their future researcher identities, positionalities and existing research literature. Tomorrow's academic influencers and decision-makers will be today's novice researchers, so additional attention should be paid to comprehending the process of developing future researchers (Niemczyk, 2018). Early-career researchers provide a unique perspective on how research methods are changing and will continue to change in the future (Nicholas et al., 2019). Since research is directly influenced by researchers' assertions of knowledge, values, and processes (Creswell, 2002), it is noteworthy to identify the preferences and practices of novice researchers and to uncover the reasons.

The doctoral training curricula provide research methodology courses but rarely include the ontological and epistemological background of methodologies (Adams, 2016). Planning and conducting educational research is a complicated, deliberative, and iterative process in which ontological and epistemological issues must be taken into account (Cohen, Manion & Morrison, 2018). The philosophical perspectives of researchers determine the type of research, methodology, design and instruments (Tuli, 2010). For novice researchers determining their epistemological and ontological positionality is difficult, yet crucial for scholarly writing. The positionality develops by doing research over time (Holmes, 2020).

Although doctorate students are supposed to be competent and prolific writers, how they learn to write research papers remains ambiguous (Aitchison, Catterall, Ross & Burgin, 2012). As consumers and producers of research, novice researchers must have a clear understanding of the various facets of conducting a proper research study (Ellis & Levy, 2009). Because the findings of educational research have an impact on educational programs, teaching methods, teaching materials, and assessment procedures (Milss & Gay, 2018), the nature of the studies applied is influenced by the



quality of educational research (Feuer, Towne & Shavelson, 2002). One of the main factors affecting the quality of research is methodological consideration.

The complexity of the research methodologies used in conducting scholarly research might be daunting to novice researchers (Ellis & Levy, 2009). Timmerman, Feldon, Maher, et al., (2013) revealed that the research skills of graduate students develop gradually. The ability to situate studies in context using literature and to generate testable hypotheses emerged early in students' careers while the ability to analyse and draw conclusions from data appears to have developed later. Defining a research-worthy problem for novice researchers is also a challenging process (Ellis & Levy, 2008). Whatever the research methodology, novice researchers in educational research confront some challenges. Henson, Hull, and Williams (2010) highlight shortcomings in quantitative research applications including methodological reporting, misconceptions and inconsistencies, and overreliance on conventional techniques. On the other hand, Kalman (2019), found that data collection, analysis and interpretation, representation of findings, and the research process as a whole are all challenges in qualitative research. Onwuegbuzie and Daniel (2003) found analytical and interpretive errors in both quantitative and qualitative educational research. The most frequent errors in quantitative research are inaccurate statistical significance interpretation and inadequate reports of confidence intervals and effect sizes. In qualitative research, the most common mistakes include failing to give evidence to assess the credibility of the findings and generalizing conclusions beyond the sample (Onwuegbuzie & Daniel, 2003).

Professional educators obtain most of their understanding of today's educational problems through published educational research. The requirement for quality research that yields relevant, interpretable information is crucial in this critical communication process (Ward, Hall & Schramm, 1975). Educational research can be classified as scientific if it follows scientific methods and is relevant to educational issues (Feuer, Towne & Shavelson, 2002). The findings of educational research provide a significant contribution to both educational theory and educational practice. Educational research becomes a cornerstone of pre-service teacher training and graduate education programs as the quantity and quality of studies increase. (Mills & Gay, 2018). In this context, it is important that novice researchers studying in the field of educational sciences have sufficient research competencies.

However, novice researchers continue to produce scientific publications despite having difficulties in methodology and lacking research skills, and early studies can help to shape future researcher identities. Hence, it is critical to understand how novice researchers do their research. This is critical to improving the quality of scientific research. Therefore, this study aims to explore the methodological preferences and research competencies of novice educational researchers in Turkey.

## **METHOD**

In this qualitative case study, we investigate the methodological preferences and research competencies of novice educational researchers using the interview method. Case studies are used in design research to investigate a specific issue in a multidimensional in-depth perspective (Merriam, 2013). A single case study design was chosen as Yin (2003) suggested collecting data from different sources within the same context. Therefore, the novice educational researchers' methodological preferences and their competencies at one university were considered as the case of this study.

### **Participants**

A purposive criterion sampling method was used to select the participants of this study. The primary criterion determined to recruit participants for this study is that they must be novice researchers who have just achieved or are studying for a PhD degree in educational sciences. Eleven educational researchers working at a state university in the southern part of Turkey were requested voluntarily. Two of the participants have just completed their PhD, five are at the doctoral dissertation stage, and four are at the doctoral coursework stage. Participants are studying at, German Language Education (f:1), Computer Education and Instructional Technology (f:1), Curriculum and Instruction

(f:1), Psychological Counseling and Guidance (f:3), Preschool Education (f:2), Fine Arts Education (f:1) and Primary Education (f:2) programs. Nine of the participants are women and two are men.

### Data Collection and Analysis

The researchers used a semi-structured interview form with six questions to collect data for the study. Concerning the content validity, a draft interview form was designed and presented to three experts who are experienced in qualitative research and educational science. The interview form was revised after receiving feedback from the experts. The interviews were held with each participant individually at their place of work. The interviews took around 35-45 minutes. All the interviews were recorded with a digital voice recorder with the participants' permission. The recordings were listened to by the researcher and then transcribed into text. For data analysis, inductive content analysis was used. In the analysis of the interviews, the written transcriptions of the voice recordings were typed into text. Then, the transcripts of the interviews were read many times by the researcher and the significant phrases or sentences were coded. Open coding was preferred in this process using NVIVO 10 software. Finally, three themes emerged as a result of the coding process.

After the research data was analyzed by one researcher, peer examination was obtained from the other two researchers and the analysis process of the data was completed by a discussion on the codes, categories and themes. In addition, the research process and the findings were described in detail without interpretation and the findings were supported by direct quotations from participants in order to establish the credibility of this study. The identities of participant novice researchers were ethically concealed and codes such as P1 and P2 were used in the findings and direct quotations.

## RESULTS

The findings obtained from eleven novice researchers were organized into three themes: research method preference, research practices and applications, and novice researchers' research skills competencies.

### Research Method Preference

The scientific research methods preferred by novice researchers have diverged. Accordingly, four of the participants adopted quantitative research, four qualitative, and three mixed research methods. Table.1 shows the scientific research methods preferred by participants and the reasons for their preference.

**Table 1. Research methods preferred by participants and reasons**

Research Methods	Reasons
Quantitative Research	Objective stance of research Being directed to
Qualitative Research	Suitable for social sciences Avoidance of generalization In-depth research opportunity Feeling freedom
Mixed Method	Requirement of interpretation of quantitative data Proper to research problems

Table 1 shows that participants preferred the quantitative research method because they were directed to do so and because of the objective stance of the method. P3 stated that; *"Because I was directed to do it, I think. In my PhD education, I took compulsory scientific research and statistics courses in two semesters. Inevitably, I found myself in quantitative research and learned about it."*

On the other hand, participants preferred the qualitative research method for its suitability for social sciences, avoidance of generalization, and in-depth research opportunities. P7 said that *"... qualitative research methods seem to be more like a research paradigm in which a social scientist can*

*touch people [...] for example, communication between us can open a different door in the interview, as we do with you now."*

Three novice researchers preferred the mixed methods for the requirements of interpretation of quantitative data and because it is proper to research problems. P4 said that *"Sometimes I find the answers to my questions in one paradigm, while I can find the answers in the other paradigm. But I do not want to reduce the study to only qualitative and quantitative methods; mixed-method studies in which both methods are used together satisfy me more."*

Participants set out from different sources and considered different points while defining the research problem. Accordingly, the participants mostly create the research problems according to personal interests (f:6), needs of society (f:4), literature review (f:4), observations (f:3), and current situation analysis (f:2). In addition, a participant decided the research problem according to the congress themes, while another participant preferred to discuss it with her colleagues while defining the problem.

Individual interests played a critical role in defining the research problem. P7 said, *"My priority is to start with something that touches me. [...] Almost all of the research I have done so far is research that has happened or been affected by something in my life."* P2 stated that, *"I created research problems that arise in daily life, that is, the needs of society."* She stated that she considers the needs of society in her words.

While defining the research problem, participants took into account the related literature. Accordingly, the participants tend to find different topics (f:3), consider the effect size (f:1), and base their decisions on the related literature (f:1). P10 expressed his views on this issue as follows: *"What could be the problem? How can I reveal different aspects? [...] I focused on the missing aspects of literature."*

### Research Practices and Applications

The participants' practices and applications while doing research, such as selecting the study group/sample, data collection, data analysis, validity-reliability, and ethics were revealed in interviews.

**Table 2. Participants' considerations in research process**

Research Process	Practices and Applications
Sampling	Convenience sampling Alignment with the research problem Considering the diversity Literature support
Data Collection	Researcher participation Data loss prevention The nature of the data collection tool
Data Analysis	Using analysis software Getting expert support Preparing data for analysis Choosing a well-known the data analysis method
Validity-Reliability	Expert judgement Reliability coefficient calculation Intercoder agreement Content validity Member checking Conducting a pilot study
Ethical Concerns	Informed consent Voluntary Participation Anonymity Avoiding plagiarism Avoiding data manipulation Request permission for measurements

The novice researchers consider convenience sampling, alignment with the problem, providing diversity, and literature support while selecting the study group or sample in their research. P8 stated that she frequently works with a convenient sampling while determining the study group; *"To be honest, I usually work with students in my department. Therefore, I worked with an easily accessible sample. However, since I do not want to call it 'easily accessible', I specify it as 'purposive sampling' or 'criterion sampling methods'."* Although she wrote that she used different sample determination strategies in her research, she stated that he worked with convenience samples. The study group/sample selection strategies that these researchers frequently prefer are convenience sampling (f:6), purposeful sampling (f:4), maximum diversity sampling (f:2), random sampling (f:2), and cluster sampling (f:1).

In the data collection process, the participation of the researcher, data loss prevention, and the nature of the data collection tool were considered. P2 said that *"I usually set up a face to face interview. I also apply the quantitative scales to the participants by myself. A few times I tried to distribute surveys but I did not get good results."* P2 preferred to be involved in the data collection process in person. In addition, the participants stated that they take measures to prevent data loss. P3 said that *"As soon as I take a questionnaire that I give to a parent or teacher, I check the form to see if it is all coded or not, then I ask them to fill it out completely because it is difficult to find them later."*

Participants used a wide variety of data analysis techniques according to the research methodology. While content analysis (f: 7) and descriptive analysis (f: 2) are often preferred in qualitative research, t-test (f: 5), ANOVA (f: 4), and regression analysis (f: 4) are preferred in quantitative research method. In addition, in the process of data analysis, novice researchers preferred to use the software in analysis, get expert support, prepare the data for analysis, and choose a well-known data analysis method. P4 expressed the advantages of using software programs in the analysis process as; *"There are programs such as MAXQDA, NVIVO [...] but I usually prefer NVIVO in analysis. Because it's time-saving and provides data and findings holistically, the software offers many opportunities, so I prefer to use it."* P8 preferred to get expert support in the data analysis process, stated that *"Sometimes there are such variables that you can make decisions very easily, but sometimes I cannot get out of it. Therefore, I ask my advisor's opinion because he is an expert on measuring and evaluation."* P10 stated that she preferred the analysis method she had already known as: *"In the analysis process, I consider collecting suitable data suitable for the analysis method that I have known."*

Novice researchers also ensure the reliability and validity of data collection tools. They preferred; expert judgement, reliability coefficient calculation (KR20, KR21, and Cronbach Alpha), determining the content validity rates, member checking, and conducting a pilot study. In both research methods, it was determined that the researchers chose expert judgement about the measurements. P5 said that *"I get the expert judgement before I conduct a pilot study. I consider the recommendations and rearrange the interview questions. Then I request a second expert judgement process."* All researchers working in quantitative method prefer to calculate the reliability coefficients of data collection tools. P1 expressed that, *"After I decided on the data collection tool, I applied a sufficient number of sample and conducted the Cronbach Alpha reliability analysis on SPSS."* Researchers preferred the qualitative method applied to the intercoder agreement in the analysis process. Besides, content validity, member checking, and pilot study were used to increase the validity and reliability of the research.

The participants also have ethical considerations while researching. They care about receiving informed consent, voluntary participation, anonymity of participants, avoiding plagiarism and requesting permission for measurements. P4 mentioned that *"I care about voluntary participation. The participants are not included in the study by force or having anxiety, It is not ethical."* P7 said that; *"I try to be ethical when I cite references during the reporting phase. I paraphrase the sentences of the original references and cite them in-text. I also try to be objective in findings, I do not manipulate the data. I am concerned about ethics."* as their own words P4 and P7 express their ethical concerns while doing research.

## Research Skill Competencies

When novice researchers are asked to evaluate themselves for research competence, three themes emerge that show a need for improvement; research planning, methodology, and reporting of research. Related categories for each theme are shown in Table 3 below.

**Table 3. The participants need for improvement regarding the research process**

Improvement Needed in	Categories
Planning a Research	Selecting the research method Determining the research topic
Methodology of Research	Data analysis Validity-reliability Using software in data analysis Selecting the data collection tool Reaching to the sample
Reporting of Research	Writing the introduction Writing the discussion Using references Publishing

Novice researchers frequently stated that they needed improvement in the methodology of research and reporting. P3 stated that she had difficulty selecting the method while planning, as, *"I think that the method and findings titles are the most difficult parts in the writing process [...]. It is due to both my lack of knowledge of qualitative analysis and the scarcity of courses and research examples for qualitative research. Also, I could not get support from professors."*

Participants often stated that they felt incompetent in the analysis. P2 said; "I don't feel good enough in quantitative research. [...] Actually, it is impossible to memorize all the techniques or analysis methods, but I need to learn more about quantitative analysis." P11 expressed that she should improve herself using software in data analysis; "For data analysis, I want to use statistical methods, but I can't use them most of the time. Because I feel inadequate. That's why I want to improve the statistics."

Another need for improvement stated by participants was to write the discussion part in the reporting of research. P2 mentioned that *"The most difficult part of reporting is the discussion. I want to express my thoughts freely. [...] But I try to create a discussion according to the rules of scientific research. It is difficult for me to do it."*

P1 also said, *"I feel lacking in some aspects of scientific research, mostly in the literature part. I find it challenging to write a literature review."* Similarly, P4 stated that *"Maybe I can get support in terms of finding the right keywords more directly and more purposefully to make a more accurate search for the literature review. Because it wastes time."*

## DISCUSSION

The participants of this study preferred to use both qualitative and quantitative methods, as well as mixed methods. According to Mills and Gay (2018), the philosophical assumptions that form the basis of an educational researcher's decision to conduct research are shaped by these three: the nature of reality (ontology), the quantitative or qualitative methods they use to study a particular phenomenon (methodology), and how researchers know what they know (epistemology). In this study, there are different reasons for the method preferences of NRs'. For these reasons, being directed to quantitative research in graduate education processes is remarkable. The lecturers trained in the positivist paradigm may have led novice researchers to quantitative research. Advisors have academic and social effects on postgraduate students. In their longitudinal study of seven years, Saudelli and Niemczyk (2020) concluded that the mentoring relationship between a graduate student and a

professor affects future career behaviours. In addition, although qualitative research is widely used in educational research today, it is controversial to direct researchers to quantitative research in graduate education. Also, it is noteworthy that each participant chooses one method. In other words, researchers prefer either qualitative research, quantitative research, or mixed research. The reason can be associated with the adopted paradigm. Another remarkable point is the possibility that the researchers act according to the paradigm they have adopted. Although researchers are sometimes unaware of their assumptions about the nature of knowledge and reality, every research is shaped by a high-level theory, and the task of a researcher is to determine which philosophical and theoretical perspective will form the basis of the study they aim to conduct (Glesne, 2013). When determining the method of research, the nature and quality of the planned research should be taken into consideration. Although it is not quick and easy for novice researchers to recognize and express their disposition towards doing research, it is crucial to determine the researcher's identity. Furthermore, novice researchers should be aware that their position towards research may change over time (Holmes, 2020). The researcher's identity may change and develop over time.

Novice researchers who preferred quantitative research also advocated that quantitative research is objective. Considering that quantitative research emphasizes objectivity, measurement, reliability, and validity (Jean Lee, 1992), it is usual for participants to prefer quantitative research because of their search for objectivity. However, focusing only on objectivity in educational research may be contrary to the nature of the social sciences. Social science is a field that includes subjectivity by its nature (Giddens, 1986), and it is mentioned that the search for objectivity derived from the natural sciences may be inadequate for the social sciences (Jean Lee, 1992).

The most challenging but crucial step of a doctoral dissertation is writing the problem statement of the research (Kerlinger & Howard, 2000). Writing the research problem is the first step in writing a dissertation, and doctoral PhD students have difficulty in this process. However, the success of the thesis depends on a well-stated research problem (Ali & Pandya, 2021). Writing the problem statement of the research correctly and choosing the related literature for the problem are essential. Individual interests come to the fore in determining research problems. As well as individual interests, the needs of society, literature reviews, observations, and current situation analysis are taken into consideration. There is no single strategy to identify the research problem. Besides, many resources can be used in defining the research problem, such as the researcher's interests and practices (McMillan, 2004). Toptaş, Şahin-Kürşad & Çokluk-Bökeoğlu (2018) discovered that novice educational researchers struggled to identify problems because they preferred topics that were original, relevant, and exciting. According to Willison & O'Regan (2007), research is driven by a desire to learn more about how things work and what they could do. It does not require any specific skills but it does require a sense of curiosity. According to Brindley (1991), the researchers investigated the problems they faced in their own experiences. Toptaş, Şahin-Kürşad, and Çokluk-Bökeoğlu (2018) found that while researchers frequently benefit from the literature, experts, and the field of practice when defining research problems, academic conferences and social media benefit them less. McMillan (2004) stated that books and journals are the main resources and asking an expert's advice to recognise contemporary problems is crucial for many researchers. In our study novice researchers also mentioned the same resources in the literature. The research findings and the literature revealed that the researcher's interests, experiences, observations, and literature reviews were important in determining the research problem.

The novice researchers prefer the convenience sampling method, this finding is dramatic. The appropriateness of the research sample to the research problem is essential (McMillan, 2004). Sampling has a significant impact on the quality of research results. In quantitative research, sampling affects the reliability and generalizability of the results (Morse, 1991), and in qualitative research, purposive sampling enables exploration of the research questions (Creswell, 2009). Selecting the sampling methods as convenient sampling may cause problems regarding the validity, generalization, and competence of the research. Merriam and Tisdell (2015) state that although convenient sampling offers some opportunities, it can limit creativity and depth of information. Time and budget are also important factors in the sampling of the study (Baştürk & Taştepe, 2013). Therefore, the reason for

preferring convenience sampling may be the time and budget constraints. Additionally, novice researchers also pay attention to the issues related to the research problem, ensuring diversity and literature. Research objectives and the nature of the research are important factors in sampling (Morse, 2000). Usually, novice researchers take the research problem into account in sampling.

In the data analysis process, the participants considered using analysis software, receiving expert support, preparing the data for analysis, and choosing a well-known data analysis method. Using computer software in the analysis is a necessity in today's technology age. Scientists are increasingly incorporating technological developments and devices directly into research and educational research (Towns, Cockerill, Dahan, Foster, Gaither, Grimshaw, et al., 2014). Computerized data analysis in research can provide speed, consistency, and accuracy to the researchers (Weitzmann, 1999). Therefore, novice researchers prefer to use analysis software. They also receive expert support in data analysis indicating that novice researchers require guidance in analysis. It is also noteworthy that the participants chose a well-known data analysis method. Researchers should use the relevant techniques in data analysis (Abulela & Harwell, 2020). Appropriate data analysis is essential for the validity and reliability of the results. However, preferring well-known analysis methods instead of the analysis method that should be used due to the nature of the research may cause problems. The findings point out that the researchers have some inefficiencies in data analysis.

One of the significant results of this study is the research competencies that novice researchers need to develop. Mostly they need help in research methods. Büyükgöze and Gün (2017) stated that graduate students assessed the graduate courses as low quality, with a limited number of research methods courses restricting the research. According to the results found by Karadağ (2010), doctoral dissertations in education have some errors in the research designs that were not appropriate for the purposes, were inappropriately named, and were not described. In our study, novice researchers have similar problems with the research method and are required to develop research skills, as well as the planning and reporting processes of the research. Brindley (1991), found that researchers had problems with focusing on the research problem in a limited and precise way, interpreting the findings, planning, time management, quantitative techniques, and academic writing. According to the American Psychological Association (APA) (2009), there are several problems in scientific research design and reporting. The lack of reporting in some statistical methods, various reporting errors, and compliance gaps between the research process and the interpretation of the results are among them. Many studies focus on the nature of and errors made in educational research (Boote & Beile, 2005; Bozan, 2012; Karadağ, 2010; Kennedy, 1997; Onwuegbuzie & Daniel, 2003; Pring, 2001). Therefore, developing the research skills and competencies of novice researchers affects the quality of research.

In conclusion, this study provides an understanding of the novice researchers' research processes. The findings were revealed into three themes: Research method preference, research practices, and research skills competencies of novice researchers. The participants were generally competent in scientific research, but they needed improvements in some stages.

The results and conclusions suggest that novice researchers should be supported in their research skills. To increase the knowledge and skills of novice researchers, research education workshops can be organized. Also, the content of research methods courses in graduate education can be revised. Furthermore, novice researchers can be involved in research project groups that have experienced researchers. This study is limited to eleven novice educational researchers working at one university, to reach a general stance among novice researchers, a comprehensive study can be conducted in different areas.

**Conflicts of Interest:** No potential conflict of interest was declared by the author.

**Funding Details:** This study was not supported by any funding agency.

**CRedit** Author Statement: Author 1: Conceptualization, Literature review, Methodology, Data analysis, original draft, Writing of introduction and discussion, Review and editing. Author 2: Data collection, Data analysis, Writing of Results, introduction and discussion,, Review and editing. Author 3: Creating tables and reference list, Review and editing.

**Ethical Statement:** Participants in this study were volunteers and verbal consent was obtained individually before the study. We ensured that strict adherence to ethical principles, safeguarding participant rights, autonomy, and dignity throughout the research process.

## REFERENCES

- Abulela, M. A., & Harwell, M. (2020). Data analysis: Strengthening inferences in quantitative education studies conducted by novice researchers. *Educational Sciences: Theory & Practice*, 20(1), 59-78. DOI: 10.12738/jestp.2020.1.005
- Adams, E. (2016). Untraining educational researchers. *Research in Education*, 96(1), 6-11.
- Aitchison, C., Catterall, J., Ross, P., & Burgin, S. (2012). ‘Tough love and tears’: Learning doctoral writing in the sciences. *Higher Education Research & Development*, 31(4), 435-447.
- Ali, A., & Pandya, S. (2021). A four stage framework for the development of a research problem statement in doctoral dissertations. *International Journal of Doctoral Studies*, 16(1), 469-485.
- American Psychological Association (2009). *Amerikan Psikoloji Derneği yazım kılavuzu* (5. bs.). (C. Pamay, & Z. G. Üstün, Trans.; H. Ekşi, Ed.). Kaknüs Yayınları. (Original work published 2001)
- Balaban, C. (2017). "The flexible ‘knowledge worker’: Figures of the PhD fellow in the EU." In C. Balaban, & S. Wright (Eds.), *European Governance and Doctoral Education: The ‘Knowledge Worker’ in the EU* (pp.7-10). UNIKE Notes on Doctoral Education No 4. <http://eurodoc.net/sites/default/files/attachments/2017/202/4europeangovernanceanddoctoraleducationtheknowledgeworkerintheeu2017.pdf>
- Baştürk, S., & Taştepe, M. (2013). Evren ve örneklem. In S. Baştürk (Ed.), *Bilimsel araştırma yöntemleri*, (pp.129- 159), Vize Yayınları.
- Bologna Process. (2003). *Realising the European higher education area*. [http://www.ehea.info/media.ehea.info/file/2003\\_Berlin/28/4/2003\\_Berlin\\_Communique\\_English\\_577284.pdf](http://www.ehea.info/media.ehea.info/file/2003_Berlin/28/4/2003_Berlin_Communique_English_577284.pdf)
- Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational researcher*, 34(6), 3-15.
- Bozan, M. (2012). Lisansüstü eğitimde nitelik arayışları. *Sosyal ve Beşeri Bilimler Dergisi*, 4(2), 177-187.
- Brindley, G. (1991). Becoming a researcher: Teacher-conducted research and Professional growth. In Sadtono, E. (ed.), *Issues in language teacher education*. Singapore: Regional Language Centre, 89–105.
- Büyükgöze, H., & Gün, F. (2017). Building the professional identity of research assistants: A phenomenological research. *Educational Sciences: Theory and Practice*, 17(1), 237-263. DOI: 10.12738/estp.2017.1.0216.



- Christian, K., Johnstone, C., Larkins, J. A., Wright, W., & Doran, M. R. (2021). Research culture: A survey of early-career researchers in Australia. *Elife*, 10, e60613. DOI:10.7554/eLife.60613
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8<sup>th</sup> ed.). Routledge.
- Creswell, J. W. (2002). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Pearson.
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Sage.
- Ellis, T. J., & Levy, Y. (2008). Framework of problem-based research: A guide for novice researchers on the development of a research-worthy problem. *Informing Science*, 11, 17-32.
- Ellis, T. J., & Levy, Y. (2009). Towards a Guide for Novice Researchers on Research Methodology: Review and Proposed Methods. *Issues in Informing Science & Information Technology*, 6, 323-337.
- Evans, L. (2010). Developing the European researcher: 'extended' professionalism within the Bologna Process. *Professional Development in Education*, 36(4), 663-677.
- Feuer, M. J., Towne, L., & Shavelson, R. J. (2002). Scientific culture and educational research. *Educational Researcher*, 31(8), 4-14.
- Gardner, S. K. (2009). The development of doctoral students--phases of challenge and support. *ASHE Higher Education Report*, 34(6), 1-127.
- Giddens, A. (1986). Action, subjectivity, and the constitution of meaning. *Social Research*, 53(3), 529-545.
- Glesne, Corrine. 2013. Nitel araştırmaya giriş [Becoming qualitative researchers 4<sup>th</sup> ed.] (A. Ersoy, & P. Yalçinoğlu, Trans. Eds.). Anı. (Original work published 2011)
- Henson, R. K., Hull, D. M., & Williams, C. S. (2010). Methodology in our education research culture: Toward a stronger collective quantitative proficiency. *Educational Researcher*, 39(3), 229-240.
- Holmes, A. G. D. (2020). Researcher positionality: A consideration of its influence and place in qualitative research - A new researcher guide. *Shanlax International Journal of Education*, 8(4), 1-10.
- Jazvac-Martek, M., Chen, S., & McAlpine, L. (2011). Tracking the doctoral student experience over time: Cultivating agency in diverse spaces. In McAlpine, L., & Amundsen, C. (Eds.), *Doctoral education: Research-based strategies for doctoral students, supervisors and administrators* (pp. 17-36). Springer.
- Kalman, M. (2019). It requires interest, time, patience and struggle: Novice researchers' perspectives on and experiences of the qualitative research journey. *Qualitative Research in Education*, 8(3), 341-377. DOI: 10.17583/qre.2019.4483
- Kamler, B., & Thomson, P. (2014). *Helping doctoral students write: Pedagogies for supervision*. (2nd ed.). Routledge. DOI: 10.4324/9781315813639
- Karadağ, E. (2010). Eğitim bilimleri doktora tezlerinde kullanılan araştırma modelleri: Nitelik düzeyleri ve analitik hata tipleri. *Kuram ve Uygulamada Eğitim Yönetimi*, 1(1), 49-71.

- Kennedy, M. M. (1997). The connection between research and practice. *Educational researcher*, 26(7), 4-12.
- Kerlinger, F. N., & Howard B. L. (2000). *Foundations of behavioral research* (4th ed.). Harcourt College Publishers.
- Jean Lee, S. K. (1992). Quantitative versus qualitative research methods—Two approaches to organisation studies. *Asia Pacific Journal of Management*, 9(1), 87-94.
- Mantai, L. (2017) Feeling like a researcher: Experiences of early doctoral students in Australia. *Studies in Higher Education*, 42(4), 636-650.
- McAlpine, L., & Amundsen, C. (2011). Making meaning of diverse experiences: Constructing an identity through time. In McAlpine, L., & Amundsen, C. (Eds.), *Doctoral education: Research-based strategies for doctoral students, supervisors and administrators* (pp. 173-183). Springer.
- McMillan, J. H. (2004). *Educational research: Fundamentals for the consumer*. Pearson Education.
- Merriam, S. B. 2013. *Qualitative Research and Case Study Applications in Education. Revised and Expanded from Case Study Research in Education*. San Francisco: Jossey-Bass Publishers
- Merriam, S. B., & Elizabeth J. T. (2015). *Qualitative research: A guide to design and implementation*. John Wiley and Sons.
- Mills, G. E., & Gay, L. R. (2012). *Educational research: Competencies for analysis and applications*. Pearson
- Morse, J. M. (1991). Strategies for sampling. In J. M. Morse (Ed.), *Qualitative nursing research: A contemporary dialogue* (pp. 127-145). Newbury Park, CA: Sage.
- Morse, J. M. (2000). Determining sample size. *Qualitative Health Research*, 10(1), 3-5.
- Nicholas, D., Watkinson, A., Boukacem-Zeghmouri, C., Rodríguez-Bravo, B., Xu, J., Abrizah, A., ... & Herman, E. (2019). So, are early career researchers the harbingers of change?. *Learned Publishing*, 32(3), 237-247.
- Niemczyk, E. K. (2018). Developing globally competent researchers: an international perspective. *South African Journal of Higher Education*, 32(4), 171-185.
- Onwuegbuzie, A. J., & Daniel, L. G. (2003). Typology of analytical and interpretational errors in quantitative and qualitative educational research. *Current issues in Education*, 6(2), 1-33.
- Pring, R. (2001). The virtues and vices of an educational researcher. *Journal of Philosophy of Education*, 35(3), 407-421.
- Saudelli, M. G., & Niemczyk, E. K. (2020). Revealing moments of mentorship: Social exchanges between a graduate research assistant and a professor. *Alberta Journal of Educational Research*, 66(4), 454-470.
- Timmerman, B. C., Feldon, D., Maher, M., Strickland, D., & Gilmore, J. (2013). Performance-based assessment of graduate student research skills: Timing, trajectory, and potential thresholds. *Studies in Higher Education*, 38(5), 693-710.

- Toptaş, B., Şahin-Kürşad, M., & Çokluk-Bökeoğlu, Ö. (2018). Araştırma görevlilerinin araştırma problemleri belirlerken izledikleri yol ve karşılaştıkları güçlükler: Nitel bir çalışma. *Current Research in Education*, 4(2), 48-61.
- Towns, J., Cockerill, T., Dahan, M., Foster, I., Gaither, K., Grimshaw, A., ... & Wilkins-Diehr, N. (2014). XSEDE: accelerating scientific discovery. *Computing in Science & Engineering*, 16(5), 62-74.
- Tuli, F. (2010). The basis of distinction between qualitative and quantitative research in social science: Reflection on ontological, epistemological and methodological perspectives. *Ethiopian Journal of Education and Sciences*, 6(1), 97-108. DOI: 10.4314/ejesc. v6i1.65384.
- Turkish National Higher Education Council. (2021). *YÖK "2020 yılı üniversite izleme ve değerlendirme raporlarını" yayımladı.* Retrived from <https://www.yok.gov.tr/Sayfalar/Haberler/2021/2020-universite-izleme-ve-degerlendirme-raporlari-aciklandi.aspx> on December 15, 2021.
- Yin, R. K. (2003). *Case Study Research: Design and Methods* (3rd ed.). London: Sage Publications.
- Ward, A. W., Hall, B. W., & Schramm, C. F. (1975). Evaluation of published educational research: A national survey. *American Educational Research Journal*, 12(2), 109-128.
- Weitzman, E. A. (1999). Analyzing qualitative data with computer software. *Health Services Research*, 34(5), 1241-1263.
- Willison, J., & O'Regan, K. (2007). Commonly known, commonly not known, totally unknown: A framework for students becoming researchers. *Higher Education Research & Development*, 26(4), 393-409.

## Evaluation of the Digital Story in Values Education Project

**Gökçe Becit<sup>i</sup>**

Nevşehir Hacı Bektaş Veli University

**Ozan Coşkunserçe<sup>ii</sup>**

Nevşehir Hacı Bektaş Veli University

### Abstract

Values education is a structure of abstract concepts, and it is difficult for students to internalize these abstract structures. This situation brings some difficulties in values education. Activity-based practices developed by using values education approaches will facilitate the learning of the relevant value. Digital stories are also materials that can be used at different levels of education and for different purposes. In this regard, the "Digital Story in Values Education" project adopted within the scope of TÜBİTAK 4005 Innovative Educational Applications Support Programme, was aimed to give information to primary school teachers about the concept of digital stories for use in values education processes, to introduce digital story preparation programs, to provide basic program information and training that can be used to create digital stories, to prepare sample digital stories that can be used in classroom values education, and sharing the prepared digital stories with all teachers by publishing them. This study aimed to determine whether the targeted widespread impact of the "Digital Story in Values Education" project, which was accepted within the scope of the TÜBİTAK 4005 program and completed in 2019, has been achieved.

**Keywords:** Digital Story, Digital Storytelling, Values Education, Project Evaluation, TÜBİTAK

**DOI:** 10.29329/ijpe.2023.503.8

**Submitted:** 11/05/2023

**Accepted:** 19/07/2023

**Published:** 16/10/2023

---

<sup>i</sup> **Gökçe Becit**, Assist. Prof. Dr., Computer Education and Instructional Technologies, Nevşehir Hacı Bektaş Veli University

<sup>ii</sup> **Ozan Coşkunserçe**, Assist. Prof. Dr., Computer Education and Instructional Technologies, Nevşehir Hacı Bektaş Veli University, ORCID: 0000-0002-1230-324X

**Correspondence:** coskunserce@nevsehir.edu.tr

## INTRODUCTION

Today, among the main goals of education in Turkey and the world is to increase the academic knowledge levels of students as well as to gain values that are indispensable for the coexistence of society. Value is generally defined as the degree of importance or superiority recognized to an object, entity, or activity in spiritual, moral, and social terms or aesthetically (Öncül, 2000). In the Curriculum of the Primary Social Studies Course of the Ministry of National Education (MoNE) published in 2004, value is defined as the common thought, purpose, basic moral principles or beliefs that are accepted as correct and necessary by the majority of the members of a social group or society to ensure and maintain its own existence, unity, functioning and continuity. Changes in the social structure, especially due to the use of technology and the increase in communication opportunities, may cause the loss of some values and an increase in negative social events. These changes increase the importance of the studies carried out for the education of value and cause the studies on values education in schools to become widespread. The aims of providing values education in schools are listed as creating a healthy, consistent, and balanced personality in students, providing each student with the necessary knowledge, skills, attitudes, behaviors, and habits to ensure that they are both "good people" and "good citizens", and raising them in accordance with their own moral understanding (Aydın, 2010). Conscious teaching of values in schools, apart from the family, is essential for creating a healthy and conscious society (Fidan, 2017). There is also a natural link between values education and increased academic performance (Lovat, 2017).

The basis of the studies on values education within the MoNE in Turkey is the National Education Basic Law No. 1739 (MEB, 2019). In line with the general objectives of Turkish National Education, values education was included in the primary education programs implemented in the 2005-2006 academic year in sections within the scope of Life Studies and Social Studies courses. It can be stated that by including values education in the primary education Social Studies curriculum, values education is brought to the forefront compared to previous programs but it is not sufficiently integrated with the program in terms of practice (Yaşar & Çengelci, 2012).

Values education is a structure of abstract concepts, and it is difficult for students to internalize these abstract structures. This situation brings some difficulties in values education. Activity-based practices developed by using values education approaches will facilitate the learning of the relevant value. In an effective values education, appropriate approaches, strategies, methods, and techniques should be put forward, then it should be supported by a rich learning-teaching process by including activities related to the real life of the child and concluded with an appropriate assessment and evaluation method (Aktepe & Tahiroğlu, 2016). The different approaches, strategies, methods, and techniques required for an effective values education process suggest the necessity of questioning the competence of teachers in these subjects. In a study examining graduate theses on values education in Turkey, it was concluded that teachers and students do not have enough information about values education, and it was emphasized that especially teacher candidates and current teachers should be informed about contemporary methods and techniques that they can use during the teaching of values education (Elbir & Bağcı, 2013). In addition, it is seen that the existing contents are examined in terms of values education. Gül den (2016) examined five animated movies in terms of values education and found that the values of struggle, cooperation, kindness, solidarity, and tolerance were included in the animations. When 22 Turkish lullabies were examined in terms of values education, it was noticed that the values of patriotism, responsibility, and love are mentioned a lot, and values such as honesty, patience, freedom, and cleanliness are given less place (Duran & Yalçıntaş, 2016).

### Digital Stories

Stories have been a teaching material that is often used in educational processes. Although the stories are not designed with the concern of teaching something, readers still learn from them (Yürük & Atıcı, 2016). The first stories were engraved on the cave walls, and centuries later with the invention of the printing press, they began to be printed on the pages of books. Today, digital storytelling has emerged as a new phenomenon as a result of developments in digital and electronic

fields, and the tradition of storytelling and listening has gained a new meaning with the combination of technology (Turgut & Kışla, 2015). The digital story is primarily a medium of expression, a medium of narrative. People can create their own stories and digitize them. Digital storytelling as a pedagogical tool enables students to tell their own stories using multimedia (Benmayor, 2008). Digital storytelling enables computer users to become creative storytellers through the process of choosing topics, doing research, writing screenplays, and developing an interesting story (Robin, 2009).

In digital stories that can be prepared using different software, the stages of determining the subject and writing the story, recording the audio, creating or selecting the appropriate visuals, bringing the audio and visual elements together in the software to be used for the digital storytelling, adding the effects if necessary, and finalizing the digital story are followed (Wawro, 2012). According to the Center for Digital Storytelling, there are 7 components to consider to create an effective digital story. These components are; the narrator's point of view, the questions that will keep the viewer interested, the selection of appropriate content, the quality of the pictures, videos and visuals used, the use of sound-music, the rhythm of the story, and the emotional bond established with the listener (Lambert, 2013). In digital storytelling studies, it is important to determine the purpose well and to prioritize story creation instead of the use of technology. However, as can be understood from the digital storytelling processes, the students who will participate in digital story preparation studies should have the competencies related to the use of some technological tools and software. Therefore, in the study groups organized for the preparation of digital stories, studies aimed at improving the digital literacy of the participants are inevitably included as a side goal (Şimşek et al., 2018).

Digital stories can be used as tools in the classroom and teaching. New content can be presented to the students by showing the digital stories that have already been prepared, or the attention of the students can be drawn to the content at the beginning of the lesson. According to multimedia theory, learning takes place through the use of two separate channels, visual and auditory, and the combined use of visual and auditory elements in the learning environment increases learning (Mayer & Anderson, 1991). With teaching enriched with visuals, we learn better and faster, and what we learn stays in the mind for longer (Bunmark, 2004). Therefore, the use of digital stories in teaching is considered to have positive effects on students' learning effectiveness. Digital storytelling, when incorporated into the classroom setting, can be an effective teaching method to capture and retain students' attention (Xu et al., 2011). Teachers who can create their own digital stories may find that digital stories help students focus more on the topic, create a discussion environment about the topics shared in the story, and make abstract and conceptual content more understandable (Robin, 2008).

There are many studies conducted in Turkey on the use of digital stories in different fields and educational levels in education. The use of digital stories in preschool education (Türe Köse, 2019), social studies lessons (Pala, 2021), teaching Turkish to foreigners (Aydın & Cigerci, 2020; Kızılcakaya, 2021), science education (Korucu, 2020; Koroğlu & Avcı, 2021; Ulum & Ercan Yalman, 2018), foreign language teaching (Çokyaman & Çelebi, 2021; İşçitürk, 2021), education for the visually impaired (Bahşi & Sis, 2023), and teaching mathematics (Dinçer & Yılmaz, 2019) has been examined in various studies. One of the areas where digital stories are used the most is Turkish education. It was determined as a result of the meta-analysis of 11 studies on this subject that digital stories have a high effect on Turkish language development (Özkaya, 2020).

Although there are studies on the use of digital stories at different levels of education and for different purposes, there are limited studies on the use of digital stories in values education. In these studies, students were often asked to develop digital stories about the determined values. In the study where the effect of digital storytelling on the democratic value judgments of university students was examined (Balaman, 2016), it was observed that the democratic value judgment levels of the students increased significantly after the digital story development studies. In a study in which 6th-grade students prepared digital stories on values (Kutlucan et al, 2019), it was determined that student's learning and behavior of values were positively affected.

There are studies in which students do not develop stories for values education, but only watch the content that has already been prepared. In the study conducted by Yürük and Atıcı (2016), digital stories prepared for the values of tolerance, hospitality, responsibility, and benevolence were shown to 5th-grade students in experimental groups in the form of weekly themes. As a result, it was concluded that the use of digital stories in values education in schools where the values education program is not implemented can positively affect the value gains of the students.

### Digital Story in Values Education Project

Today, values education has become a significant part of education systems intending to help younger generations develop their valuable behaviors. Values education aims to teach students ethical and human rights respect, social responsibility, tolerance, fair treatment, and democratic values. The acquisition of these values helps students develop their characters and approach social problems more sensitively and responsibly. The rapid development of digital technologies has presented new opportunities for values education. Digital stories are an effective tool for learning and applying values. Digital stories allow students to play an active role in their learning experience and express their own values. However, there has not been enough research on the effects of digital stories on values education. Therefore, this article aims to determine whether the targeted widespread impact of the project "Digital Story in Values Education" have been achieved.

The "Digital Story in Values Education" project adopted within the scope of TÜBİTAK 4005 Innovative Educational Applications Support Programme, was aimed to give information to primary school teachers about the concept of digital story for use in values education processes, to introduce digital story preparation programs, to provide basic program information and training that can be used to create digital stories, to prepare sample digital stories that can be used in classroom values education, and sharing the prepared digital stories with all teachers by publishing them. In line with these objectives, 30 participants working as classroom teachers were trained on the concept of value, classification of values, the teaching of values, achievements related to the teaching of values, use of stories in education, digital story concept and its use in education, digital story preparation stages, audio-visual processing software to be used in digital story preparation, and digital story preparation software. The trainings provided within the scope of the project lasted 10 days. The content of the training programme of the project can be summarized in Figure 1.

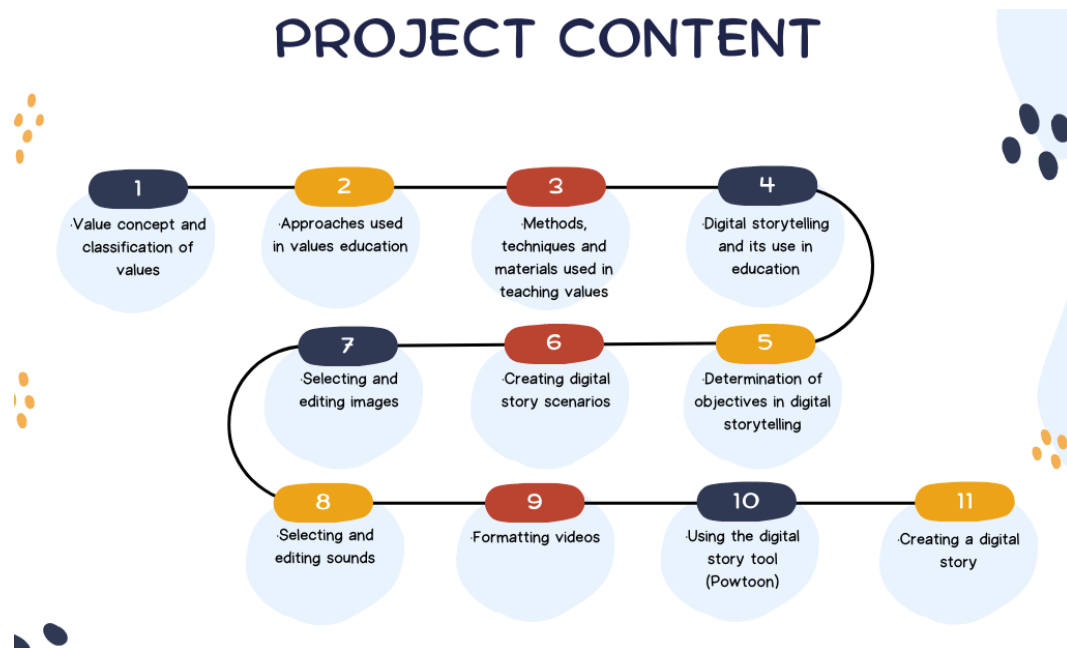


Figure1. The content of the training programme of the project

In line with this training, the participants wrote their scripts and created their digital stories about the value they chose. The stories created can be visited at <https://www.youtube.com/channel/UC1I4IIA1SkToob3YyYQP8g/videos>. Figure 2 shows screenshots from digital stories prepared by the participants.



**Figure2. Screenshots of digital stories prepared by project participants**

The targeted widespread impact of the TÜBİTAK 4005 Innovative Educational Applications Support Programme includes many dimensions. Accordingly, the pervasive impact includes the following dimensions: The role of the project results in popularizing science and increasing interest in science in a large part of society; The nature of the project contributes to the dissemination of national resources in the field of science and society and encourages new projects and new application studies in the fields of science and society with the interest it arouses in this subject; Planning the follow-up system to ensure that the gains obtained by the participants are permanent and develop after the project is concluded, thus increasing the widespread impact. In this regard, this study aimed to determine whether the targeted widespread impact of the "Digital Story in Values Education" project, which was accepted within the scope of the TÜBİTAK 4005 program and completed in 2019, has been achieved. For this purpose, answers to the following research questions were sought.

1. What are the views of project participant teachers about the knowledge and skills they acquired in the project?
2. What are the opinions of project participant teachers about other projects?

## METHOD

A case study, one of the qualitative research methods, was used in this study, which was conducted to determine the views and experiences of the project participant classroom teachers about the widespread impact of the "Digital Story in Values Education" project. In the case study, the factors related to one or several situations are examined with a holistic approach, and in-depth research is carried out on how they affect the relevant situation and how they are affected by the relevant situation. The case study allowed for an in-depth analysis of teacher candidates' experiences over time using various data collection procedures (Yin, 2014).

### Study Group

The study group consists of a total of 13 classroom teachers, six females, and seven males, who are participants of the "Digital Story in Values Education" project and who have successfully completed the project by preparing a digital story. While 12 teachers work in public schools, only 1 teacher works in private schools. The convenience sampling method was used to determine the study group. In this method, the participants are selected because of their convenient accessibility and proximity to the researcher, with the aim of speed and practicality (Yıldırım & Şimşek, 2006). The study group consisted of project participants who were still working at their schools, could be reached, and agreed to participate in the study.



## Data Collection Tools and Data Collection Process

The data collection tool of the study is an interview form consisting of four open-ended questions prepared by the researcher. The data were collected in writing from teacher candidates. The questions to be used in the interview were prepared by conducting a literature review to respond to the sub-objectives of the study. The prepared questions were presented to the opinion of three experts working in the field of educational technologies before the implementation and edits were made in line with the feedback given.

## Data Analysis

Content analysis technique was used in the analysis of the data. This approach aims to present the data obtained as a result of the interview and observation to the reader in an organized and interpreted way. The data are classified, summarized, and interpreted according to predetermined themes. In this study, the answers received for each question were recorded in the relevant indexes, and the data collected were made ready for analysis by making a classification based on the question. The data were examined by the researcher, divided into meaningful sections, and coded. The encoded data was categorized by combining themes, and the themes were converted into coding keys. The content analysis was performed by another expert as well as the researcher and the results of the two analyzes were compared to increase the reliability of the analysis. To test the reliability of the data, Miles and Huberman's (1994) formula ( $\text{reliability} = \text{consensus} / (\text{consensus} + \text{disagreement})$ ) was calculated and the value of 90% was reached.

## FINDINGS

This section presents findings from semi-structured interviews with project participants. The qualitative data of the study were presented under 2 themes formed within the framework of research questions and 5 sub-themes that emerged as a result of the analysis. The theme and sub-themes are as follows:

### 1. Knowledge and skills obtained from the project

a-Use in lessons

b-Share with colleagues

c-Efforts to improve

### 2. Other projects

a-Participation

b-Recommendations

## Findings on the Knowledge and Skills Acquired in the Project

### *Use of the Knowledge and Skills Obtained in the Project in the Lessons*

**Table 1. Use of the knowledge and skills obtained in the project in the lessons**

	<i>f</i>	%
I used	9	69.2
I did not use	4	30.8

As can be seen in Table 1, nine (69.2%) of the 13 classroom teachers who participated in the interviews used the knowledge and skills obtained in the project in their lessons after the project was completed, while four (30.8%) did not use them.

Within the scope of the project, participants were provided with many digital skills such as image, video, and audio editing. The findings regarding the areas where these skills were used by the participants after the project are presented in Table 2.

**Table 2. Areas where the digital skills obtained in the project are used**

	<i>f</i>	%
Audio editing	7	53.8
Video editing	4	30.8
Image editing	4	30.8
eTwinning projects	4	30.8

As can be seen in Table 2, seven of the 13 classroom teachers (46.2%) who participated in the interviews used the digital skills they had acquired in the project for audio editing after the project was completed, four participants (30.8%) used for video editing, four participants (30.8%) used for image editing, and four participants (30.8%) used for eTwinning projects. The area where the most opinions were mentioned under this heading has been audio editing. For example:

*“P13: Or, this year on October 29, we had a project work, we had a stage work. In this stage work, we needed a sound recording, and we needed some music, so I applied that music using Audacity by cut and paste. In fact, it has come into my life quite a bit.”*

It is seen that P13 used the Audacity sound editing software, which was trained within the scope of the project, for a work. Another teacher used audio editing tools for specific days and weeks.

*P7: At the time, yes, I remember now, I used it to set the music on April 23 to set the music on certain days, weeks.*

It is seen that teachers often need sound editing tools in their studies with students in schools. Thanks to the digital skills obtained within the scope of the project, the teachers also carried out video editing work. For example:

*P10: As you know, we had a distance education process; In distance education, I tried to prepare a course video by using the methods you showed in the course videos.*

It is seen that P10 used the digital skills gained within the scope of the project to prepare course videos during the distance education process. One of the teachers, who stated that she was able to edit the images thanks to the digital skills she gained within the scope of the project, said the following.

*P7: It was paint.net I could say I used it. I also used it to work on visuals.*

P7 used paint.net software, which she learned to use within the scope of the project, to edit the images after the project. It is seen that teachers can use their acquired digital skills not only to prepare digital stories but also in many different areas. In this regard, it can be stated that the project has a wide-ranging contribution to teachers.

Four participants stated that they used the digital skills they gained within the scope of the project in their eTwinning projects. The comment of one of these participants is as follows:

*P6: Obviously we used a lot of it because we had an eTwinning project. We tried to use Web 2.0 tools there, we did things like this with the kids, like voice recordings. The children used these software to introduce themselves from there.*

eTwinning projects are frequently carried out in schools. It is seen that the digital skills acquired by the participating teachers within the scope of the project also contribute to their work on eTwinning projects.

#### *Sharing the knowledge obtained in the project with colleagues*

**Table 3. Sharing the knowledge and skills acquired in the project with colleagues**

	<i>f</i>	%
I shared my acquired knowledge and skills with my colleagues	12	92.3
I didn't share anything	1	7.7

As can be seen in Table 3, 12 (92.3%) of the 13 classroom teachers who participated in the interviews shared the knowledge and skills they gained in the project with their colleagues after the project was completed, while one (7.7%) did not.

*P13: Yes, right after we learned it, we told our other colleagues how it was used, how Powtoon was, how Toondo was, and we did it practically.*

It is seen that K13 shared the skills gained within the scope of the project with his/her teacher friends right after the project. This is a very positive and desirable situation in terms of spreading the impact of the project.

*P9: Actually, I did this, I shared my sharing about the project with our information technology teacher in our school. Because he, too, was using the video editing method, as it was a pandemic at that time, but he was using another tool. Since Web 2.0 is very comprehensive, we cannot master every tool. I transferred what I learned to her and she transferred what she knew to me, it was very good. I shared Audacity with our music teacher. Of course, our music teacher was using more professional software, but we talked that good things could come out by using this program software.*

It is seen that P9 shared his/her skills with the information technologies and music teachers at his school after the project.

#### *Participants' post-project activities to improve the knowledge gained in the project*

**Table 4. Status of trying to improve the knowledge gained in the project after the project**

	<i>f</i>	%
I worked to improve it	5	38.5
I didn't do any work to improve it	8	61.5

As can be seen in Table 4, five (38.5%) of the 13 classroom teachers who participated in the interviews worked to improve the knowledge obtained in the project, while eight (61.5%) did not

work. Table 5 shows the findings related to the fields of study of the participants who worked to improve the knowledge they obtained in the project.

**Table 5. Areas of work to improve the knowledge gained in the project**

	<i>f</i>	%
Mobile apps	2	15.4
Web 2.0 tools	2	15.4
Video editing	1	7.7
Audio editing	1	7.7

As can be seen in Table 5, to improve their knowledge, two (15.4%) of the 13 classroom teachers who participated in the interviews worked in the field of mobile applications, two participants (15.4%) worked in the field of Web 2.0 tools, one participant (7.7%) worked in the field of video editing, and one participant (7.7%) worked in the field of audio editing. The opinion of one of the participants who expressed an opinion on this issue is as follows:

*P2: My work is not on the computer, but rather on the applications I can use on the mobile phone. I used applications like InShot.*

It is seen that the user focuses on mobile applications to improve the knowledge obtained in the project. Another participant, on the other hand:

*P8: I turned to Web 2.0 tools, and I discovered Web 2.0 tools that are especially useful for us. I liked Renderforest for example. There was Moovly about them, I was a little bit interested.*

It is seen that the participant is interested in this topic on the Web 2.0 tools introduced in the project and wants to learn different Web 2.0 tools.

### **Findings Relating to Other Projects**

This section presents the opinions of the participating teachers about other projects.

#### ***Effect on Participation-Application to Other Projects***

This section presents the data on the willingness of the participating teachers to participate in other projects after the project.

**Table 6. The impact of the project on participating in other projects and applying**

	<i>f</i>	%
It encouraged me to participate in other projects	12	92.3
I do not have a request to participate in any project	1	7.7

As can be seen in Table 6, 12 (92.3%) of the 13 classroom teachers who participated in the interviews stated that the project encouraged them to participate in other projects, while one (7.7%) stated that he did not have a request to participate in any other project.

*P4: After the project, I started to be more interested in such activities... If possible, I would like to participate again.*

It is seen that P4's interest in projects to improve teachers' knowledge and skills increased after her participation in the project.

*P3: I would like; We had very valuable and interested teachers. It was very valuable to see the excitement, self-confidence, and happiness my students experienced when they heard their own voices and succeeded in a task.*

It is seen that P3 is very satisfied with the project, as a result of applying the skills he has gained in his school, he has received positive feedback from his students and therefore wants to participate in other projects.

### ***Findings on the Opinions and Suggestions of the Project Participant Teachers for the Projects***

This section presents the opinions and suggestions of the participating teachers about other projects.

**Table 7. The impact of the project on participating in other projects and applying**

	<i>f</i>	%
Carrying out projects to teach different Web 2.0 tools	6	46.2
Carrying out projects for the use of digital stories for other courses	4	30.8
Carrying out similar projects for teachers of other branches	3	23

As can be seen in Table 7, six (46.2%) of the 13 classroom teachers who participated in the interviews wanted projects to be carried out for teaching different Web 2.0 tools, four participants (30.8%) wanted projects to be carried out for the use of digital stories for other lessons, and three participants (23%) wanted similar projects to be carried out for other branch teachers. The views of some of the teachers on this issue are as follows.

*P9: I think the digital story may be made through other tools as well. I would appreciate it if there is also training with different Web 2.0 tools. In this way, I believe that I will be familiar with the new Web 2.0 tools.*

P9, who wanted to participate in projects about different Web 2.0 tools, stated that he wanted to receive training specifically about Web 2.0 tools that could be used in digital stories.

*P3: It can be used in mathematics class. Since our school has also a smart board, digital content can be produced and used more effectively in this way.*

P3 wanted similar projects to be carried out for mathematics teachers and stated that these training would increase the performance of teachers, especially in the use of smart boards.

*P12: We can increase the variety of teachers and branches, not only with classroom teachers. Plus, I want you to go to private schools, sir. Because there were public schools in the density, I was the only one from the private schools. But for example, many people like us want to join. There are people who want to be involved in a project and want to contribute to a project. And if you just expand the branch limitation a little more, maybe it will.*

P12 also wanted projects to be carried out for teachers from different branches. It was noted by the participant that in such projects there is more participation of public school teachers, but it is also necessary to involve private school teachers in such projects.

## **DISCUSSION, CONCLUSION AND RECOMMENDATIONS**

This study aimed to determine whether the targeted widespread impact of the "Digital Story in Values Education" project, which was accepted within the scope of the TÜBİTAK 4005 program and completed in 2019, has been achieved. In line with this main purpose, 13 classroom teachers who were

participants of the project were reached again and the participating teachers were asked semi-structured interview questions prepared by the researchers.

When the findings regarding the knowledge and skills acquired by the participating teachers in the project were examined, it was seen that most of the teachers used the knowledge they gained from the project in their lessons and shared this information with their colleagues. Therefore, it can be stated that the project has a widespread impact in terms of the information dimension, plays an effective role in popularizing science and increasing interest in science in a wide section of society, and contributes to the dissemination of national resources in the field of science and society. After the widespread impact scale administered in the TÜBİTAK 4004 nature education project carried out for the 7th and 8th-grade students, it is seen that the majority of the students determined that the skills they gained were applicable in their daily lives (Avan et al., 2019). The fact that the knowledge and skills gained by the participants within the scope of the project are put into practice by the participants in their lessons and daily lives is a significant indicator that the objectives of the project have been achieved. Thus, it is understood that the content of the project can be applied in daily life, in the lessons, and in the field of classroom education specific to the project examined and can contribute to education. In addition, it is seen that teachers use the digital skills they have gained within the scope of the project in areas such as audio, video, and image editing, and eTwinning projects. This shows that the participants use the digital skills they gained due to the training within the project in other areas related to the teaching profession, apart from preparing digital stories. According to this result, the outputs of the project have been more comprehensive than expected and have increased the knowledge and skills of classroom teachers on the integration of technology into their lessons and the eTwinning project works.

The most significant widespread impact of the project is that classroom teachers working in different schools share their knowledge about the use of digital stories in values education with their colleagues and create a multiplier effect. In the post-project evaluation study of a TÜBİTAK 4004 nature education project organized for teachers, it is seen that the participating teachers plan to transfer the information they have obtained within the scope of the project to their students and their environment (Türkoğuz et al., 2018). It was emphasized that the collaborative work of project participant teachers on face-to-face, online, and social media with other colleagues after the project is very essential to increase the widespread impact of the project (Aşık et al., 2017). As can be seen, it is desirable for the participants to share the knowledge and skills they have gained with their environment after the project to increase the widespread impact of the projects. In this regard, it can be stated that the project has reached two of its most significant widespread impact.

However, it was concluded that the majority of the participating teachers did not carry out any studies to improve and update the knowledge they gained in the project. One of the dimensions related to the development of the widespread impact of the projects is that the gains obtained by the participants are permanent and developed after the project is concluded. Therefore, it is expected that the participating teachers will improve their knowledge and skills by making new studies after the project. The low motivation of teachers to improve their knowledge and skills, and knowing what topics to work on for this purpose can be cited as the main reasons why this situation does not occur. Teachers' positive attitudes and motivations toward professional development are considered significant factors in carrying out activities aimed at developing innovative knowledge and skills related to the teaching profession (Çoban, 2019; Liu et al., 2018; Zhang et al., 2020). Likewise, motivation problems are considered an obstacle to the professional development of teachers (Eroğlu & Özbek, 2020). In addition, the fact that teachers do not have time for additional studies due to work and lack of research opportunities are shown as obstacles to updating their knowledge and skills (Can, 2019).

The second question of the research is the opinions of the participants about other projects. Accordingly, their participation in the project encouraged the participants to participate in other projects. This result suggests that teachers are pleased to have participated in the project and have a positive attitude towards participation in TÜBİTAK projects. Similar results have been achieved in

previously organized TÜBİTAK science and society projects. For example, after the widespread impact scale applied in the TÜBİTAK 4004 nature education project, which was carried out for 7th and 8th-grade students, it was determined that the majority of the students wanted to participate in the training again (Avan et al., 2019). In addition, the participants wanted the use of different Web 2.0 tools to be taught in future TÜBİTAK projects. The use of Web 2.0 tools in education is a topic of great interest to teachers (Horzum, 2010), graduate students in the field of education (Altunışık & Aktürk, 2021), and lecturers (Korucu & Karalar, 2017). In addition, it is seen that teachers' knowledge of Web 2.0 tools is limited (Yükseltürk et al., 2017) and they need these tools intensively, especially during the Covid-19 pandemic (Şenyurt & Şahin, 2022).

The use of digital stories in values education may be a significant tool in terms of supporting students' character development. However, more research is needed in this area. Therefore, the following recommendations can be presented for a study on the use of digital stories in values education: Assessing the effectiveness of digital stories: Assessing the effectiveness of digital stories in values education is essential to understand how digital stories contribute to students' understanding and practice of values. This study should examine students' attitudes toward digital stories, their effectiveness in learning values, and how they can help students better understand digital stories. To assess the effects of digital stories on learning outcomes, students' knowledge, attitudes, and behaviors can be evaluated and their ability to apply the given values and exhibit appropriate behaviors can be observed. In addition, the effects of digital stories on value education in different age groups and different cultures can be examined. Comparing the results of studies conducted in different age groups and different cultures will yield significant results in terms of determining the effects of digital stories on value education.

Teachers' attitudes towards the use of digital stories are also proposed as another research topic. For the use of digital stories in values education to be successful, teachers need to be willing to use these tools. Future studies should examine teachers' attitudes towards the use of digital stories, the potential of digital stories to contribute to students' learning of values, and how teachers can use digital stories in their classrooms. In this study, some of the Web 2.0 tools for creating digital stories were introduced and implemented. However, by planning training on the use of constantly developing and changing Web 2.0 tools and digital story platforms, teachers' competencies in this area can be kept up to date.

**Conflicts of Interest:** No potential conflict of interest was declared by the authors.

**Funding Details:** No funding was received for the study.

**CRedit Author Statement:** Gökçe Becit : Conceptualization, Investigation and Methodology. Ozan Coşkunserçe : Formal Analysis, Writing- Original draft preparation, Reviewing and Editing, Visualization, Investigation.

**Ethical Statement:** All rules specified in the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" have been followed in this research study.

## REFERENCES

- Aktepe, V., & Tahiroğlu, M. (2014). Değerler eğitimi yaklaşımları ve etkinlik örnekleri. *International Journal of Social Science*, 42, 361-384.
- Altunışık, M., & Aktürk, A. O. (2021). Türkiye’de Web 2.0 araçlarının eğitim-öğretim ortamlarında kullanımına bir bakış: 2010-2020 dönemi tezlerinin incelenmesi. *Bilim Eğitim Sanat ve Teknoloji Dergisi*, 5(2), 205-227. <https://doi.org/10.24315/trkefd.304255>

- Aşık, G., Doğança Küçük, Z., Helvacı, B. & Corlu, M. S. (2017). Integrated teaching project: a sustainable approach to teacher education, *Turkish Journal of Education*, 6(4), 200-215. <http://dx.doi.org/10.19128/turje.332731>
- Aydın, E., & Cığerci, F. M. (2020). Yabancılar Türkçe öğretiminde dijital hikâye anlatımının yazma kaygısına etkisi, *Journal of History School (JOHS)*, 45,1078- 1097. <http://dx.doi.org/10.29228/Joh41513>
- Aydın, M. Z. (2010). Okulda değerler eğitimi. *Eğitime Bakış*, (18).
- Atıcı, B., & Yürük, S. E. Dijital öykü temelli değerler eğitimi materyallerinin öğrencilerin değer kazanımına etkisi. *Trakya Üniversitesi Eğitim Fakültesi Dergisi*, 7(1).
- Bahşi, N. & Sis, N. (2023). Dijital hikâye anlatımının görme yetersizliği bulunan öğrencilerin dinleme becerisine etkisi. *RumeliDE Dil ve Edebiyat Araştırmaları Dergisi* , (32) , 212-227. <https://doi.org/10.29000/rumelide.1253141>
- Balaman, F. (2016). Dijital Öyküleme'nin Üniversite Öğrencilerinin Demokratik Değer Yargılarına Etkisi: Mustafa Kemal Üniversitesi Örneği, *Current Research Education*, 2(1), 42-52.
- Benmayor, R. (2008). Digital storytelling as a signature pedagogy for the new humanities. *Arts and Humanities in Higher Education*, 7(2), 188-204.
- Burmark, L. (2004). Visual presentations that prompt, flash & transform. *Media and Methods*, 40(6), 4-5.
- Can, E. (2019). Öğretmenlerin meslekî gelişimleri: Engeller ve öneriler. *Eğitimde Nitel Araştırmalar Dergisi*, 7(4), 1618-1650.
- Çoban, Ö. (2019). *Öğretmenlerin motivasyon düzeylerinin mesleki gelişime yönelik görüşleri bakımından değerlendirilmesi* [Doctoral dissertation]. Necmettin Erbakan University.
- Çokyaman, M., & Çelebi, M. (2021). Yabancı dil öğretiminde dijital hikâye anlatımının (DHA) akademik başarıya etkisi. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 22(2), 994-1035. <https://dergipark.org.tr/en/pub/kefad/issue/62829/993465>
- Dinçer, B., & Yılmaz, S. (2019). Matematik dersinde dijital hikaye anlatımının açıklık kavramı öğretimine etkisinin incelenmesine yönelik deneysel bir çalışma. *International Journal of New Trends in Arts, Sports & Science Education (IJTASE)*, 8(2), 49-57.
- Duran, E., & Yalçıntaş, E. (2016). Türk Ninnilerinin Çocukların Değer Eğitime ve Kelime Hazinesine Katkısının İncelenmesi. *Eğitimde Gelecek Arayışları: Düünden Bugüne Türkiye'de Beceri, Ahlak ve Değerler Eğitimi Uluslararası Sempozyumu Bildiri Kitabı*, 371-380.
- Elbir, B., & Bağcı, C. (2013). Değerler eğitimi üzerine yapılmış lisansüstü düzeyindeki çalışmaların değerlendirilmesi. *Electronic Turkish Studies*, 8(1).
- Eroğlu, M. & Özbek, R. (2020). Etkili öğretmenlerin mesleki gelişimi. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, 1(37), 73-92. <https://dergipark.org.tr/en/pub/zgefd/issue/54277/735479>
- Fidan, N. K. (2017). Views of the classroom teachers about the contributions of certain days and weeks to value education. *Pegem Eğitim ve Öğretim Dergisi*, 7(2), 287.



- Glden, B. (2015). Deęerler eęitiminde izgi filmlerin iřlevi. *Eęitimde Gelecek Arayışları Dnden Bugne Trkiye 'de Beceri Ahlak ve Deęerler Eęitimi Konferansı Bartın: Bartın niversitesi*, 735-765.
- Horzum, M. B. (2010). ęretmenlerin Web 2.0 aralarından haberdarlıęı, kullanım sıklıkları ve amalarının eřitli deęiřkenler aısından incelenmesi. *Uluslararası İnsan Bilimleri Dergisi*, 7(1), 603-634. <https://core.ac.uk/download/pdf/268072336.pdf>
- İřitrk, G. B. (2021). Yabancı Dil ęretiminde Dijital Hikye Kullanımına İliřkin ęretmen Adaylarının Grřleri. *Kapadokya Eęitim Dergisi*, 2(2), 32-39. <https://dergipark.org.tr/en/pub/kaped/issue/72977/1186975>
- Kızılcağaya, S. (2021). Trkenin yabancı dil olarak ęretimi programına uygun dijital hikye ve etkinlik nerisi: A1 dzeyi. *Edebiyat Bilimleri Dergisi*, 1. [http://edebiyatbilim.com/makaleler/s2\\_m5\\_kizilcakaya.pdf](http://edebiyatbilim.com/makaleler/s2_m5_kizilcakaya.pdf)
- Korucu, A. T. (2020). Fen eęitiminde kullanılan dijital hikyelerin ęretmen adaylarının akademik bařarı, sayısal yetkinlik durumları ve sorgulama becerileri zerindeki etkisi. *Kastamonu Eęitim Dergisi*, 28(1), 352-370. <https://doi.org/10.24106/kefdergi.3617>
- Korucu, A. T. & Karalar, H. (2017). Sınıf ęretmenlięi ęretim elemanlarının Web 2.0 aralarına ynelik grřleri. *Trakya niversitesi Eęitim Fakltesi Dergisi*, 7(2), 456-474. <https://doi.org/10.24315/trkefd.304255>
- Kroęlu, Z. & Avgın, S. S. (2022). Dijital hikaye ynteminin ortaokul 7. sınıf ęrencilerinin "hcre blnmeleri" konusundaki kavram yanılgılarını gidermeye etkisi. *Kahramanmarař St İmam niversitesi Sosyal Bilimler Dergisi*, 19(3), 1087-1109. <https://doi.org/10.33437/ksusbd.1121913>
- Kutlucan, E., akır, R., & nal, Y. (2018). Dijital yk anlatımı ile verilen deęerler eęitimine ynelik bir eylem arařtırması. *Kastamonu Eęitim Dergisi*, 27(5), 2187-2202.
- Lambert, J. (2013). Digital Storytelling: Capturing Lives, Creating Community. New York, Routledge.
- Lisenbee, P. S., & Ford, C. M. (2018). Engaging students in traditional and digital storytelling to make connections between pedagogy and children's experiences. *Early Childhood Education Journal*, 46(1), 129-139.
- Liu, Ws., Li, XW. & Zou, Ym. (2019). The formation of teachers' intrinsic motivation in professional development. *Integr. psych. Beha.*, 53, 418-430. <https://doi.org/10.1007/s12124-018-9465-3>
- Lovat, T. (2017). Values education as good practice pedagogy: Evidence from Australian empirical research. *Journal of Moral Education*, 46(1), 88-96.
- Mayer, R. E., & Anderson, R. B. (1991). Animations need narrations: An experimental test of a dual-coding hypothesis. *Journal of educational psychology*, 83(4), 484.
- MEB (2019). Deęerler Eęitimi Ynergesi. Eriřim Tarihi: 10.05.2019 URL:[http://mebk12.meb.gov.tr/meb\\_iys\\_dosyalar/34/39/749197/dosyalar/2015\\_02/09093609\\_degerleregitimi.pdf](http://mebk12.meb.gov.tr/meb_iys_dosyalar/34/39/749197/dosyalar/2015_02/09093609_degerleregitimi.pdf)
- MEB (2019). *Milli Eęitim Temel Kanunu*. Eriřim Tarihi: 11.04.2019 URL:<http://www.mevzuat.gov.tr/MevzuatMetin/1.5.1739.pdf>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis*, Sage.

- Öncül, R. (2000). Eğitim ve Eğitim Bilimleri Sözlüğü, İstanbul, Milli Eğitim Basımevi.
- Özkaya, P. G. (2020). Dijital öykülerin Türkçe dil becerilerinin gelişimine etkisi: Bir meta analiz çalışması. *Ana Dili Eğitimi Dergisi*, 8(4), 1386-1405. <https://www.anadiliegitimi.com/tr/download/article-file/1261970>
- Pala, F. (2021). Sosyal bilgiler dersi tarihe yolculuk ünitesi bağlamında dijital hikâye kullanımının öğrenci akademik başarı ve kalıcılığa etkisi. *Dumlupınar Üniversitesi Eğitim Bilimleri Enstitüsü Dergisi*, 5(2), 43-58. <https://dergipark.org.tr/en/pub/debder/issue/63644/858648>
- Robin, B. R. (2008). Digital storytelling: A powerful technology tool for the 21st century classroom. *Theory into practice*, 47(3), 220-228.
- Robin, B. R. (2006). The educational uses of digital storytelling. In *Society for Information Technology & Teacher Education International Conference*, 1, 709-716.
- Şimşek, B., Usluel, Y. K., Sarıca, H. Ç., & Tekeli, P. (2018). Türkiye’de eğitsel bağlamda dijital hikâye anlatımı konusuna eleştirel bir yaklaşım. *Eğitim Teknolojisi Kuram ve Uygulama*, 8(1), 158-186.
- Şenyurt, Y. S. & Şahin, Ç. (2022). Covid-19 salgınında uzaktan eğitim sürecinde Web 2.0 araçlarının kullanımı ile ilgili sınıf öğretmenlerinin görüşleri. *Uluslararası Bilim ve Eğitim Dergisi*, 5(1), 34-49. <https://doi.org/10.47477/ubed.1082738>
- Tunç, Ö. A., & Karadağ, E. (2013). Postmodernden oluşturmacılığa dijital öyküleme. *Eğitim ve Öğretim Araştırmaları Dergisi*, 2(4), 310-315.
- Turgut, G., & Kışla, T. (2015). Bilgisayar destekli hikaye anlatımı yöntemi: Alanyazın araştırması. *Turkish Online Journal of Qualitative Inquiry*, 6(2). 97-121.
- Türe Köse, H. B. (2019). *Okul öncesi dönem çocuklarında dijital hikâye anlatımının dinleme becerisine etkisi* (Master's thesis, Kütahya Dumlupınar Üniversitesi/Eğitim Bilimleri Enstitüsü).
- Türkoğuz, S., Oğurlu, İ., & Aksu, G. (2018). Doğa eğitimi projelerinin katılımcı profili ve yaygın etkisinin değerlendirilmesi: IDE projeleri örneği. *İnsan ve Toplum Bilimleri Araştırmaları Dergisi*, 7 (5), 262-283. <http://www.itobiad.com/issue/41845/467483>
- Ulum, E. & Ercan Yalman, F. (2018). Fen bilimleri dersinde dijital hikaye hazırlamanın ders başarısı düşük ve bilgisayarla fazla vakit geçiren öğrenciler üzerindeki etkisinin incelenmesi. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi*, 12(2), 306-335. <https://doi.org/10.17522/balikesirnef.506446>
- Wawro, L. (2012). Digital storytelling. *Children & Libraries*, 10(1), 50-52.
- Xu, Y., Park, H., & Baek, Y. (2011). A new approach toward digital storytelling: An activity focused on writing self-efficacy in a virtual learning environment. *Journal of Educational Technology & Society*, 14(4), 181-191.
- Yaşar, Ş., & Çengelci, T. (2012). Sosyal bilgiler dersinde değerler eğitime ilişkin bir durum çalışması. *International Journal Of Eurasia Social Sciences*, 3(9), 1-23.
- Yıldırım, A., & Şimşek, H. (2006). *Sosyal bilimlerde nitel araştırma yöntemleri*. Seçkin Yayıncılık.

- Yükseltürk, E. , Altıok, S. & Üçgül, M. (2017). Evaluation of a scientific activity about use of Web 2.0 technologies in education: The participants` views. *Journal of Instructional Technologies and Teacher Education*, 6(1), 1-8. <https://dergipark.org.tr/en/pub/jitte/issue/29003/295287>
- Zhang, X., Admiraal, W., & Saab, N. (2021). Teachers' motivation to participate in continuous professional development: relationship with factors at the personal and school level. *Journal of Education for Teaching*, 47(5), 714-731. <https://doi.org/10.1080/02607476.2021.1942804>

## Investigation of Pedagogical Content Knowledge of In-service and Pre-Service Pre-school Teachers in Pre-school Mathematics\*

**Zehra Bilgen<sup>i</sup>**

Çanakkale Onsekiz Mart University

**Yasemin Abalı Öztürk<sup>ii</sup>**

Çanakkale Onsekiz Mart University

### Abstract

The effect of academic skills acquired in the early period on future school success is indisputable. In this regard, it is important that pre-service teachers who are trained to be future teachers have appropriate content knowledge. The purpose of the current study is to examine the pedagogical content knowledge of in-service and pre-service pre-school teachers in - sub-dimensions of pre-school mathematics such as number, pattern, order, shape, spatial perception and comparison. In the current study, which was conducted using an explanatory mixed design, 439 pre-service and 73 in-service pre-school teachers took part in the quantitative section and 9 pre-service and 22 in-service pre-school teachers in the qualitative section. The Pedagogical Content Knowledge Scale in Preschool Mathematics and a semi-structured interview form were used to collect data. The results of the study revealed that the pedagogical content knowledge of the pre-service and in-service teachers is at a medium level. It was also observed that the pedagogical content knowledge of the in-service pre-school teachers varied significantly depending on the years of teaching experience and that the pedagogical content knowledge of the pre-service preschool teachers varied significantly depending on gender, grade level, academic achievement, having taken the Mathematics Education course and belief in the necessity of mathematics education in the pre-school period. It was also found that both the in-service and pre-service teachers consider mathematics education necessary in the pre-school period due to its importance to get ready for primary school education, the acquisition of basic mathematics skills and the existence of mathematics in life. Additionally, both groups mostly preferred activities based on numbers, counting, operations, patterns, matching and concrete life experiences.

**Keywords:** Pre-school Period, Mathematics Education, Pedagogical Content Knowledge, Teacher, Pre-service Teacher

**DOI:** 10.29329/ijpe.2023.603.9

**Submitted:** 03/03/2023

**Accepted:** 13/09/2023

**Published:** 16/10/2023

<sup>i</sup> **Zehra Bilgen**, Research Assist, Department of Early Childhood Education, Çanakkale Onsekiz Mart University/facult of Education, ORCID: 0000-0002-4146-3090

**Correspondence:** zehragunduz@comu.edu.tr

<sup>ii</sup> **Yasemin Abalı Öztürk**, Assist. Prof. Dr., Department of Mathematics and Science Education, Çanakkale Onsekiz Mart University, Education Faculty, ORCID: 0000-0003-1961-0557

## INTRODUCTION

Mathematics has been an indispensable part of life since the beginning of human history (Nasibov and Kaçar, 2005). Sometimes it has remained abstract as a result of intellectual activities, and sometimes it has employed symbols and numbers to be more concrete. Mathematics is in the words we express unconsciously in our daily life, in the sentences we use almost every day (Karakuş and Akman, 2016). According to Griffin (2004), mathematics consists of real quantities, numbers, written numbers and formal symbols in space and time. At the same time, mathematics is a support mechanism beyond numbers and symbols that makes life easier and helps to think logically and rationally (Yenilmez, 2011; Yıldız, 2005).

The science of mathematics, which enables us to acquire the knowledge and skills necessary in all areas of our lives, includes many concepts such as short-long, large-small, less-more, far-close as well as numbers, graphics and some calculations acquired in schools from an early age. Such an intense existence of mathematics in life makes its teaching compulsory. The beginning of mathematics education in the pre-school period is very important for the development of further mathematics skills. The preschool period, which covers the first six years of life, is a critical period in which effective learning takes place, which is full of new knowledge and experiences and which is not possible to live again. The fact that the knowledge and skills acquired in this period will be reflected in the following periods, increases the importance of mathematics education in pre-school period.

### Conceptual Framework

#### Mathematics Education in Pre-school Period

In the preschool period, children's minds are completely open and their minds are ready for new information. Academic skills acquired in the early years have a positive effect in later years (Jordan, Kaplan, Ramineni and Locuniak, 2009; NCTM, 2000; Polat, 2007; Uyanık and Kandır, 2010). Acquisition of early mathematics skills as one of the academic skills, can be decisive for future school success and mathematics achievement. Children who receive pre-school education are exposed to mathematics skills at early ages. It has been determined that these children are more successful in primary school first grade mathematics than children who have not received pre-school education (Dağlı, 2007). Moreover, it has been observed that these children's conceptual acquisitions, knowledge of concepts of quantity and reasoning skills are at a better level (Erkan and Kırca, 2010; Karakuş, 2015). Moreover, these acquisitions ensure that children's readiness for primary school and school maturity are higher (Yazıcı, 2002). It has also been revealed that mathematics skills gained in early years of life are effective not only in the first grade and second grade (Güven and Uyanık Balat, 2006), but also in the secondary school (Wolfgang, Stannard and Jones, 2003).

#### Sub-Dimensions of Pre-school Mathematics

The subject area of pre-school mathematics education is quite wide. Among the subjects of mathematics education, there are different concepts and skills such as numbers, counting, operation, geometry, spatial perception, measurement, graphics, order, classification, comparison, matching and pattern. In the current study, six sub-dimensions including numbers, pattern, order, shape, spatial perception and comparison were addressed within the scope of preschool mathematics pedagogical content knowledge (Aksu and Kul, 2017; Smith, 2000).

The sub-dimension of *numbers* includes recognizing numbers, showing the wanted number, understanding the relationships between numbers and the number system (NCTM, 2000). Counting, on the other hand, is the coordination of tangible physical objects with numerical words. At first, children learn to count numbers in order. They, then, use this counting order when counting a group of objects (Baroody and Price, 1983). In the pre-school period, children can even count up to 100 in this way. However, this type of counting is mostly just a rhythmic counting and it is for sure that the real meaning of each number is not understood by the child because counting is a different activity than

counting letters in the alphabet or singing a song (Sarnecka and Carey, 2008). According to Piaget, in order for children to understand the concept of number, they should have the ability to sort and classify, understand a conservation about numbers and be able to make one-to-one matching (Aktaş-Arnas, 2013).

In addition, the sub-dimension of *pattern* refers to a combination of geometric shapes, symbols, situations or sounds (Souviney, 1994, as cited in Yıldırım, 2011), and a state of numerical or spatial order (Papic and Mulligan, 2005, as cited in Yıldırım, 2011). Pattern, as the concept, includes information about sorting, separating, and classifying objects by size, number and other similar properties. In a pattern, objects are classified according to one or more of their properties and then these properties are repeated in a certain “order”. Pattern activities in the period from pre-school to the first grade of primary education consist of sorting, separating and classifying objects according to their number, size and different properties, then recognizing, maintaining, defining, analysing patterns that repeat or change and creating patterns (NCTM, 2000).

Another sub-dimension is *ordering* and it includes making a comparison among more than two objects or object groups and placing the compared objects in a certain order according to the given quality. Ordering is a complex math skill requiring much more than comparison (Charlesworth and Lind, 2013; Charlesworth and Radeloff, 1991, as cited in Uludağ, 2019). It also includes organizing events in a meaningful way. In this way, ordering the events in a story according to the order of occurrence allows the whole story to be understood (Aktaş-Arnas, 2013; Ministry of Education Republic of Singapore, 2013, as cited in Uludağ, 2019).

One of the other dimensions that come to mind in early childhood mathematics education is *geometric shapes*. A child learning to distinguish qualities can also distinguish shapes. However, the teaching of shapes should be with more concrete expressions and examples rather than explaining the concept of “triangle” because children learn better by associating shapes with objects they see in the natural environment (Güven, 2005).

Moreover, the sub-dimension of *spatial perception* is mostly related to the positions of objects in the space. It is quite complex in terms of the location of the objects and their relationship with other objects and events around them, also forms the basis of geometry by including the concepts of shapes and dimensions. Pre-school children are at a level to be able to learn concepts such as right-left, front-back, next to, up-down related to the sub-dimension of spatial perception. Supporting these concepts with different activities is important to improve children’s acquisition of these concepts (Aktaş-Arnas, 2013).

The sub-dimension of comparison refers to the determination of whether two objects or groups of objects are the same or different according to their qualitative and quantitative properties (Aksu and Kul, 2017). The skill of comparison requires first paying attention to the properties of objects and then being able to grasp that this property is more or less than others or the difference of this property from others. Children make comparisons intuitively, without any measurement. (Clarke-Stewart and Friedman 1987, Resnick, 1989, as cited in Aktaş-Arnas, 2013).

In the pre-school period, it is primarily the duty of pre-school teachers to improve children’s mathematics knowledge and competence as in all other areas of pre-school education. Children’s liking and understanding mathematics, their success in problem solving and establishing relationships are related to the opportunities offered to them by their teachers during mathematics education. This is because, the teacher is the planner and organizer of the education process and a teacher with high pedagogical content knowledge who knows the developmental characteristics of children, can create daily education plans with a good command of mathematics content and give an effective mathematics education. Studies show that teachers with high pedagogical content knowledge can make explanations appropriate to students’ cognitive levels, focus on their understanding and thinking, use methods and strategies that will respond to student interests and needs and present the content properly (Gudmundsdottir, 1990; Rovegno, 1992, as cited in Aksu and Kul, 2017). Therefore, it is important to

examine the pedagogical content knowledge of in-service and pre-service pre-school teachers in mathematics education.

In this context, the purpose of the current study is to examine the pedagogical content knowledge of pre-service and in-service pre-school teachers in preschool mathematics. To this end, answers to the following sub-problems will be sought:

1. What is the level of pedagogical content knowledge of pre-service and in-service pre-school teachers in the sub-dimensions of pre-school mathematics?
2. Does the pedagogical content knowledge of preschool teachers in pre-school mathematics vary significantly depending on different variables?
3. Does the pedagogical content knowledge of pre-service preschool teachers in pre-school mathematics vary significantly depending on different variables?
4. What are the opinions of pre-service and in-service pre-school teachers about preschool mathematics?

## **METHOD**

Under this heading, the research model, population and sample, data collection tool and data analysis process are discussed.

### **Study Model**

In the study, a mixed method research design was used in order to examine the pedagogical content knowledge of pre-service and in-service pre-school teachers in preschool mathematics. Mixed method is a way of collecting, analysing and mixing quantitative and qualitative data in a single study or in a series of studies to understand a research problem (Creswell and Plano Clark, 2015). In the current study, an explanatory design, one of the mixed research methods, was employed. The explanatory design involves collecting quantitative data first and then obtaining qualitative data to help explain and elaborate on the quantitative results (Creswell and Plano Clark, 2015). The explanatory design is frequently preferred by researchers because quantitative and qualitative research data are collected at separate times (Yıldırım and Şimşek, 2013).

### **Population and Sample**

The population of the study consists of in-service and pre-service pre-school teachers. The sample of the study in the quantitative dimension consists of 73 teachers selected out of the 393 pre-school teachers working in official pre-school education institutions affiliated to Çanakkale Provincial Directorate of National Education in the 2018-2019 academic year and 439 pre-service pre-school teachers selected out of the 485 pre-service pre-school teachers attending the Pre-school Education Department in the Education Faculty of Çanakkale Onsekiz Mart University and the sample in the qualitative dimension consists of 9 in-service and 22 pre-service pre-school teachers. While determining the sample, the simple random sampling method was used as it allowed choosing each sample in the population at equal probability (Büyüköztürk, 2016a; Metin, 2015). While forming the study group in the qualitative dimension of the study, it was taken into account that the pre-service teachers had taken the "Mathematics Education in Preschool Period" course and had practical experience. Therefore, 3<sup>rd</sup> and 4<sup>th</sup> grade pre-service teachers participated in the interviews. The demographic information of the in-service teachers included in the sample in the quantitative dimension of the study is given in Table 1 and the demographic information of the pre-service teachers is given in Table 2. The demographic information of the in-service and preservice teachers participating in the interviews in the qualitative dimension of the study is given in Table 3 and Table 4.

**Table 1. Demographic Information of the In-service Teachers Constituting the Sample**

Variables		f	%
Length of Service	0-5	3	4.1
	6-10	15	20.5
	11-15	29	39.7
	16-20	9	12.3
	21 years or more	17	23.4
Education Level	Associate's degree	4	5.5
	Bachelor's degree	58	79.4
	Graduate degree	11	15.1
Level of Self-efficacy in Mathematics Education	(3) Level	15	20.5
	(4) High	33	45.3
	(5) Very high	25	34.2

As can be seen in Table 1, 39.7 % of the teachers have 11-15 years of teaching experience. When their education level is examined, it is seen that 79.5 % of teachers hold a bachelor's degree. When the mathematics education self-efficacy levels of the teachers are examined, it is seen that 45.2 % of them have a high level of self-efficacy in mathematics education.

**Table 2. Demographic Information of the Pre-service Teachers Constituting the Sample**

Variables		f	%
Gender	Female	364	82.9
	Male	75	17.1
Grade Level	1 <sup>st</sup> grade	116	26.3
	2 <sup>nd</sup> grade	110	25.1
	3 <sup>rd</sup> grade	99	22.6
	4 <sup>th</sup> grade	114	26.0
Grade Point Average	Very low (1.80-2.00)	7	1.6
	Low (2.01-2.50)	46	10.5
	Medium (2.51-3.00)	191	43.5
	High (3.01-3.50)	176	40.1
	Very high (3.51-4.00)	19	4.3
State of Having Taken the Mathematics Education Course	Yes	208	47.4
	No	231	52.6
Grade Point Taken from the Mathematics Education Course	Very low (40 <sup>-</sup> )	2	1.0
	Low (41-60)	4	1.9
	Medium (61-80)	45	21.8
	High (81-90)	72	35.0
	Very high (90 <sup>+</sup> )	83	40.3
Believing in the Necessity of Mathematics Education	Yes	363	82.7
	No	76	17.3

When Table 2 is examined, it is seen that 82.9 % of the pre-service teachers are female, 17.1 % are male, that the numbers of students from different grade levels are close to each other, that 43.5 % of them have grade points considered to be medium (2.51-3.00) and 40.1 % have grade points considered to be high (3.01-3.50)., 47.4 % of the pre-service teachers participated in the study took the Mathematics Education course while 52.6 % did not take the course. It is among the remarkable data of the study that the grade points of the pre-service teachers who took the Mathematics Education course are "high" (81-90) and "very high" (over 90). The percentage of the pre-service teachers who believe in the necessity of a mathematics education course was found to be 82.7 %.



**Table 3. Demographic Information of the In-service Teachers Participating in the Interviews**

Variables		f	%
Gender	Female	9	100.0
	Male	0	0
Length of Service	6-10	3	33.3
	11-15	5	55.5
	16-20	0	0
	21 years or more	1	11.2

When the demographic information of the in-service teachers participated in the qualitative section of the study is examined, it is seen that all the teachers participating in the interviews are female (Table 3). It is seen that 55.5% of the teachers have 11-15 years of teaching experience, 33.3% of them have 6-10 years of teaching experience and 11.2% of them have 21 years or more of teaching experience.

**Table 4. Demographic Information of the Pre-service Teachers Participated in the Interviews**

Variables		f	%
Gender	Female	19	86.4
	Male	3	13.6
Grade Level	3 <sup>rd</sup> grade	14	63.6
	4 <sup>th</sup> grade	8	36.4
Grade Point Average	Low (2.01-2.50)	2	9.0
	Medium (2.51-3.00)	11	50.0
	High (3.01-3.50)	9	41.0

Analysis of the demographic information of the pre-service teachers participated in the qualitative section of the study is depicted in Table 4. It is seen that 86.4% of the pre-service teachers are female and 13.6% are male. 63.6% of the participants are 3<sup>rd</sup> grade and 36.4% are 4<sup>th</sup> grade students. When the grade point averages of the pre-service teachers are examined, it is seen that 50% of them have a medium grade point average, 41.0% of them have a high grade point average 9.0% have a low grade point average.

### Data Collection Tools and Data Collection Process

In the quantitative section of the study, a “Personal Information Form” developed by the researcher, the “Pedagogical Content Knowledge in Preschool Mathematics (PCKPM)” Scale developed by Smith (2010) and adapted into Turkish by Aksu and Kul (2017) were used. In order to collect qualitative data a semi-structured interview form consisting of open-ended questions which was developed by the researcher was used. After obtaining the necessary permissions for quantitative data collection, pre-service teachers from every grade level were reached. For the data to be collected from in-service teachers, teachers working at kindergartens in independent pre-schools, in primary and middle schools were interviewed. The participation was on a voluntary basis. The in-service and pre-service teachers were informed about the study and asked to answer the questions impartially. The data were collected personally by the researcher and it took approximately 15-20 minutes for each group to answer the scale. On the other hand, qualitative data were collected with face-to-face interviews by using a semi-structured interview form. After the in-service and pre-service teachers approved the consent forms, the interviews were recorded. Each interview conducted by the researcher lasted approximately 15 minutes.

The “Pedagogical Content Knowledge in Preschool Mathematics (PCKPM)” Scale was developed by Smith (2010) and adapted into Turkish by Aksu and Kul (2017). The scale consists of 15 items and preschool mathematics is handled in six dimensions: “number”, “pattern”, “order”, “shape”, “spatial” and “comparison”. The Cronbach Alpha value of the whole scale was found to be 0.71 by Aksu and Kul (2017). The reliability coefficients for the sub-dimensions were found to vary between

0.77 and 0.64. Each question in the scale has one correct answer. The highest score to be taken from the scale is 15, and the lowest score is 0. Scores in the range of 0.00-5.00 taken from the scale are considered “low”, scores in the range of 5.01-10.00 are considered “medium” and scores in the range 10.01-15.00 are considered “high”.

The semi-structured interview form, which was developed to elicit the views of the in-service and pre-service pre-school teachers on pre-school mathematics, was developed by the researchers considering the literature review and the sub-dimensions of mathematics. The form was reviewed by three different experts in the field of mathematics and pre-school education. In line with the feedbacks given by a field expert, the two question items were combined into a single item due to the fact that they presented similar statements. A pilot study was conducted with three in-service and three pre-service teachers. In line with the pilot applications and expert opinions, the interview questions were revised and the interview form was given its final form. In this form, questions about the necessity of preschool mathematics, the state of preschool mathematics in our country, the types of activities included in preschool mathematics education, the sub-dimensions of mathematics, the evaluation of the objectives and specifications of mathematics in the current preschool curriculum and their evaluation of preschool mathematics were asked.

### Data Analysis

In the study, descriptive statistics were used to analyze the quantitative data. The quantitative findings obtained were analysed using the SPSS (Statistical Package for Social Sciences) 20.0 program package. In the determination of which statistical techniques to be used Kurtosis, skewness values and histograms regarding whether the distributions show a normal distribution were examined. The Kurtosis and skewness values of the Pedagogical Content Knowledge in Preschool Mathematics (PCKPM) Scale administered to the in-service and pre-service pre-school teachers are given in Table 5.

**Table 5. The Kurtosis and Skewness Values of the Pedagogical Content Knowledge in Pre-school Mathematics (PCKPM) Scale Administered to the In-service and Pre-service Pre-school Teachers**

	Sub-dimensions	N	Skewness	Kurtosis
In-service Teachers	Sub-dimension of number	73	.182	-1.064
	Sub-dimension of pattern	73	.572	-.627
	Sub-dimension of order	73	-1.672	2.006
	Sub-dimension of shape	73	-.415	-.713
	Sub-dimension of spatial	73	-.329	-.335
	Sub-dimension of comparison	73	-.845	-.269
	Whole scale	73	-.477	.188
Pre-service Teachers	Sub-dimension of number	439	.285	-.955
	Sub-dimension of pattern	439	.394	-.880
	Sub-dimension of order	439	-.521	-1.043
	Sub-dimension of shape	439	-.414	-.992
	Sub-dimension of spatial	439	.233	-.522
	Sub-dimension of comparison	439	-.780	-.588
	Whole scale	439	.104	-.246

When Table 5 is examined, it is seen that the skewness value of the “Pedagogical Content Knowledge in Preschool Mathematics” Scale answered by the in-service pre-school teachers was found to be -.477 and the Kurtosis value was found to be .188 for the whole scale. When the sub-dimensions of the PCKPM Scale are examined, it is seen that the Kurtosis and skewness values obtained as a result of statistical calculations for the sub-dimensions of “number”, “pattern”, “order”, “shape”, “spatial” and “comparison” are between -1.5 and +1.5. The skewness value of the “Pedagogical Content Knowledge in Preschool Mathematics” Scale answered by the pre-service pre-school teachers was found to be .104 and the Kurtosis value was found to be -.246 for the whole scale.

When the sub-dimensions of the scale are examined, it is seen that the Kurtosis and skewness values found for the sub-dimensions of “number”, “pattern”, “order”, “shape”, “spatial” and “comparison” are between -1.5 and +1.5. By considering the results of the histogram analyses carried out in order to understand whether the distribution is parametric or not, it was decided to use parametric statistical techniques to answer the research questions. In this regard, it was decided to analyse the sub-questions of the study with two independent variables using the Independent Samples t-Test and the sub-problems with more than two independent variables using the One-Factor Analysis of Variance ANOVA (One Way ANOVA) test (Büyüköztürk, 2016b; Tabachnick and Fidell, 2013).

In the analysis of qualitative data, it was decided to use the content analysis method to provide a systematic, quantitative and objective perspective (Cartwright, 1953, as cited in Bilgin, 2006). The content analysis method is defined as the set of techniques that are used according to the issues requiring detailed examination between the message and interpretation, increasingly developing and efficient (Bilgin, 2006). In the analysis of the qualitative data in the study, the answers given to each question were examined separately, interview codes were created for each question and similar statements were coded under the same codes and themes that were created. The answers given by each teacher participated in the study were coded as T1, T2, T3, T4. In the coding of the pre-service teachers, the third grade pre-service teachers were coded as 3.1, 3.2, 3.3... and the fourth grade pre-service teachers were coded as 4.1, 4.2, 4.3, 4.4.

## FINDINGS

The findings obtained in the analysis process are presented below in the light of research questions and research themes.

### Findings Related to the First Sub-Question of the Study

The findings regarding the levels of pedagogical content knowledge of the in-service and pre-service pre-school teachers in pre-school mathematics are given in the tables below.

**Table 6. Levels of Pedagogical Content Knowledge of the In-service and Pre-service Pre-school Teachers in Pre-school Mathematics**

	Sub-dimensions	N	$\bar{X}$	Maximum value to be taken	Ss
In-service Teachers	Sub-dimension of number	73	1.27	3	1.00
	Sub-dimension of pattern	73	1.01	3	.95
	Sub-dimension of order	73	1.72	2	.50
	Sub-dimension of shape	73	1.30	2	.66
	Sub-dimension of spatial	73	1.57	3	.81
	Sub-dimension of comparison	73	1.49	2	.62
	Whole scale	73	8.38	15	2.45
Pre-service Teachers	Sub-dimension of number	439	1.20(0-3)	3	.98
	Sub-dimension of pattern	439	1.25(0-3)	3	.99
	Sub-dimension of order	439	1.28(0-2)	2	.74
	Sub-dimension of shape	439	1.25(0-2)	2	.71
	Sub-dimension of spatial	439	1.32(0-3)	3	.84
	Sub-dimension of comparison	439	1.42(0-2)	2	.69
	Whole scale	439	7.75(0-15)	15	2.50

When Table 6 is examined, it is seen that the pedagogical content knowledge of the in-service teachers who took part in the study regarding pre-school mathematics is 8.38 and that of the pre-service teachers is 7.75. When the sub-dimensions are examined, it is seen that the in-service teachers have the highest mean in the sub-dimension of *order* and the lowest mean in the sub-dimension of *pattern*. While the highest mean taken by the pre-service teachers is in the sub-dimension of *comparison*, and the lowest mean is in the sub-dimension of *number*.

### Findings Related to the Second Sub-Question of the Study

The findings regarding the levels of pedagogical content knowledge of the pre-school teachers in preschool mathematics in terms of different variables are given in the tables below.

**Table 7. Descriptive Statistics Showing the Scores Taken from the PCKPM Scale in relation to the Variable of teaching experience**

	Teaching experience	N	$\bar{X}$	Ss
PCKPM Scale Scores	0-5	3	9.33	3.21
	6-10	15	8.66	2.02
	11-15	29	8.89	2.48
	16-20	9	8.00	2.39
	20 years or more	17	7.29	2.54
	Total	73	8.38	2.45

When Table 7 is examined, it is seen that in-service pre-school teachers who have 0-5 years of teaching experience have a score over the average out of 15 in the PCKPM scale ( $\bar{X}=9.33$ ). The teachers with the lowest mean are those with 20 years or more of teaching experience. Based on this result, it can be said that the mathematics knowledge of the newly recruited teachers is higher. It was also revealed that the PCKPM levels of the teachers having the longest teaching experience ( $\bar{X}=7.29$ ) are below the general average ( $\bar{X}=8.38$ ).

**Table 8. ANOVA Results Showing Whether the Scores Taken from the PCKPM Scale and its Sub-dimensions Vary Significantly Depending on the Variable of Teaching Experience**

	Source of the Variance	Sum of Squares	Sd	Mean Squares	F	p	Significant Difference
Number	Between-Groups	1.888	4	.472	.454	.769	-
	Within-Groups	70.633	68	1.039			
	Total	72.521	72				
Pattern	Between-Groups	8.669	4	2.167	2.617	.043*	-
	Within-Groups	56.317	68	.828			
	Total	64.986	72				
Order	Between-Groups	.944	4	.236	.913	.462	-
	Within-Groups	17.577	68	.258			
	Total	18.521	72				
Shape	Between-Groups	.692	4	.173	.384	.820	-
	Within-Groups	30.677	68	.451			
	Total	31.370	72				
Spatial	Between-Groups	6.981	4	1.745	2.905	.028*	11-15 > 20
	Within-Groups	40.854	68	.601			
	Total	47.836	72				
Comparison	Between-Groups	.334	4	.084	.204	.936	-
	Within-Groups	27.912	68	.410			
	Total	28.247	72				
PCKPM Scale Total	Between-Groups	33.041	4	8.260	1.403	.242	-
	Within-Groups	400.219	68	5.886			
	Total	433.260	72				

\*p< 0.05

When Table 8 is examined, it is seen that the pedagogical content knowledge of the in-service teachers in pre-school mathematics does not vary significantly depending on the variable of teaching experience ( $F(4.68)=1.403$ ,  $p>.05$ ). When the sub-dimensions of the scale are examined, it is seen that only the scores taken from the sub-dimension of *spatial* vary significantly depending on the variable of teaching experience ( $F(4.68)=2.905$ ,  $p<.05$ ). Although the  $p$  value in the sub-dimension of *pattern* was found to be smaller than .05, no significant difference was found as a result of the Scheffe test. According to the Scheffe test results, in the sub-dimension of *spatial*, there is a significant difference between the teachers who have been working as a teacher for 20 years or more ( $\bar{X}=1.11$ ) and the teachers who have been working for 11-15 years ( $\bar{X}=1.89$ ) in favour of the teachers with less experience.

**Table 9. Descriptive Statistics Showing the Scores Taken from the PCKPM Scale in relation to the Variable of Education Level**

	Education Level	N	$\bar{X}$	Ss
PCKPM Scale Scores	Associate's degree	4	8.50	.57
	Bachelor's degree	58	8.25	2.42
	Graduate degree	11	9.00	3.03
	Total	73	8.38	2.45

When Table 9 is examined, it is seen that the mean score of the teachers holding a graduate degree from the PCKPM Scale is quite high ( $\bar{X}=9.00$ ), followed by the teachers holding an associate's degree ( $\bar{X}=8.50$ ) and the teachers holding a bachelor's degree ( $\bar{X}=8.25$ ).

**Table 10. ANOVA Results Showing Whether the Scores Taken from the PCKPM Scale and its Sub-dimensions Vary Significantly Depending on the Variable of Education Level**

	Source of the Variance	Sum of Squares	Sd	Mean Squares	F	p
Number	Between-Groups	.470	2	2.235	.229	.796
	Within-Groups	72.050	70	1.029		
	Total	72.521	72			
Pattern	Between-Groups	2.664	2	1.332	1.496	.231
	Within-Groups	62.322	70	.890		
	Total	64.986	72			
Order	Between-Groups	.448	2	.224	.867	.425
	Within-Groups	18.073	70	.258		
	Total	18.521	72			
Shape	Between-Groups	.320	2	.160	.360	.699
	Within-Groups	31.050	70	.444		
	Total	31.370	72			
Spatial	Between-Groups	.309	2	.154	.228	.797
	Within-Groups	47.527	70	.679		
	Total	47.836	72			
Comparison	Between-Groups	1.174	2	.587	1.518	.226
	Within-Groups	27.072	70	.387		
	Total	28.247	72			
PCKPM Scale Total	Between-Groups	5.140	2	2.570	.420	.659
	Within-Groups	428.121	70	6.116		
	Total	433.260	72			

When Table 10 is examined, it is seen that the pedagogical content knowledge of the teachers in pre-school mathematics does not vary significantly depending on the variable of educational conditions ( $F(2,70)=.420$ ,  $p>.05$ ).

**Table 11. Descriptive Statistics Showing the Scores Taken from the PCKPM Scale in relation to the Variable of Self-Efficacy in Teaching Mathematics in the Preschool Period**

	Self-Efficacy Level	N	$\bar{X}$	Ss
PCKPM Scale Scores	Medium	15	8.53	2.06
	High	33	8.87	2.21
	Very high	25	7.64	2.84
	Total	73	8.38	2.45

Table 11 shows that, the teachers who consider their self-efficacy as “very high” have lower scores on the PCKPM Scale than the teachers who consider their self-efficacy as “high” and “medium”.

**Table 12. ANOVA Results Showing Whether the Scores Taken from the PCKPM Scale and its Sub-dimensions Vary Significantly Depending on the Variable of Self-Efficacy in Teaching Mathematics in the Preschool Period**

	Source of the Variance	Sum of Squares	Sd	Mean Squares	F	p
Number	Between-Groups	.882	2	.441	.431	.652
	Within-Groups	71.639	70	1.023		
	Total	72.521	72			
Pattern	Between-Groups	.443	2	.222	.240	.787
	Within-Groups	64.543	70	.922		
	Total	64.986	72			
Order	Between-Groups	.300	2	.150	.576	.565
	Within-Groups	18.221	70	.260		
	Total	18.521	72			
Shape	Between-Groups	2.354	2	1.177	2.840	.065
	Within-Groups	29.016	70	.415		
	Total	31.370	72			
Spatial	Between-Groups	2.735	2	1.368	2.122	.127
	Within-Groups	45.101	70	.644		
	Total	47.836	72			
Comparison	Between-Groups	1.013	2	.506	1.301	.279
	Within-Groups	27.234	70	.389		
	Total	28.247	72			
PCKPM Scale	Between-Groups	22.252	2	11.126	1.895	.158
	Within-Groups	411.008	70	5.872		
	Total	433.260	72			

In Table 12 it is seen that the scores obtained by the pre-school teachers from the PCKPM Scale and its sub-dimensions do not vary significantly depending on the variable of self-efficacy in teaching mathematics in the pre-school period ( $F(2,70)=1.895$ ,  $p>.05$ ).

### Findings Related to the Third Sub-Question of the Study

The findings regarding the levels of pedagogical content knowledge of the pre-service pre-school teachers in pre-school mathematics in terms of different variables are given in the tables below.

**Table 13. T-test Results Showing Whether the Scores Taken from the PCKPM Scale and its Sub-Dimensions Vary Significantly Depending on the Variable of Gender**

	Gender	N	$\bar{X}$	Ss	sd	t	p
Number	Female	364	1.20	.99	437	-.058	.954
	Male	75	1.21	.97			
Pattern	Female	364	1.27	.99	437	1.245	.214
	Male	75	1.12	.98			
Order	Female	364	1.33	.71	437	3.00	.003*
	Male	75	1.05	.83			
Shape	Female	364	1.29	.70	437	2.62	.009*
	Male	75	1.05	.75			
Spatial	Female	364	1.31	.83	437	-.434	.664
	Male	75	1.36	.93			
Comparison	Female	364	1.47	.68	437	3.45	.001*
	Male	75	1.17	.68			
Scale Total	Female	364	7.90	2.43	437	2.93	.004*
	Male	75	6.98	2.66			

\*p< 0.05

Table 13 presents that there is a significant difference between the pedagogical content knowledge of the male and female pre-service teachers in favour of the female pre-service teachers ( $t(437)=2.93$ ,  $p<.05$ ). The mean scores taken from the sub-dimensions of “order” ( $t(437)=3.00$ ,  $p<.05$ .), “shape” ( $t(437)=2.62$ ,  $p<.05$ .) and “comparison” ( $t(437)=3.45$ ,  $p<.05$ .) were found to vary significantly depending on gender.

**Table 14. Descriptive Statistics Showing the Scores Taken by the Pre-service Pre-school Teachers from the PCKPM Scale in relation to the Variable of Grade Level**

	Grade Level	N	$\bar{X}$	Ss
PCKPM Scale Scores	1 <sup>st</sup> grade	116	7.23	2.37
	2 <sup>nd</sup> grade	110	7.46	2.30
	3 <sup>rd</sup> grade	99	8.43	2.68
	4 <sup>th</sup> grade	114	7.96	2.50
	Total	439	7.75	2.50

As can be seen in Table 14, the first grade pre-service teachers have the lowest mean score from PCKPM Scale ( $\bar{X}=7.23$ ) while the third grade pre-service teachers have the highest mean score ( $\bar{X}=8.43$ ).

**Table 15. ANOVA Results Showing Whether the Scores Taken by the Pre-service Preschool Teachers from the PCKPM Scale and its Sub-Dimensions Vary Significantly Depending on the Variable of Grade Level**

	Source of the Variance	Sum of Squares	Sd	Mean Squares	F	p	Significant Difference
Number	Between-Groups	16.095	3	5.365	5.664	.001*	3>2
	Within-Groups	412.042	435	.947			4>2
	Total	428.137	438				
Pattern	Between-Groups	5.508	3	1.836	1.853	.137	-
	Within-Groups	430.930	435	.991			
	Total	436.437	438				
Order	Between-Groups	7.489	3	2.496	4.595	.004*	3>1
	Within-Groups	236.347	435	.543			
	Total	243.836	438				
Shape	Between-Groups	1.747	3	.582	1.128	.338	-
	Within-Groups	224.690	435	.517			
	Total	226.437	438				

Spatial	Between-Groups	3.979	3	1.326	1.851	.137	-
	Within-Groups	311.734	435	.717			
	Total	315.713	438				
Comparison	Between-Groups	4.481	3	1.494	3.176	.024*	-
	Within-Groups	204.558	435	.470			
	Total	209.039	438				
PCKPM Scale Total	Between-Groups	91.683	3	30.561	5.024	.002*	3>1
	Within-Groups	2446.253	435	6.083			3>2
	Total	2737.936	438				

\*p< 0.05

When Table 15 is checked, it is obvious that the pedagogical content knowledge of the pre-service teachers varies significantly depending on the variable of *grade level* ( $F(3.435)=5.024$ ,  $p<.05$ ). According to the results of the Scheffe test, which was conducted to determine between which groups the difference was significant, it was determined that the third grade ( $\bar{X}=8.43$ ) pre-service teachers have a higher mean than the first grade ( $\bar{X}=7.23$ ) and second grade ( $\bar{X}=7.46$ ) pre-service teachers. When the mean scores taken from the sub-dimensions were examined, it was found that in the sub-dimension of *number*, the third grade pre-service teachers ( $\bar{X}=8.43$ ) and fourth grade pre-service teachers ( $\bar{X}=7.96$ ) have higher mean scores than the second grade pre-service teachers ( $\bar{X}=7.46$ ); in the sub-dimension of *order*, the third grade pre-service teachers were found to have a higher mean score ( $\bar{X}=8.43$ ) than the first grade pre-service teachers ( $\bar{X}=7.23$ ). Although the p value in the sub-dimension of comparison was smaller than .05, no significant difference was found as a result of the Scheffe test.

**Table 16. Descriptive Statistics Showing the Scores Taken by the Pre-service Preschool Teachers from the PCKPM Scale in relation to the Grade Point Average**

	Grade Point Average	N	$\bar{X}$	Ss
PCKPM Scale Scores	Very low (1.80-2.00)	7	5.57(0-15)	2.43
	Low (2.01-2.50)	46	6.91(0-15)	2.21
	Medium (2.51-3.00)	191	7.74(0-15)	2.52
	High (3.01-3.50)	176	7.98(0-15)	2.50
	Very high (3.51-4.00)	19	8.47(0-15)	2.16
	Total	439	7.75(0-15)	2.50

When Table 16 is examined, it is seen that the scores of the pre-service teachers in the PCKPM Scale increase depending on their grade point average.

**Table 17. ANOVA Results Showing Whether the Scores Taken by the Pre-service Preschool Teachers from the PCKPM Scale and its Sub-Dimensions Vary Significantly Depending on the Variable of Grade Point Average**

	Source of the Variance	Sum of Squares	Sd	Mean Squares	F	p	Significant Difference
Number	Between-Groups	3.071	4	.768	.784	.536	-
	Within-Groups	425.065	434	.979			
	Total	428.137	438				
Pattern	Between-Groups	3.612	4	.903	.905	.461	-
	Within-Groups	432.826	434	.997			
	Total	436.437	438				
Order	Between-Groups	9.699	4	2.425	4.494	.001*	4>2
	Within-Groups	234.137	434	.539			
	Total	243.836	438				
Shape	Between-Groups	3.873	4	.968	1.888	.111	-
	Within-Groups	222.564	434	.513			
	Total	226.437	438				



Spatial	Between-Groups	4.443	4	1.111	1.549	.187	-
	Within-Groups	311.270	434	.717			
	Total	315.713	438				
Comparison	Between-Groups	10.916	4	2.729	5.978	.000*	3>1, 3>2,
	Within-Groups	198.123	434	.457			4>1, 4>2,
	Total	209.039	438				5>1
PCKPM Scale	Between-Groups	85.426	4	21.357	3.494	.008*	-
	Within-Groups	2652.510	434	6.112			
	Total	2737.936	438				

\*p< 0.05

The examination of table 17 presents that the pedagogical content knowledge of the pre-service teachers varies significantly depending on their grade point average ( $F(4.434)=3.494$ ,  $p<.05$ ). However, as a result of the Scheffe test, which was carried out to determine between which groups a significant difference occurs, no result was found in favour of any group. When the mean scores taken from the sub-dimensions were examined, it was found that the pedagogical content knowledge of the pre-service teachers varied significantly in the sub-dimensions of *order* ( $F(4.434)=4.494$ ,  $p<.05$ ) and *comparison* ( $F(4.434)=5.978$ ,  $p<.05$ ). According to the results of the Scheffe test, which was conducted to examine the significant difference, it is seen that pre-service teachers with a “high” grade point average ( $\bar{X}=7.98$ ) in the sub-dimension of *order* have a higher mean score than the pre-service teachers with a “low” grade point average ( $\bar{X}=6.91$ ). In the sub-dimension of *comparison*, the significant difference between the pre-service teachers having a medium and very low grade point average, between the pre-service teachers having a medium and low grade point average, between the pre-service teachers having a high and very low grade point, between the teachers having a high and low grade point average and between the teachers having a very high and very low grade point average was found to be in favour of the pre-service teachers having lower grade point averages.

**Table 18. T-test Results Showing Whether the Scores Taken by the Pre-service Teachers from the PCKPM Scale and its Sub-Dimensions Vary Significantly Depending on the Variable of Having Taken the Mathematics Education Course**

	Having Taken the Course	N	$\bar{X}$	Ss	sd	t	p
Number	Yes	208	1.38	1.01	437	3.615	.000*
	No	231	1.04	.93			
Pattern	Yes	208	1.35	1.00	437	2.103	.036*
	No	231	1.15	.98			
Order	Yes	208	1.42	.71	437	3.677	.000*
	No	231	1.16	.75			
Shape	Yes	208	1.25	.74	437	.117	.907
	No	231	1.24	.69			
Spatial	Yes	208	1.25	.81	437	-1.557	.120
	No	231	1.38	.87			
Comparison	Yes	208	1.56	.64	437	4.281	.000*
	No	231	1.29	.70			
Scale Total	Yes	208	8.25	2.57	437	4.031	.000*
	No	231	7.30	2.34			

\*p< 0.05

When Table 18 is examined, it is seen that the pedagogical content knowledge of the pre-service teachers varies significantly depending on the state of having taken the mathematics education course ( $t(437)=4.031$ ,  $p<.05$ ). The pedagogical content knowledge ( $\bar{X}=8.25$ ) of the pre-service teachers who took a mathematics education course was found to be higher than that of the pre-service teachers who did not take the course ( $\bar{X}=7.30$ ). When the mean scores taken from the sub-dimensions were examined, it was found that the mean scores taken from the sub-dimensions of *number* ( $t(437)=3.615$ ,  $p<.05$ ), *pattern* ( $t(437)=2.103$ ,  $p<.05$ ), *order* ( $t(437)=3.677$ ,  $p<.05$ ) and *comparison* ( $t(437)=4.281$ ,  $p<.05$ ) varied significantly depending on the state of having taken the mathematics

education course. This significant difference was found to be in favour of the pre-service teachers having taken the mathematics education course.

**Table 19. Descriptive Statistics Showing the Scores Taken by the Pre-service Pre-school Teachers from the PCKPM Scale in relation to the Grade Point from the Mathematics Education Course**

	Grade Point from the Mathematics Education Course	N	$\bar{X}$	Ss
PCKPM Scale Scores	Very low (1.80-2.00)	2	4.00	1.41
	Low (2.01-2.50)	4	6.00	1.63
	Medium (2.51-3.00)	45	7.68	2.80
	High (3.01-3.50)	72	8.30	2.53
	Very high (3.51-4.00)	83	8.63	2.49
	Total	206	8.21	2.61

When Table 19 is examined, it is seen that the grade points in the mathematics education course of the pre-service teachers and the PCKPM scale scores are parallel to each other. The PCKPM scale mean scores of the pre-service teachers who have a very low grade point in the mathematics education course are also quite low compared to the other pre-service teachers ( $\bar{X}=4.00$ ). Similarly, the mean scores of the pre-service teachers with a very high grade point taken from the scale ( $\bar{X}=8.63$ ) are higher than those of the other pre-service teachers.

**Table 20. ANOVA Results Showing Whether the Scores Taken by the Pre-service Preschool Teachers from the PCKPM Scale and its Sub-Dimensions Vary Significantly Depending on the Variable of Having Taken the Mathematics Education Course**

	Source of the Variance	Sum of Squares	Sd	Mean Squares	F	p	Significant Difference
Number	Between-Groups	5.807	4	1.452	1.423	.228	-
	Within-Groups	205.125	201	1.021			
	Total	210.932	205				
Pattern	Between-Groups	7.078	4	1.769	1.791	.132	-
	Within-Groups	198.616	201	.988			
	Total	205.694	205				
Order	Between-Groups	7.844	4	1.961	4.026	.004*	5>3
	Within-Groups	97.903	201	.487			
	Total	105.748	205				
Shape	Between-Groups	4.793	4	1.198	2.168	.074	-
	Within-Groups	111.071	201	.553			
	Total	115.864	205				
Spatial	Between-Groups	2.636	4	.659	.979	.420	-
	Within-Groups	135.228	201	.673			
	Total	137.864	205				
Comparison	Between-Groups	3.912	4	.978	2.319	.058	-
	Within-Groups	84.768	201	.422			
	Total	88.680	205				
PCKPM Scale	Between-Groups	83.091	4	20.773	3.163	.015*	-
	Within-Groups	1320.079	201	6.568			
	Total	1403.170	205				

\*p< 0.05

As can be seen in Table 20, the mean scores taken from the PCKPM Scale vary significantly depending on the grade points in the mathematics education course ( $F(4.201)=3.163$ ,  $p<.05$ ). However, as a result of the Scheffe test, which was carried out to determine between which groups there was a significant difference, no result was found in favour of any group. When the mean scores taken from the sub-dimensions were examined, it was found that there was a significant difference in the sub-dimension of *order* ( $F(4.201)=4.026$ ,  $p<.05$ ). According to the Scheffe test findings, this

significant difference is in favour of the pre-service teachers with a medium grade point ( $\bar{X}=1.11$ ) compared to the pre-service teachers with a very high grade point ( $\bar{X}=1.51$ ).

**Table 21. T-test Results Showing Whether the Scores Taken by the Pre-service Teachers from the PCKPM Scale and its Sub-Dimensions Vary Significantly Depending on the Variable of Believing in the Necessity of Mathematics Education in the Pre-school Period**

	Believing in the Necessity	N	$\bar{X}$	Ss	sd	t	p
Number	Yes	363	1.27	.99	437	3.32	.001*
	No	76	.86	.89			
Pattern	Yes	363	1.27	1.00	437	1.01	.310
	No	76	1.14	.97			
Order	Yes	363	1.32	.74	437	2.17	.030*
	No	76	1.11	.74			
Shape	Yes	363	1.26	.72	437	1.06	.290
	No	76	1.17	.70			
Spatial	Yes	363	1.30	.83	437	-.97	.328
	No	76	1.40	.89			
Comparison	Yes	363	1.44	.68	437	1.65	.099
	No	76	1.30	.69			
Scale	Yes	363	7.90	2.51	437	2.85	.005*
Total	No	76	7.01	2.31			

\*p< 0.05

As can be seen in Table 21, mean scores taken from the PCKPM scale by the pre-service pre-school teachers vary significantly depending on their state of believing in the necessity of mathematics education in the preschool period ( $t(437)=2.85$ ,  $p<.05$ ). Accordingly, the PCKPM scores of the pre-service teachers who believe in the necessity of mathematics education in the pre-school period ( $\bar{X}=7.90$ ) are higher than those of the pre-service teachers who do not believe in the necessity of mathematics education ( $\bar{X}=7.01$ ). When the mean scores taken from the sub-dimensions were examined, significant differences were found in the sub-dimensions of *number* ( $t(437)=3.32$ ,  $p<.05$ ) and *order* ( $t(437)=2.17$ ,  $p<.05$ ) in favour of the teachers believing in the necessity of mathematics education.

#### *Findings related to the Fourth Sub-Question of the Study*

The opinions of the in-service and pre-service pre-school teachers regarding pre-school mathematics are given in Tables 22, 23, 24, 25, 26 and 27 in the form of frequency and percentage.

**Table 22. The Reasons Why the In-service and Pre-Service Pre-school Teachers Consider Mathematics Education Necessary in the Pre-school Period**

	Codes	f	%
In-service Teachers	Preparation for primary education	3	33.44
	Because their minds are open/early education	2	22.22
	Acquisition of basic math skills	2	22.22
	Presence of it in all areas of life	1	11.11
	Acquisition of daily life skills	1	11.11
Pre-service Teachers	Acquisition of basic math skills	7	31.81
	Acquisition of daily life skills	5	22.72
	Providing support to cognitive development	4	18.18
	The importance of early education	2	9.00
	Preparation for literacy	1	4.54
	Teaching of abstract concepts	1	4.54
	Developing a positive attitude towards mathematics	1	4.54

As can be seen in Table 22, the answers of three teachers are related to the code of “preparation for primary education”, the answers of two teachers are about the code of “children’s minds are open” and the answers of two teachers are under the code of “acquisition of basic mathematics skills”. Similarly, seven pre-service teachers consider mathematics education necessary for the “acquisition of basic mathematics skills”, five pre-service teachers consider it necessary for the “acquisition of daily life skills” and four pre-service teachers consider it necessary for “supporting cognitive development”. Some related explanations made by teachers and pre-service teachers are as follows:

*“.....It is very important because it is the beginning of education life and children’s minds are open.” (T7)*

*“Mathematics is in our life at any moment and it is one of the most important abilities necessary for cognitive development. Therefore, it should be included in early education..... I think it is necessary.” (3.1)*

**Table 23. The Importance Given to Mathematics Education in the Pre-school Period in our Country according to the Opinions of the Preschool Teachers and Pre-service Teachers**

	<b>Codes</b>	<b>f</b>	<b>%</b>
In-service Teachers	Due importance is given	6	66.66
	As teachers, we give importance	4	44.44
	Partially/insufficient	2	22.22
	It changes depending on the scope; the education system makes it necessary	1	11.11
	It is not taught by doing, by experiencing and through discovery	1	11.11
	Parents don’t give enough importance	1	11.11
	Teachers’ preference for being inactive/teacher incompetence	1	11.11
Pre-service Teachers	Inadequacy of implemented activities	4	18.18
	Mathematics’ being abstract, not being able to concretize it	4	18.18
	Mathematics’ being difficult and requiring effort	3	13.63
	Preference for art activities	2	9.09
	The comfort of its being given in primary school	1	4.54
	Not allocating enough time to subjects	1	4.54
	Preference for easy activities	1	4.54
	Presentation of too many concepts	1	4.54
	Inadequacy of teacher training	1	4.54
	Using too many games rather than teaching the subjects	1	4.54
	Lack of awareness	1	4.54
	Teaching by imitation	1	4.54

Table 23 shows that while six teachers stated that the required importance is given to mathematics education in the pre-school period in our country, all of the pre-service teachers stated that it is not given adequate importance. Some related explanations are as follows:

*“I give importance. I try to include activities such as pattern, counting, matching activities.” (T6)*

*“Mostly not given. Games are usually used rather than teaching the subjects because mathematics education is a more demanding than the teaching of other subjects, so most teachers do not give enough importance.” (3.7)*

**Table 24. Activities that the Preschool Teachers and Pre-Service Teachers Include or Consider to Include in Preschool Mathematics Education**

	<b>Codes</b>	<b>f</b>	<b>%</b>
In-service Teachers	Number-Counting	8	88.88
	Operations	5	55.55
	Pattern	4	44.44
	Matching	4	44.44
	Activities based on concrete life experiences	2	22.22
	Algorithm	2	22.22
	Attention/Perception activities	2	22.22
	Classification	1	11.11
	Table, graph	1	11.11
	Music-game-movement	1	11.11
Pre-service Teachers	Activities based on concrete life experiences	10	45.45
	Pattern	7	31.81
	Number-Counting	5	22.72
	Operations	4	18.18
	Matching	3	13.63
	Geometric shapes	3	13.63
	Length, weight measurements	1	4.54
	Part-whole, full-half	1	4.54
	Mind enhancing activities	1	4.54
	Music-game-movement	1	4.54

According to Table 24, the in-service and pre-service teachers mostly prefer activities based on number-counting, operations, patterns, matching and concrete experiences in preschool mathematics education. When the most preferred activities are examined, it is seen that 8 of the in-service teachers stated that they included or would include activities based on number-counting and 10 of the pre-service teachers stated that they included or would include activities based on concrete life experiences. Seven teachers stated that they preferred activities based on patterns and five pre-service teachers stated that they preferred activities based on number-counting. Some statements about the activities that teachers and pre-service teachers included are as follows:

*“Activities requiring writing and recognizing numbers, performing simple addition and subtraction operations, pattern, matching, grouping, attention enhancing activities....” (T5)*

*“I would use activities that one could learn by doing and experiencing. Instead of printing numbers on paper, I would use activities through which they could understand by touching and feeling.” (3.5)*

**Table 25. Codes that the In-service and Pre-Service Pre-school Teachers Have Difficulty or Think They will Have Difficulty in Implementing in Pre-School Mathematics**

	<b>Codes</b>	<b>f</b>	<b>%</b>
Teacher	There is no theme that I have difficulty in	4	44.44
	Operations	2	22.22
	I have a hard time with developmentally retarded children	2	22.22
	Pattern	1	11.11
Pre-service Teacher	There is no theme that I have difficulty in	10	45.45
	Operations	4	18.18
	Abstract themes	3	13.63
	Spatial concepts	2	9.09
	Advanced mathematics	1	4.54
	Time	1	4.54
	Matching	1	4.54
	Volume	1	4.54

According to Table 25, nearly half of the in-service and pre-service teachers think that there is no code that they consider they will have difficulty in while teaching mathematics. The code of operations is one of the maincodes that the other in-service teachers and pre-service teachers have difficulty in or think they will have difficulty while teaching mathematics. In addition, two of the in-service teachers stated that they had difficulty in developmentally retarded children, and another teacher stated that he/she had difficulty in teaching patterns. On the other hand, three of the pre-service teachers stated that they would have difficulty in teaching abstract themes and two in teaching spatial concepts. Accordingly, some statements indicating the codes that teachers and pre-service teachers have difficulty or think they will have difficulty in teaching:

*“We can have difficulties when starting the operations; we have to teach by using concrete things. However, we may have problems with some children even in operations performed on the basis of concrete objects.” (T7)*

*“... it is difficult to teach abstract themes” (3.14)*

**Table 26. The Extent to which the In-service and Pre-Service Pre-school Teachers Find the Objectives and Specifications in the Current Pre-school Curriculum in the Field of Mathematics Sufficient**

	<b>Codes</b>	<b>f</b>	<b>%</b>
Teacher	I find sufficient	8	88.89
	Can be improved	1	11.11
	It does not give enough opportunities to the teacher	1	11.11
	Activities should be increased	1	11.11
Pre-service Teacher	I find sufficient	12	54.55
	I don't find sufficient	9	40.91
	I have no idea, I don't have a grasp of the subjects	1	4.54
	Teachers should be consulted	2	9.09
	Training should be given to teachers	2	9.09
	Insufficient practice	2	9.09
	Concepts should be embodied	2	9.09
	Activities should be supported with materials	1	4.54
	Activities should be increased	1	4.54

As can be seen in Table 26, 8 of the in-service pre-school teachers and 12 of the pre-service teachers find the objectives and specifications in the field of mathematics in the Pre-school Curriculum prepared by the Ministry of National Education sufficient, 9 pre-service teachers do not find the objectives and specifications sufficient. Some of the explanations made by the teachers and pre-service teachers regarding the objectives and specifications in the field of mathematics in the preschool curriculum are as follows:

*“Yes, they are sufficient. They have a wide scope.” (3.9)*

*“The objectives and specifications in the current curriculum are not sufficient. They seem to be sufficient for mathematics education. The mathematics teaching carried out in the classroom needs to be improved so that we can evaluate the objectives and specifications accordingly.” (4.8)*

**Table 27. Areas where the In-service and Pre-Service Pre-school Teachers Find Themselves Incompetent and their Attempts to Develop Themselves in these Areas**

	<b>Codes</b>	<b>f</b>	<b>%</b>
Teacher	I don't think I have shortcomings	6	66.66
	I think I have shortcomings	2	22.22
	I am not good at individual learning	2	22.22
	I try to learn GEMS, STEM, coding etc. programs	1	11.11
	I'm looking for educational videos and activities	1	11.11
	I examine each child's paper and try to give feedback to the parents	1	11.11
Pre-service Teachers	I think I have shortcomings	15	68.18
	I don't think I have shortcomings	7	31.82
	I have lack of experience in practice	4	18.18
	I am not competent enough in subjects apart from number and counting	2	9.09
	I am not good enough in the implementation of the curriculum	1	4.54
	I am personally not competent enough in mathematics	1	4.54
	I am not competent enough in finding activities and making them concrete	1	4.54
	I am not competent enough in using techniques	1	4.54
	I can attend courses, workshops, seminars, conferences and certificate programs	2	9.09
	I consult the people around	1	4.54
	I get help from the internet	1	4.54
	I do research	1	4.54
	I participate in trainings	1	4.54
	I am planning to get help in the future	1	4.54

As can be seen in Table 27, 6 of the teachers and 7 of the pre-service teachers consider themselves competent in the field of preschool mathematics. Two of the in-service teachers evaluated themselves as inadequate in “individual learning”. The pre-service teachers expressed themselves as inadequate especially in terms of practical experience in areas other than number and counting. They stated that they “followed different mathematics programs”, “researched for videos and activities”, and “communicated with parents” so that they could improve themselves in subjects in which they were not good enough. The pre-service teachers reported that they participated in courses, workshops, seminars, conferences and certificate programs. Accordingly, some expressions about the areas in which the teachers and pre-service teachers are not competent enough and their attempts made to improve themselves in these areas are given below:

*“I try to learn GEMS and STEM, coding etc. programs. I am trying to improve myself.” (T6)*

*“I don't find myself competent enough. I think that I can improve myself by attending courses and seminars that provide training I need.” (4.7)*

## DISCUSSION, CONCLUSION AND IMPLICATIONS

In light of the results of the current study, which was carried out to examine the in-service and pre-service pre-school teachers' pedagogical content knowledge in mathematics education, it was determined that the pedagogical content knowledge of the in-service teachers and pre-service teachers in preschool mathematics was at a “medium” level. When the sub-dimensions of pre-school mathematics were examined, it was concluded that the highest mean score was taken from the sub-dimension of *order* by the teachers and the sub-dimension of *comparison* by the pre-service teachers. On the other hand, it was found that the lowest mean score was taken from the sub-dimension of *pattern* by the teachers and the sub-dimension of *number* by the pre-service teachers. In studies examining the pedagogical content knowledge of teachers in pre-school mathematics (Argın, 2019;

Avcı Güryet, 2021; Lee, 2017), it was determined that the content knowledge of the teachers was at a moderate level, similar to the current study. Different from this result, in various studies examining the pedagogical content knowledge of pre-school teachers, there are also results showing that teachers' pedagogical content knowledge about early mathematics is insufficient (Argın and Dağlıoğlu, 2020; Ginsburg and Ertle, 2008; Ginsburg and Golbeck, 2006; Zhang, 2015). Contrary to these findings, there are also studies concluding that teachers' pedagogical content knowledge in pre-school mathematics is high (Dal, 2015; Demirbaş, 2019). When studies conducted on pre-service teachers are examined, it is seen that there are results indicating that pre-service teachers' beliefs about mathematics, mathematics teaching and learning mathematics (Duru and Göl, 2016) and pedagogical content knowledge (Avcı and Kutluca, 2022) are high.

It was also concluded that there was no significant difference in the scores taken from the PCKPM Scale depending on the "educational level" and "the level of self-efficacy of the teachers in teaching mathematics in the pre-school period". On the contrary to this result, the results of the study conducted by Özdemir (2020) showed that there is a significant difference in the pedagogical content knowledge of pre-school teachers depending on their education level and the type of high school they graduated from. Similarly, in the study conducted by Argın (2019), it was concluded that the pedagogical content knowledge mean scores of the teachers holding a bachelor's or graduate degree are better than those of the teachers who were the graduates of a vocational high school or an associate's degree program.

When it was examined whether the mean scores taken from the PCKPM Scale by the teachers vary significantly depending on the variable of "teaching experience", it was seen that only in the sub-dimension of "spatial", the teachers with 11-15 years of teaching experience had a higher mean score than the teachers who had worked for more than 20 years. Parpucu and Erdoğan (2017) examined the relationship between the frequency of in-service pre-school teachers and pre-service teachers' using the mathematical language and their mathematical pedagogical content knowledge and they found that the teachers with 6-10 years of teaching experience used more mathematical expressions than the teachers who were novice and the teachers with 10 or more years of teaching experience. In the study conducted by Argın (2019), it was also reported that the teachers with 6-10 years of teaching experience had a higher pedagogical content knowledge mean score than the teachers with 0-5 years of teaching experience in the sub-dimension of pattern. In addition, in the same study, it was revealed that there was a significant age-related difference. Accordingly, in the sub-dimension of number, it was determined that the mean scores of the teachers aged between 23-30 and 31-40 years differed significantly compared to the mean score of the teachers aged between 18-22. In the sub-dimension of comparison, a significant decrease was observed in the mean scores of the teachers who were over 51 years old compared to younger teachers (Argın, 2019). This result is consistent with the result of the current study.

In the current study, it was found that the scores taken by the pre-service teachers from the PCKPM Scale varied significantly depending on the variables of "gender", "grade level", "grade point average", "having taken the mathematics education course", "grade point in the mathematics education course", "believing in the necessity of mathematics education in the preschool period". The significant difference found on the basis of gender was in favour of the female pre-service teachers. Different studies conducted on in-service teachers and pre-service teachers in the literature also support this result (Aksu, 2008; Duatepe Paksu, 2008; Duru and Göl, 2016). It was determined that the pedagogical content knowledge mean scores of the pre-service teachers studying at upper grade levels taken from the whole scale and from the sub-dimensions of number and order were higher than those of the pre-service teachers studying at lower grade levels. The mean scores taken from the PCKPM Scale by the pre-service teachers varied significantly depending on the variable of having taken the mathematics education course. As a result, it can be said that the Early Childhood Mathematics Education course that the pre-service teachers took during their undergraduate education contributed positively to the pre-school mathematics pedagogical content knowledge of the pre-service teachers. The mean scores taken from the whole scale and the sub-dimension of order were found to vary significantly depending on the grade point in the mathematics education course in favour of the pre-



service teachers whose grade points were “very high” and “high”. Similarly, in the study by Duatepe and Paksu (2008), it was revealed that pre-service teachers found the mathematics course very useful.

When the results from the qualitative dimension of the study were examined, it was seen that all of the pre-school teachers consider mathematics education necessary because of a variety of reasons such as “preparation for primary education, the importance of early education as the minds of pre-school children are open, the acquisition of basic mathematics skills, the acquisition of daily life skills and the necessity of mathematics is in all areas of life”. Similarly, all of the pre-service teachers interviewed consider mathematics education necessary in the pre-school period for reasons such as its necessity for “preparation for primary education, acquisition of basic mathematical skills and daily life skills and the importance of early education”. In the quantitative dimension of the study, it was revealed that the pedagogical content knowledge mean scores of the pre-service teachers taken from the whole scale and the sub-dimensions of *number* and *order* varied significantly depending on the variable of belief in the necessity of mathematics education in the pre-school period in favour of the pre-service teachers believing in the necessity of mathematics education in the preschool period. In this sense, it was observed that the quantitative and qualitative results of the study concurred with each other. Similarly, in the study by Umay (2003) and İnan (2014), the pre-service teachers stated that mathematics exists in all areas of life. According to another result that emerged in the qualitative dimension of the study, it was stated that activities based on concrete experiences were preferred by both the teachers and pre-service teachers in preschool mathematics education. This result is parallel to the results of the study conducted by Tarım and Bulut (2006) on pre-service teachers.

The teachers’ opinions on the importance given to mathematics in the preschool period in our country are that the due importance is given to mathematics. Few teachers on the other hand stated that mathematics education is partially given importance in the pre-school period in our country. The stated reasons for lack of importance attached to mathematics education include reasons related to the teaching method such as not teaching in such a way as to allow students to learn by doing and experiencing or through discovery and parental attitude such as their not much caring about their children’s education. The pre-service teachers also stated that “teachers are not very active, activities are insufficient, mathematics is abstract as a subject area, it cannot be concretized, mathematics is challenging, difficult, artistic activities and easy activities are preferred, it will be given in primary school and the subjects are not emphasized much”.

The participated preschool teachers stated that they mostly used activities based on number and counting, operations, pattern, matching and activities based on concrete experiences, algorithm and attention/perception in mathematics education. In the study by Lee (2017), it was concluded that the content knowledge about number, measurement and classification is higher than the subjects of shape and spatial perception. The pre-service teachers stated that they would mostly include activities based on concrete life experiences, similar to the teachers. After the activities based on concrete life experiences, the activities most preferred were based on pattern, number-counting, operations, matching, geometric shapes, length, weight measurements, piece-whole, full-half, mind-enhancing activities and music-game-movement activities. In the study by Avcı and Kutluca (2022), it was seen that the pre-service teachers adopted child-centred pedagogical beliefs.

When the mean scores obtained by the in-service teachers and pre-service teachers from the PCKPM Scale were examined in terms of sub-dimensions, it was seen that the teachers and pre-service teachers had the lowest mean scores from the sub-dimensions of number, pattern and shape. According to the results of the interviews, although the in-service and pre-service teachers gave importance to the mentioned sub-dimensions of mathematics, the scale scores showed the opposite. In addition, the sub-dimensions that the teachers and pre-service teachers had the highest mean scores in the quantitative dimension are the sub-dimensions of spatial and comparison. However, in the qualitative dimension, the most difficult subjects for the in-service teachers and pre-service teachers were found to be abstract themes and spatial issues after operations. In this sense, it is seen that the results obtained from the interviews in the qualitative dimension and the results obtained from the scale in the quantitative dimension do not concur.

While the in-service teachers mostly agree with the idea that the Preschool Curriculum is sufficient in the field of mathematics, about half of the pre-service teachers consider it sufficient. In the suggestions made regarding the areas deemed insufficient in the curriculum, there are suggestions regarding the need to consult teachers, train teachers, increase practice opportunities, concretize concepts, support activities with materials and increase the number of activities. To do so, teachers must first have this competence.

The in-service pre-school teachers considered themselves highly competent in pre-school education. In the variable of the level of competence, which was considered in the quantitative dimension of the study, the teachers generally evaluated themselves as “competent enough” and “very competent”. Seen from this perspective, it can be said that the quantitative and qualitative data of the study concur with each other. According to the results of the studies conducted by Di Santo, Timmons and Lennis (2017), and Avcı and Kutluca (2022), it was concluded that early childhood educators who receive pre-service education believe that pre-school education has a high pedagogical importance in children’s learning. In this respect, their results are in line with the results of the current study. However, in the current study, when the self-efficacy of the pre-school teachers in teaching mathematics was examined, it was determined that the scale scores of the teachers who expressed themselves as quite competent were lower than the other groups. Studies in the literature also support the results that teachers have high self-efficacy in mathematics education (Çelik, 2017; Gömleksiz and Serhatlıoğlu, 2013; Kesgin 2006). In the current study, contrary to the in-service teachers, the majority of the pre-service teachers stated that there is a theme in which they are not competent enough or have difficulty within the field of preschool mathematics education.

In the study, apart from the teachers and pre-service teachers who do not think that they have a deficiency in the field of pre-school mathematics education, there are pre-service teachers who stated that they feel inadequate in terms of “practice experience, subjects other than numbers and counting, the curriculum, finding activities and techniques” and there are teachers who stated that they are inadequate in terms of “individual learning”. As a result of the study conducted by Özdemir (2020), it was concluded that the negative past experiences of preschool teachers in mathematics or their participation in mathematics studies do not affect their self-efficacy. This result does not concur with the result of the current study. In the current study, the pre-service teachers stated that they participated in training programs, consulted people around, sought help from the internet, conducted research and would receive support in the future” to improve themselves in the areas in which they feel not competent enough. When the opinions of the teachers were examined, it was seen that they tried to learn GEMS (Great Exploration in Math and Science), STEM (Science, Technology, Engineering and Mathematics) and coding programs, examined the educational videos and activities and gave feedback to the parents about the children’s performances to improve themselves in the areas in which they feel not competent enough.

According to the results of the current study, it can be suggested to organize training and certificate programs to increase the pedagogical content knowledge of pre-school teachers and pre-service teachers in the field of mathematics. Based on the idea that mathematics remains abstract, it can be suggested to examine the resources related to activities based on concrete life experiences and to follow educational videos. Additionally, the result obtained from the current study highlights the importance of the Mathematics Education course in Preschool Education undergraduate programs and its relationship with other disciplines. Accordingly, it can be suggested to enrich the content of the Mathematics Education course and increase the practical courses in undergraduate programs. Moreover, the results emphasize the importance of learning based on concrete experiences in daily life in the teaching of mathematical concepts. In this direction, families can be offered activities where they can include many skills such as comparison, matching, classification in kitchen activities, daily housework, house arrangement and closet arrangement. For teachers, in-service training can be given to integrate mathematics education with different types of activities such as art, Turkish, games and drama. Finally, it can be suggested that academicians should make more use of practice while educating teachers and pay more attention to giving more place to mathematics activities in practice-oriented lessons.

**Conflicts of Interest:** No potential conflict of interest was declared by the authors.

**Funding Details:** This research is not funded by any institution or organization.

**CRedit Author Statement:** Author 1: Data Curation, Investigation, Visualization, Writing – Original Draft Preparation. Author 2: Methodology, Supervision, Reviewing & Editing.

**Ethical Statement:** In this research, "Higher Education Institutions Scientific Research and Publication Ethics Directive" All rules specified in the scope have been followed. The second part of the directive, "Scientific None of the actions mentioned under the heading "Actions Contrary to Research and Publication Ethics" has not been realised. This study was produced from the master's thesis completed by the 1st author under the supervision of the 2nd author. Ethics committee permission was not mandatory in the year the thesis was published.

## REFERENCES

- Aksu, H. H. (2008). Öğretmen adaylarının matematik öğretimine yönelik öz-yeterlilik inançları, *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 8(2), 161-170. Retrieved from <https://dergipark.org.tr/pub/aibuefd/issue/1495/18091>
- Aksu, Z. ve Kul, U. (2017). Turkish adaptation of the survey of pedagogical content knowledge in early childhood mathematics education, *International Journal Of Eurasia Social Sciences*, 8(30), (1832-1848). Erişim adresi: <https://openaccess.artvin.edu.tr/xmlui/handle/11494/4165>
- Aktaş-Arnas, Y. (2013). *Okul öncesi dönemde matematik eğitimi*. Ankara: Vize.
- Argın, Y. (2019). *Okul öncesi eğitimcilerinin matematik eğitimine ilişkin pedagojik alan bilgi düzeylerinin çeşitli değişkenler açısından incelenmesi*. (Yayınlanmamış yüksek lisans tezi). Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.
- Avcı Güryel, İ. (2021). *Okul öncesi öğretmenlerinin matematik eğitimine yönelik özyeterlilikleri ile matematik pedagojik alan bilgileri arasındaki ilişkinin incelenmesi (Afyonkarahisar örnekleme)* (Yayınlanmamış yüksek lisans tezi). Afyon Kocatepe Üniversitesi, Sosyal Bilimler Enstitüsü, Afyon.
- Avcı, A. ve Kutluca, A. Y. (2022). Okul öncesi öğretmen adaylarının pedagojik inançları ve pedagojik alan bilgilerinin öğretim uygulamaları üzerindeki etkisi. *TEBD*, 20(2), 394-428. <https://doi.org/10.37217/tebd.1065083>
- Baroody, A. J., & Price, J. (1983). The development of the number-word sequence in the counting of three year olds. *Journal for Research in Mathematics Education*, 14(5), 361-368. Erişim adresi: [https://www.jstor.org/stable/748681#metadata\\_info\\_tab\\_contents](https://www.jstor.org/stable/748681#metadata_info_tab_contents)
- Büyükoztürk, Ş. (2016a). *Bilimsel araştırma yöntemleri*. Ankara: Pegem Akademi.
- Büyükoztürk, Ş. (2016b). *Sosyal bilimler için veri analizi el kitabı*. Ankara: Pegem Akademi.
- Creswell, J. W. & Plano Clark, V. L. (2015). *Karma yöntem araştırmaları tasarımı ve yürütülmesi*. Ankara: Anı.
- Çelik, M. (2017). Okul öncesi öğretmenlerinin erken matematik eğitimine ilişkin öz-yeterlilikleri. *Uluslararası Türk Eğitim Bilimleri Dergisi*, 5(8), 240-247. Erişim adresi: <https://dergipark.org.tr/tr/download/article-file/408869>

- Dağlı, A. (2007). *Okul öncesi eğitimi alan ve almayan ilköğretim birinci sınıf öğrencilerinin Türkçe ve matematik derslerindeki akademik başarılarının karşılaştırılması* (Yayınlanmamış yüksek lisans tezi). Selçuk Üniversitesi, Sosyal Bilimler Enstitüsü, Konya.
- Duatepe Paksu, A. (2008). Comparing teachers' beliefs about mathematics in terms of their branches and gender. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 35, 87-97. Erişim adresi: [https://www.researchgate.net/publication/279765917\\_Comparing\\_teachers'\\_beliefs\\_about\\_mathematics\\_in\\_terms\\_of\\_their\\_branches\\_and\\_gender\\_Ogretmenlerin\\_matematik\\_hakkindaki\\_inanclarinin\\_brans\\_ve\\_cinsiyet\\_bakimidan\\_karsilastirilmesi](https://www.researchgate.net/publication/279765917_Comparing_teachers'_beliefs_about_mathematics_in_terms_of_their_branches_and_gender_Ogretmenlerin_matematik_hakkindaki_inanclarinin_brans_ve_cinsiyet_bakimidan_karsilastirilmesi)
- Duru, A. ve Göl, R. (2016). Öğretmen adaylarının matematik, matematik öğretimi ve matematik öğrenmeye ilişkin inançları. *Adıyaman Üniversitesi Eğitim Bilimleri Dergisi*, 6(2), 255-282. Erişim adresi: <http://dspace.adiyaman.edu.tr:8080/xmlui/handle/20.500.12414/254>
- Erkan, S. ve Kırca, A. (2010). Okul öncesi eğitimin ilköğretim birinci sınıf öğrencilerinin okula hazır bulunuşluklarına etkisinin incelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 38(38), 94-106. Erişim adresi: <https://search.trdizin.gov.tr/yayin/detay/104800/>
- Ginsburg, H. P. & Ertle, B. (2008). Knowing the mathematics in early childhood mathematics. In *Contemporary Perspectives on Mathematics in Early Childhood Education* (O. N. Saracho ve B. Spodek., pp. 45-66). Charlotte, NC: Information Age Publishing.
- Ginsburg, H. P. & Golbeck, S. L. (2006). Thoughts on the future of research on mathematics and science learning and education. *Early Childhood Research Quarterly*, 19(1), 190-200. <https://doi.org/10.1016/j.ecresq.2004.01.013>
- Gömlüksiz, M. N. ve Serhatlıoğlu, B. (2013). Okul öncesi öğretmenlerinin öz-yeterlik inançlarına ilişkin görüşleri. *Turkish Studies- International Periodical for the Languages, Literature and History of Turkish or Turkic*, 8(7), 201-221. DOI:<http://dx.doi.org/10.7827/TurkishStudies.5336>
- Griffin, S. (2004). Building number sense with number worlds: A mathematics program for young children. *Early Childhood Research Quarterly*, 19(1), 173-180. <https://doi.org/10.1016/j.ecresq.2004.01.012>
- Gudmundsdottir S. (1990). Values in Pedagogical Content Knowledge. *Journal of Teacher Education* 41(3), 44-52. DOI:10.1177/002248719004100306
- Güven, Y. (2005). *Erken çocuklukta matematiksel düşünme ve matematiği öğrenme*. İstanbul: Küçük Adımlar Eğitim.
- Güven, Y. ve Uyanık Balat, G. (2006). 1. ve 2. sınıf öğrencilerinin matematik yeteneğinin okul öncesi eğitimi alıp almama ve kurumda veya ailesinin yanında kalma durumlarına göre karşılaştırılması. *1. Uluslararası Okul Öncesi Eğitim Kongresi Bildiri Kitabı I. Cilt*, 384-397. İstanbul: Ya-Pa.
- İnan, C. (2014). Okul öncesi öğretmen adaylarının matematik dersini öğretebilme konusunda hazır bulunuşluk düzeylerinin değerlendirilmesi (Diyarbakır il örneği). *Turkish studies*, 9(8), 537-550. DOI:<http://dx.doi.org/10.7827/TurkishStudies.7021>
- Jordan, N. C., Kaplan, D., Ramineni, C. & Locuniak, M. N. (2009). Early math matters: Kindergarten number competence and later mathematics outcomes. *Developmental Psychology*, 45(3), 850-867. DOI: 10.1037/a0014939
- Karakuş, H. (2015). *Okul öncesi öğretmenlerinin matematiksel gelişimine ilişkin inanışları ile çocukların matematik kavram kazanımları arasındaki ilişkinin incelenmesi*.

(Yayınlanmamış yüksek lisans tezi). Hacettepe Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.

- Karakuş, H. ve Akman, B. (2016). Okul öncesi dönem çocuklarının matematik kavram kazanımlarının incelenmesi. *Pegem Atıf İndeksi, North America*, 0, oct. 2016. Available at: <http://www.pegemindex.net/index.php/Pati/article/view/9786053183563b2.029/9786053183563>. Date accessed: 11 Jul. 2019.
- Kesgin, E. (2006). *Okulöncesi eğitim öğretmenlerinin özyeterlik düzeyleri ile problem çözme yaklaşımlarını kullanma düzeyleri arasındaki ilişkinin incelenmesi. (Denizli ili örneği)*. Yayınlanmamış Yüksek Lisans Tezi. Pamukkale Üniversitesi, Denizli.
- Lee, J. E. (2017). Preschool Teachers' Pedagogical Content Knowledge in Mathematics. *International Journal of Early Childhood*, 49, 229–243. Erişim adresi: <https://link.springer.com/content/pdf/10.1007/s13158-017-0189-1.pdf?pdf=button>
- Metin, M. (2015). *Eğitimde bilimsel araştırma yöntemleri*. Ankara: Pegem Akademi.
- Nasibov, F. ve Kaçar, A. (2005). Matematik ve matematik eğitimi hakkında. *Kastamonu Eğitim Dergisi*, 13(2), 339-346. Erişim adresi: <https://search.trdizin.gov.tr/yayin/detay/117139/>
- NCTM (2000). *Principles and standards for school mathematics*. Reston, Va. NCTM.
- Özdemir, B. (2020). *Okul öncesi öğretmenlerinin erken matematik eğitimine ilişkin pedagojik alan bilgileri ile özyeterlilikleri arasındaki ilişkinin incelenmesi* (Yayınlanmamış Yüksek Lisans Tezi). Sabahattin Zaim Üniversitesi, Lisansüstü Eğitim Enstitüsü, İstanbul.
- Parpucu, N. ve Erdoğan, S. (2017). Okul öncesi öğretmenlerinin sınıf uygulamalarında matematik dilini kullanma sıklıkları ile pedagojik matematik içerik bilgileri arasındaki ilişki. *Erken Çocukluk Çalışmaları Dergisi*, 1(1), 19-32. DOI:10.24130/eccd-jecs.19672017118
- Rovegno, I. (1992). Learning a new curricular approach: Mechanisms of knowledge acquisition in preservice teachers. *Teaching and Teacher Education*, 8(3), 253-264. [https://doi.org/10.1016/0742-051X\(92\)90024-W](https://doi.org/10.1016/0742-051X(92)90024-W)
- Sarnecka, B. W. & Carey, S. (2008). How counting represents number: What children must learn and when they learn it. *ELSEVIER*, 108(3), 662-674. Erişim adresi: <https://www.sciencedirect.com/science/article/pii/S0010027708001145>
- Smith, K. H. (2000). *Early childhood teachers' pedagogical content knowledge in mathematics: A quantitative study*. Unpublished Doctoral Dissertation, Georgia State University, Georgia, Atlanta.
- Tarım, K. ve Bulut, M. S. (2006). Okul öncesi öğretmenlerinin matematik ve matematik öğretimine ilişkin algı ve tutumları. Çukurova Üniversitesi, *Eğitim Fakültesi Dergisi*, 32(2), 152-164. Erişim adresi: <https://search.trdizin.gov.tr/yayin/detay/96170/>
- Umay, A. (2003). Okul öncesi öğretmen adaylarının matematik öğretmeye ne kadar hazır olduklarına ilişkin bazı ipuçları. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi* 25, 194-203. Erişim adresi: <https://search.trdizin.gov.tr/yayin/detay/3090/>
- Polat Unutkan, Ö. (2007). Okul öncesi dönem çocuklarının matematik becerileri açısından ilköğretime hazır bulunuşluğunun incelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 32(32), 243-254. Erişim adresi: [https://www.researchgate.net/publication/330967429\\_Okul\\_öncesi\\_donem\\_cocuklarinin\\_matematik\\_becerileri\\_acisindan\\_ilkogretime\\_hazir\\_bulunuslugunun\\_incelenmesi](https://www.researchgate.net/publication/330967429_Okul_öncesi_donem_cocuklarinin_matematik_becerileri_acisindan_ilkogretime_hazir_bulunuslugunun_incelenmesi)

- Uyanık, Ö. ve Kandır, A. (2010). Okul öncesi dönemde erken akademik beceriler. *Kuramsal Eğitim Bilim Dergisi*, 3(2), 118-134. Erişim adresi: <https://dergipark.org.tr/tr/download/article-file/304144>
- Wolfgang, C., Stannard, L., & Jones, I. (2003). Advanced constructional play with LEGOs among preschoolers as a predictor of later school achievement in mathematics. *Early Child Development and Care*, 173(5), 467-475. doi:<https://doi.org/10.1080/0300443032000088212> [Taylor & Francis Online], [Google Scholar]
- Yazıcı, Z. (2002). Okul öncesi eğitiminin okul olgunluğu üzerine etkisinin incelenmesi. *Milli Eğitim Dergisi*, 155. Erişim adresi: [http://dhgm.meb.gov.tr/yayimlar/dergiler/milli\\_egitim\\_dergisi/155-156/yazici.htm](http://dhgm.meb.gov.tr/yayimlar/dergiler/milli_egitim_dergisi/155-156/yazici.htm)
- Yenilmez, K. (2011). Matematik öğretmeni adaylarının matematik tarihi dersine ilişkin düşünceleri. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 30, 79-90. Retrieved from <https://dergipark.org.tr/tr/pub/pauefd/issue/11113/132873>
- Yıldırım, B. (2011). Matematik ilkeleri ve standartları. B. Akman (Ed.), *Okul öncesi matematik eğitimi* (ss. 12-24). Ankara: Pegem Akademi.
- Yıldırım, A. ve Şimşek, H. (2013). *Sosyal bilimlerde nitel araştırma yöntemleri* (9. baskı). Ankara: Seçkin.
- Yıldız, G. (2005). *Erken çocuklukta matematiksel düşünme ve matematiği öğrenme*. İstanbul: Küçük Adımlar Eğitim.
- Zhang, Y. (2015). *Pedagogical content knowledge in early mathematics: What teachers know and how it associates with teaching and learning*. Loyola University Chicago

## Translation of the MOOC Student Satisfaction Survey to Turkish: A Scale Adaptation and Validation Study\*

**Emre Uygun<sup>i</sup>**

National Defence University

**Kürşat Cesur<sup>ii</sup>**

Çanakkale Onsekiz Mart University

### Abstract

Massive Open Online Courses (MOOCs) have been widely used all around the world to a great extent. Many of the MOOCs in different countries are in their native language, and there is a need to reliably assess the satisfaction levels of learners with various first languages since satisfaction stands as a critical aspect in identifying the reasons of dropouts and incontinence to MOOCs. To this end, this study aimed to translate Kumar and Kumar's (2020) "MOOC Student Satisfaction Survey" into Turkish. The researchers first translated the instrument items from English to Turkish before consulting a panel of three English experts and one Turkish expert on the suitability of the translation. A professional translator then backtranslated the scale to English, ensuring that no items were lost in translation. To establish content validity, changes were done in view of the professional feedback. The translated scale was subsequently administered to 150 former massive open online course participants for testing validity and reliability. Since this was a translation study, the same constructs of the original scale were retained, and a confirmatory factor analysis was conducted, the results of which indicated acceptable levels of validity with one item being discarded. As for the reliability values, Cronbach's alpha coefficient for the entire scale was .91, and the split-half reliability score was .87, indicating that the scale maintains good internal consistency. Therefore, it was determined that the scale's Turkish translation was valid and reliable.

**Keywords:** Distance Education, MOOCs, Online Learning, Scale Adaptation, Student Satisfaction

**DOI:** 10.29329/ijpe.2023.603.10

**Submitted:** 05/04/2023

**Accepted:** 04/07/2023

**Published:** 16/10/2023

-----  
\* This study is part of the first author's ongoing master's degree thesis, supervised by the second author.

<sup>i</sup> **Emre Uygun**, Instructor, Foreign Languages Department, Army NCO Vocational HE School, National Defence University, ORCID: 0000-0003-2027-4394

**Correspondence:** emre.uygun.elt@gmail.com

<sup>ii</sup> **Kürşat Cesur**, Assoc. Prof. Dr., English Language Teaching, Çanakkale Onsekiz Mart University, ORCID: 0000-0001-5091-9793

## INTRODUCTION

As in every part of human life, technological advances have also influenced the way education is theorised and practiced. Novel developments in technology inevitably lead to educational change. Distance education, however, is not a new concept in this regard as its roots can be traced as far back as to nineteenth century when correspondence education started in London (Mehlenbacher & Mehlenbacher, 2020). Evolving through the years, distance education has come to be an umbrella term encompassing such types of learning as distant, open, networked, flexible, distributed, and that which happens in connectivity as explained by Gunawardena and McIsaac (2008). Then, MOOCs have emerged in the last decade as a distance learning type in distance education. As the name suggests, MOOCs are *courses* conducted on an *online* learning environment, which is *open* to *massive* amounts of distant learner audiences freely or with a reasonable amount of fee.

Much research has been conducted with regards to MOOCs, their types, theoretical grounds, and practical implications in the field. Furthermore, universities over the globe have been creating their distance learning platforms on which they provide a vast range of MOOCs that address both academical and skill-based purposes (Miller, 2015) in many different languages, and many online courses have been designed in their pertaining countries' first languages. Türkiye does not constitute an exception to this trend since many state universities have been founding their own online distance learning platforms within the scope of their continuing education centres, and many MOOC studies exist in the Turkish context as well. However, there is a scarcity of research with regards to learner needs, expectations, and satisfaction levels in MOOCs when the general literature is considered (Kumar & Kumar, 2020; Sallam et al., 2022). These are crucially vital factors to address and overcome learner related weaknesses of MOOCs, thereby maintaining student participation through the courses. Although there exists some research in the Turkish context with regards to student satisfaction in MOOCs (Göktaş, 2019; İşgör Şimşek & Turan, 2017; Şahin & Durdu, 2021), they use indirect instrumentation constructed with general learning statements to assess the satisfaction levels. Therefore, there is a need for a valid and reliable tool to measure the student satisfaction in MOOCs in the Turkish language. To this end, the current adaptation and validation study aims to address this gap by translating the MOOC Student Satisfaction Survey (MSSS) by Kumar & Kumar (2020), who developed it by adapting from a study by Bhattacharjee (2001) and the New World Kirkpatrick Model (see Kirkpatrick & Kirkpatrick, 2021).

### Participation in MOOCs

Hunter (1976), in her study theorising effective instruction, proposes several elements listed as teaching with an aim, planning outcomes in line with the learner proficiency, observing learner development, and implementing learning principles. Learning principles include active participation, emerging from the intentional and conscient efforts of the teacher to foster direct student engagement (Pratton & Hales, 1986). Student participation is the involvement of learners in an effective learning process. Hence, the element of active participation and engagement in the educational processes holds a crucial value in the occurrence of learning. Student participation in learning is important in that active participation increases engagement and motivation, allows for more investment in the material, and fosters longer information retention thanks to active involvement (Felder & Silverman, 1988; Fredricks et al., 2004). However, in the literature, MOOCs are highly criticised for inadequate learner participation or complete lack thereof as a result of numerous factors inherent to the nature of MOOCs.

Although MOOCs are aimed to include a wide range of participants of diverse backgrounds with the purpose of increasing access to higher education, general demographics of distant learners in such courses constitute young adults from usually developed countries, who are educated well with high levels of formal instruction (Christensen et al., 2014). As for learners with different demographical features, reasons for not enrolling in a MOOC vary. Most prevalently, they include being unfamiliar with a distant online learning environment, having concerns about not being able to maintain learning, and feeling that MOOCs lack interactional communication and a sense of belonging



among their stakeholders (Aldowah et al., 2019; Ma & Lee, 2018; Zheng et al., 2015). If individuals have no prior experience with regards to such distance educational settings, they might refrain from participating in MOOCs, thereby opting for traditional classrooms as Kumar and Kumar (2020) explain. Many learners are accustomed to receiving teacher-directed instruction and thus learning in others' guidance in traditional education, so some individuals may face the feeling of getting lost in MOOCs.

Similar reasons apply for those who are enrolled in but drop out of MOOCs instead of completing them. Motivational factors and autonomy are among the primary causes of dropout rates (Aldowah et al., 2019). Other reasons for withdrawal include but are not limited to losing interest in the course, shortage of adequate communication and proper course design (Kumar & Kumar, 2020), having a high workload, lacking time, and lacking a pushing factor to complete the course (Zheng et al., 2015). Therefore, the main reasons for high dropout rates in MOOCs are lack of motivation, unclear planning, disengagement, and inadequate support.

### **MOOC Satisfaction**

Initially, the term satisfaction should be established in the study's context. By satisfaction, that of learners is addressed. Student satisfaction serves as a measure of how students perceive their learning experiences, making it a significant factor in determining the impact on psychological factors such as motivation levels (Astin, 1993; Hew et al., 2020). Moreover, in distance learning, student satisfaction is intricately linked to their perception of the instruction quality, emphasizing the significance of taking student satisfaction into account when developing and implementing distance education programs (Chiu et al., 2005; Elia et al., 2019; Wu et al., 2010). In addition to this, student participation and student satisfaction levels are in a strong relationship. Studies have shown that those who are actively engaged in learning are more likely to be satisfied with their educational experiences (Astin, 1984, 1993). Consequently, when designing an efficient MOOC or assessing one that already exists, student satisfaction should be a central aspect to evaluate both for improving the quality of education and to overcome the most known weakness of MOOCs, high dropout rates. If learners of a MOOC are viewed as consumers of the education it provides in line with Thomas and Galambos' (2004) notion, then there is nothing more valuable for an educational institution that offers the MOOC than satisfied customers. A satisfied MOOC learner would presumably neither withdraw from the course nor would exhibit inactivity. Furthermore, satisfied MOOC student will attract more students to the course, boosting the financial gain and prestige of the institution (Hew et al., 2020).

Student satisfaction in MOOCs is affected by a range of factors that can be grouped into two categorisations as course-related and learner-related. Course-related factors include the planning, design, and implementation of the course, with key elements being the learners' perception of the practicality, user-friendliness, and flexibility of the course (Hew et al., 2020; Joo et al., 2018), which when well established, can positively impact satisfaction by promoting effective interactions between the learner and the course content (Alraimi et al., 2015; Gameel, 2017; Shrader et al, 2016). On the other hand, learner-related factors refer to the unique attributes of the individuals participating in the course, which include but are not limited to motivational aspects, learner autonomy, determination, and overall engagement in the course (Kumar & Kumar, 2020; Joo et al., 2018; So & Brush, 2008). Both categorisations of affecting factors are interrelated since if a MOOC is well designed, then it would increment positive learning experiences. Understanding the factors that influence student satisfaction in MOOCs is important for educators and course designers to improve the overall experience and ensure learners' satisfaction. Indeed, there is an emerging research trend on student satisfaction to evaluate MOOCs and identify areas for improvement.

## METHOD

### Research Design

Following a quantitative approach in research, the current study is a survey research design that aims to translate the MSSS by Kumar and Kumar (2020) into the Turkish language. In such a design, the researchers measure the attitudes, behaviours, beliefs, or opinions of a population with the use of a survey or a questionnaire (Creswell, 2002). Additionally, a typical scale translation study involves rigorous adaptational procedures, gathering data from a large sampling group, and statistical analyses for the adapted scale's validation (e.g., Demirci & Akcaalan, 2022; Mendi & Mendi, 2015).

### Instrument

In this study, the data collection instrument is a Turkish translation of the survey developed by Kumar and Kumar (2020) in their research, which measures student satisfaction in MOOC learning environments with 20 items in five constructs on a five-point Likert-type scale ranging from 1 to 5. Course Content (CC), Course Delivery (CD), Course Assessment (CA), Course Support (CS), and Overall Satisfaction (OS) are the constructs involved. Table 1 contains detailed information about the original scale's constructs, including their items, AVE (average variance extracted) values for construct validity, composite reliability (CR) values, and internal consistency scores. As can be seen, the subscales have a high level of reliability and validity. Nevertheless, when it comes to the overall reliability of the MSSS, Kumar and Kumar appear to have not provided any internal consistency score in their analysis, which is a missing component that is rectified within the adaption phase of the scale.

**Table 1 Reliability and Validity Scores of the MSSS**

Construct	Items	AVE	CR	$\alpha$
Course Content	CC1	.65	.92	.89
	CC2			
	CC3			
	CC4			
	CC5			
	CC6			
	CC7			
	CC8			
Course Delivery	CD1	.73	.92	.88
	CD2			
	CD3			
	CD4			
Course Assessment	CA1	.60	.86	.78
	CA2			
	CA3			
	CA4			
Course Support	CS1	.72	.88	.80
	CS2			
	CS3			
Overall Satisfaction	OS1	.68	.86	.76
	OS2			
	OS3			

### Participants and Setting

The setting of the adaptation procedure is a state university in Turkiye and its online continuing education centre. The study's population consists of learners who have taken a MOOC in the university's continuing education centre. Sampling of the population is done randomly. Since this is a scale development design, it has several stages, detailed in the adaptation procedure, with different participant groups, composing of the Faculty of Education's students in addition to other MOOC participants.

In a study aimed at developing or adapting a scale, the suggested number of participants to be sampled varies in the literature. Tay and Jebb (2017), for instance, propose a number of 200 participants as a rule of thumb, while Comrey and Lee (2013) provide a five-point scale for sampling size, ranging from 100 participants considered inadequate to 1000 or more considered excellent. Given that the present adaptation study was partly retrospective in nature in the sense that it invited former MOOC learners to participate and share their course satisfaction, it was expected that the sample size would be limited. Therefore, the threshold of 200 participants set by the aforementioned authors could not be met. However, other researchers suggest that a ratio of at least five participants per scale item is acceptable, provided that the sample size reaches a minimum number of 100 participants (Ding et al., 1995; Gorsuch, 1983; Tabachnick & Fidell, 1996). Accordingly, a total of 160 participants took part in this study, corresponding to an average of 8 participants per scale item. After the removal of extreme outliers to ensure normal distribution, the number of participants decreased to 150 ( $n_{\text{male}} = 29$ ,  $n_{\text{female}} = 121$ ), or an average of 7.5 per item. Participant ages ranged from 19 to 50, averaging to 29 years old. Further information regarding these participants can be found in Table 2.

**Table 2 Participant Demographics by Profession and Level of Education**

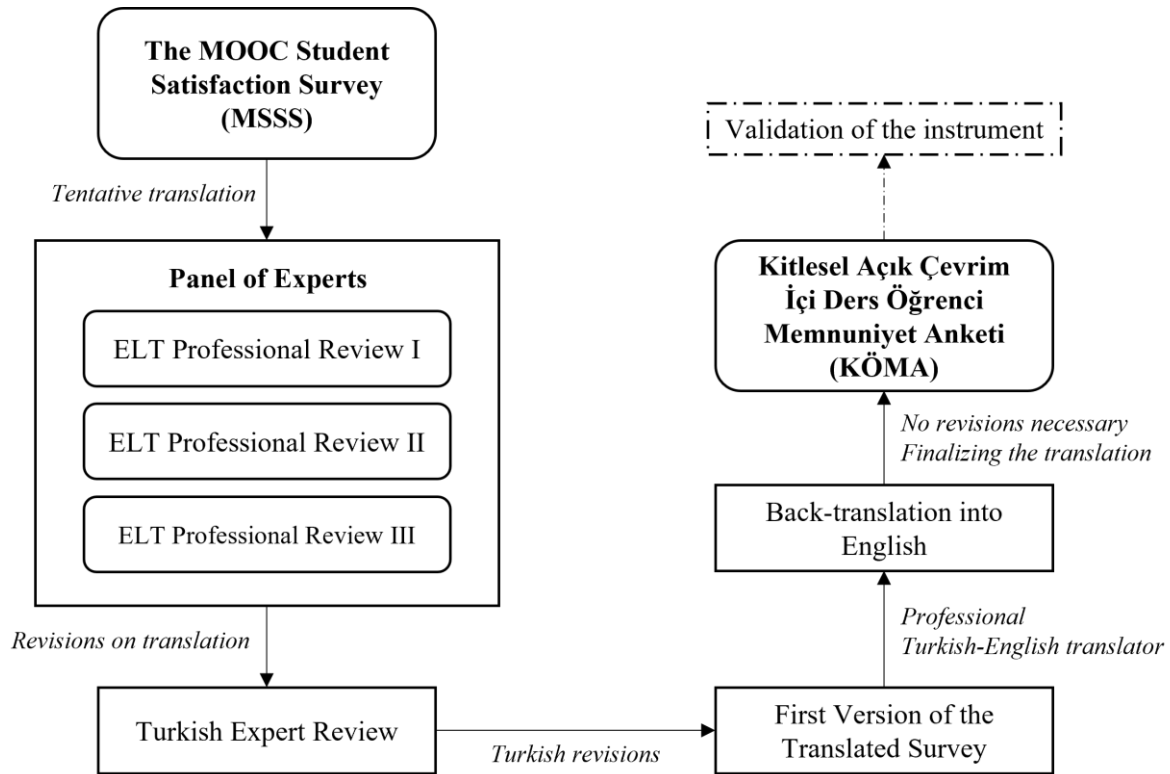
		Department of Study or Graduation					
		ELT Department	Preschool Education	Child Development	Other Dpts. of FoE	Other Language Dpts.	Other Fields of Study
Profession	Student	60		1		2	2
	Unemployed Graduate	4	1	3		3	3
	English Language Teacher	25		4	1	9	
	Other Branch Teachers	2	10	7	3	2	
	Faculty Member	2	1				
	Other Professions	2	1				2
Education	Associate degree			2		2	3
	Undergraduate degree	83	11	7	2	12	4
	Graduate degree	12	2	6	2	2	

*Note.* Dpts. = Departments, FoE = Faculty of Education.

### Translation Procedure

Initially, the creators of the original satisfaction survey were contacted to obtain their approval for the scale's translation into Turkish. Prof. Dr. Parul Kumar, who is listed as the corresponding author of Kumar and Kumar's (2020) study, approved of the Turkish translation and gave the researchers access to the original scale items. The translation process followed.

Figure 1 depicts the full process of translating and adapting the MOOC Student Satisfaction Survey. The procedure was carried out in five major steps, the first of which was the researcher's tentative translation of the original scale items into Turkish. Each item was translated from English to Turkish, with any necessary modifications or additions. Because of linguistic differences between the source and target languages, some items could not be translated verbatim, so adaptations construing the same meaning were made if required.



**Figure 1 The Translation Procedure of the MSSS**

The translated items were then revised in light of the panel's feedback and approved as sufficient by the panel thereafter. Thirdly, a faculty member from the Turkish Language Teaching department was given this revised version of the survey to review for linguistic comprehensibility and clarity. After the translated items had been adjusted in accordance with the Turkish professional's advice, the survey was prepared for backtranslation into English to make sure no terminology or content had been lost in the translation. This was done to check whether the original version and the backtranslation were similar as in similar studies (Mendi & Mendi, 2015; Tuğsal, 2020), which is one of the steps in ensuring the quality of the translated research instruments as instructed by Wild et al. (2005). The back translation was carried out by an expert Turkish-English translator who had no prior knowledge of the original scale items. Table 4 compares some of the back translations with the original items. As can be seen, no significant difference in meaning is present when the items and their corresponding backtranslated versions are compared although some linguistic structures appear to have changed during the process of backtranslation.

**Table 3 Some Problematic Points in Translation as Reviewed by the Panel of ELT Experts**

Item	Original Items	Translated Items <sup>a</sup>	M <sup>b</sup>
CC2	I found the course modules adequate.	Ders <u>modüllerini</u> yeterli buldum.	2.67
CC3	I found the course modules easy to understand and follow.	Ders <u>modüllerinin</u> takibi kolay ve anlaşılırdı.	2.67
CC4	I found the multimedia materials (videos) used to be engaging.	Kullanılan multimedya materyallerini (videoları) <u>etkileşimli</u> buldum.	1.67
CC6	Examples, illustrations, or real-world cases were used effectively to explain things.	<u>Olayları</u> açıklamak için örnekler, görseller ve gerçek olay durumları etkili bir şekilde kullanılmıştı.	2.33
CD2	I did not have problems with course delivery.	Dersin <u>verilişinde</u> bir sorun yaşamadım.	1.67
CD3	I was able to relate each of the learning objectives to the learning I achieved.	Öğrenme hedeflerinin her birini <u>elde ettiğim öğrenmeyle</u> ilişkilendirebildim.	1.67
CE2	I felt the deadlines were fair.	<u>Verilen görevler</u> için belirlenen son tarihler <u>makuldü</u> .	2.33
CE3	Assignments demand full attention and are quite rigorous.	<u>Verilen görevler</u> tam dikkat gerektiriyor ve oldukça özenli.	2.33
CE4	Quizzes are little tricky.	Sınavlar <u>biraz zor</u> .	2.00
CS1	I was able to navigate the course site easily.	Ders <u>sitesinde</u> kolayca gezinebildim.	2.67

CS3	Interacting in the forums helped me to clarify things I did not understand.	Forumlarda (yorumlar, eğiticiyle iletişim, vb.) etkileşimde bulunmak anlamadığım şeyleri netleştirmemde yardımcı oldu.	2.67
OS3	I am encouraged to enrol in another course in the future.	Gelecekte başka bir kitlesel açık çevrimiçi derse kaydolmayı düşünüyorum.	2.33

<sup>a</sup>Problematic points were underlined. <sup>b</sup>Mean scores of total relevance (min = 1, max = 3).

**Table 4 Sample of Original Items and Their Backtranslations to English from Turkish**

Item	Original Items	Items Backtranslated to English from Turkish
CC2	I found the course modules adequate.	I found the units adequate.
CC4	I found the multimedia materials (videos) used to be engaging.	I found the used multimedia materials (videos) interesting.
CC6	Examples, illustrations, or real-world cases were used effectively to explain things.	Examples, visuals, and real-life situations were effectively used to explain the content.
CD1	I was comfortable with the pace of the program.	I was satisfied with the program's speed.
CD3	I was able to relate each of the learning objectives to the learning I achieved.	I was able to associate each learning objective to what I learned.
CE2	I felt the deadlines were fair.	The deadlines were appropriate.
CE4	Quizzes are little tricky.	The exams were a bit challenging.
CS1	I was able to navigate the course site easily.	I was able to easily navigate the website where the course was taught.
CS3	Interacting in the forums helped me to clarify things I did not understand.	Interacting on forums (via comments, having contact with the educator, etc.) helped me clarify points where I didn't understand.
OS3	I am encouraged to enrol in another course in the future.	I would be willing to enrol in another massive open online course in the future.

### Data Collection and Analysis

The data collection procedure began with addressing ethical concerns. Due to the inclusion of a group of preservice teachers in the current scale adaptation and validation study, permission was initially sought from the Faculty of Education. Subsequently, an Ethical Board Approval was granted by the university at which the study was conducted. Next, former participants of a MOOC were invited to participate in the study via email through the continuing education centre's panel. The email provided a detailed explanation of the study's aims, outcomes, and significance, along with a link to the adapted questionnaire's online version on Google Forms. Data was collected from respondents who voluntarily participated in the study via email.

The handling and analysis of data gathered were done using the software packages, IBM SPSS Statistics (v26.0) and IBM SPSS AMOS (v22.0). The former was used with two purposes, which are to descriptively present the means of responses and to calculate the internal consistency values of the adapted Turkish version of the scale. The latter program, AMOS was used to conduct confirmatory factor analysis (CFA), a statistical technique used with the purpose of testing and confirming the underlying factor structure of a set of survey items (Hair et al., 2010). The factors of a constructed survey can either be assumed or explored through the use of a statistical technique called exploratory factor analysis (EFA). As its name implies, EFA is used when the researcher has no prior knowledge of the underlying factors that comprise the survey and needs to identify and explain them (Orçan, 2018). Typically, prior to conducting a CFA, EFA is used to determine factor loadings and structures that will be later labelled by the researcher. However, if the factors of the developed instrument are strongly assumed or a translation or adaptation of the instrument is being performed, the step of EFA can be skipped, and CFA can be directly utilized (Orçan, 2018).

With the conduction of CFA, the aim was to measure the extent to which the translated scale showed satisfactory level of validity. Various statistical values were used as determinants of validation, including the ratio of chi-square to the degree of freedom ( $\chi^2/df$ ), root mean square error of approximation (RMSEA), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), normed fit index (NFI), and non-normed fit index (NNFI), as commonly practiced in the literature (Klein et al., 2005; Kline, 2011).

Moreover, the panel of experts was consulted again to identify the content validity index (CVI) of the adapted scale in line with Lynn's (1986) instructions. Lynn suggests that within a group of experts, a single item CVI of at least .80 and a mean CVI of .90 should be achieved for satisfactory content validity. Since the initial panel comprised only 3 experts, 2 additional faculty members were invited to rate the items on a four-point scale (1 = irrelevant, 2 = somewhat relevant, 3 = relevant, 4 = very relevant), as per Lynn's guidelines.

## RESULTS

This section of the study presents the results of the abovementioned statistical analyses performed on the data collected using the Turkish version of the adapted scale. Prior to conducting these analyses, it was necessary to assume normal distribution among the variables. Table 5 shows that this assumption was met, as evidenced by the skewness values falling within the range of  $\pm 2$  and the kurtosis values falling within the range of  $\pm 7$ , as proposed by Hair et al. (2010) and Byrne (2010).

**Table 5 Descriptive Statistics of the Turkish MSSS and Normality Distributions of the Data (N = 150)**

Construct	Item	<i>M</i>	<i>SD</i>	Skewness		Kurtosis	
				Value	SE	Value	SE
Course Content	CC1	4.78	0.43	-1.62	0.20	1.33	0.39
	CC2	4.65	0.57	-1.37	0.20	0.93	0.39
	CC3	4.72	0.48	-1.36	0.20	0.70	0.39
	CC4	4.61	0.65	-1.86	0.20	3.79	0.39
	CC5	4.75	0.47	-1.54	0.20	1.33	0.39
	CC6	4.66	0.55	-1.39	0.20	0.98	0.39
Course Delivery	CD1	4.33	0.89	-1.55	0.20	2.39	0.39
	CD2	4.69	0.54	-1.84	0.20	3.93	0.39
	CD3	4.65	0.52	-1.05	0.20	-0.02	0.39
	CD4	4.65	0.56	-1.55	0.20	2.76	0.39
Course Evaluation	CE1	4.44	0.66	-0.77	0.20	-0.48	0.39
	CE2	4.63	0.60	-1.56	0.20	2.33	0.39
	CE3	4.54	0.65	-1.40	0.20	2.01	0.39
	CE4	3.04	1.27	0.04	0.20	-1.03	0.39
Course Support	CS1	4.61	0.63	-1.69	0.20	3.03	0.39
	CS3	4.57	0.63	-1.16	0.20	0.26	0.39
	CS3	4.41	0.80	-1.13	0.20	0.23	0.39
Overall Satisfaction	OS1	4.69	0.51	-1.59	0.20	3.60	0.39
	OS2	4.71	0.49	-1.27	0.20	0.43	0.39
	OS3	4.58	0.64	-1.41	0.20	1.52	0.39

### Content Validity

Firstly, content validity was to be ensured. To this end, Lynn's (1986) instructions were adhered, and a panel of 5 professionals were asked to rate the relevancy of each scale item on a four-point scale, ranging from irrelevant to very relevant. For each item, the number of experts who rate the item as either 3 or 4 was divided by the total number of experts, and the average CVI for the whole scale was also calculated by summing the proportion of experts who rate each item as 3 or 4 and dividing by the total number of items. As in Table 6, some items were found to have an unsatisfactory level of content validity ( $CVI < .80$ ) according to Lynn (1986).

**Table 6 Content Validity Indices Provided by Five Experts**

Construct	Item	E1	E2	E3	E4	E5	Experts in Agreement	CVI
Course Content	CC1	+	+	+	+	+	5/5	1.00
	CC2	+	+	+	+	+	5/5	1.00
	CC3	-	-	-	+	+	2/5	.40*
	CC4	+	+	-	+	+	4/5	.80
	CC5	+	+	-	+	+	4/5	.80
	CC6	+	+	+	+	+	5/5	1.00
Course Delivery	CD1	+	+	+	+	+	5/5	1.00
	CD2	+	+	+	+	+	5/5	1.00
	CD3	+	+	+	+	+	5/5	1.00
	CD4	+	+	+	+	+	5/5	1.00
Course Evaluation	CE1	+	+	+	+	+	5/5	1.00
	CE2	+	-	-	+	+	3/5	.60*
	CE3	+	-	-	-	-	1/5	.20*
	CE4	+	-	+	+	+	4/5	.80
Course Support	CS1	+	+	+	+	+	5/5	1.00
	CS3	+	+	+	+	+	5/5	1.00
	CS3	+	+	+	+	+	5/5	1.00
	OS1	+	+	+	+	+	5/5	1.00
Overall Satisfaction	OS2	+	+	+	+	+	5/5	1.00
	OS3	+	+	-	+	+	4/5	.80

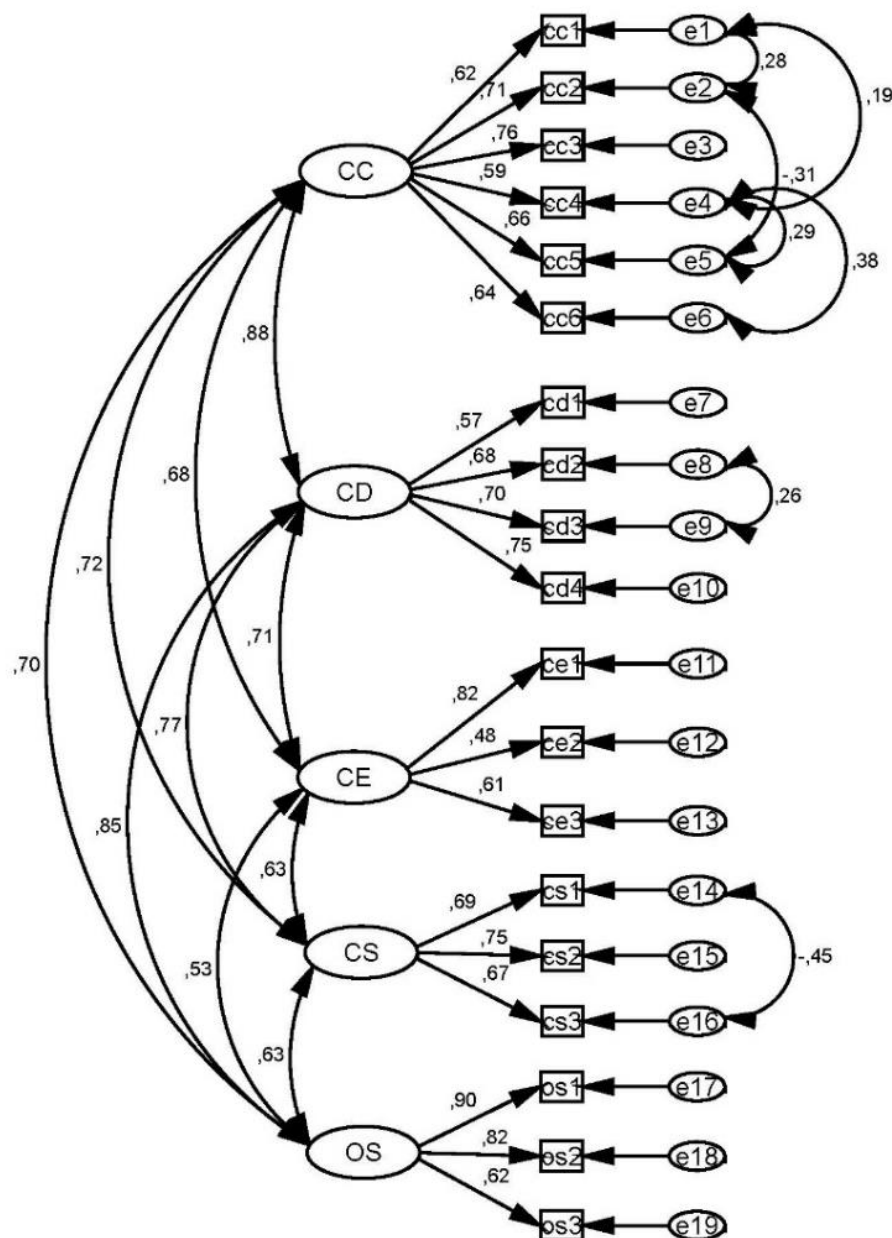
\*Items were revised with feedback received from the experts as they indicated low CVI.

The items of CC3, CE2, and CE3 demonstrated unacceptable CVI levels, so they were revised in line with the panellists' feedback and resent to them for evaluation. They rated the items again on a four-point scale. Accordingly, this time 5 experts were in agreement for CC3's content validity (CVI = 1.00), whereas for CE2, 4 experts were in agreement (CVI = .80), and for CE3, 4 experts were in agreement (CVI = .80). As for the overall CVI, the translated instrument had an index value of .90. So, the content validity of the MSSS' Turkish version was ensured.

### Construct Validity

Secondly, in order to determine the construct validity of the Turkish MSSS, a CFA was run. Since the item CE4 indicated the poorest level of standardized loading estimate with a value of .05 lower than the threshold of .50 according to Hair et al. (2010), it was discarded, and the CFA was rerun with the new structure. This time, CE2 showed poor level of standardized loading estimate, as shown in Figure 2, but the item was just below the threshold and was essential item to the questionnaire, so it was not discarded.

The results of the CFA demonstrate that the translated instrument has acceptable model fit indices. Firstly, the ratio of chi-square to the degree of freedom ( $\chi^2/df$ ), which measures the goodness of fit of a statistical model, was calculated to be 1.74 ( $\leq 3$ ), indicating a good fit with the  $\chi^2$  value of 234.86,  $p < .001$  (Kline, 2011). Secondly, while the GFI (= .86) and AGFI (= .81) values fall below the .90 threshold, they are still considered acceptable as they satisfy the criterion proposed by Baumgartner and Homburg (1995), as well as Doll et al. (1994), who consider values above .80 as acceptable, and the values of standardized root mean square (SRMR = .053) and root mean square (RMR = .021) are indicative of good fit scores as well. Thirdly, the baseline comparisons reveal that the values of NFI (= .84), NNFI (= .90) and CFI (= .92) also indicate acceptable fit levels. Finally, the RMSEA (= .07) value also indicates an acceptable fit as it falls within the range of .05 to .08 suggested by MacCallum et al. (1996).



**Figure 2 Structural Model for CFA**

Convergent validity is a type of construct validity that measures the degree to which different methods of measuring the same construct are correlated. Simply put, it refers to the extent to which two or more measures of the same construct produce similar results (DeVellis, 2017). Convergent validity can be established by examining the factor loadings, AVE, and CR values of a measurement instrument (Fornell & Larcker, 1981). In this regard, Table 7 presents the factor loadings, AVE, and CR values for each subscale of the translated item. Accordingly, convergent validity is established since Fornell and Larcker (1981) suggest that if the CR value of a factor is .60 or higher, AVE values above .40 are satisfactory.



**Table 7 Parameter Estimates of the Turkish MSSS**

Item	Standardized Factor Loading				
	Factor CC	Factor CD	Factor CE	Factor CS	Factor OS
CC1	.62				
CC2	.71				
CC3	.76				
CC4	.59				
CC5	.66				
CC6	.64				
CD1		.57			
CD2		.68			
CD3		.70			
CD4		.75			
CE1			.82		
CE2			.48		
CE3			.61		
CS1				.69	
CS2				.75	
CS3				.67	
OS1					.90
OS2					.82
OS3					.62
AVE (%)	.45	.46	.43	.50	.62
CR	.83	.77	.68	.75	.83

As for discriminant validity, which is the second type of construct validity that measures the degree to which different constructs are distinct from each other, it can be established by demonstrating that the measures of the different constructs are not highly correlated (DeVellis, 2017). Although some authors suggest that the factor correlation values should not exceed the threshold of .85 (e.g., Kline, 2011), some others propose a threshold of .90 (e.g., Teo et al., 2008). As shown in Table 8, the correlational values of the Turkish MSSS fall within the range of .53 to .88, which, therefore, indicate discriminant validity according to Teo et al. (2008).

**Table 8 Discriminant Validity of the Turkish MSSS**

	CS	CC	CD	CE	OS	AVE (%)
CS	0.70					.43
CC	0.72	0.67				.45
CD	0.77	0.88	0.68			.46
CE	0.63	0.69	0.71	0.65		.50
OS	0.63	0.70	0.85	0.53	0.80	.62

*Note.* Bold-type numerical data represents the squared value of AVE. The correlation between the dimensions is represented off diagonally.

### Reliability

Lastly, the reliability coefficients of the translated MSSS were calculated. To do that firstly, Cronbach's alpha measurement was taken into consideration. Overall reliability of the instrument was  $\alpha = .91$ , and internal consistency values ranged from .67 to .84, which indicate acceptable levels of reliability according to Konting et al. (2009), who suggest that  $\alpha < .60$  is unreliable. The subscale of CC had  $\alpha = .83$  with 6 items; the subscale of CS had  $\alpha = .67$  with 3 items; the subscale of CD had  $\alpha = .75$  with 4 items; the subscale of CE had  $\alpha = .67$  with 3 items; the subscale of OS had  $\alpha = .80$  with 3 items.

Guttman split-half coefficients were also measured for the internal consistency of the translated instrument. Overall split-half coefficient was .87, and the coefficient values of the constructs ranged from .59 to .75, mostly exhibiting acceptable levels of reliability again, according to Konting et al. (2009). The only construct under the threshold of .60 was CS, but it should be noted that since it had 3 items, the halves split while running the measurement may not have been balanced due to low

number of items. The other constructs' split-half coefficients were as follows: CC had .74; CD had .75; CE had .62; OS had .68.

A summary of all the validation statistics for the Turkish translated version of the MOOC Satisfaction Survey can be found in Table 9. The scale is available as Appendix at the end of the article.

**Table 9 Summary of Turkish MOOC Satisfaction Survey's Validation**

Construct	Item	Validity and reliability values				
		CVI	CR	AVE (%)	$\alpha$	Split-half reliability
Course Content	CC1	1.00	.83	.45	.84	.74
	CC2	1.00				
	CC3	1.00				
	CC4	.80				
	CC5	.80				
	CC6	1.00				
Course Delivery	CD1	1.00	.77	.46	.75	.75
	CD2	1.00				
	CD3	1.00				
	CD4	1.00				
Course Evaluation	CE1	1.00	.68	.43	.67	.62
	CE2	.80				
	CE3	.80				
Course Support	CS1	1.00	.75	.50	.67	.59
	CS2	1.00				
	CS3	1.00				
Overall Satisfaction	OS1	1.00	.83	.62	.80	.68
	OS2	1.00				
	OS3	.80				
Entire instrument's scores		.95*	–	–	.91	.87

\*Overall CVI increased since the item CE4 was discarded.

## DISCUSSION AND CONCLUSION

The aim of the present adaptation study was to translate the “MOOC Student Satisfaction Survey”, developed originally in English by Kumar and Kumar (2020), into the Turkish language. The scale's validation was done in two aspects, the first of which was ensuring content validity during and after the translation. With a panel of experts, the adapted scale went through rigorous rounds of revision. In the final version of the instrument, individual CVI values of each scale item ranged from .80 to 1.00 with an overall CVI value of .95, indicating high content validity according to Lynn (1986). Secondly, construct validity was to be ensured, so confirmatory factor analysis was conducted with the purpose of measuring the model fit indices of the adapted scale. The item CE4 was discarded due to low factor loading in the structural model. With the structural model for CFA, the following fit indices were measured:  $\chi^2 = 234.86$  ( $p < .001$ ),  $\chi^2/df = 1.74$ , RMSEA = .070, SRMR = .053, GFI = .86, AGFI = .81, CFI = .92, NFI = .84, and NNFI = .90. Therefore, the translated version of the scale acceptable fit indices (Byrne, 2010). On the other hand, AVEs of the subscales were above the threshold of .40 with CR values over .60, which according to Fornell and Larcker (1981), are acceptable scores for validity. In this regard, the Turkish MSSS was revealed to have both content and construct validity.

Cronbach's alpha coefficients and split-half reliability scores were used to ensure the internal consistency of the translated instrument. Cronbach's alpha for the total scale was .91, while the coefficients for the subscales ranged from .67 to .84, showing satisfactory levels of reliability. However, as compared to the original instrument developed by Kumar and Kumar (2020), the internal consistency values determined with Cronbach's alpha coefficients were found to be lower in the Turkish version, which could be attributed to the small sample size in this study as well as the fact that the translated items in the Turkish version were not run through an EFA for the sake of preserving the original scale constructs, leading to lower reliability scores in the Turkish context. In terms of split-half reliability, the values of which are absent for the original scale, the overall instrument was highly

reliable, with a value of .87, and the subscales likewise demonstrated, though barely, adequate levels of split-half reliability (Groth-Marnat & Wright, 2016).

In conclusion, after a thorough procedure of translation, adaptation, and validation of the original scale to the Turkish language, which followed the structure of similar scale adaptation studies (İskifoğlu & Ağazade, 2013; Mendi & Mendi, 2015; Tuğsal, 2020) in line with the steps of scale development and standardisation laid down by Kyriazos and Stalikas (2018), the translated version of the MOOC Student Satisfaction Survey was proven to be a valid and reliable instrument for measuring student satisfaction in a massive open online learning environment in the Turkish setting. The instrument was not translated verbatim for every item since some points needed to be adjusted to the study's context, where either a comprehensive explanation in parentheses was given to describe a term or a phase, or a complete rephrasing was done to offer the exact meaning in Turkish. The general structure of the instrument was kept, with only one item being removed due to poor factor loading under the construct to which it originally belonged in the English instrument. Although running an exploratory factor analysis prior to the CFA could have saved the item CE4 by fitting it under a more appropriate factor, the translated version would not be faithful to the original in its overall structure and subscales, so the researchers decided to remove the item instead, which is a practice that can be followed in scale development and/or adaptation studies according to DeVellis (2017) if an item exhibits unacceptable fit during the analyses.

The assessment of student satisfaction in the context MOOCs carries significant educational implications. Firstly, it provides a valuable avenue for course improvement by utilizing participant feedback to identify strengths and weaknesses, enabling to refine content, assessments, and delivery methods, thereby enhancing the overall learning experience to align with the preferences and needs of learners (Kara et al., 2021; Lu et al., 2019; Moore, 2005). Secondly, student satisfaction plays a crucial role in driving engagement and retention; a positive MOOC experience fosters motivation and commitment, increasing the likelihood of course completion. By pinpointing elements that resonate positively, such as interactive features and effective communication, educators can create an environment that encourages active participation and long-lasting impact (de Barba et al., 2016; Ustaoglu & Kukul, 2022). Analysing satisfaction data also enables evidence-based decision-making, allowing instructors to identify effective pedagogical approaches and implement targeted strategies for enhancing learning. Lastly, insights into diverse preferences guide efforts toward inclusivity, facilitating course adaptations catering to a wide range of learners (Kara et al., 2021; Joo et al., 2018).

With the growing use of MOOCs over the globe, especially sparking interest in the domain of education after the COVID-19 period, the original MSSS by Kumar and Kumar (2020) stands a promising instrument to assess the levels of satisfaction among a variety of MOOC learners that are from different contexts other than those in which the medium of instruction is the English language. Therefore, the current study holds importance as the first sample of disseminating the scale to other languages, and the adaptation of the scale to other languages are strongly recommended in this regard. Lastly, it is hoped that gradually more studies will be undertaken in Türkiye as well, and this instrument will be a beneficiary tool in providing insights into the satisfaction levels of MOOC learners, thereby showing the effectiveness of a MOOC from various aspects to be considered by course designers and instructors.

## **LIMITATIONS AND RECOMMENDATIONS**

The present scale translation study is subject to several limitations that have exerted influence on the overall findings. Firstly, it should be noted that the study's scope was delimited by a constrained number of respondents. Consequently, the authors are cautious in asserting full validation and reliability of the instrument. Further investigation is thus warranted, involving the administration of the Turkish scale to a broader cohort of MOOC learners within analogous contexts, which would be crucial to corroborate the validation scores derived from the current study.

Secondly, although the adaptation of the scale to the Turkish context exhibited robustness, there remains a salient need to delve into the cultural factors that might exert an impact on levels of satisfaction. In this regard, it is recommended that a cross-cultural validation study be undertaken for the adapted scale. Such an endeavour would entail an assessment of the scale's performance across diverse cultural settings, contributing valuable insights into its cross-cultural validity.

A third limitation pertains to the methodology employed for establishing construct validity. Specifically, the current study opted solely for CFA, bypassing the more preliminary step of EFA. This choice was informed by considerations such as the modest sample size and the desire to maintain fidelity to the original scale structure. However, it is prudent to acknowledge that the nuances introduced during the translation process due to contextual disparities may warrant the integration of EFA. This could effectively facilitate a more comprehensive exploration of the latent factor structure, yielding a heightened comprehension of the alignment between the dimensions of the scale and the Turkish context as well as improving the internal consistency scores obtained here.

Lastly, given the dynamic and open nature of MOOC learning environments, characterized by learners' sustained engagement with activities and lectures over an extended duration of time, it is proposed that longitudinal investigations be conducted, the purpose of which would be to discern potential shifts in learner satisfaction over time. Such a longitudinal lens holds the promise of furnishing additional insights into the evolving patterns of student contentment.

In summary, the current study's findings, while informative, are circumscribed by certain constraints. A more expansive investigation involving a wider respondent base, cross-cultural validation, and a nuanced methodological approach could substantially augment the comprehensiveness and depth of insights derived from the present research.

## DECLARATIONS

**Conflicts of Interest:** There are no potential conflicts of interest to disclose.

**Funding Details:** This scale adaptation study is a part of the first author's ongoing master's degree thesis study, supervised by the second author. The thesis study is funded by the Scientific and Technological Council of Türkiye (TUBITAK) with the identification number of 1649B022214071 within the scope of 2210-A Domestic Graduate Scholarship Program.

**Credit Author Statement:** Author 1: Conceptualization, Data Collection and Analysis, Funding Acquisition, Investigation, Writing – Literature Review and Original Draft Preparation.

Author 2: Methodology, Project Administration, Supervision, Validation, Writing – Review and Editing.

**Ethical Statement:** The current research study complies with research publishing ethics as the Ethical Board Approval was granted by Çanakkale Onsekiz Mart University on March 9th, 2023 (Issued: E-84026528-050.01.04-2300062215, No: 03/39).

## REFERENCES

- Aldowah, H., Al-Samarraie, H., Alzahrani, A. I., & Alalwan, N. (2019). Factors affecting student dropout in MOOCs: A cause and effect decision-making model. *Journal of Computing in Higher Education*, 32, 429-454. <https://doi.org/10.1007/s12528-019-09241-y>
- Alraimi, K. M., Zo, H., & Ciganek, A. P. (2015). Understanding the MOOCs continuance: The role of openness and reputation. *Computers & Education*, 80, 28-38. <https://doi.org/10.1016/j.compedu.2014.08.006>

- Astin, A. W. (1984). Student satisfaction and participation in the college classroom. *Research in Higher Education*, 21(2), 153–164. <https://doi.org/10.1007/BF00988238>
- Astin, A. W. (1993). *What matters in college? Four critical years revisited*. Jossey-Bass.
- Bhattacharjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, 25(3), 351. <https://doi.org/10.2307/3250921>
- Baumgartner, H., & Homburg, C. (1996). Applications of structural equation modeling in marketing and consumer research: A review. *International Journal of Research in Marketing* 13(2), 139-161. [https://doi.org/10.1016/0167-8116\(95\)00038-0](https://doi.org/10.1016/0167-8116(95)00038-0)
- Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Taylor and Francis Group Publication.
- Chiu, C-M., Hsu, M-H., Sun, S-Y., Lin T-C., & Sun, P-C. (2005). Usability, quality, value and e-learning continuance decisions. *Computers & Education*, 45(4), 399-416. <https://doi.org/10.1016/j.compedu.2004.06.001>
- Christensen, G., Steinmetz, A., Alcorn, B., Bennett, A., Woods, D., & Emanuel, E. J. (2014). The MOOC phenomenon: Who takes massive open online courses and why? *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2350964>
- Comrey, A. L., & Lee, H. B. (2013). *A first course in factor analysis*. Psychology Press.
- Creswell, J. W. (2002). *Educational research: planning, conducting, and evaluating quantitative*. Prentice Hall.
- Demirci, C., & Akcaalan, M. (2022). The adaptation of language learning curiosity scale into Turkish language. *International Journal of Educational Research Review*, 7(1), 48-55. <https://doi.org/10.24331/ijere.1019300>
- De Barba, P. G., Kennedy, G. E., & Ainley, M. D. (2016). The role of students' motivation and participation in predicting performance in a MOOC. *Journal of Computer Assisted Learning*, 32, 281-231. <https://doi.org/10.1111/jcal.12130>
- DeVellis, R. F. (2017). *Scale development theory and applications* (4th ed.). SAGE Publications.
- Ding, L., Velicer, W. F., & Harlow, L. L. (1995). Effects of estimation methods, number of indicators per factor, and improper solutions on structural equation modeling fit indices. *Structural Equation Modeling*, 2(2), 119-143. <https://doi.org/10.1080/10705519509540000>
- Doll, W. J., Xia, W., Torkzadeh, G. (1994). A confirmatory factor analysis of the end-user computing satisfaction instrument. *MIS Quarterly*, 18(4), 357–369. <https://doi.org/10.1111/j.1540-5414.2003.02428.x>
- Elia, G., Solazzo, G., Lorenzo, G., & Passiante, G. (2019). Assessing learners' satisfaction in collaborative online courses through a big data approach. *Computers in Human Behavior*, 92, 589-599. <https://doi.org/10.1016/j.chb.2018.04.033>
- Felder, R. M., & Silverman, L. K. (1988). Learning and teaching styles in engineering education. *Engineering Education*, 78(7), 674–681.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18, 39–50. <https://doi.org/10.2307/3151312>

- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59–109. <https://doi.org/10.3102/00346543074001059>
- Gameel, B. G. (2017). Learner satisfaction with massive open online courses. *American Journal of Distance Education*, 31(2), 98-111. <https://doi.org/10.1080/08923647.2017.1300462>
- Gorsuch, R. L. (1983). *Factor analysis* (2nd ed.). Lawrence Erlbaum Associates.
- Göktaş, M. (2019). *Evaluating massive open online course participants in terms of environmental factors* [Unpublished master's thesis]. Firat University, Türkiye.
- Groth-Marnat, G., & Wright, A. J. (2016). *Handbook of psychological assessment* (6th ed.). Wiley.
- Gunawardena, C. N., & McIsaac, M. N. (2008). Distance education. In D. H. Jonassen (Ed.), *Handbook of research on educational communications and technology* (pp. 355-395). Lawrence Erlbaum Associates.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective*. Pearson Education India.
- Hew, K. F., Hu, X., Qiao, C., & Tang, Y. (2020). What predicts student satisfaction with MOOCs: A gradient boosting trees supervised machine learning and sentiment analysis approach. *Computers & Education*, 145, Article 103724. <https://doi.org/10.1016/j.compedu.2019.103724>
- Hunter, M. C. (1976). *Improved instruction*. Theory Into Practice (TIP) Publications.
- İskifoğlu, G., & Ağazade, A. S. (2013). Translation and validation of a Turkish version of the California critical thinking disposition inventory. *Social Behavior and Personality: An International Journal*, 41(2), 187–196. <https://doi.org/10.2224/sbp.2013.41.2.187>
- İşgör Şimşek, E., & Turan, B. O. (2017). Evaluation of massive open online courses (MOOC) usability in mobile platforms. *Mersin University Journal of the Faculty of Education*, 13(2), 595-608. <https://doi.org/10.17860/mersinefd.336745>
- Joo, Y. J., So, H. J., & Kim, N. H. (2018). Examination of relationships among students' self-determination, technology acceptance, satisfaction, and continuance intention to use K-MOOCs. *Computers & Education*, 122, 260-272. <https://doi.org/10.1016/j.compedu.2018.01.003>
- Kara, M., Kukul, V., & Çakır, R. (2021). Self-regulation in three types of online interaction: How does it predict online pre-service teachers' perceived learning and satisfaction? *The Asia-Pacific Education Researcher*, 30(1), 1–10. <https://doi.org/10.1007/s40299-020-00509-x>
- Kirkpatrick, J., & Kirkpatrick, W. K. (2021). *An introduction to the New World Kirkpatrick Model*. Kirkpatrick Partners. <https://www.kirkpatrickpartners.com/wp-content/uploads/2021/11/Introduction-to-the-Kirkpatrick-New-World-Model.pdf>
- Klein, S., Astrachan, J., & Smyrniotis, K. (2005). The F-PEC scale of family influence: Construction, validation and further implication for theory. *Entrepreneurship Theory and Practice*, 29(3), 321-39. <https://doi.org/10.1111/j.1540-6520.2005.00086.x>
- Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). Guilford Press.

- Konting, M. M., Kamaruddin, N., & Man, N. A. (2009). Quality assurance in higher education institutions: Exit survey among Universiti Putra Malaysia graduating students. *International Education Studies*, 2(1), 25–31.
- Kumar, P., & Kumar. N. (2020). A study of learner's satisfaction from MOOCs through a mediation model. *Procedia Computer Science*, 173, 354-363. <https://doi.org/10.1016/j.procs.2020.06.041>
- Kyriazos, T. A., & Stalikas, A. (2018). Applied psychometrics: The steps of scale development and standardization process. *Psychology*, 9, 2531-2560. <https://doi.org/10.4236/psych.2018.911145>
- Lu, Y., Wang, B., & Lu, Y. (2019). Understanding key drivers of MOOC satisfaction and continuance intention to use. *Journal of Electronic Commerce Research*, 20(2), 105-117.
- Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, 35, 382–385.
- Ma, L., & Lee, C. S. (2018). Understanding the barriers to the use of MOOCs in a developing country: An innovation resistance perspective. *Journal of Educational Computing Research*, 57(3), 571–590. <https://doi.org/10.1177/0735633118757732>
- MacCallum, R. C., Browne, M. W., & Sugawara, H., M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, 1(2), 130-49. <https://doi.org/10.1037/1082-989X.1.2.130>
- Mehlenbacher, B., & Mehlenbacher, A. R. (2020). Distance education. In A. Tatnall (Ed.), *Encyclopaedia of education and information technologies* (pp. 612-622). Springer. <https://doi.org/10.1007/978-3-030-10576-1>
- Mendi, B., & Mendi, O. (2015). Evaluation of validity and reliability of the Turkish version of the e-lifestyle instrument. *Journal of Yasar University*, 10(40), 6624-6632. <https://doi.org/10.19168/jyu.37431>
- Miller, S. L. (2015). Teaching an online pedagogy MOOC. *MERLOT Journal of Online Learning and Teaching*, 11(1), 104-119.
- Moore, J. C. (2005). The Sloan Consortium quality framework and the five pillars. *The Sloan Consortium*. <http://www.mit.jyu.fi/OPE/kurssit/TIES462/Materiaalit/Sloan.pdf>
- Orçan, F. (2018). Exploratory and confirmatory factor analysis: Which one to use first? *Journal of Measurement and Evaluation in Education and Psychology*, 9(4), 414-421. <https://doi.org/10.23031/epod.394323>
- Pratton, J., & Hales, L. W. (1986). The effects of active participation on student learning. *Journal of Educational Research*, 79(4), 210-215. <https://doi.org/10.1080/00220671.1986.10885679>
- Sallam, M. H., Martin-Monje, E., & Li, Y. (2022). Research trends in language MOOC studies: A systematic review of the published literature (2012-2018). *Computer Assisted Language Learning*, 35(3), 764-791. <https://doi.org/10.1080/09588221.2020.1744668>
- Shrader, S., Wu, M., Owens, D., & Ana, K. S. (2016). Massive open online courses (MOOCs): Participant activity, demographics, and satisfaction. *Online Learning Journal*, 20(2), 199-216. <https://doi.org/10.24059/olj.v20i2.596>

- So, H-J., & Brush, T. A. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers & Education*, 51(1), 318-336. <https://doi.org/10.1016/j.compedu.2007.05.009>
- Şahin, E. B., & Durdu, P. O. (2021). Usability evaluation of massive open online courses (MOOC) websites with the cognitive walkthrough. *The Journal of Information Technologies*, 14(4), 377-389. <https://doi.org/10.17671/gazibtd.871801>
- Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics* (3rd ed.). Harper Collins.
- Tay, L., & Jebb, A. (2017). Scale development. In S. Rogelberg (ed.), *The SAGE encyclopedia of industrial and organizational psychology* (2nd ed.). SAGE Publications.
- Teo, T. S. H., Srivastava, S. C., & Jiang, L. (2008). Trust and electronic government success: An empirical study. *Journal of Management Information Systems*, 25(3), 99-132. <https://doi.org/10.2753/MIS0742-1222250303>
- Thomas, E. H., & Galambos, N. (2004). What satisfies students? Mining student-opinion data with regression and decision tree analysis. *Research in Higher Education*, 45(3), 251-269. <https://doi.org/10.1023/b:rihe.0000019589.79439.6e>
- Tuğsal, T. (2020). Translation, adaptation, validity, and reliability of the sense-making scale: A cross-cultural evidence from India, Malaysia, Romania, and Turkey. *Electronic Journal of Social Sciences*, 19(76), 1810-1848. <https://doi.org/10.17755/esosder.710803>
- Ustaoğlu, M. A., & Kukul, V. (2022). Gaining an insight into learner satisfaction in MOOCs: An investigation through blog mining. *Open Praxis*, 14(3), 230-241. <https://doi.org/10.55982/openpraxis.14.3.490>
- Wild, D., Grove, A., Martin, M., Eremenco, S., McElroy, S., Verjee-Lorenz, A., Erikson, P., & ISPOR Task Force for Translation and Cultural Adaptation (2005). Principles of good practice for the translation and cultural adaptation process for Patient-Reported Outcomes (PRO) Measures: Report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value in Health*, 8(2), 94-104. <https://doi.org/10.1111/j.1524-4733.2005.04054.x>
- Wu, J.-H., Tennyson, R. D., & Hsia, T.L. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education*, 55(1), 155-164. <https://doi.org/10.1016/j.compedu.2009.12.012>
- Zheng, S., Rosson, M. B., Shih, P. C., & Carroll, J. M. (2015). Understanding student motivation, behaviors and perceptions in MOOCs. In D. Cosley, A. Forte, L. Ciolfi, & D. McDonald (Eds.), *Proceedings of the 18th ACM conference on computer supported cooperative work & social computing* (pp. 1882-1895). Association for Computing Machinery. <https://doi.org/10.1145/2675133.2675217>



## Appendix

### MOOC Student Satisfaction Survey's Turkish Adaptation

	Hiç Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen Katılıyorum
<b>Ders İçeriği</b>					
Dersin hedeflerini anladım.	1	2	3	4	5
Üniteleri yeterli buldum.	1	2	3	4	5
Üniteleri, takibi kolay ve anlaşılır buldum.	1	2	3	4	5
Kullanılan multimedya materyallerini (videoları) ilgi çekici buldum.	1	2	3	4	5
Kullanılan multimedya materyallerini ders içeriğine uygun buldum.	1	2	3	4	5
İçeriği açıklamak için örnekler, görseller ve gerçek olay durumları etkili bir şekilde kullanılmıştı.	1	2	3	4	5
<b>Dersin İşlenişi</b>					
Programın hızından memnundum.	1	2	3	4	5
Dersin işlenişinde bir sorun yaşamadım.	1	2	3	4	5
Öğrenme hedeflerinin her birini, öğrendiklerimle ilişkilendirebildim.	1	2	3	4	5
Ders, beklentilerimi karşıladı.	1	2	3	4	5
<b>Dersin Değerlendirilmesi</b>					
Değerlendirme kriterlerinin ve yönteminin öğrenmemi ölçmede yeterli olduğuna inanıyorum.	1	2	3	4	5
Yapmam gerekenler için belirlenen son tarihlerin makul olduğunu düşünüyorum.	1	2	3	4	5
Dersi tamamlamam için gerekenler, tam dikkat gerektiriyordu ve oldukça zorlayıcıydı.	1	2	3	4	5
<b>Ders Yardımı</b>					
Dersin işlendiği internet sitesinde kolayca gezinebildim.	1	2	3	4	5
Kitlesel açık çevrim içi ders destek hizmeti hızlıydı.	1	2	3	4	5
Forumlarda (yorumlar, eğiticiyle iletişim vb.) etkileşimde bulunmak, anlamadığım şeyleri netleştirmeme yardımcı oldu.	1	2	3	4	5
<b>Genel Memnuniyet</b>					
Genel olarak bu dersin kalitesinden memnunum.	1	2	3	4	5
Genel olarak bilgi / becerilerimi geliştirdim.	1	2	3	4	5
Gelecekte başka bir kitlesel açık çevrim içi derse kaydolmayı isterim.	1	2	3	4	5

## Mathematical Reasoning Skills as a Predictive of Number Sense

**Ahsen Seda Bulut<sup>i</sup>**

Kirsehir Ahi Evran University

**Okan Kuzu<sup>ii</sup>**

Kirsehir Ahi Evran University

### Abstract

This study aims to examine the relationship between number sense skills and mathematical reasoning skills of preservice mathematics teachers. The research was conducted with 124 preservice mathematics teachers in the 2018-2019 academic year. Correlational model, one of the quantitative research methods, is used in the research. Data was analysed by the simple linear regression analysis, and the multiple regression analysis. As a result of the analysis, it was determined that the mathematical reasoning skills and the number sense skills of the preservice mathematics teachers were at "High" level. A statistically significant relationship was observed between preservice mathematics teachers' mathematical reasoning skills and their number sense skills, both in general and in some of its factors. Besides, the main findings of this study was determined that mathematical reasoning skill was a significant predictor of the number sense skill. It was seen that the strongest predictor of number sense was "solving non-routine problems" and the weakest predictor was "recognizing and using mathematical patterns". Thus, it is thought that this study is particularly important in that it emphasizes the strong relationship between number sense and non-routine problems and illustrates that this aspect has a great importance in terms of number sense skills of preservice mathematics teachers.

**Keywords:** Number Sense, Mathematical Reasoning Skills, Preservice Mathematics Teachers

**DOI:** 10.29329/ijpe.2023.603.11

**Submitted:** 07/10/2022

**Accepted:** 20/08/2023

**Published:** 16/10/2023

---

<sup>i</sup> **Ahsen Seda Bulut**, Assist. Prof. Dr., Accounting and Taxation, Kirsehir Ahi Evran University

**Correspondence:** as\_kilic@windowslive.com

<sup>ii</sup> **Okan Kuzu**, Assist. Prof. Dr., Department of Mathematics and Science Education, Kirsehir Ahi Evran University

## INTRODUCTION

Numbers is an important sub-learning area that forms the basis of mathematics education. Solving problems involving numbers requires processes such as making sense of numbers, recognizing the relationships between numbers and recognizing the connections between numbers and multiplicities. This concept, which is expressed as number sense, has been defined as a good intuition about numbers and the relationships between numbers (Howden, 1989). Number sense is used when presenting practical, flexible and effective strategies (including mental and estimation) in solving numerical problems (Şengül & Gülbağcı-Dede, 2013). There are many definitions and classifications regarding the concept of number sense and its components in the literature. The fact that researchers make different classifications of the components of number sense affects the definition of the concept of number sense, and so different definitions emerge. Reys and Yang (1998) define number sense as a person's ability to understand numbers and operations in a general sense, develop useful strategies for solving complex problems, and use flexible methods to make mathematical judgments. Gersten and Chard (1999) stated that in the definition of number sense, similar to Reys and Yang (1998), the meanings of numbers should be understood, and in addition, the skills of doing mental mathematics and making comparisons are also included in number sense. Hope (1989) defines number sense as the feeling of being able to make logical predictions about the use of numbers, to notice number patterns, to notice arithmetic errors, and to choose the most effective way of calculation. The National Council of Teachers of Mathematics ([NCTM], 1989), which sets principles and standards for mathematics education, states that students with a developed number sense understand what numbers mean and realize the effects of transactions on numbers. The individual who knows the meanings of the transactions can develop flexible methods by going beyond the regular methods. Considering the fact that regular operations cannot be performed continuously in daily life, the individual must be able to produce unique and flexible solutions in order to solve the problems he/she encounters (Şengül & Gülbağcı-Dede, 2013). Students who use number sense adequately do not have problems by making connections between numbers and numerical expressions in mathematics and quantities in the real world (Case, 1998). Therefore, number sense, which has become one of the basic skills to be gained in mathematics education, is considered as a characteristic of students who are good at mathematics and a desired outcome of mathematics teaching (Howell & Kemp, 2005). Hence, there are some studies showing that number sense positively affects mathematics achievement (see e.g., Jordan, Glutting, & Ramineni, 2010; Mohamed & Johnny, 2010). Studies on the development of number sense in students indicate that number sense can be developed depending on many different parameters. One of them is undoubtedly the provision of enriched learning experiences to students. (Tsao, 2004; Yang, 2003). This raises the question of the level of number sense in teachers and teacher candidates. It is clear that the level of teachers' number sense will affect the number sense education they will teach students (National Research Council [NRC], 2001). Some studies examining the number sense levels of teachers and pre-service teachers revealed that the number sense of the participants was not at the desired level (Almeida, Bruno, & Perdomo-Díaz, 2016; Yang, 2007; Yang, Reys, & Reys, 2009). This finding reveals the need to identify the components that affect number sense. McIntosh, Reys, and Reys (1992) define number sense as the ability to develop useful strategies in numbers and transactions involving daily life situations and to make mathematical reasoning in flexible ways. Considering that mathematical reasoning is a necessary skill to understand mathematical concepts, generate mathematical ideas, use operations flexibly and reconstruct previously learned mathematical knowledge (Brodie, 2010), it is clear that mathematical reasoning and number sense include common skills. Associating mathematics with its own operation priority with the help of reasoning, questioning its structure and knowing why and what it does provides the formation of mathematics that is both permanent and open to development (Umay & Kaf, 2005). Individuals with mathematical thinking and reasoning skills can develop different solution strategies, make predictions, and prove or generalize their results (Baki, 2008). From the point of view of mathematicians, reasoning is one of the basic tools for the development of mathematical understanding and the construction of new mathematical knowledge (Ball and Bass, 2003).

In the standards produced by NCTM (2000), the importance of realizing mathematical thinking and having the necessary mathematical knowledge for daily life mathematics is strongly

emphasized. In the Mathematics Curriculum in Turkey, some skills related to every subject of mathematics have been determined. What is expected from the student is to make predictions about the measurement results by using the number sense while facing a problem (Ministry of National Education, 2018). Creating mathematical predictions in accordance with logic is among the characteristics of students with reasoning skills (NCTM, 1989). These reports and the skills to be gained in the curriculum show that individuals need to have a strong number sense and mathematical reasoning to be able to solve daily life problems and produce rational solutions that will reflect mathematics to daily life. The existence of these skills that support each other and the limited number of studies examining the relationship between these skills have been the subject of the problem of this research. Although there are many studies in the literature on mathematical reasoning and mathematical achievement or the number sense and its components, a limited number of studies that deals with these concepts together has been found (see e.g., Almeida, Bruno, and Perdomo-Díaz, 2016; Chrysostomou, Pitta-Pantazi, Tsingi, Cleanthous and Christou, 2013). For this reason, the research problem was determined as examining the relationship between number sense skills and mathematical reasoning skills of PMTs. The sub-problems created to investigate this problem are as follows:

1. How is the relationship between number sense skills and mathematical reasoning skills of PMTs?
2. Do PMTs' mathematical reasoning skills predict their number sense skills?
3. Do PMTs' grade levels predict their mathematical reasoning and number sense skills?

## METHOD

### Research Design

In this study, in which the quantitative research approach was adopted, the correlational model was used. The correlational model involves collecting data in order to determine the degree to which a relationship exists between two or more variables (Fraenkel & Wallen, 2006). In this context, in this study, the relationship between mathematical reasoning and number sense skills of primary school preservice mathematics teachers (PMTs) and the relationship between their grade level and mathematical reasoning and number sense skills were examined using a correlational model.

### Sample

The sample of the study was composed of 124 PMTs studying in a state university in the Central Anatolia Region of Turkey in the spring term of the 2018-2019 academic year. While the convenience sampling method was used in the selection of the relevant universities, the purposive sampling method (Cohen and Manion, 1994) was used in the selection of the PMTs studying at this university. Percentage and frequency distribution of the sample are presented in Table 1 in detail.

**Table 1. Percentage and frequency distribution of the sample**

Variable		n	%
Grade	1	44	35,5
	2	28	22,6
	3	34	27,4
	4	18	14,5

### Data Collection

In this study, two data collection tools were used. First, the two-stage "Mathematical Reasoning Assessment Scale" (MRAS) consisting of 20 multiple-choice and six open-ended items developed by Çoban (2010) was used to measure preservice teachers' mathematical reasoning skills.

The Kuder Richardson-20 (KR-20) reliability coefficient of the multiple-choice items of the scale was calculated as .74. The reliability of the part consisting of open-ended items was calculated by the correlation between the two raters and was found to be .85. A calculated reliability coefficient of .70 and higher is generally considered sufficient for the reliability of test scores (Yockey, 2016). In this context, it was seen that a measurement tool with high reliability was obtained. The measurement tool developed by Çoban (2010) consists of seven factors: "MRF1: Estimating", "MRF2: Recognizing different representations of the same data", "MRF3: Recognizing and using mathematical patterns", "MRF4: Deciding the correctness of the process and result", "MRF5: Ability to make mathematical generalizations", "MRF6: Developing logical arguments for solutions" and "MRF7: Solving non-routine problems". The relevance, content validity and scientific accuracy of this scale were obtained by taking the opinions of four experts in the field of mathematics education and two experts in the field of educational sciences. Each multiple-choice item of the scale was scored as "3.8: true, 0=false", corresponding to a total of 76 scores. In the evaluation of open-ended items, a scoring key between 0 and 4 scores was used, corresponding to a total of 24 scores. In this context, the MRAS was evaluated over a total of 100. (For detailed information, see Çoban, 2010). In this study, in order for the total scores of the scales and factors to be similar calculation was made out of 100 scores (total score from factors)  $\times 100 /$  (the highest total score that can be obtained from factors). For example, for the MRF6, which consists of six multiple-choice and two open-ended items, four correct ( $4 \times 3.8$ ) in multiple-choice items; In the open-ended item, a sample calculation of the total score of a PMT who got one full correct ( $1 \times 4$ ) and two points partially correct ( $1 \times 2$ ) is presented in Table 2.

**Table 2. Total score calculation for the mathematical reasoning assessment scale**

Factor	Total score received	Total score possible	Total score out of 100
MRF6	$4 \times 3.8 + 1 \times 2 + 1 \times 4 = 21.2$	$6 \times 3.8 + 2 \times 4 = 30.8$	$21.2 \times 100 / 30.8 = 68.1$

Another measurement tool used in this study was measured with the "Number Sense Test (NST)" prepared by Yang (2007). This measurement tool consists four factors: "NSF1: Understanding the meaning of numbers, operations and their relationships"; "NSF2: Recognizing relative number size", "NSF3: Developing and using benchmarks appropriately"; "NSF4: Judging the reasonableness of a computational result by using the strategies of estimation" (For detailed information, see Yang, 2007). In this study, if the process and response to the use of number sense in the evaluation of each item of the test is correct, the researchers defined "2 (Correct)"; "1 (Partially correct)" if the process for using number sense is correct and the response is incorrect; in other cases, it is coded as "0 (false)". Afterwards, the number sense test was also evaluated over 100 scores in terms of being similar to the mathematical reasoning assessment scale over the total score. For example, for the NSF3, which consists of three items, a sample calculation of the total score of a fully correct ( $1 \times 2$ ), a partially correct ( $1 \times 1$ ) and a wrong ( $1 \times 0$ ) is presented in Table 3.

**Table 3. Calculation of the total score for the number sense test**

Factor	Total score received	Total score possible	Total score out of 100
NSF3	$1 \times 2 + 1 \times 1 + 1 \times 0 = 3$	$3 \times 2 = 6$	$3 \times 100 / 6 = 50$

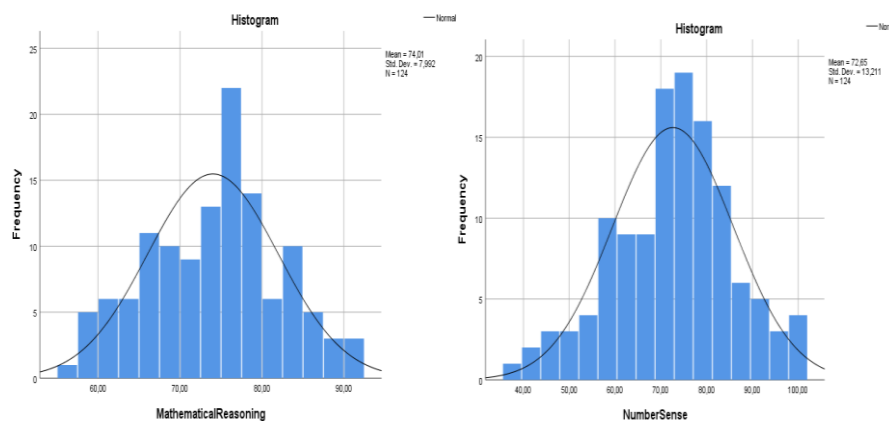
During the evaluation process of the responses given to the test, scores were made independently by two academicians who are experts in the field of mathematics education, and the agreement between the two raters was calculated with the "weighted kappa", a type of kappa statistics. It is recommended that the values obtained should be at least .60. On the other hand, values between .60-.80 indicate good agreement between raters; Values above .80 correspond to a very good fit among raters (Wood, 2007). In this context, when Table 4 is examined, it is seen that the agreement between raters is very good (Table 4).

**Table 4. Concordance values between raters**

NST	1	2	3	4	5	6	7	8	9	10	11	12
$\kappa$	.88	.89	.86	.91	.90	.91	.96	.95	.92	.90	.93	.89

## Data Analysis

During the data analysis process, firstly, the data obtained from 141 PMTs were transferred to the SPSS 23 program and the z score of each item was calculated for data cleaning. Then, normality tests were performed on the total score of the MRAS and NST. Histogram, boxplot and normal probability graphs were examined and the resulting extreme values were deleted. As a result, it was seen that boxplot and Q-Q graphs showed normal distribution over 124 data and the histogram curve met the assumption of normality (Figure 1).



**Figure 1. Histogram of mathematical reasoning and number sense total scores**

On the other hand, when the descriptive statistics of the distribution are examined, the values such as arithmetic mean, mode and median are close to each other; it was observed that the skewness and kurtosis coefficients did not differ significantly between the values of -3 and +3 (Kim, 2013). In addition, although the Kolmogorov-Smirnov test results were found to be  $p > .05$  for the total score of the MRAS, this value was found to be  $p < .05$  for factors of the MRAS and also both the number sense test and its factors. Therefore, it was determined that it did not meet the normality condition for Kolmogorov-Smirnov. However, when Kolmogorov-Smirnov results were evaluated together with the descriptive and graphical results, the normality of the distribution was seen in this study (Table 5).

**Table 5. Descriptive statistics results on the distribution of data**

	Mode	Median	$\bar{x}$	SD	Skewness	Kurtosis	Min	Max	Kolmogorov Simirnov
MRAS	75.00	75.00	74.01	7.99	-.08	-.64	56.40	90.20	.20
MRF1	100.00	50.00	70.04	32.38	-.63	-.58	.00	100.00	.00
MRF2	100.00	100.00	85.89	22.60	-.98	-1.06	50.00	100.00	.00
MRF3	60.00	72.89	71.80	16.30	.14	-.64	40.00	100.00	.00
MRF4	75.00	75.00	77.62	20.86	-.63	.16	.00	100.00	.00
MRF5	91.67	83.33	78.63	19.80	-1.26	1.19	8.33	100.00	.00
MRF6	65.58	68.83	70.29	13.31	-.06	-.38	34.42	100.00	.00
MRF7	74.36	74.36	72.29	8.24	-1.34	2.65	48.72	87.18	.00
NST	75.00	75.00	72.65	13.21	-.25	-.01	37.50	100.00	.00
NSF1	100.00	83.33	87.10	15.88	-1.27	1.27	33.33	100.00	.00
NSF2	83.33	83.33	74.33	18.94	-.71	.95	.00	100.00	.00
NSF3	83.33	83.33	71.77	23.10	-.96	.48	.00	100.00	.00
NSF4	50.00	50.00	52.02	22.95	-.28	-.27	.00	100.00	.00

After providing the normality, the mathematical reasoning and number sense skills of the PMTs were examined. In addition, simple linear regression analysis to determine whether the mathematical reasoning skills of the PMTs significantly predicted their number sense skills; multiple regression analysis was performed regarding the extent to which the factors of the scale predicted the number sense skill. In addition, multiple regression analysis was used to determine whether it predicted mathematical reasoning and number sense skills by considering the grade levels of PMTs as a dummy variable.

## FINDINGS

In this section, mathematical reasoning and number sense skills of PMTs are examined and the findings obtained as a result of the analyzes are presented. In this study, considering the limit values specified by Kuzu (2021), the levels are determined according to the total score that can be obtained from both measurement tools. Such that  $0 \leq \text{score} \leq 20$ : Very low,  $20 < \text{score} \leq 40$ : Low,  $40 < \text{score} \leq 60$ : Medium,  $60 < \text{score} \leq 80$ : High,  $80 < \text{score} \leq 100$ : Very high. In this context, when Table 5 is examined, it is seen that the mathematical reasoning and number sense skills of the PMTs are high ( $\bar{X}_{\text{MRAS}} = 74.01$ ;  $\bar{X}_{\text{NST}} = 72.65$ ). On the other hand, when examined in terms of factors, the skill levels of the "MRF2: Recognizing different representations of the same data" factor of the MRAS are very high; other skill levels were determined to be high. In terms of the NST, the skill levels of the factor "NSF1: Understanding the meaning of numbers, operations and their relationships" are very high; The skill levels of the factor "NSF4: Judging the reasonableness of a computational result by using the strategies of estimation" were medium; other skill levels were found to be high (Table 5). On the other hand, in this study, the relationship between PMTs' number sense skills and mathematical reasoning skills was examined with the Pearson correlation test and the findings are presented in Table 6.

When Table 6 is examined, it is seen that there is a statistically significant correlation between the mathematical reasoning skills of the PMTs and their number sense skills both in general and in some of its factors ( $p < .05$ ). The obtained correlation coefficient ( $r$ ) is very weak if  $r < .20$ ; If  $.20 < r < .40$ , weak; If  $.40 < r < .60$ , medium; If  $.60 < r < .80$ , it is high;  $r > .80$  indicates that there is a very high level (Evans, 1996).

**Table 6. The relationship between PMTs' mathematical reasoning skills and number sense skills**

r		Number Sense				
		NST	NSF1	NSF2	NSF3	NSF4
Mathematical Reasoning	MRAS	.242*	.140	.180*	.193*	.280*
	MRF1	.207*	.182*	.189*	.059	.100
	MRF2	.234*	-.077	.160	.100	.212*
	MRF3	.109	.146	.133	.036	-.004
	MRF4	.145	.011	.026	.077	-.025
	MRF5	.239*	-.008	.109	.147	.123
	MRF6	.280*	.098	.223*	.165	.250*

\*:  $p < .05$

Accordingly, it was observed that there was a weak positive correlation between the mathematical reasoning skills of the PMTs and their number sense skills ( $r = .242$ ). When the total of the mathematical reasoning scale is examined in terms of the factors of the number sense test, there is a difference between the mathematical reasoning skills of the PMTs and the skills of "SHF2: Recognizing the magnitudes of relative numbers" ( $r = .180$ ) and "NSF3: Developing and using benchmarks appropriately" ( $r = .193$ ). It was determined that there was a very weak correlation. In addition, it was observed that there was a positive but weak ( $r = .280$ ) significant correlation between the mathematical reasoning skills of the PMTs and the skill of "NSF4: Judging the reasonableness of a computational result by using the strategies of estimation".

On the other hand, when examined in terms of the factors of the mathematical reasoning scale and the number sense test, it has been determined that there is a very weak and significant positive correlation between "MRF1: Estimating" and "NSF1: Understanding the meaning of numbers, operations and their relationships" ( $r = .182$ ); and between MRF1 and "NSF2: Recognizing relative number size" ( $r = .189$ ). There was a weak and positive correlation between the "MRF4: Deciding the correctness of the process and result" and "NSF4: Judging the reasonableness of a computational result by using the strategies of estimation" ( $r = .212$ ). There was a weak and positive correlation between the "MRF4: Deciding the correctness of the process and result" and the "NSF4: Judging the

reasonableness of a computational result by using the strategies of estimation" ( $r=.212$ ). There was a weak positive correlation between the skills of "MRF6: Developing logical arguments for solutions" and "NSF2: recognizing relative number size" ( $r=.223$ ) and "NSF4: Judging the reasonableness of a computational result by using the strategies of estimation" ( $r=.250$ ). When the sum of the NST is analyzed in terms of the factors of the MRAS, a significant relationship the positive and weak level ( $r=.207$ ;  $r=.234$ ;  $r=.239$ ; respectively;  $r=.280$ ) was found between the number sense skills and MRF1, MRF2, MRF5, MRF6 of the mathematical reasoning skills of the PMTs. Simple linear regression analysis was used to determine whether the mathematical reasoning skills of PMTs significantly predicted their number sense skills, and the findings are presented in Table 7.

**Table 7. Simple linear regression analysis results on the prediction of mathematical reasoning skill on number sense skill**

	B	Standart Error	r	r <sup>2</sup>	Standardized $\beta$	t	F	p
Mathematical Reasoning	.741	.134	.448	.20	.448	5.542	30.711	.000*

\*:  $p<.05$

When Table 7 is examined, it is seen that the result of analysis of variance ( $F=30.711$ ;  $p<.05$ ) is significant. According to the results of analysis of variance, it was determined that the relationship between number sense and mathematical reasoning skills was linear, and that the mathematical reasoning skills of the PMTs predicted their number sense skills significantly positively. It was seen that 20% of the PMTs' number sense skills were explained by their mathematical reasoning skills. Multiple regression analysis was performed regarding the degree of predicting the number sense skill of the factors of the mathematical reasoning scale, and the findings are presented in Table 8.

**Table 8. Multiple regression analysis results on the prediction of the factors of mathematical reasoning skills on the number sense skill**

	Unstandardized		Standardized						
Mathematical Reasoning	B	Standart Error	$\beta$	t	p	F	r	Adjusted r <sup>2</sup>	p
Constant	-7.59	13.405		-.566	.572				
MRF1	.076	.033	.186	2.273	.025				
MRF2	.110	.049	.188	2.241	.027				
MRF3	.086	.065	.106	1.325	.188				
MRF4	.089	.051	.141	1.758	.081	6.180	.521	.23	.000
MRF5	.121	.054	.181	2.219	.028				
MRF6	.178	.082	.179	2.163	.033				
MRF7	.420	.129	.262	3.256	.001				

When Table 8 is examined, it is seen that the result of analysis of variance ( $F=6.180$ ;  $p<.05$ ) is significant. According to the analysis of variance results, it was determined that the relationship between the MRF3 and MRF4 factors and number sens was not statistically significant, and that these two variables did not significantly predict the number sense skill. On the other hand, it was seen that the relationship between the other factors of the MRAS and the number sense skill was linear and predicted the number sense skill significantly positively. When the factors of the MRAS were taken together, it was seen that they explained 23% of the total variance regarding the number sense skill. On the other hand, when the standardized regression coefficients ( $\beta$ ) are examined, the order of importance of the factors of the MRAS on the number sense skill was determined as MRF7 ( $\beta = .262$ ;  $t=3.256$ ;  $p<.05$ ), MRF2 ( $\beta = .188$ ;  $t=2.241$ ;  $p<.05$ ), MRF1 ( $\beta = .186$ ;  $t=2.273$ ;  $p<.05$ ), MRF5 ( $\beta = .181$ ;  $t=2.219$ ;  $p<.05$ ), MRF6 ( $\beta = .179$ ;  $t=2.163$ ;  $p<.05$ ), MRF4 ( $\beta = .141$ ;  $t=1.758$ ;  $p>.05$ ), MMF3 ( $\beta = .106$ ;  $t=1.325$ ;  $p>.05$ ). The results of multiple regression analysis regarding the prediction of mathematical reasoning and number sense skills of PMTs grade levels are presented in Table 9.



**Table 9. Multiple regression analysis results on the prediction of the grade levels on mathematical reasoning and number sense skills**

		Unstandardized		Standardized						
	Grade	B	Standart Error	$\beta$	t	p	F	r	Adjusted r <sup>2</sup>	p
MRAS	Constant	71.836	1.070		67.142	.000				
	2	.076	.858	.008	.089	.929	11.986	.480	.21	.00
	3	.619	.540	.104	1.146	.254				
	4	2.815	.496	.498	5.670	.000				
NST	Constant	68.750	1.751		39.268	.000				
	2	-1.11	1.404	-.071	-.795	.428	13.055	.496	.23	.00
	3	2.288	.884	.233	2.588	.011				
	4	4.340	.812	.465	5.343	.000				

When Table 9 is examined, it is seen that the result of analysis of variance is significant for both mathematical reasoning ( $F=11.986$ ;  $p<.05$ ) and number sense ( $F=13.055$ ;  $p<.05$ ). The average mathematical reasoning skill score of the 1st grade students was high ( $B=71,836$ ); It was observed that this score was relatively higher and did not differ significantly ( $p>.05$ ) among the PMTs studying in the 2nd grade ( $B=71,912$ ) and the 3rd grade ( $B=72,455$ ). It was determined that the mathematical reasoning skills of the 4th grade students differed significantly ( $B=74,651$ ). Accordingly, it was determined that 21% of the PMTs' mathematical reasoning skills were explained by their 4th grade education. On the other hand, the number sense skill score of the PMTs studying in the 1st grade high ( $B=68,750$ ); It was observed that this score was relatively lower in the PMTs studying in the 2nd grade ( $B=67.64$ ) and did not differ significantly ( $p>.05$ ). It was determined that the number sense skills of the PMTs studying in the 3rd grade ( $B=71,038$ ) and the 4th grade ( $B=73,09$ ) were significantly higher. Accordingly, 19% of the PMTs' number sense skills are in the 4th grade; 5% is explained by their education in the 3rd grade. When the PMT studying in the 3rd and 4th grades are considered together, it was seen that it explained 21% of the total variance. When the order of importance of the grade level on the mathematical reasoning skill was examined, it was seen that the first three classes did not have a significant difference between them and did not have a significant effect on mathematical reasoning. It was observed that studying in the 4th grade had a significant effect on mathematical reasoning skills ( $\beta=.498$ ;  $t=5.670$ ;  $p<.05$ ). In terms of number sense skills, it was determined that the most important effect was to be educated in the 4th grade ( $\beta=.465$ ;  $t=5.343$ ;  $p<.05$ ) and 3rd grade ( $\beta=.233$ ;  $t=2.588$ ;  $p<.05$ ) respectively. It was observed that studying in the 1st and 2nd grades did not have a significant effect on the number sense skill.

## CONCLUSION DISCUSSION AND SUGGESTIONS

Number sense requires reaching the result by using short, effective, and practical solution methods instead of calculation methods that require long time (Kayhan-Altay, & Umay, 2013). The fact that we need practical solution methods in order to encounter mathematics in almost every field of our daily life and to solve the problems we encounter reveals the importance of the sense of number we have. Individuals need skills related to number sense not only in the short term, but at every stage of their lives. Therefore, it is thought that considering every factor that shapes number sense of individuals will shed light on the trainers in order to develop these skills.

In this study, it was determined that the number sense level of PMTs was at "High" level. While a group of studies in the literature state that preservice teachers' number sense skills are at a moderate level (Gülbağcı-Dede, 2015), a group of studies indicate that they are low (Almeida, Bruno, and Perdomo-Díaz, 2016; Can, 2020; Courtney-Clarke & Wessels, 2014; Yang, 2007; Yang, Reys, & Reys, 2009). This difference may be related to the different measurement tools used, as well as the fact that the participants are teacher candidates from different branches. Can (2020) stated that primary school teacher candidates have a low level of number sense and they prefer to use computational solution methods further. In the study, which focused on the relationship between logical thinking skill and number sense, she stated that candidates with low logical thinking skills also had low number sense. In this study, the remarkable finding regarding the number sense of PMTs is that the scored

"Very High" in the factors of "Understanding the meaning of numbers, operations, and relations between them", "Recognizing the magnitudes of relative numbers" and "Using and developing appropriate criteria", they received a "Medium" score in the factor of "Evaluation of the result of the transaction using estimation strategies".

Gülbağcı-Dede (2015), who reached a similar conclusion, stated that PMTs' number sense showed the lowest performance in the "Guess" component. Similarly, in the study by Şenol, Dündar and Gündüz (2015) focused on preservice classroom teachers' number sense and detected that they had difficulty in deciding the rationality of the results by using estimation strategies which are the most employed. Boz-Yaman and Bulut (2017) stated that mathematics teachers have limited definitions of estimation skills and revealed that mathematics teachers have limited knowledge of estimating strategies. Sayın, Özdemir and Öner (2022) stressed that teachers use estimation skills in questions that clearly require estimation, but they do not use estimation skills other than that. The fact that preservice teachers cannot make inferences about making predictions in daily life problems shows that they cannot use number sense sufficiently. The estimation skill which is common in the lives of children and adults and is also an important part of mathematical understanding gives information about how mathematical concepts and relationships are generally understood in terms of the strategies used (Siegler & Booth, 2005; Dowker, 1992). Therefore, the fact that preservice teachers' estimation performances are not at the desired level may be an indication that they cannot adequately perceive and make sense of mathematical concepts and relationships. In this context, as stated by Kuzu, Kuzu and Sıvacı (2018), it is beneficial to design a learning environment and teaching process suitable for pre-service teachers' understanding in order to make sense of mathematical concepts.

In this study, it was found that PMTs' mathematical reasoning skills were at a "High" level. The striking situation here is that while PMTs perform at high and very high levels in all other factors of the scale, they score "Intermediate" in the factors of "Recognizing and using mathematical patterns" and "Developing logical arguments for solutions". Yeşildere and Akkoç (2011) revealed that the majority of pre-service mathematics teachers had various difficulties in the process of generalizing and using shape patterns.

In the study, it was determined that there was a significant and positive relationship between number sense and mathematical reasoning ability. The highest correlation is between number sense and the factor of "Developing logical arguments for solutions" of mathematical reasoning skill. Considering that number sense is making the fastest and most logical decision for solving problems, the fact that mathematical reasoning includes similar thinking processes in this respect is a finding of this research. As a matter of fact, Greeno (1991) describes number sense as making judgments and inferences about quantities. Similarly, Toulmin, Rieke, and Janik (1984) stated that reasoning is making the best decision about a particular situation, issue or event rather than generating new ideas. Almeida, Bruno, and Perdomo-Díaz (2016) stated that pre-service teachers who do not use number sense know how to solve activities in different ways, but they use algorithms rigidly in their solutions while they can reach a solution with good mathematical reasoning. Since PMTs can develop logical arguments for solutions and include high-level thinking skills, it can be ensured that they practice with activities that include different thinking skills, which are thought to increase this skill to develop number sense. Solving the problem by considering multiple and different strategies can help them develop their number sense in parallel with developing logical arguments.

It has been determined that PMTs' mathematical reasoning skills are a significant predictor of number sense skills. It was seen that the strongest predictor of number sense was "Solving non-routine problems", and the weakest predictor was "Recognizing and using mathematical patterns". Işık and Kar (2011) stated that there is a positive relationship between number perception and non-routine problem-solving skills. Non-routine problems, by their nature, require skills beyond just processing skills, such as organizing data, classifying, seeing relationships, and performing certain actions one after the other (Altun, 2005). In this respect, non-routine problems require some skills, such as reasoning along with mathematical thinking, in order for students to find an algorithm that is different from the one they learn in the class (Işık & Kar, 2011). The result of this research shows that number

sense is used to a great extent in problem solving skill, which is considered important in terms of helping students establish the connection between mathematics and real-life situations, especially in the solution process of non-routine problems that require reasoning. In this manner, it is thought that this study is particularly important in that it emphasizes the strong relationship between number sense and non-routine problems and illustrates that this aspect has a great importance in terms of number sense skills of PMTs. In this direction, in the process of developing number sense skills, it is recommended to include activities aiming at developing this process, especially with non-routine problems, in parallel with targeting individuals' mathematical reasoning skills.

In the analyses made to see how the grade levels affect the mathematical reasoning of the PMTs, it was seen that studying in the 4th grade had a significant effect on the mathematical reasoning skills. It is a finding in the literature that mathematical reasoning skills increase with age (Dündar & Yaman, 2015). It is thought that such a result emerged due to the fact that the teachers took courses related to mathematical reasoning during their undergraduate education with their increasing mathematics experience.

In terms of number sense, it was determined that the number sense skills of the PMTs studying in the 3rd and 4th grades were significantly higher. There are many studies in the literature that support this finding (Ak & Ertekin, 2020; Aunio, Niemirta, Hautamaki, Van Luit, Shi, & Zhang, 2006; Sturdevant, 1991; Singh, 2009; Takir, 2016; Tunalı, 2018). This can be explained as number sense which is a developmental process and is generally expected to increase with age (Kayhan-Altay & Umay, 2013). The increase in the mathematical experience of the individual and the development of abstract thinking as a result of increasing age may lead to an increase in the individual's performance of number sense.

As a result, in this study, it was determined that PMTs had mathematical reasoning skills in explaining their number sense skills. Determining that the strongest predictor of number sense is "solving non-routine problems", it can be said that non-routine problems should be included in teaching to increase number sense skills. Tsao (2004) stated that pre-service teachers' number sense performances increased when problem solving approaches were used in lessons. If it is desired to develop students' number sense for high-quality mathematics education, first of all, teachers' number sense should be developed (Yang et al., 2009). Therefore, the first thing to do is to carry out studies to increase the number sense performances of teachers. It is obvious that the quality of teaching in terms of number sense will increase if teachers have high number sense and the components related to number sense are revealed.

**Conflicts of Interest:** The authors declare that there is no conflict of interest.

**Funding Details:** The authors declare that this study has not received any financial support.

**CRedit Author Statement:** Ahsen Seda Bulut: Writing-Original Draft Preparation, Conceptualization, Methodology, Investigation, Formal Analysis, Writing-Reviewing and Editing, Supervision. Okan Kuzu: Writing-Original Draft, Methodology, Validation, Visualization.

**Ethical Statement:** This study does not require an ethics committee approval.

## REFERENCES

- Altun, M. (2005). *İlköğretim ikinci kademe (6-7 ve 8.sınıflarda) matematik öğretimi [Teaching mathematics in primary education second level (6-7 and 8th grades)]*. Bursa: Aktüel Yayınları [Bursa: Aktüel Publications].
- Almeida, R., Bruno, A., & Perdomo-Díaz, J. (2016). Strategies of number sense in pre-service secondary mathematics teachers. *International Journal of Science and Math Education*, 14, 959–978.

- Ak, Y. & Ertekin, E. (2020). A study on the relationship between number sense and math anxiety of 7th and 8th grade students. *OPUS International Journal of Society Researches*, 16(31) , 4047–4076.
- Aunio, P., Niemivirta, M., Hautamäki, J., Van Luit, J. E., Shi, J., & Zhang, M. (2006). Young children's number sense in China and Finland. *Scandinavian Journal of Educational Research*, 50(5), 483–502.
- Baki, A. (2008). *Kuramdan uygulamaya matematik eğitimi [Mathematics education from theory to practice]*. Ankara: Harf Eğitim Yayıncılığı [Ankara: Harf Eğitim Publishing].
- Ball, D. L., & Bass, H. (2003). Making mathematics reasonable in school. In J. Kilpatrick, W. G. Martin, & D. Schifter (Ed.) *A Research Companion to principles and standards for school mathematics*. 27-44. Reston, VA: National Council of Teachers of Mathematics.
- Boz-Yaman, B., & Bulut, S. (2017). Middle school mathematics teachers' opinions on estimation. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education*, 11(1), 48–80.
- Brodie, K. (2010). *Teaching mathematical reasoning in secondary school classrooms*. London: Springer.
- Can, D. (2020). An analysis on the number sense performances of preservice primary school teachers based on their logical thinking ability. *Cumhuriyet International Journal of Education*, 9(2), 367-389.
- Case, R. (1998). A psychological model of number sense and its development. *Paper presented at the annual meeting of the American Educational Research Association*, San Diego, CA.
- Chrysostomou, M., Pitta-Pantazi, D., Tsingi, C., Cleanthous, E., & Christou, C. (2013). Examining number sense and algebraic reasoning through cognitive styles. *Educational Studies in Mathematics*, 83(2), 205–223.
- Cohen, L., & Manion, L. (1994). *Research methods in education (Fourth Edition)*. London: Routledge.
- Courtney-Clarke, M., & Wessels, H. (2014). Number sense of final year pre-service primary school teachers: Original research. *Pythagoras*, 35(1), 9 pages.
- Çoban, H. (2010). *Investigating the relationship between the level of students? using mathematical reasoning skills and using metacognitive learning strategies*. Master's thesis, Gaziosmanpaşa University Institute of Social Sciences, Tokat.
- Dowker, A. (1992). Computational estimation strategies of professional mathematicians. *Journal for Research in Mathematics Education*, 23(1), 45–55.
- Dündar, S. & Yaman, H. (2015). To examine how the skills of class teacher candidates in terms of interpreting tables and graphics change according to mathematical reasoning skills. *Kastamonu Education Journal*, 23(4), 1695–1710.
- Evans, J. D. (1996). *Straightforward statistics for the behavioral sciences*. Pacific Grove, CA: Brooks/Cole Publishing.
- Fraenkel, J. R., & Wallen, N. E. (2006). *How to design and evaluate research in education*, Sixth Edition, New York: McGraw-Hill.

- Gersten, R., & Chard, D. (1999). Number sense: Rethinking arithmetic instruction for students with mathematical disabilities. *The Journal of Special Education*, 33(1), 18–28.
- Greeno, J. G. (1991). Number sense as situated knowing in a conceptual domain. *Journal for Research in Mathematics Education*, 22(3), 170–218.
- Gülbağcı-Dede, H. (2015). *Investigation of number sense of primary and secondary school mathematics teacher candidates*. Doctoral dissertation, Marmara University Institute of Educational Sciences, Istanbul.
- Hope, J. (1989). Promoting number sense in school. *The Arithmetic Teacher*, 36(6), 12.
- Howden, H. (1989). Teaching number sense. *Arithmetic Teacher*, 36, 6–11.
- Howell, S., & Kemp, C. (2005). Defining early number sense: A participatory Australian study. *Educational Psychology*, 25(5), 555–571.
- Işık, C., & Kar, T. (2011). Investigating of the number perception and nonroutine problem solving skills of 6th, 7th and 8th grade students. *Ahi Evran University Journal of Kırşehir Education Faculty*, 12(1), 57–72.
- Jordan, N.C., Glutting, J., & Ramineni, C. (2010). The importance of number sense to mathematics achievement in first and third grades. *Learning and Individual Differences*, 20 (2), 82–88.
- Kayhan-Altay, M., & Umay, A. (2013). The development of number sense scale towards middle grade students. *Education and Science*, 38(167), 241–255.
- Kim, H. Y. (2013). Statistical notes for clinical researchers: Assessing normal distribution using skewness and kurtosis. *Restorative Dentistry & Endodontics*, 38(1), 52–54.
- Kuzu, O. (2021). Diagnostic assessment of preservice mathematics and science teachers' attributes on integral. *YYU Journal of Education Faculty*, 16(1), 1402–1418.
- Kuzu, O., Kuzu, Y., & Sıvacı, S. Y. (2018). Preservice teachers' attitudes and metaphor perceptions towards Mathematics. *Cukurova University Faculty of Education Journal*, 47(2), 897–931.
- McIntosh, A., Reys, B. J., & Reys, R. E. (1992). A proposed framework for examining basic number sense. *For the Learning of Mathematics*, 12(3), 2–9.
- Ministry of National Education, (2018). Mathematics (1-2-3-4-5-6-7-8th grade) curriculum. Board of Education and Discipline.
- Mohamed, M., & Johnny, J. (2010). Investigating number sense among students. *Procedia-Social and Behavioral Sciences*, 8, 317–324.
- National Council Of Teachers of Mathematics (1989). Curriculum and evaluation standards for school mathematics. Reston, VA: NCTM.
- NCTM, (2000). Principles and standards for school mathematics. [https://www.nctm.org/uploadedFiles/Standards\\_and\\_Positions/PSSM\\_ExecutiveSummary.pdf](https://www.nctm.org/uploadedFiles/Standards_and_Positions/PSSM_ExecutiveSummary.pdf). Accessed June 10, 2022.
- National Research Council. (2001). *Adding it up: Helping children learn mathematics*. In J. Kilpatrick, J. Swafford, B. Findel (Eds.), Mathematics learning study committee, center for education, division of and behavioral and social sciences and education. Washington, DC: National Academy Press

- Reys, R. E., & Yang, D. C. (1998) Relationship between computational performance and number sense among sixth- and eighth-grade students in Taiwan, *Journal for Research in Mathematics*, 29, 225–237.
- Sayın, S., Özdemir, Ü., & Oner, A. T. (2022). Mathematics teachers' instructional explanations and estimation skills about area measurement. *Ahi Evran University Journal of Kırşehir Education Faculty*, 23, 84–127. Special Issue.
- Siegler, R. S. & Booth, J. L. (2005). Development of numerical estimation a review. Edited Jamie I.D. Campbell. *Handbook of Mathematical Cognition*.
- Singh, P. (2009). An assessment of number sense among secondary school students. *International Journal for Mathematics Teaching and Learning*, 155, 1–29.
- Sturdevant, R.J. (1991). *Investigating the use of number sense by elementary students in grades 4, 6, and 8*. PhD Thesis, University of Missouri, Colombia.
- Şengül, S., & Gülbağcı-Dede, H. (2013). An investigation of classification of number sense components. *International Journal of Social Science*, 6(8), 645–664.
- Şenol, A., Dündar, S., & Gündüz, N. (2015). Analysis of the relationship between estimation skills based on calculation and number sense of prospective classroom teachers. *International Journal of Progressive Education*, 11(3), 90–105.
- Takır, A. (2016). Investigating the relations number sense ability of 6th, 7th and 8th grade students between their grade level, gender and mathematics self-efficiency level. *Dicle University, Journal of Ziya Gökalp Faculty of Education*, 29, 309–323.
- Toulmin, S., Rieke, R., & Janik, A. (1984). *An introduction to reasoning* (Second Edition). New York: Macmillan Publishing Co.
- Tsao, Y. L. (2004). Exploring the connections among number sense, mental computation performance, and the written computation performance of elementary preservice school teachers. *Journal of College Teaching & Learning*, 1(12), 71–90.
- Tunalı, C. (2018). *The determination of gifted students' level of number sense*. Master's thesis, Dokuz Eylul University Institute of Educational Sciences, Izmir.
- Umay, A., & Kaf, Y. (2005). A study on flawed reasoning in mathematics. *Hacettepe University Journal of Education*, 28, 188–195.
- Wood, J. M. (2007). Understanding and computing Cohen's kappa: A tutorial. Web Psych Empiricist. Retrieved from <http://wpe.info/vault/wood07/wood07ab.html>.
- Yang, D. C. (2003). Teaching and learning number sense—an intervention study of fifth grade students in Taiwan. *International Journal of Science and Mathematics Education*, 1(1), 115–134.
- Yang, D. C. (2007). Investigating the strategies used by pre-service teachers in Taiwan when responding to number sense questions. *School Science and Mathematics*, 107(7), 293–301.
- Yang, D. C., Reys, R. E., & Reys, B. J. (2009). Number sense strategies used by pre-service teachers in Taiwan. *International Journal of Science and Mathematics Education*, 7(2), 383–403.
- Yeşildere, S., & Akkoç, H. (2011). Pre-Service mathematics teachers' generalization processes of visual patterns. *Pamukkale University Journal of Education*, 30(30), 141–153.

Yockey R.D., (2016). *SPSS Demystified: A simple guide and reference* (Second edition). United Kingdom: Taylor & Francis.

## Effective School Leadership as a Predictor of School Culture

**Bayram Bozkurt<sup>i</sup>**  
Gaziantep University

### Abstract

The research aims to examine the relationship between effective school leadership and school culture according to teacher perceptions. For this purpose, the research is designed with predictive correlational model. The sample of the study consists of 507 teachers identified by simple selected sampling methods. The research data were collected through "Effective School Leadership Scale" and "School Culture Scale". To determine perceptions of participating teachers' on effective school leadership and school culture for the purpose of the research, statistical analyzes such as arithmetic average and standard deviation were used. To determine the relationship between variables, Pearson Moments multiplication correlation coefficient analysis was used. The common variance of effective school leadership and school culture was determined using structural equation modeling. As a result of the research, a strong relationship between effective school leadership and success and support culture and a moderate relationship between the task culture was determined. It was also concluded that there was a very weak relationship between effective school leadership and bureaucratic culture. On the other hand, it was concluded that effective school leadership is a significant predictor of school culture. In this context, school administrators' leadership skills should be developed in order to create an effective school culture.

**Keywords:** Effective School Leadership, School Culture, Structural Equation Modeling.

**DOI:** 10.29329/ijpe.2023.603.12

**Submitted:** 27/08/2022

**Accepted:** 19/07/2023

**Published:** 16/10/2023

---

<sup>i</sup> **Bayram Bozkurt**, Assist. Prof. Dr., Educational Sciences,, Gaziantep University

**Email:** byrmbzkrt02@gmail.com



## INTRODUCTION

Schools can be considered as social environments where individuals spend the majority of their lives and serve as a bridge between the past and the future of individuals and societies. Therefore, schools should be turned into living spaces for individuals both in terms of transferring the cultural heritage of the society to future generations and adapting to the changes in culture. Schools try to transfer the cultural heritage of the society from generation to generation and support the socialization of their stakeholders with the resulting organizational culture (Çelik, 2002). It can be said that effective schools have strong cultures and that school culture is an influential factor in students' success (Demirtaş, 2010; Yılmaz, 2010). Studies on effective schooling reveal that schools with a positive climate and strong school culture are more successful and that these schools create a learning environment that supports students' cognitive, affective, psychomotor, social, and aesthetic development (Helvacı, 2011). It can be said that the environment that occurs has an effect on the effectiveness of the students and therefore on the effectiveness of the school. Effective schools need to create a culture that values academic achievement, expects high performance, and prioritizes the formation of collaborative relationships (Balci, 1993). Effective school culture supports education and training, and encourages individual learning and development (Balci, 2007). In settings with strong school cultures, it is reasonable to anticipate that students will interact with one another and with their teachers, as well as with the community in which the school is located. Teachers' interactions with one another, parents, students, and managers are influenced by the culture of the school. (Rosenholtz, 1991). It is accepted that effective communication and cooperation are predominant, teamwork is at the forefront, the informal structure is stakeholder, and administrators and school stakeholders are in constant interaction in schools where effective school culture is in question (Terzi, 2005). At this point, it can be said that school administrators have a significant responsibility in the context of the formation of effective school culture. Effective school administrators must be able to establish an environment of effective communication and interaction between teachers, students, and the environment in which the school is located. Administrators' leadership behaviors are closely related to the creation, management, and replacement of culture. (Çelikten, 2003). The impact of leadership on the school should not be overlooked in the acceptance of schools as effective (Şahin, 2011). Effective leaders encourage social interaction to organize, organize, manage, and motivate the activities of others. The leader makes task-oriented efforts and employs effective strategies to achieve this goal; they must coordinate interpersonal skills (McCormick, 2001). One of the primary responsibilities of the school leader is to identify the focal point of the work being done and to gather the efforts of the school stakeholders at the common point. If the school leaders want to be successful, it can be said that they should determine what is necessary to achieve success and be to develop the school culture (Turan and Bektaş, 2013). School administrators should be able to share responsibility for shaping culture with the stakeholders of the school. Leaders do not only form the concrete and logical part of the school, but also are effective in the creation of the symbols, ideology, language, beliefs, ceremonies, and legends of the school (Akıncı, 1998).

Competencies such as modern management skills, leadership skills, and subordinate management, as well as effective and on-the-spot decision-making power, are increasingly sought after in today's school administrators (Bursalioglu, 2000). School administrators should be able to solve daily problems in the school while also being able to make effective and appropriate decisions in crisis situations and when unexpected problems arise (Day, Harris and Hadfield, 1999). Therefore, successful and effective leaders help shape the culture. (Özdemir, 2006). The role of school administrators is great in maintaining the created culture and changing and renewing it when necessary. There is a strong correlation between school effectiveness and effective school leadership (Dean, 2002). It is important to how the current culture is perceived in schools, how teachers perceive school culture, and what kind of culture they want (Çelik, 2002). In this context, it is critical to investigate the relationship between effective school leadership and school culture. So that, whether there is a relationship between effective school leadership and school culture, and whether effective school leadership is a variable that explains school culture, is considered a research problem in the current study.

The word effectiveness was defined by Barnard in 1930 as "the degree to which an organization achieves its objectives" (Barnard, 1948; cited in Duranay, 2005). Leadership, on the other hand, is the process of influencing and directing the people in a group by one or more people who have a strong impact (Ekvall and Rhyammar, 1998), is the process of overcoming obstacles, carrying out responsibilities, ensuring individual or group work, determining what needs to be done and how to be more effective (Yukl, 2002). Leadership is creativity and moral strength (Brown, 2007). Leaders must have the skills to define the goals and objectives of the organization, develop strategies, create plans around the goals set, control outputs, guide the organization, and motivate their stakeholders (Edwards, Ayers and Howard, 2003). It is the ability to rally a group of people around a set of goals and mobilize them to achieve those goals (Eren, 2009). An effective leader is someone who can motivate people in a group, create the necessary environment for organizational development, and assist the organization in reaching its goals (Kılıç, et al., 2011).

Culture is a concept derived from the Greek verb "colere", meaning to cultivate. (Özbudun, 2005). Hoy and Miskel (1996) defines culture as "shared orientations that provide unity and give a special identity". The concept of school culture is defined as a set of common ideas, assumptions, values and beliefs that give the school its identity and indicate the behaviors expected from school members (Erickson, 1987). School culture can be defined as all ideals, values, norms, beliefs, traditions, and other cultural symbols that help determine school quality. (Önal and Ekici, 2012). Without a written text, it can be expressed as rules that are known and applied among the stakeholders of the school (Eren, 2009). Basically, school culture can be thought of as the answer to the question "how do things work in this school?" (Tableman, 2004). Leaders create culture, which is then implemented in schools and developed (Dursun, 2019). There are important contributions of school administrators in the creation, maintenance and development of organizational culture (Demirkol and Savaş, 2012). In this context, school administrators' leadership behaviors can have an impact on the school's culture. The resulting culture affects teachers, students, other employees of the school and families (Demir and Durnalı, 2022). It can be said that a strong school culture is one of the main indicators of an effective school (Kafalı, 2022).

Both leadership and school culture have emerged as important issues in the literature in recent years, especially in the field of educational administration. In literature, paternalistic leadership (Özgenel and Dursun, 2020), instructional leadership (Şahin, 2011), servant leadership (Kahveci and Aypay, 2013; Yalçın and Karadağ, 2013), leadership styles (Boyras, 2018; Dalgıç, 2015), charismatic leadership (Yüzer, 2019), leadership teacher (Çetin and Güven, 2015), spiritual leadership (Ankaralıoğlu, 2020; Karadağ, 2009), sustaining and transformative leadership (Şahin, 2004) it is seen that studies are carried out to examine the relationship between school culture and school culture. According to relevant research, school administrators play an important role in the formation of a strong school culture (Çelik, 2013). However, with the current study, it is expected to contribute to the literature in the context of both examining the relationship between effective school leadership and school culture and addressing the relationship between different leadership styles and school culture. On the other hand, it is thought that the results of the current study will inform school administrators and policy makers about the cultural structure in schools and give ideas in the context of creating new policies in this direction. At this point, it is expected to help strengthen the link between research and practice. In this context, the aim of the study is to reveal the relationship between effective school leadership and school culture according to teacher perceptions. For this purpose, the following research questions were sought:

- What is the level of effective school leadership of school administrators according to teacher perceptions?
- What are the perceptions of the school culture in the institutions where they work, according to the teacher?
- Is there a significant relationship between effective school leadership and school culture?

- Does effective school leadership significantly predict school culture?

## METHOD

### Research design

This study, which aims to examine the relationship between effective school leadership and school culture, is designed with the predictive correlational model. Predictive correlational research is work in which the existence, direction, and degree of relationship between two or more variables is discovered, or that explains how much the variables predict each other. (Büyüköztürk et al., 2008) In the study, it was designed as a predictive correlational research model because it was investigated whether effective school leadership (independent variable) predicted school culture (dependent variable).

### Population and sample

The population of the study consists of 13.100 teachers working in Şahinbey district of Gaziantep province. The sample of the study consists of 507 teachers determined by simple random sampling method. Simple random sampling is sampling, in which participants are randomly selected and have an equal chance of participants being involved in the sampling (Ekiz, 2020). Pallant (2001) states that Kaiser-Meyer-Olkin (KMO) value of .90 or above is perfect for determining the sample size. In this study, KMO value was obtained as .97. In this respect, it can be said that the sample size of 507 people is sufficient. Demographic information of the teachers participating in the research is given in Table 1.

**Table 1. Personal information of participating teachers**

Variable	Category	<i>f</i>	%
Gender	Male	222	44
	Female	285	56
Age groups	Between 20-30	235	46
	Between 31-40	198	39
	Over 41 years	74	15
Level of education	Undergraduate	432	85
	Graduate	75	15
Professional seniority	Between 1-10	338	67
	Between 11-20	125	25
	Over 21 years	44	8
Working time at school	Between 1-5	357	70
	Between 6-10	125	25
	Over 11 years	25	5
Type of school	Primary school	125	25
	Secondary school	313	62
	High school	69	14
Teaching field	Pre-school teacher	15	3
	Primary school teacher	115	23
	Subject matter teacher	377	74
Total		507	100

When Table 1 was examined, it was seen that the ratio of female (44%) teachers and male (56%) teachers was close to each other, and the number of teachers aged 20-30 (46%), that is, the number of teachers aged 41 and over (15%), where young teachers were concentrated, was less according to their age. Again, the number of teachers between 1-10 years (67%) in terms of professional seniority and 1-5 years (70%) of teachers in terms of working time in the same school is higher. On the other hand, it is seen that the number of teachers working in secondary schools (62%) and branch teachers (74%) is intense.

### Data collection tool and process

Data collection tool consisting of three parts, "Personal Information" "Effective School Leadership Scale" and "School Culture Scale" was used in the study's data collection process. The information in the Personal Information section is given under the heading of population and sample (Table 1). Information about the scales is given below.

**Effective School Leadership Scale:** The "Effective School Leadership Scale", developed by Ata (2015) and for which validity and reliability studies are carried out, consists of six dimensions and a total of 39 items graded as 7 points likerts: visionary leadership (VL=5 items), personal characteristics (PC=8 items), educational leadership (EL=8 items), understanding and developing learning and teaching processes (UDLTP=5 items), combining resources, planning and evaluating (CRPE=6 items), giving importance to cooperation, communication and teamwork (GICCT=7 items). In the related study, the Cronbach alpha reliability coefficient of the scale was determined as .99. In this study, the reliability coefficient of the scale was determined as .99. It can be said that the results of the reliability coefficient support each other. As a result of the confirmatory factor analysis performed to check the construct validity of the scale, the goodness of fit values  $\chi^2/Df = 2.2$ , RMR= .004, RMSEA= .053, GFI= .98, AGFI= .96, CFI= .99, TLI= .99 were obtained at an excellent level.

**School Culture Scale:** The "School Culture Scale", which was developed by Terzi (2005) and whose validity and reliability studies were carried out, consists of four dimensions as support culture (6 items), success culture (8 items), bureaucratic culture (9 items), task culture (6 items) and a total of 29 items graded as 5-point likert. In the related study, the Cronbach alpha reliability coefficient of the scale was calculated as .84. In this study, the reliability coefficient was determined as .90. As a result of the confirmatory factor analysis performed to check the construct validity of the scale, the compliance goodness values were obtained at an acceptable level of  $\chi^2/Df = 4.2$ , RMR = .016, RMSEA= .078, GFI= .98, AGFI= .91, CFI= .98, TLI= .94.

In the study, the data collection process was collected by face -to -face interviews with the participants. In order to increase the reliability of the research, participation is completely based on voluntary basis. It is stated that the data will not be shared with anyone except the researcher in order to get the correct answers and to respond to the participant. The data sometimes collected in single interviews and sometimes in groups, and the filling time of the form lasted between 10-15 minutes.

### Data Analysis Process

The study's data was analyzed using the SPSS 22 and AMOS 20 package programs. To make the data suitable for the analysis, end value cleaning, coding the reverse items and the arithmetic average of the variables were examined to check the normal distribution of Skewness and Kurtosis values to control the normal distribution. Skewness values ranged from .09 to .71 and Kurtosis values ranged from .05 to .91. According to Tabachnick and Fidell (2013), skewness and Kurtosis can be assumed to show a normal distribution if they are located between -1.5 and +1.5. In this context, it was accepted that the data showed normal distribution in the current study and it was decided to use parametric tests. While analyzing the data, Cronbach alpha internal consistency coefficients were used to determine the reliability of the scales and confirmatory factor analysis was performed in the context of the construct validity of the scales. On the other hand, statistical analyses such as arithmetic mean and standard deviation were used to determine the perceptions of the participating teachers towards effective school leadership and school culture in line with the aim of the study. Perception levels to determine the perceptions of effective school leadership of the participants; 1.00-1.84 range "very low", 1.85-2.70 range "slightly low", 2.71-3.56 range "low". 3.57-4.42 range "Middle", 4.43-5.29 range "high", The range of 5.30-6.15 is "slightly high", The range of 6.16-7.00 was evaluated as "very high", Their perception of school culture is "never" in the range of 1.00-1.79, the range of 1.80-2.59 "rarely", the range of 2.60-3.39 "sometimes", the range 3.40-4.19 is "by the majority", the range 4.20-5.00 was evaluated as "always".

Pearson Moments Multiplication Correlation Coefficient analysis was used to determine the relationship between effective school leadership and school culture. Correlation value ranges Salkind (2010) is taken into account the classification. In this context, the range of 0.00-0.20 was evaluated as "no relationship or very weak", the range of 0.20-0.40 as "weak relationship", the range of 0.40-0.60 as "medium level relationship", the range of 0.60-0.80 as "strong relationship", and the range of 0.80-1.00 as "very strong relationship".

Structural equation modeling (SEM) was used to determine the common variance between effective school leadership and school culture. Some fit indices were used to decide whether the model designed in the structural equation model was supported by the data. Regarding the goodness criteria of the adjustment indices used in the structural equation model observed in the research and performed with implicit variables  $\chi^2/Df$  that there is perfect fit when it is less than 2 for its value, acceptable when it is less than 5, It is perfectly acceptable if the RMR value is less than .05, there is acceptable fit between .06-.08, It is accepted If the RMSEA value is between .08 and .05, it is excellent, and if it is less than .05 (Schumacher and Lomax, 2010). At the same time, it is acceptable for the CFI value to be .95 and above, and .97 and above to be a perfect fit, and it is acceptable for the TLI fit index to be between .90 and .95, and for these values to be .95 and above is a perfect fit, GFI and AGFI values are acceptable at .85 and above and are a perfect fit at .90 and above (Byrne, 2013; Kline, 2011).

## RESULTS

In this section, the findings of the analysis of the data are included in order to seek answers to the research questions determined in line with the purpose of the research. In this context, which are the first two problems of the research, the findings on effective school leadership and sub-dimensions and the level of school culture and sub-dimensions according to teacher perceptions, are given in Table 2.

**Table 2. Teachers' perception on effective school leadership and school culture**

	N	$\bar{X}$	SD	Skewness	Kurtosis
Task culture	507	3.74	0.63	-.40	.25
Bureaucratic culture	507	3.33	0.61	-.09	.11
Succes culture	507	3.58	0.70	-.29	.23
Support culture	507	3.51	0.74	-.36	.26
<b>School culture</b>	507	3.52	0.52	-.24	.91
VL	507	4.96	1.36	-.69	.05
PC	507	5.11	1.38	-.71	-.16
EL	507	4.90	1.37	-.57	-.22
CRPE	507	4.99	1.35	-.66	-.06
GICCT	507	5.02	1.35	-.67	-.11
UDLTP	507	4.94	1.36	-.57	-.22
<b>Effective school leadership</b>	507	4.99	1.33	-.66	-.11

When Table 2 was examined, it was seen that teachers' perceptions of task culture were mostly at ( $\bar{X}$ =3.74) level, perceptions of achievement culture ( $\bar{X}$ =3.58) were mostly at the level and support culture perceptions ( $\bar{X}$ =3.51) were mostly at the level, and on the other hand, their perceptions of bureaucratic culture ( $\bar{X}$ =3.33) were sometimes at the level. Accordingly, it can be said that the teachers participating in the research perceive the task culture, success culture and support culture at a higher level than the bureaucratic culture. When teachers' perceptions of effective school leadership were examined, it was determined that they had a high level of perception of visionary leadership ( $\bar{X}$ =4.96), personal characteristics ( $\bar{X}$ =5.11), educational leadership ( $\bar{X}$ =4.90), planning and evaluation of combining resources ( $\bar{X}$ =4.99), emphasis on collaboration, communication and teamwork ( $\bar{X}$ =5.02), understanding and improving learning and teaching processes ( $\bar{X}$ = 4.94) and effective school leadership in general ( $\bar{X}$ =4.99).

The findings of the Pearson Moments Multiplication Correlation coefficient analyses for whether there is a significant relationship between effective school leadership and school culture and sub-dimensions according to teacher perceptions are given in Table 3.

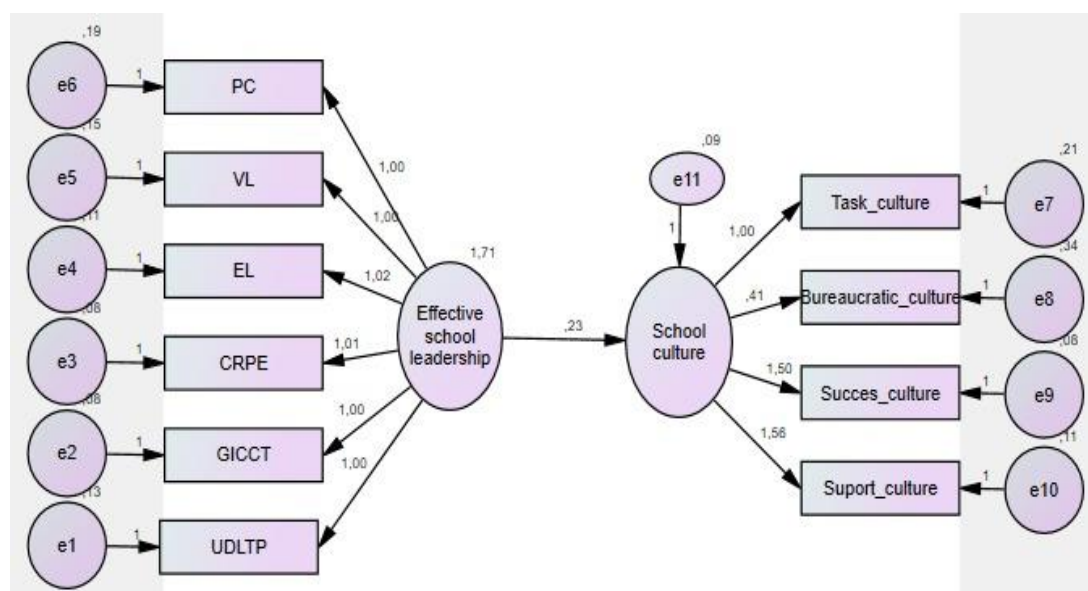
**Table 3. Correlation analysis of the relationship between effective school leadership and school culture**

	VL	PC	EL	CRPE	GICCT	UDLTP	Effective school leadership
Task culture	.54**	.52**	.54**	.54**	.53**	.54**	.55**
Bureaucratic culture	.16**	.10*	.18**	.16**	.14**	.13**	.15**
Success culture	.61**	.63**	.61**	.61**	.61**	.60**	.63**
Support culture	.60**	.62**	.63**	.61**	.61**	.59**	.63**
School culture	.60**	.59**	.62**	.60**	.59**	.58**	.61**

\* $p < 0.05$ ; \*\* $p < 0.01$

As a result of the Pearson Moments Multiplication Correlation coefficient analyzes conducted to determine the relationship between effective school leadership and school culture, the sub-dimensions of school culture and effective school leadership, there is a strong positive, significant relationship between visionary leadership ( $r=.60$ ), personal characteristics ( $r=.59$ ), educational leadership ( $r=.62$ ), combining resources, planning and evaluation ( $r=.60$ ), emphasis on collaboration, communication and teamwork ( $r=.59$ ), learning and understanding and improving teaching processes ( $r=.58$ ). A positive, meaningful and moderate relationship between effective school leadership and task culture ( $r=.55$ ), which are sub-dimensions of school culture, a positive, meaningful and strong relationship between the culture of success ( $r=.63$ ) and the culture of support ( $r=.64$ ) and it was found that there was no relationship between it and bureaucratic culture ( $r=.15$ ) or that there was a very weak relationship. On the other hand, according to teacher perceptions, a positive, meaningful and strong relationship ( $r=.62$ ) was found between effective school leadership and general perception of school culture.

In line with another sub-problem of the study, the model on whether effective school leadership predicts school culture according to teacher perceptions and the findings on non-standardized path coefficients regarding whether this model is supported by data are given in Figure 1.



**Figure 1. A model for the relationship between effective school leadership and school culture**

When Figure 1 is examined, it is seen that effective school leadership positively predicted the school culture according to the perceptions of the teacher ( $\beta = .23$ ;  $p < 0.001$ ). It was found that the values of fit of compliance belonging to the model tested on the estimation of effective school leadership to school culture  $\chi^2/Df = 3.6$  (acceptable), RMR= .027, RMSEA= .073 (acceptable), GFI= .97, AGFI= .92, CFI= .98, TLI= .95 were at an excellent level. In this context, it can be said that the model for the predicate of the school culture of effective school leadership can be accepted. The values of the standardized path coefficients related to the obtained model are given in Table 4 of the findings regarding the ratio of effective school leadership to explain school culture according to these values.

**Tablo 4. Standardized path coefficients of the relationship between variables**

Variables		Coefficients
Effective school leadership	School culture	0,70
Effective school leadership	Support culture	0,63
Effective school leadership	Success culture	0,64
Effective school leadership	Bureaucratic culture	0,19
Effective school leadership	Task culture	0,47

When Table 4 is examined, it is seen that effective school leadership explains success culture by 40% ( $R^2 = .40$ ), support culture by 39% ( $R^2 = .39$ ), task culture by 22% ( $R^2 = .22$ ), and bureaucratic culture by 3% ( $R^2 = .03$ ). When the overall situation was examined, it was found that the common variance between effective school leadership and school culture was 49% ( $R^2 = .49$ ).

## DISCUSSION AND CONCLUSION

The purpose of this study is to investigate the relationship between effective school leadership and school culture as perceived by teachers. To that end, it was first attempted to uncover teachers' perceptions of effective school leadership and task culture, success culture, bureaucratic culture, and support culture. As a result of the research, although teachers' perceptions of task culture, success culture, bureaucratic culture and support culture are similar to each other, the task culture in schools is partially at a high level, compared to other dimensions, it was seen that they perceived bureaucratic culture at a relatively low level. Accordingly, it can be said that the primary purpose of the schools is to do the work determined in the program and the aims of the school, student success is the main goal and at this point it is better than other schools. The fact that the program is trained, the phenomenon of competition with other schools, and the fact that the understanding of education is exam-oriented can all explain why the understanding of task is higher. Terzi's (2005) study in primary schools found that teachers perceive task-oriented culture at a higher level in the institutions where they work, which is similar to the findings of the research. Again, in the studies conducted by Işık (2017) and Sezgin (2010) with teachers, it was concluded that teachers perceived the highest level of task-oriented culture and the lowest level of bureaucratic culture in parallel with the findings of the current research. Even if teachers perceive bureaucratic culture such as hierarchy, rules, strict supervision, authority, formal relations at a relatively high level, their perception of a lower level compared to the culture of support, task and success may be related to the differences in the understanding of leadership exhibited in the school and the sample in which the data are collected. In addition, the fact that the bureaucratic culture is lower than the culture of task, support and success can be expressed as a promising situation where the bureaucratic structure is partially low and a prescriptive management is perceived at a low level.

It was concluded that teachers perceived the leadership skills of school administrators at a high level in the context of visionary leadership, personal characteristics, educational leadership, combining resources, planning and evaluation, giving importance to cooperation, communication and teamwork, understanding and developing learning and teaching processes. It was concluded that the dimensions of effective school leadership with personal characteristics, cooperation, communication and emphasis on teamwork were perceived at a high level and the educational leadership dimension was perceived at a slightly lower level compared to other skills. Accordingly, it can be said that the leadership qualities of school administrators such as being patient, kind, humble, loving, entrepreneurial have characteristics, being fair and dedicating themselves to work, communicating

effectively, giving importance to teamwork and being open to cooperation are more preliminary. This situation can also be seen as the reason for the lower perception of bureaucratic culture in existing schools. On the other hand, although the educational leadership skills of school administrators such as coordinating programs, making class visits and handling the program on a scientific basis are still at a high level, it can be said that they are perceived as lower than other dimensions. This situation can also be seen as the reason for the higher perception of task culture in existing schools. In the related study, where the current research results are similar to the study conducted by Ata (2015), it is seen that the dimensions of effective school leadership with personal characteristics, cooperation, communication and teamwork are perceived at a higher level and the perceptions of educational leadership are perceived at a lower level than other dimensions.

The study sought to determine whether there was a significant relationship between effective school leadership and school culture. It was concluded that there is a strong relationship between effective school leadership and a culture of success and support, a middle relationship between the culture of task, and a very weak relationship between the bureaucratic culture in this context. Accordingly, as effective school leadership behaviors increase, it can be said that the culture of support and success in the school will increase strongly and the culture of task will increase moderately. Another important conclusion of the research is that there is no significant relationship between effective school leadership and bureaucratic culture. In other words, as effective school leadership behaviors increase in schools, it can be said that the culture of success, support and task will increase to a certain extent, but there will be no change in bureaucratic culture. According to this result, it can be said that effective school leadership is an important factor in shaping school culture. Yalçinkaya-Akyüz (2002) states that the effectiveness of leaders is effective and responsible in the context of the formation of a strong school culture and that strong cultures are the criterion of effective leadership. According to Küçükaslan (2022), school administrators should develop school culture as a leader, and the formation of culture in the school is the responsibility of the school administrator as a leader.

Finally, in the context of the research's goal, it was investigated whether effective school leadership is a predictive variable in school culture based on teacher perceptions, and if so, how powerful this predictive power is. As a result of the analyzes carried out in this context, it was concluded that effective school leadership is a significant predictor of school culture. Effective school leadership was found to be a factor that explains school culture (49%). Accordingly, it can be said that the leadership skills of school administrators such as visionary leadership, personal characteristics, educational leadership, combining resources, planning and evaluation, emphasis on cooperation, communication and teamwork, understanding and improving learning and teaching processes are variables that explain school culture. In the study, it was seen that effective school leadership explained the culture of success, support and task in order of importance, but it was the factor that explained the bureaucratic culture, albeit at a very low level. Çelikten (2003) emphasizes that the shaping of school culture can be achieved through effective leadership. As a result, school administrators' personal characteristics, human relations, creating a positive climate in school, continuous and positive interaction with students, teachers, and other stakeholders, and the effort to use the institution's resources effectively and efficiently are effective in the formation of an effective school culture. On the other hand, it can be said that effective school leadership does not have an effect on the bureaucratic understanding dominated by the management approach based on the subordinate-superior relationship, non-participatory, effective rules. Nichols (2007) states that school leaders need to move away from the hierarchical understanding of structure, focus on school development and transformation, and create learning organizations.

### **Limitations and Recommendations**

The research's limitation can be expressed as a lack of in-depth information about the underlying cause of this situation as a result of data collection via scales and quantitative consideration of the data only in the context of the level of teachers' perceptions. When the conclusion that there is a very low level between bureaucratic culture and effective leadership in the research is considered, it



can be said that strengthening the relations between individuals, giving more space to informal practices, and including practices to increase communication, interaction and cooperation between stakeholders will positively affect the school climate. As a leader, it can be said that in order for school administrators to develop a school culture in a positive way, they should use school resources effectively and fairly, develop an environment of trust, and include practices for horizontal organization, self-control and internalization of rules instead of hierarchy, strict supervision and authoritarian rules. Finally, schools, like any other field, are becoming institutions of rapid change and transformation. In this context, it can be said that the leadership skills of school administrators should be increased in order to develop an effective school culture.

**Conflicts of Interest:** No potential conflicts of interest were disclosed by the author(s) with respect to the research, authorship, or publication of this article.

**Funding Details:** No financial support was received during the research process.

**CRedit Author Statement:** The introduction, method, findings, discussion and conclusion, references and all processes of the research were carried out by the author. No contributions were made by other individuals or institutions.

**Ethical Statement:** Ethical permission (05.07.2022-E-87841438-604.01.01.01-211181) was obtained from Gaziantep University Social and Human Sciences Ethics Committee for this research

## REFERENCES

- Akıncı, Z. B. (1998). *Kurum kültürü ve örgütsel iletişim*. İletişim Yayınları.
- Ankaralıoğlu, S. (2020). *Farklı okul kademelerinde görev yapan öğretmen algılarına göre yöneticilerin ruhsal liderlik stilinin okul kültürüne etkisi* [Yüksek Lisans Tezi]. İstanbul Sabahattin Zaim Üniversitesi.
- Ata, E. (2015). *Okul yöneticilerinin öz yeterlik inançları ile etkili okul liderliği arasındaki ilişki* [Yayınlanmamış Doktora tezi]. Gazi Üniversitesi.
- Balcı, A. (2007). *Etkili okul ve okul geliştirme* (4. Baskı). Pegem Yayıncılık.
- Balcı, A. (1993). *Etkili okul: Kuram, uygulama ve araştırma*. Erek Ofset.
- Boyras, A. (2018). *Özel eğitim okul müdürlerinin liderlik stillerinin okul kültürü ve iklimine etkisi* [Yayınlanmamış Yüksek lisans tezi]. Yeditepe Üniversitesi.
- Brown, K. M. (2007). Eta sigma gamma: Preparing leaders today for tomorrow's challenges. *Health Educator*, 39(2), 73-74. <https://files.eric.ed.gov/fulltext/EJ784829.pdf>
- Bursalıoğlu, Z. (2000). *Okul yönetiminde yeni yapı ve davranış*. Pegem Yayıncılık.
- Büyükoztürk. Ş., Kılıç-Çakmak. E., Akgün, Ö. E., Karadeniz, Ş. & Demirel, F. (2008). *Bilimsel araştırma yöntemleri*. Pegem Akademi Yayıncılık.
- Byrne, B. M. (2013). *Structural equation modeling with Mplus: Basic concepts, applications, and programming*. Routledge.
- Çelik, V. (2002). *Okul kültürü ve yönetimi*. Pegem A Yayıncılık.
- Çelik, V. (2013). *Eğitimsel Liderlik*. Ankara: Pegem Akademi Yayıncılık.

- Çelikten, M. (2003). Okul kültürünün şekillendirilmesinde müdürün rolleri. *Türk Eğitim Bilimleri Dergisi*. 1(4), 1-7.
- Çetin, M., & Güven, Y. (2015). Lider öğretmenlerin okul kültürüne etkileri. *Uluslararası Eğitim Bilimleri Dergisi*. (3), 1-15.
- Dalgıç, E. (2015). *Okul yöneticilerinin algılanan liderlik stilleri ile okul kültürü arasındaki ilişkinin çok boyutlu incelenmesi* [Yayınlanmamış Yüksek lisans tezi]. Yeditepe Üniversitesi.
- Day, C., Harris, A. & Hadfield, M. (1999, 22-25 September). *Leading Schools in Times of Change*. Paper Presented at the European Conference on Educational Research. Lahti. Finland.
- Dean, J. (2002). *Managing the Secondary School* (Second Edition). UK: Taylor & Francis e-Library.
- Demir, V., & Durnalı, M. (2022). Ortaokul Öğretmenlerine Göre Okul Müdürlerinin Liderlik Davranışları ile Öğretmenlerin Örgütsel Bağlılığının İncelenmesi. *MANAS Sosyal Araştırmalar Dergisi*. 11(1), 143-157. <https://doi.org/10.33206/mjss.879492>
- Demirkol, A. Y., & Savaş, A. C. (2012). Okul müdürlerinin örgüt kültürü algılarının incelenmesi. *Süleyman Demirel Üniversitesi Fen-Edebiyat Fakültesi Sosyal Bilimler Dergisi*, 25, 259-272.
- Demirtaş, Z. (2010). Okul kültürü ile öğrenci başarısı arasındaki ilişki. *Eğitim ve Bilim*, 35(158), 3-13.
- Duranay, P.Y. (2005). *Ortaöğretim kurumlarının etkili okul özelliklerini karşılama düzeyleri (Erzurum örneği)* [Yayınlanmamış yüksek lisans tezi]. Pamukkale Üniversitesi.
- Dursun, İ. E. (2019). Okul müdürlerinin paternalist liderlik davranışlarının okul kültürü oluşturmadaki etkisi [Yüksek lisans tezi]. İstanbul Sabahattin Zaim Üniversitesi.
- Edwards, M., Ayers, R & Howard, C. (2003). Public service leadership: Emerging issues. A report for the Australian Public Service Commission. Can put and National Institute of Governance. The University of Canberra. Canberra.
- Ekiz, D. (2020). *Bilimsel araştırma yöntemleri: Yaklaşım, yöntem ve teknikler*. Anı Yayıncılık.
- Ekvall, G. & Ryhammar, L. (1998). Leadership style. Social climate and organizational outcomes: A study of a Swedish University College. *Creativity and Innovation Management*. 7(3), 126–130. <https://doi.org/10.1111/1467-8691.00100>
- Eren, E. (2009). *Yönetim ve Organizasyon*. Beta Basım Yayım Dağıtım.
- Erickson, F. (1987). Conceptions of school culture: An overview. *Educational Administration Quarterly*. 23, 11–24.
- Helvacı, M. A.. & Aydoğan, İ. (2011). Etkili okul ve etkili okul müdürüne ilişkin öğretmen görüşleri. *Uşak Üniversitesi Sosyal Bilimler Dergisi*, 4(2), 41-60. <https://dergipark.org.tr/en/pub/usaksosbil/issue/21648/232728>
- Hoy, W. K. & Miskel, C. G. (1996). *Educational administration: Theory, research, and practice*. (5<sup>th</sup> Ed.). McGraw-Hill.
- Işık, H.(2017). Ortaokullarda okul kültürünün incelenmesi. *İstanbul Aydın Üniversitesi Dergisi*, 9(3), 61-71. <https://doi.org/10.17932/IAU.IAUD.13091352.2017.9/35.61-71>

- Kafalı, U. (2022). Okul yöneticilerinin okul kültürünün oluşturulmasındaki rolü. *Balkan ve Yakın Doğu Sosyal Bilimler Dergisi*, 8(01), 48-58. [https://www.ibaness.org/bnejss/2022\\_08\\_01/08\\_Kafali.pdf](https://www.ibaness.org/bnejss/2022_08_01/08_Kafali.pdf)
- Kahveci, H. & Aypay, A. (2013). Hizmetkâr liderlik ve okul kültürü arasındaki ilişkinin ilköğretim okullarında incelenmesi. *Eğitimde Politika Analizi*, 2(1), 44-60. <https://dergipark.org.tr/en/pub/epa/issue/48309/611618>
- Karadağ, E. (2009). Ruhsal liderlik ve örgüt kültürü: bir yapısal eşitlik modelleme çalışması. *Kuram ve Uygulamada Eğitim Bilimleri*, 9(3), 1357-1405.
- Kılıç, E. D., Üstün, A., & Önen, Ö. (2011). Öğrenen örgütlerde etkili liderlik: Burdur örneği. *Educational Policy Analysis and Strategic Research*, 6(1), 5-22. <https://dergipark.org.tr/en/download/article-file/161878>
- Kline, R. B. (2011). Convergence of structural equation modeling and multilevel modeling. In M. Williams (Ed.), *Handbook of methodological innovation*. Thousand Oaks, CA: Sage.
- Küçükaslan, A. (2022). Okul yöneticilerinin liderlik stillerinin eğitime yansımaları üzerine değerlendirme. *Muallim Rifat Eğitim Fakültesi Dergisi*, 4(2), 156-169. <https://dergipark.org.tr/en/pub/mrefdergi/issue/71304/1113529>
- McCormick, M. J. (2001). Self-efficacy and leadership effectiveness: Applying social cognitive theory to leadership. *Journal of Leadership Studies*, 8(1), 22-33. <https://doi.org/10.1177/107179190100800102>
- Nichols, A. M. (2007). *A study of teacher leadership roles and their association to institutional benefits as perceived by principals and instructional facilitators* [Doctoral dissertation]. The University of Memphis.
- Önal, H. İ., & Ekici, S. (2012). Okul kütüphanecilerinin görüşlerine göre okul kültürü değerlendirmesi. *Bilgi Dünyası*, 13(1), 138-164. <https://doi.org/10.15612/BD.2012.172>
- Özbudun, S. (2005). Kültür (Fikret Başkaya Ed.). *Kavram sözlüğü: Söylem ve gerçek içinde* (s. 319-324). Özgür Üniversite Yayını.
- Özdemir, A. (2006). Okul kültürünün oluşturulması ve çevreye tanıtılmasında okul müdürlerinden beklenen ve onlarda gözlenen davranışlar. *Türk Eğitim Bilimleri Dergisi*, 4(4), 411-436. <https://dergipark.org.tr/en/pub/tebd/issue/26118/275151>
- Özgenel, M., & Dursun, İ. E. (2020). Okul müdürlerinin paternalist liderlik davranışlarının okul kültürüne etkisi. *Sosyal. Beşerî ve İdari Bilimler Dergisi*, 3(4), 284-302.
- Pallant, J. (2001). *SPSS survival manual: A step-by-step guide to data analysis using SPSS for windows* (version 10). Open University Press, Buckingham.
- Rosenholtz, S.J. (1991). *Teachers' workplace: The social organization of schools*. Teachers College Press.
- Salkind, N.J. (2010). *Statistic for people who (think they) hate stasssssss* (3th ed.). Sage.
- Schumacher, R. E., & Lomax, R. G. (2010). *A beginners guide to structural equation modeling: SEM*. Lawrence Erlbaum Associates.
- Sezgin, F. (2010). Öğretmenlerin örgütsel bağlılığının bir yordayıcısı olarak okul kültürü. *Eğitim ve Bilim*, 35(156), 142-159. <http://egitimvebilim.ted.org.tr/index.php/EB/article/view/248/22>

- Şahin, S. (2004). Okul müdürlerinin dönüşümcü ve sürdürümcü liderlik stilleri ile okul kültürü arasındaki ilişkiler (İzmir ili örneği). *Kuram ve Uygulamada Eğitim Bilimleri*, 4(2), 365-395.
- Şahin, S. (2011). Öğretimsel liderlik ve okul kültürü arasındaki ilişki (İzmir ili örneği). *Kuram ve Uygulamada Eğitim Bilimleri*, 11(4), 1909-1928.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Boston, MA: Pearson.
- Tableman, B. (2004). *School culture and school climate*. Michigan State University.
- Terzi, A. R. (2005). İlköğretim okullarında örgüt kültürü. *Kuram ve Uygulamada Eğitim Yönetimi*, 43, 423-442. <https://dergipark.org.tr/en/pub/kuey/issue/10354/126787>
- Turan, S., & Bektas, F. (2013). The relationship between school culture and leadership practices. *Eurasian Journal of Educational Research*, 13, 155-168.
- Yalçın, M., & Karadağ, E. (2013). Hizmetkâr liderlik ve okul kültürü: Bir yapısal eşitlik modellemesi. *İnönü Üniversitesi Eğitim Fakültesi Dergisi*, 14(2), 101-120.
- Yalçınkaya-Akyüz, M. (2002). Çağdaş okulda etkili liderlik. *Ege Eğitim Dergisi*, 1(2), 109-119. <https://dergipark.org.tr/en/pub/eggeefd/issue/4923/67351>
- Yılmaz, E. G. (2010). *Okul kültürü öğrenci başarısı ilişkisi: İstanbul ili ilköğretim okullarında ampirik bir araştırma* [Doktora Tezi]. Marmara Üniversitesi.
- Yukl, G. (2002). *Leadership in Organization* (5th Ed.) Academic Press.
- Yüzer, B. (2019). *Okul müdürlerinin karizmatik liderlik özellikleri ile okul öncesi öğretmenlerinin okul kültürü algıları arasındaki ilişkinin incelenmesi* [Yayınlanmamış Doktora tezi]. Marmara Üniversitesi.

## An Analysis of Handwriting Legibility of First Grade Students by School Starting Age

**İlhan Polat<sup>i</sup>**

Ministry of Education

**Cengiz Kesik<sup>ii</sup>**

Harran University

### Abstract

Legibility, which can be defined as the format of the text, is one of the key elements in teaching writing. School starting age can affect students' learning and writing, and determining it can give an idea about what type of work to be undertaken to ensure the legibility of the handwriting in the early reading and writing processes. The possible effect of the school starting age on the legibility of handwriting was the basis of this study. As such, the study aimed to examine the straight basic writings of primary school first grade students in terms of legibility based on the school starting age. The study was designed as a survey in the quantitative research method. The study group consists of 513 primary school first grade students. The convenience sampling method was chosen to determine the study group. The students who participated in the study voluntarily consisted of primary school first-year students who passed into literacy in May of the 2022-2023 academic year. Data were obtained using the Multidimensional Legibility Scale. The Mann-Whitney U test was used in the analysis of the data. Results revealed that the handwriting legibility of the students was moderate regarding the dimensions of slant, spacing, size, and line awareness, but not legible in terms of 'form'. While the results of this study show that the average handwriting legibility of girls is higher than that of boys, there is no statistically significant difference between the age of school entry and handwriting legibility.

**Keywords:** Handwriting Legibility, School Starting Age

**DOI:** 10.29329/ijpe.2023.603.13

**Submitted:** 07/06/2023

**Accepted:** 18/09/2023

**Published:** 16/10/2023

---

<sup>i</sup> **İlhan POLAT**, Ph.D., Van İlknur Ilıcalı Primary School, Ministry of Education, Turkey, ORCID: 0000-0002-7802-6337

**Correspondence:** ilhan\_polatt@hotmail.com

<sup>ii</sup> **Cengiz KESİK**, Assist. Prof. Dr., Faculty of Education, Harran University, Turkey, ORCID: 0000-0001-9777-0076

## INTRODUCTION

As social beings, individuals need some skills to express themselves in the environment they live in and the society they are part of. While the individual expresses him/her self by speaking in the preschool period, she/he expresses him/her self through writing after learning how to write after starting school. There are various definitions of handwriting in the literature. While Güneş (2021) defines writing as a process consisting of various steps such as holding a pencil, writing letters, activating prior knowledge, organizing in the mind, texting and reviewing, Akyol (2020) describes it as the production of symbols necessary to convey thoughts and ideas through motor skills. Examining the related definitions, it is clear that writing is a process and integrated skill that emerges as a result of mental and physical operations. It is important for the individual to develop his/her writing skills, to express his/her feelings and thoughts, and to be able to write legibly, as it is a skill that is used for a lifetime.

The stage in which the individual will formally learn the writing skill and take critical steps regarding this skill is the first grade of primary school. At this stage, individuals progress towards automation in writing skills by learning letter symbols, during which classroom teachers should not rush and perform the necessary preparation and awareness-raising activities to help learners acquire legible writing skills. In addition to all these, the development of writing skills is not limited to the first grade of primary school, but should be developed by spreading it to all education levels. In this way, the writing skill will develop better, the individual will be able to express him/her self more accurately, and convey his/her thoughts to other people more effectively. Göçer (2019) states that the development of an individual's writing skills can positively affect their cognitive, social and academic achievements.

Some variables play a role in the development of writing skills, which are grouped in various ways in the literature. While Feder and Mejnemer (2007) found that variables such as fine motor muscle control, visual motor adaptation, hand preference, visual perception and emotional awareness in the fingers are key factors in the development of writing skills, Coşkun (2019) concluded that variables such as muscle development, writing direction, hand preference, holding a pencil, sitting position, letters, and line awareness are crucial. These variables may affect the legibility of writing, which is one of the many factors that affect the development of writing skills. Writing legibility, which has dimensions such as education, line awareness, letterform-size-ratio, and spacing between letters and words, needs to be developed together with writing skills (Tok & Erdoğan, 2017). Not following the aforementioned dimensions, not noticing mistakes related to them, not having mistakes corrected, and not being given feedback may cause the individual to form illegible writing habit. In addition to all these, whether the age of starting school affects the legibility of writing has been a matter of curiosity, which has led to the current study focusing on the variable of school starting age.

Legibility, which can be defined as the format of the text, is one of the key elements in teaching writing. Reviewing the relevant research literature in Turkey reveals some studies on legibility (Babayiğit, 2018; Doğan & Doğan, 2018; Ekmekçi & Kasa Ayten, 2022; Gök & Baş, 2020; Kodan, 2016; Kuşdemir, Kurban & Bulut, 2018; Kuşdemir, Katrancı & Arslan, 2018; Okatan & Arslan Özer, 2020; Ulu, 2019; Yıldırım, 2019; Yıldız, 2013; Yıldız, Yıldırım & Ateş, 2009). Some of these studies focused on slant, spacing, size, form, and line awareness elements, while others tried to improve the legibility of writing according to different strategies, methods and techniques, or compared the legibility of the text, and also determined the legibility levels of the students' writing. When the studies in the literature were examined, handwriting legibility was found to have been examined by various variables. However, no research could be found that indicates that the handwriting legibility may differ by the age of starting school. School starting age can affect students' learning and writing, and determining it can give an idea about what type of work to be undertaken to ensure the legibility of the handwriting in the early reading and writing processes. The possible effect of the school starting age on the legibility of handwriting was the basis of this study. As such, the study aimed to examine the straight basic writings of primary school first grade students in terms of

legibility based on the school starting age, and for this purpose, the answers were sought for the following questions:

1. What is the level of legibility of the straight basic writings of primary school first grade students?
2. Does the handwriting legibility of primary school first grade students vary by
  - a) gender?
  - b) the age of starting school?

## METHOD

### Research design

The study, in which the straight basic writings of primary school first grade students were examined in terms of legibility on the basis of their school starting age, was designed as a survey in the quantitative research method. The survey design is defined as the collection and description of data to reveal the characteristics of events and phenomena that existed in the past or exist in present (Büyüköztürk et al., 2023).

### Study group

The study group consists of 513 primary school first grade students. The school starting age in Turkey is 72 months as of the end of September of the enrollment year. In However, 66, 67 and 68 months old children who have a written request from their parents are also enrolled in the first grade of primary school. Parents of those who are 69, 70 and 71 months old can send their child to pre-school education or postpone their enrollment for one year (MEB, 2019). The convenience sampling method was chosen to determine the study group. Since this method is quick and easy to apply, it is a frequently preferred method (Patton, 2005). The students who participated in the study voluntarily consisted of primary school first-year students who passed into literacy in May of the 2022-2023 academic year. The distribution of the students by their school starting age and gender is as shown in Table 1.

**Table 1. Demographic information**

Students		f	%
Gender	Girl	247	48,14
	Boy	266	51,85
Age of starting school	66-71 months	73	14,23
	72+ months	440	85,76
Total		513	100

Looking at the table, the gender distribution can be seen to be balanced. When Table 1 is examined, 14.23% of the students are 66-71 months old and 85.76% are 72 months old and above.

### Data Collection

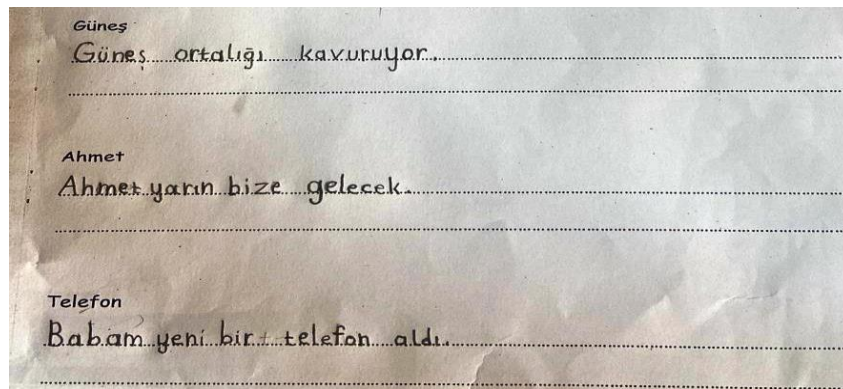
The data were obtained by using the *Multidimensional Legibility Scale* developed by Yıldız and Ateş (2007) based on student handwritings. There are 5 dimensions in the scale: slant, spacing, size, form, and line awareness (staying on the line). The need to change the slant factor in the first version of the scale arose due to the transition from cursive handwriting to straight basic letters in the first literacy teaching in Turkey. Therefore, in this study, the slant factor adapted by Gök and Baş (2020) to straight basic letters was used. Scale factors are scored as completely adequate (3 points),

moderate (2 points), not at all sufficient (1 point). The lowest score that can be obtained on the scale is 5, and the highest score is 15. The legibility values of the scale are as in Table 2.

**Table 2. Multidimensional Legibility Scale Values**

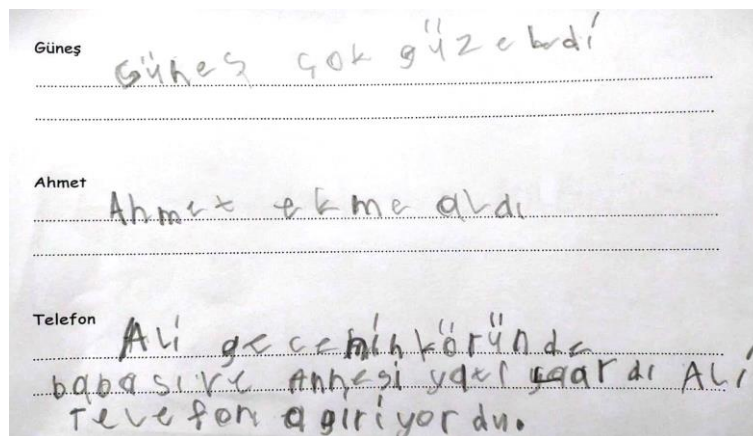
Legibility level	Over the total score	Over each factor
Illegible	5 - 8,3 pts	1 - 1.66
Moderately legible	8.4 – 11.7 pts	1.67 - 2.32
Legible	11.8 – 15 pts	2.33 - 3

Within the scope of the study, the students were asked to write six sentences. Considering the grade level of the students, they were given six keywords to facilitate their writing and they were asked to write sentences about these words. The writings of the students were scored separately by the two researchers according to the *Multidimensional Legibility Scale*. To ensure rater reliability, 30% of the scores were scored separately by another researcher, and the inter-rater reliability between the raters was also calculated. According to this calculation, the Cronbach Alpha coefficient was found to be .96 and it was concluded that the scoring was reliable. The data set was created by adding the school starting age and gender status of the students to the scores obtained. The writing samples of the students and the assessment samples of the researchers are given in Figure 1 and Figure 2.



**Figure 1. An example of legible handwriting**

When the handwriting sample seen in Figure 1 was subjected to legibility analysis, it was rated as “legible,” with a total of 13 points in terms of slant (3), spacing (3 points), size (2 points), form (2 points) and line awareness (3 points).



**Figure 2. An example of illegible handwriting**



Analyzing the handwriting sample shown in Figure 2, an illegible text gets a total of 5 points by adding slant (1 point), spacing (1 point), size (1 point), form (1 point), and line awareness (1 point) together.

### Data Analysis

Package programs were used in the analysis of the data. The Kolmogorov-Smirnov test revealed that the data did not show normal distribution. As such, the non-parametric Mann-Whitney U test was used in the analysis of the data. In addition, the mean and standard deviation values for handwriting legibility were calculated over the sub-dimensions and the total score.

## RESULTS

In this section, the results regarding the legibility of the first-grade primary school students' straight (non-cursive) handwritings are presented, which consist of the mean and standard deviation values of the text legibility of the sub-dimensions and total scores, followed by results regarding gender and school starting age. The descriptive assessment results regarding the sub-dimensions and the total score are given in Table 3.

**Table 3. Handwriting Legibility Mean and Standard Deviation Scores**

Legibility dimensions	n	$\bar{x}$	Ss	Legibility
Slant	513	1,79	.62	Moderately legible
Spacing	513	1,86	.70	Moderately legible
Size	513	1,92	.65	Moderately legible
Format	513	1,39	.58	Illegible
Line awareness	513	1,98	.60	Moderately legible
Total	513	8,95	2,53	Moderately legible

Looking at the table, we can see that the legibility of the handwriting is  $\bar{x}=1.79$  in the slant dimension,  $\bar{x}=1.86$  in the spacing dimension,  $\bar{x}=1.92$  in the size dimension,  $\bar{x}=1.39$  in the form dimension,  $\bar{x}=1.98$  in the line awareness dimension, and  $\bar{x}=8.95$  in the total score. According to the average scores, the slant, spacing, size, line awareness and the total score for legibility are moderate. However, the handwriting legibility in terms of 'form' is observed to be inadequate. Based on these results, the legibility of the first grade students' handwriting can be said to be moderate.

The assessment results regarding the sub-dimensions of handwriting legibility and the total score based on the gender of the students are presented in Table 4.

**Table 4. Mann Whitney U Test Results on Handwriting Legibility by Gender**

Dimension	Gender	n	Rank average	Rank total	U	p
Slant	Girl	247	272,32	67264,00	29066,00	.011
	Boy	266	242,77	64577,00		
Spacing	Girl	247	275,23	67981,00	28349,00	.003
	Boy	266	240,08	63860,00		
Size	Girl	247	266,70	65874,50	30455,00	.110
	Boy	266	247,99	65966,50		
Format	Girl	247	271,94	67170,00	29160,00	.008
	Boy	266	243,12	64671,00		
Line awareness	Girl	247	280,26	69223,50	27106,00	.000
	Boy	266	235,40	62617,50		
Total Score	Girl	247	283,05	69913,00	26417,00	.000
	Boy	266	232,81	61928,00		

As shown in the table, the scores obtained by the first grade students in the sub-dimensions of legibility, slant, spacing, form, line awareness, and the total of the scale differ significantly by gender,

while there is no significant gender-based difference in the ‘size’ sub-dimension. Examining the rank averages, the average score of girls is observed to be higher than those of the boys according to the sub-dimensions of slant, spacing, form, line awareness, and the total score. Accordingly, it can be said that the handwriting legibility of girls is higher than that of boys.

The results regarding the sub-dimensions of handwriting legibility and the total score of the students by the school starting age are given in Table 5.

**Table 5. Mann Whitney U Test Results on Handwriting Legibility by School Starting Age**

Dimension	Age	n	Rank average	Rank total	U	p
Slant	66-71 months	73	263,34	19224,00	15597,00	,655
	72+ months	440	255,95	112617,00		
Spacing	66-71+ months	73	270,08	19716,00	15105,00	,376
	72+ months	440	254,83	112125,00		
Size	66-71 months	73	273,57	19970,50	14850,50	,249
	72+ months	440	254,25	111870,50		
Form	66-71 months	73	266,32	19441,00	15380,00	,486
	72+ months	440	255,45	112400,00		
Line awareness	66-71 months	73	272,13	19865,50	14955,50	,271
	72+ months	440	254,49	111975,50		
Total score	66-71 months	73	274,38	20030,00	14791,00	,275
	72+ months	440	254,12	111811,00		

Looking at the table, it is seen that the scores of first grade students in the sub-dimensions of legibility of writing such as slant, spacing, size, form, line awareness, and the sum of the scale do not differ significantly by the school starting age. Thus, there is no statistically significant difference between the handwriting legibility of the students who start school in the 66-71 month period and of those who start school at 72 months or more.

## DISCUSSION AND CONCLUSION

Focusing on the legibility of the first grade primary school students’ handwriting, this study revealed that the handwriting legibility of the students was moderate regarding the dimensions of slant, spacing, size, and line awareness, but not legible in terms of ‘form’. The highest performance was observed in the line-awareness dimension. These results are consistent with some previous research results reported in the literature (Gök & Baş, 2020; Kuşdemir, Katrancı & Arslan, 2018; Ulu, 2019). Gök and Baş (2020) determined that the students wrote legibly by all subdimension criteria, except for the ‘form’ subdimension, and they performed the best in ‘line awareness’. Based on the results of the current research and the literature, it can be said that the handwritings of the first grade students in primary school can be said to be legible, but they cannot write the letters correctly in terms of ‘form’. Such problems can be solved by writing exercises. The action research conducted by Ekmekçi and Kasa Ayten (2022) by going over letters, words, sentences and texts and visual dictation reported improvements in the writing skills of the students. The results of Yıldırım’s (2019) research based on the Montessori method recorded improvements in the legibility of the students’ handwriting as well. The results of the current study clearly show that writing activities based on different strategies, methods and techniques improve writing skills.

The results of the present study show that the handwriting legibility of girls is higher than that of boys. While these results are supported by some results in the literature (Kuşdemir, Katrancı, & Arslan, 2018), they contradict some others (Demiroğlu Memiş, 2018; Gök & Baş, 2020). Overall, results from the current study and those in the literature show that the average of handwriting legibility in terms of gender can sometimes be in favor of girls and sometimes boys, which can be argued to stem from the demographic characteristics of the participants included in the study.

Another result revealed by this study is that there is no statistically significant difference between the school starting age and handwriting legibility. In the related literature, no research could be found on the relationship between the school starting age and the legibility of handwriting. The only exception to this is the study conducted by Tatal and Oral (2015), which found that the first

writing achievement of students aged 73 months and older was higher than those of students aged 60-66 months. This highlights the importance of the current study once again, as the results obtained here fill the gap in the relevant literature. It can be concluded that the age of starting school has no effect on the legibility of handwriting.

**Conflicts of Interest:** The authors declared no conflicts of interest with respect to the research, authorship, and/or publication of this article

**Funding Details:** The authors received no financial support for the research.

**CRedit Author Statement:** The authors equally contributed to all stages of the study.

**Ethical Statement:** Ethical approval for this study was obtained from Harran University Social and Humanities Ethics Committee dated 14.04.2023 (Decision: 2023/46).

## REFERENCES

- Akyol, H. (2020). *Türkçe ilk okuma yazma öğretimi*. Pegem Akademi Yayıncılık.
- Babayiğit, Ö. (2018). İlkokul birinci sınıf öğrencilerinin dik temel harf yazım hatlarının incelenmesi. *Adıyaman Üniversitesi Eğitim Bilimleri Dergisi*, 8(2), 176-199.
- Büyükoztürk, Ş., Akgün, Ö. E., Karadeniz, Ş., Demirel, F. & Kılıç Çakmak, E. (2023). *Bilimsel araştırma yöntemleri*. Pegem Akademi
- Coşkun, İ. (2019). Yazmayı Etkileyen etmenler ve yazmaya hazırlık çalışmaları. E. Ünal & F. Susar Kırmızı (Editor). *İlk okuma ve yazma öğretimi* içinde (ss. 153-187). Anı Yayıncılık.
- Demiroğlu Memiş, A. (2018). Examination of legibility and writing speeds of primary school students with respect to writing disposition and writing style. *Universal Journal of Educational Research*, 6(5), 1050-1059.
- Doğan, M. F. & Doğan, Z. (2018). Identifying common errors in vertical lowercase manuscript writing of the first graders in primary school. *Journal of Education and e- Learning Research*, 5(3), 144- 156.
- Ekmekçi, S. & Kasa Ayten, B. (2022). İlkokul öğrencilerinin yazma hatalarının düzeltilmesi: Bir eylem araştırması. *RumeliDE Dil ve Edebiyat Araştırmaları Dergisi*, (31), 227-255.
- Feder, K. P. & Mejnemer, A. (2007). Handwriting development, competency, and intervention. *Developmental Medicine & Child Neurology*, 49, 312-317.
- Göçer, A. (2019). *Yazma eğitimi*. Pegem Akademi Yayıncılık.
- Gök, B. & Baş, Ö. (2020). İlkokul 1. sınıf öğrencilerinin dik temel yazılarının okunaklılığı üzerine bir inceleme. *Ana Dili Eğitimi Dergisi*, 8(2), 572-585
- Güneş, F. (2021). *Türkçe öğretimi yaklaşımlar ve modeller*. Pegem Akademi Yayıncılık.
- Kodan, H. (2016). Yazma güçlüğü olan üçüncü sınıf öğrencisinin el yazısı okunaklılığının geliştirilmesi: Eylem araştırması. *Türkiye Sosyal Araştırmalar Dergisi*, 2, 523-539.
- Kuşdemir, Y., Katrancı, M. & Arslan, F. (2018). Analysis of the primary school students' legibility. *International Online Journal of Educational Sciences*, 10(3), 116-132.

- Kuşdemir, Y., Kurban, H. & Bulut, P. (2018). Yazma güçlüğü yaşayan bir öğrenci ile ilgili eylem araştırması. *Uluslararası Türkçe Edebiyat Kültür Eğitim (TEKE) Dergisi*, 7(2), 1190-1209.
- MEB. (2019). Millî Eğitim Bakanlığı Okul Öncesi Eğitim ve İlköğretim Kurumları Yönetmeliğinde Değişiklik Yapılmasına Dair Yönetmelik. Resmî Gazete, Sayı :30827. Date of access: 24.05.2023: <https://www.resmigazete.gov.tr/eskiler/2019/07/20190710-6.htm>
- Okatan, Ö. & Arslan Özer, D. (2020). İlkokul birinci sınıf öğrencilerinin yazma becerilerinin betimlenmesi. *Ana Dili Eğitimi Dergisi*, 8(3), 720-731.
- Patton, M. Q. (2005). *Qualitative Research*. John Wiley & Sons, Ltd.
- Tok, R. & Erdoğan, Ö. (2017). İlkokul 2. 3. ve 4. sınıf öğrencilerinin yazma becerilerinin incelenmesi. *YYÜ Eğitim Fakültesi Dergisi*, 14(1), 1003-1024.
- Tutal, Ö. & Oral, B. (2015). İlk okuma-yazma öğrenmede okula başlama yaşının okuma-yazma başarısına etkisi. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, (24), 96-121.
- Ulu, H. (2019). İlkokul birinci sınıf öğrencilerinin dik temel yazılarının okunaklılık ve yazım hataları açısından incelenmesi. *International Journal of Field Education [IJOFE]*, 5(2), 195-211.
- Yıldırım, C. (2019). *Montessori yöntemine dayalı öğretim tasarımının birinci sınıf öğrencilerinin hazırbulunuşluklarına, matematik ve okuma yazma becerilerine etkisi* [Doctoral Thesis]. Mehmet Akif Ersoy Üniversitesi, Burdur.
- Yıldız, M. (2013). Yazma güçlüğü (disgrafi) olan bir ilkokul 2. Sınıf öğrencisinin el yazısı okunaklılığının geliştirilmesi: Eylem araştırması. *Uşak Üniversitesi Sosyal Bilimler Dergisi*, 16, 281-310.
- Yıldız, M. & Ateş, S. (2007). *İlköğretim 3. sınıf öğrenci yazılarının okunaklılık bakımından incelenmesi*. I. Ulusal İlköğretim Kongresinde sunulan poster bildirisi. Hacettepe Üniversitesi. Ankara.
- Yıldız, M., Yıldırım, K. & Ateş, S. (2009). Sınıf öğretmenlerinin sınıf tahtasına yazdıkları yazıların okunaklılık bakımından öğrencilere model olmadaki uygunluğu. *Uluslararası İnsan Bilimleri Dergisi*, 8(2), 75-88.

## **Nurturing Young Minds and Bodies: Exploring Critical Media Literacy Through Healthy Food Adventures\***

**Şerife Cengiz**<sup>i</sup>  
Usak University

**Tolga Kargin**<sup>ii</sup>  
Usak University

### **Abstract**

This study aimed to help young children understand media better and develop healthy eating habits through fun and engaging activities that encourage critical thinking about media content. These activities were designed for children aged 60 to 72 months and were part of an action research project. Eleven children participated in the study, and the results showed that initially, they had limited knowledge about healthy eating and how media works. However, after taking part in the media literacy activities, they became better at analyzing media content and realized that not everything they see in advertisements is accurate. As a result, their awareness of healthy eating improved significantly. This research highlights the potential benefits of teaching media literacy to young children, which can positively influence their overall development and enhance their critical thinking skills on real-world issues.

**Keywords:** Early Childhood Education, Critical Media Literacy, Nutritional Awareness, Action Research.

**DOI:** 10.29329/ijpe.2023.603.14

**Submitted:** 16/08/2023

**Accepted:** 20/09/2023

**Published:** 16/10/2023

---

\* Preliminary findings of this study were remotely presented at EJER Congress 2022.

<sup>i</sup> **Şerife Cengiz**, Instructor, Department of Child Development, Usak University, ORCID: 0000-0002-4201-9426

<sup>ii</sup> **Tolga Kargin**, Asst. Prof. Dr., Department of Elementary Education, Usak University, ORCID: 0000-0003-2380-2383

**Correspondence:** tolga.kargin@usak.edu.tr

## INTRODUCTION

Digital technologies have become an integral part of children's lives (Recalde & Gutiérrez-García, 2017; Yang & Chang, 2021), attracting children of all ages. Research indicates that many children are exposed to media tools before age one (Chaudron et al., 2015; Cheung et al., 2017; Dardanou et al., 2020; Kabali et al., 2015; Wei & Chuang, 2016). A large-scale study by the Pew Research Center (2020) involving parents in the United States with children aged 0-11 revealed that 60% of parents reported their children using smartphones before age 5, and 81% of parents with children aged 5-8 mentioned their children using tablet computers. Comparable digital technology usage patterns are evident in Turkey, where daily internet usage in 2021 exceeds the global average by about an hour (We Are Social and Hootsuite, 2021).

While new technologies offer developmental opportunities for young children (Kargın, 2022), they also present challenges (Ling et al., 2022). Early childhood significantly influences lifelong development (Mukherji & Dryden, 2014), with technology misuse potentially yielding lasting effects (Ling et al., 2022), including musculoskeletal issues, visual impairments (Asqarova & Zengin, 2022), attention deficits, behavioral problems (Gökçe et al., 2021), language development disorders (Nobre et al., 2019), eye disorders (Guo et al., 2021), and sleep disturbances (Staples et al., 2021).

Digital media has also integrated into children's lives, affecting eating habits (Bar-on, 2000). Research shows that digital media can influence improper eating habits, potentially leading to eating disorders (Wartella, 2013). Addressing healthy nutrition is pertinent as obesity becomes a global concern, with projections indicating a 60% rise in childhood obesity worldwide, reaching 250 million by 2030 (Ministry of Health, 2022). Childhood obesity tends to persist into adulthood (Sahoo et al., 2015), influenced by factors like media-driven unhealthy eating habits (Bar-on, 2000). Numerous food advertisements aimed at children promote calorie-, sugar-, sodium-, and fat-rich products (Kelly et al., 2010), contributing to poor food choices and obesity risks (European Food and Nutrition Action Plan, 2015-2020).

Advertising's impact on children's consumption habits is evident (Kraak et al., 2006), utilizing modern strategies like digital game characters, virtual marketing, and integrated online ads (Calvert, 2008). Platforms such as YouTube employ personalized ads (Demir & Kargın, 2020). Media's potential to promote healthy habits is demonstrated by a study showing Pacman favoring healthy food (Pempek & Calvert, 2009). Integrating media literacy into education becomes vital for cultivating critical perspectives (Agnoletti et al., 2021) to navigate media's evolving landscape (Hobbs, 2011). Media literacy, encompassing various literacy forms (Potter, 2005), is crucial in today's information-rich world (Çetintaş & Turan, 2018). Promoting safe media use rests with adults (Hobbs, 2011), while media content profoundly impacts children's habits (Vuksan et al., 2022). This study addresses the gap in preschool research on media's role in healthy eating habits, emphasizing critical media literacy for young children. This study aims to enable correct analysis of media content, particularly unhealthy food ads, and foster healthy nutrition awareness among 60-72-month-old children through critical media literacy activities.

This study seeks to answer the following research questions concerning critical media literacy activities with preschool children:

- How effectively do children analyze media content?
- To what extent does critical media literacy raise awareness of healthy eating?

## METHOD

### Research Design

This study employs an action research design, a qualitative research approach aimed at facilitating meaningful change (Bogdan & Biklen, 2003). As articulated by Merriam (2009), qualitative research encompasses techniques to define, interpret, and address matters related to meaning. Action research involves a structured sequence including planning, implementing, collecting, and analyzing data to enhance the quality of real-world actions, particularly in classroom settings (Fraenkel & Wallen, 2003; Johnson, 2003). This methodology not only illuminates existing conditions but also encourages proactive steps to improve or transform those conditions.

### Participants and Data Collection

This study was conducted with 11 children aged between 60 and 72 months. The study took place in a kindergarten classroom situated within a secondary school in an urban area of a province in the Aegean Region of Turkey. This school primarily caters to children from families with socio-economic backgrounds ranging from low to middle income levels. To select participants, the researchers opted for a convenient sampling method aiming for a quick and efficient assembly of the study group, in line with the approach recommended by Baltacı (2018).

### Setting

The research was conducted in a kindergarten classroom equipped with technological amenities like smart boards and computers, facilitating the exploration of media content. Additionally, the classroom's spaciousness allowed for various activities and original product creation. When needed, the study also utilized the kindergarten's multipurpose hall.

### Data Collection Instruments

Prior to data collection, parental consent was obtained in accordance with ethical guidelines set forth by Uşak University Social and Human Sciences Scientific Research and Publication Ethics Committee (Meeting Date: 13.10.2022, Decision Number: 2022-138). Data collection took place during the action research phases: identifying and analyzing problem situations, devising strategies to address these issues, implementing plans, and evaluating and sharing outcomes. The study spanned five weeks with 10 visits to the kindergarten, involving interventions lasting 35 to 150 minutes (See Table 1 for the action plan). To capture comprehensive data, two cameras were deployed to record classroom activities from different perspectives. In addition to video recordings, supplementary data sources included audio recordings, photographs, researcher diaries, and students' end products.

**Table 1. Action Plan**

Application Week	Application Sequence	Application Period	Action
Week 1	1	40 minutes	Meeting the children / Giving information about the research
Week 1	2	70 minutes	Determination of Children's Knowledge and Awareness Levels
Week 1	3	50 minutes	Preparing Poster about Healthy / Unhealthy
Week 2	4	35 minutes	What Do Advertisements Tell? (Activity)
Week 2	5	120 minutes	Advertising Analysis (Activity) / Fictionality in Advertisements
Week 3	6	40 minutes	Website Analysis
Week 3	7	75 minutes	Let's Create Our Own Menu (Activity)
Week 4	8	110 minutes	Let's Create Our Own Menu (Activity)
Week 4	9	120 minutes	From Learning to Teaching
Week 5	10	150 minutes	We are on Stage

## Data Analysis

Data analysis employed a Multimodal Interaction Analysis approach, considering not only verbal communication but also nonverbal cues such as gestures, expressions, and movements (Norris, 2013). This method enriches the analysis by exploring meanings conveyed beyond words. The researchers coded video and audio recordings, photographs, diaries, and generated products. Themes emerged through coding, guiding the subsequent findings.

## Validity and Reliability Measures

Ensuring validity and reliability involved reviewing the action plan by expert researchers and revising it in light of their insights. The implementation of the plan was conducted alongside classroom teachers to foster a sense of security among children. Accurate data collection, a hallmark of robust action research (Koshy, 2005), was facilitated through multiple data sources, including two cameras from different angles, audio recordings, diaries, photographs, and children's creations. The researcher's ongoing observations and consultations with the classroom teacher augmented data collection. Achieving consensus in data interpretation was a priority (Koshy, 2005). To ensure this, both researchers independently reviewed all data, addressing any uncertainties by re-evaluating camera and audio recordings with participant involvement to gain accurate insights.

## FINDINGS

### Introductory Activities and Initial Knowledge Assessment

In the initial week, following the completion of necessary permissions, the children were introduced to the study. The researcher conveyed the study's purpose and introduced the cameras that would be used during the sessions, clarifying their role in the process. To exemplify the importance of the cameras, the children were given the chance to create short recordings within the classroom. These recordings were then reviewed collectively, illustrating the significance of the cameras' utility.

During the second interaction with the children, a series of questions were posed to gauge their comprehension and awareness regarding healthy and unhealthy dietary choices. The responses provided by the children were illuminating and are compiled in Table 2.

**Table 2. Children's Awareness and Knowledge Levels in the Second Week**

Child	What are unhealthy foods?	How do you know these are unhealthy? (Who said that, where did you hear it?)
C 1	Chips, cola	Mom/Dad told me. I drink when the acid runs out.
C 3	Jelly Bean	My brother told me
C 5	Acidic Colas	My teacher explains
C 6	Cola, chocolate, chips	I hear it on the news.
Child	<b>If you went to a restaurant, what would you order for yourself?</b>	<b>Why?</b>
C 1	Hamburger and Ice tea	Because it tastes so good
C 4	French fries, pastry, cola	I love them all
C 9	Hamburger and Coke with ice	As a menu, I mean, I love it because it's icy

From the responses, it was evident that initial awareness of unhealthy foods was somewhat limited. The query about restaurant preferences further underscored this trend, as the choices leaned exclusively toward unhealthy options. Notably, an engaging discussion emerged among the children about the potential harm of acidic colas, revealing a pivotal insight. A child referred to a YouTube video featuring "Princess Elif," a popular child YouTuber with a substantial online following. This interaction underscored the considerable influence wielded by digital personalities. After the intervention, the child altered their perspective on cola, recognizing its acidity as detrimental. This transition highlighted the effect of precise information dissemination. The subsequent conversation



delved into the adverse effects of cola, including dental concerns, kidney impact, and bone health, showcasing the researcher's role in delivering comprehensive insights.

## **Educational Process**

### ***Raising Awareness about Healthy and Unhealthy Foods***

In the following session, the children were equipped with distinctive hats symbolizing diverse healthy foods. Each child shared the benefits and rationale behind their food choices. Visuals portraying unhealthy foods such as cola, chips, artificially colored sweets, candy, and ice cream were then presented, stimulating a discourse on their detrimental attributes. A collection of images depicting both healthy and unhealthy foods was distributed, prompting the children to classify and affix them on designated boards based on their healthiness. Though sporadic confusion arose, the children generally assigned the images accurately. The resultant posters were showcased on the school's bulletin board (See Figure 1-2-3).



**Figure 1-2-3. Preparing Healthy and Unhealthy Foods Posters**

A noteworthy exchange ensued when fruit juice was identified as healthy by a child (C 3). Similarly, a debate arose over blue-colored ice cream, with one child (C 5) labeling it as "healthy," while another child (C 6) countered due to the artificial color. The ensuing dialogue unearthed a misconception about the origin of such colors. The researcher facilitated the discussion, urging the children to explore the source of these colors. This exercise not only clarified the confusion but also instilled in the children a proactive approach to sourcing accurate information.

This engagement cultivated an environment where the internet evolved from a source of entertainment to a tool for learning and inquiry. The children exhibited newfound curiosity and an aptitude for questioning and understanding novel information. This preliminary engagement indicated that even before the formal initiation of the study, foundational notions about healthy nutrition had already begun to shape in the children's minds.

Following a joint viewing of a commercial, an experiment was conducted involving a commonly consumed product. During this experiment, the children were prompted with questions concerning the product's healthiness and the omission of its unhealthy aspects in the advertisement. Throughout the experiment, only two children (C 4 and C 9) responded to the query "What makes the dragees colorful?" by stating "paint." Conversely, other children did not offer opinions, and one child remarked, "They make them yellow with lemon and red with strawberry, teacher."



**Figure 4. Colors of Dragees Experiment**

To ascertain whether the colors in the dragees were sourced from fruits, the researcher executed an experiment (See Figure 4). Slices of lemons and oranges were placed in separate glasses of water, allowing the children to observe whether the fruits influenced the water's color. Despite the passage of time, the water remained unaffected, whereas the dragees immediately imparted their colors to the plate upon contact with water. This observation prompted a subsequent discussion. The children were then informed about the ingredients responsible for the dragees' color, including some substances banned in certain countries due to their harmful nature, and the use of beeswax for enhancing shine. Some children expressed astonishment, with C 9 remarking, "Teacher, this is like eating watercolors."

Another child (C 3) responded by saying, "But we can't eat it at all, we crave it." In response, the researcher disclosed a secret to prevent the children from becoming disillusioned by the research or dampening their initial enthusiasm. The researcher stated, "Of course, sometimes we will have strong cravings for these foods, even though it's best not to consume them at all. Occasionally, we can indulge in having a few bites."

Recognizing that rigid prohibitions might not effectively induce habit change and that an overly prescriptive stance would be inappropriate from the outset, the approach taken was intentionally flexible. Table 3 presents the responses of select children before and after the study.

**Table 3. Children's Responses Before and After the Experiment**

Do you think dragees are healthy or not? Why do you think that?		
Child	Pre-Application Answer	Response After Implementation
C 5	It's healthy because it gives energy, but it can rot teeth, which is unhealthy.	Unhealthy because it contains food coloring.
C 8	Unhealthy because it has chocolate.	It contains things we shouldn't eat, so it's unhealthy.
C 9	It's neither healthy nor unhealthy, but it tastes good.	There are very harmful and unhealthy disgusting dyes.
C 11	I don't eat at all, teacher, my mom won't let me.	There's too much glossy paint, very unhealthy.

The objective was not to impose discipline but to cultivate media literacy coupled with healthy dietary habits. Accordingly, a flexible and adaptable approach was embraced.

### ***Understanding Media***

#### ***The Integration of Sound, Image, and Music Elements in Media Products***

During the initial application of the second week, a commercial was presented to the children utilizing solely sound, without any accompanying visuals. Subsequently, the sound was muted entirely, prompting the children to concentrate on the visual component. Finally, the commercial was

screened with both sound and image, encouraging the children to contemplate the rationale behind combining visuals, music, and sound (such as the degree of entertainment, the potential impact of solely visuals or sound, etc.).

Conversations unfolded as follows:

C 8: "I did not understand what happened when there was only sound."

C 2: "No sound but we can see."

C 1: (referring to both sound and image) "She is beautiful and funny in her own way."

The essence of this exercise aimed to facilitate the children's comprehension of how these elements collaboratively shape a more captivating and memorable content. Remarkably, most children who focused solely on the auditory dimension (excluding C 8) were able to discern the advertising company and product with ease. When presented with only images and no sound, the children accurately recited the lines from the advertisement in their appropriate contexts. Furthermore, when the complementary components (sound and image) were disjointed, a subset of children diverted their attention to other matters. However, upon the synchronized presentation of sound and image, heightened engagement and enthusiasm were evident. This outcome suggests that commercials attain their objectives more effectively through the strategic integration of various effects, sound, and images. In light of this, the children were informed that songs and dynamic visuals are harnessed to enhance product memorability, eliciting some children to spontaneously sing different jingles.

#### *Exploring the Fictionality of Advertisements*

In this activity, children viewed commercials for Hot Wheels and Barbie to cultivate their awareness of fictionality within advertisements. Following the viewing, the children were informed that they would soon engage with these toys. Subsequently, a Hot Wheels race track was set up in the classroom. The girls enthusiastically commenced play with Barbie dolls, encountering minimal issues except for slight discrepancies from the commercial in terms of doll flexibility and outfit changes. Conversely, with the Hot Wheels toy, which necessitated competitive play, the children encountered difficulties consistently launching the cars toward their target. Despite repeated attempts, the outcome remained unchanged. The researcher observed this process without interference (See Figure 5 and 6).



**Figure 5 – 6. Fictionalization in Advertisements Activity**

Subsequently, one child from the doll-playing group sought the researcher's assistance in dressing the dolls, while some children from the car-playing group requested aid in propelling the cars. With the researcher's support, doll attire was reluctantly arranged, while the cars consistently failed to

hit the target. This puzzling situation confounded the children. One child (C 7) proposed rewatching the commercials, prompting their subsequent viewing. C 8 continued, "Now I realize that we were doing it wrong" and wished to try anew. Despite a forceful launch resembling the commercial, the outcome persisted unchanged. The novelty of this toy and brand contributed to this enlightening experience, as none of the children had encountered similar toys before. This inability to replicate the commercial portrayal despite familiarity with the advertisements underscored the concept of fictionality, evoking profound realization. Lengthy discussions were held with the children (See Table 4 for children's responses before and after the application).

**Table 4 Children's Thoughts About the Fictionality in Advertisements**

Do you think everything we see in advertisements is true?		
Child	Pre-Application Response	After Application Response
C 1	Yes, for us it's all already.	We played with my teacher, we wanted to fly with Barbie.
C 4	I don't know.	Teacher, they are fiction, they are made on the computer for us to buy.
C 5	I once bought a toy that came out, so it's true.	They are not true, they are doing it for our money.
C 11	I think it's true.	Teacher, they're rigged

During a dialogue centered on Barbie's slogan, "Everything is possible with Barbie," the children were asked if everything was possible with Barbie. One child who responded affirmatively was prompted to hold the doll and articulate their intended action. An attempt at flying ensued; however, the realization quickly dawned that this endeavor was futile. C 1 exclaimed, "No." This marked a pivotal moment of enlightenment for C 1, who recognized the implausibility of the action depicted in the commercial. They commented, "It didn't happen because it can't happen; it's absurd. They are just trying to excite us." This realization underscored an essential phase in media literacy—discerning fictionality in advertisements. Conversations among children playing with the cars unfolded:

C 8: "It doesn't always have to be like that; after all, we played a fun game."

This exchange reflected a moment of awareness within the children, despite their frustration with the process.

### ***Analyzing Websites and Advertisements Featuring Healthy and Unhealthy Foods***

In another segment of the implementation plan, two websites were scrutinized—one promoting healthy food and the other endorsing unhealthy food. The chosen websites were from a hamburger company (<https://www.mcdonalds.com.tr/>, 16.05.2022) representing unhealthy food, and a kefir company (<https://www.altinkilic.com/>, 16.05.2022) advocating healthy options. As the children explored these websites, distinct features were discussed.

During the examination of the hamburger company's website, various elements were highlighted, including the allergen list displayed in minuscule fonts, intrusive pop-up advertisements enticing purchases, children's menus, and the inclusion of toys. Similarly, the kefir company's website was studied, focusing on sections elaborating on kefir's benefits and its nutritional content. Subsequently, product advertisements were also viewed, considering the potential influence of visual stimuli on children's attention. During these advertisements, the children were probed about aspects like rapid and small text passages, the frequent utilization of beloved characters in ads, and the practice of offering toys with hamburger menus.

When the children were collectively asked, "Why did the kefir company's website emphasize kefir's benefits, whereas the hamburger company's website did not provide similar information?" only one child (C 1) responded, "Because hamburgers aren't beneficial." The responses encapsulated in Table 5 emerged from children who initially accepted products as presented by food companies, illustrating their evolution in analyzing advertisements and websites.



**Table 5 Website and Advertising Analysis**

Why do they give toys on children's menus?

	Pre-Application Answer	Response After Implementation
C 1	To make the children happy.	We'll go and pick it up .
C 4	They didn't give it to me, teacher.	I got the kids' menu, but they're out of toys. He said it in the article, you showed me.
C 7	I don't know.	So we can go to more burger joints.
	Why are there the underlining text in the commercials we just watched, why is it written so fast and small?	
	Pre-Application Response	Response After Implementation
C 7	To teach us to read, to read fast.	So that we cannot read.
C 9	I don't know.	In case we don't buy it if we read it.
C 11	I've never seen it.	It passes quickly, you have to write them down or else we can complain to the police.

The children's responses, which initially aligned with the desired product perception propagated by food companies, underwent a transformation after the website and advertisement analysis. This transformation is paramount in the context of the study's findings. Initially, the majority of children exhibited limited comprehension of the subject matter. Nevertheless, through active participation guided by the researcher, Table 5 attests to the children's accurate comprehension of the intended message. For instance, after viewing an advertisement in which the toy availability in children's menus was indicated to be limited or variable, C 4's comment reflected this awareness: "I ordered a children's menu, but no toys were left. It was stated in the text, and you showed it." As Hobbs (2011) affirms, the analysis process constitutes the crux of media literacy. The capacity to comprehend and dissect messages stands as the primary objective of media literacy, a facet astutely demonstrated through this study's analysis component.

### Evaluation Activities

#### *Menu of the Healthy Food Café*

As the study neared its conclusion, the children and researchers embarked on an exercise involving the creation of an illustrative food menu. Given the children's limited literacy, ready-made menus with text-heavy content from restaurants or cafes were deemed unsuitable. Thus, the researchers prepared two distinct menus—one highlighting healthy foods and the other featuring unhealthy options.

After examining the prepared menus, the children were informed about the intention to establish a café or restaurant, though the name remained undecided. C 6 suggested the name "Healthy Food Café," a suggestion embraced by the other children as well. Subsequently, the children were tasked with curating a menu for this envisioned café. The table was adorned with numerous images of healthy and unhealthy foods, along with glue and paper. The children were guided in their task: "Let's create a menu for our café. Choose what should be on this menu from the pictures and affix them." A dialogue emerged between two children regarding the inclusion of a rainbow-colored birthday cake:

C 1: "Let's put this birthday cake too, it's soooo good."

C 4: "But it is very painted, look, there are blue, yellow, green paints."

C 1: "But it's nice."

C 4: [Pointing to the strawberry cake] "This is also good, there is no dye in this, it is strawberry."

This conversation resulted in the strawberry cake being added to the menu without objections. Throughout the study, children gravitated towards healthier food choices.

Another child (C 9) proposed the inclusion of onion rings and pizza in the café menu. When questioned about adding such items to a healthy food café, the children suggested handmade pizza (C 8) and baked onion rings (C 1), demonstrating their utilization of previously discussed knowledge about preparing foods at home in healthier ways (See Figure 7).



**Figure 7. Let's Create Our Own Menu Activity**

The process culminated in the creation of a menu collectively designed by the children, heavily favoring wholesome options and natural drinks such as mineral water, yogurt drink, lemonade, and orange juice. During the creation of the drink menu, a conversation occurred between the researcher and a child:

C 8: "Teacher, I think orange juice and lemonade should be included."

Researcher: (Displaying images of boxed lemonade and orange juice) "Are you referring to these? Should we add them?"

C 8: "No, of course homemade lemonade and orange juice, for the customers, I mean..."

This dialogue reflected the children's heightened awareness regarding the use of preservatives and fresh ingredients, a topic previously discussed in conversations about boxed drinks. Notably, some children had expanded their usage of media tools beyond entertainment, citing instances of watching experiments, including one about mold emerging from a fruit juice box.

### **Change in Children's Knowledge and Awareness Levels**

Post-study evaluations aimed to ascertain any shifts in the children's knowledge and awareness. The findings presented in Table 6 underscore the efficacy of the action plan. However, while the children's responses regarding food preferences in restaurants remained consistent between the first and fourth weeks, there were instances of evolving awareness and knowledge not yet fully translating into behavior.

**Table 6 Change in Children's Knowledge and Awareness Levels**

	Answers on the Second Visit		Answers on the Tenth Visit	
<i>Child</i>	<i>What are unhealthy foods?</i>	<i>How do you know these foods are unhealthy?</i>	<i>What are unhealthy foods?</i>	<i>How do you know these foods are unhealthy?</i>
<b>C 1</b>	Chips, cola	Mom/Dad told me. I drink when the acid runs out.	Chips, Coke, Hamburger, Pizza	I watch science videos online I learn from the news
<b>C 3</b>	Jelly Bean	My brother told me	French fries, junk food	I can read from books
<b>C 5</b>	Acidic Colas	My teacher explains	Like the ones on YouTube, like Danino, Ozmo, chips.	I'll look it up online
<b>C 6</b>	Cola, chocolate, chips	We hear it on the news	Most of the things sold in the market	From the Healthy Food Team (the name the children gave themselves)
	Answers on the Second Visit		Answers on the Tenth Visit	
<i>Child</i>	<i>If you went to a restaurant, what would you order for yourself?</i>	<i>Why?</i>	<i>If you went to a restaurant, what would you order for yourself?</i>	<i>Why?</i>
<b>C 1</b>	Hamburger and Ice tea	Because it tastes so good	Pita and yogurt drink	Because yogurt drink strengthens our bones
<b>C 4</b>	French fries, pastries, cola	I love them all	A homemade pizza and lemonade	Because I like pizza
<b>C 9</b>	Hamburger and Coke with ice	As a menu, I mean, I love it because it's icy	Meatballs and Coke	I know cola is very harmful, but I love the taste.

While C1 and C4's preferences shifted to healthier foods (yogurt drink, lemonade, homemade food), C 9's preference for cola persisted despite acknowledging its harm. This instance highlights the distinction between knowledge acquisition and its practical application, indicating a progression in understanding but not yet in behavior for some children.

### Sharing with Others

Another vital facet of media literacy involves not only analyzing and evaluating media but also creating one's own media products (Kejanoğlu, 2011). In line with this objective, the final week of the study was dedicated to sharing the acquired knowledge with others. The process commenced with the collaborative preparation of a presentation on the significance of healthy nutrition. The presentation was meticulously crafted to incorporate ample visuals, poetic expressions, and engaging clarity. All children contributed to its development, although some exhibited hesitancy regarding the forthcoming presentation.

The children who volunteered for the presentation underwent numerous rehearsals, and the event was extended to include another kindergarten class. The presentation took place in the school library, with both live delivery and recorded video shared with parents. The children were informed that they had the opportunity to share their newfound knowledge with their peers. When asked how to go about this, a dialogue emerged:

C 3: "I told my brother but he still eats too much junk food."

Researcher: "How about inviting him here and sharing together?"

C 3: "I don't know."

C 2: "How do we explain?"

C 1: "Let's videotape the experiments."

Researcher: "I think there's a concise way to summarize all we've learned."

Children: "How?"

Researcher: "By preparing a presentation and presenting it..."

It was then apparent that the children were unfamiliar with the concept of a presentation. They watched a video together of a firefighter delivering a presentation to young children and discussed it. A dialogue ensued, with one child noting the text in the video:

C 10: "But we can't read..."

C 6: "I can read, I can write, I can do it all." (The child demonstrated reading and writing skills)

C 10: "Then it would be very boring, just you..."

Researcher: "So can we find a different way? How can we make the presentation?"

C 1: "I suggested we videotape it."

The researcher then proposed a presentation with minimal text and abundant photographs. This experience thrilled the children. During the presentation's preparation phase, C 9 suggested including water as the most crucial beverage and C 10 proposed highlighting harmful foods. C 8 showcased images of unhealthy foods, remarking, "They've definitely eaten all of these because they don't know about them," referring to the audience for whom the presentation was intended. C 7 declared, "We'll explain the presentation just like a teacher." These expressions signaled the children's justified pride in their acquired knowledge. The presentation was collaboratively crafted, with poetic sentences rehearsed for each image (See Figure 8).



**Figure 8. Sharing with Others Activity**

Subsequent to the presentation, younger children not part of the study group were interviewed. When asked what their friends aimed to convey in the presentation, only a few children emphasized healthy nutrition. One child mentioned, "We saw healthy snacks, like walnuts, grapes, and fruits." Although a comprehensive awareness wasn't anticipated from a single event, the topic did generate a positive impact on the children in general.



## DISCUSSION AND CONCLUSION

In today's digital age, children's engagement with technology has surged, primarily driven by the proliferation of portable and easily accessible devices. Children often use these devices to watch videos and play games (Kabali et al., 2015). For instance, Ofcom's recent media use report (2021) indicated that 47% of preschool children watch live broadcasts, and a staggering 92% utilize video sharing platforms like YouTube and TikTok. Consequently, the escalating screen time among children has highlighted the significance of media literacy as a defense mechanism against the detrimental impacts of media exposure.

This study aimed to assess the effectiveness of critical media literacy activities designed for 60-72-month-old children in enabling them to accurately interpret media signals and cultivate awareness about healthy and unhealthy foods. A substantial body of research underscores the profound influence of media on children's dietary habits (Kraak et al., 2006; Özdemir, 2020; Ural & Özmaden, 2022; Wartella, 2013; Yıldız & Eneçli, 2013). Given that the food industry is a multi-billion-dollar enterprise, fostering media literacy skills in children from an early age is crucial to safeguard them from the negative influences of this industry (Elliott & Brierley, 2012; Truman & Elliot, 2020; Truman et al., 2022).

The initial stage of the research aimed to gauge the knowledge and awareness levels of the children. It was evident that prior to the interventions, many children exhibited limited media literacy skills. Upon assessing the children's food preferences, it emerged that their choices were often swayed by factors such as a food's popularity, advertising, familial preferences, visual appeal, taste, and the inclusion of toys. Although the children cited examples of unhealthy foods, such as cola, candy, and chips, they did not perceive these items as harmful. Moreover, child YouTubers wielded influence over the children, who were captivated by the sensory elements in advertisements, particularly those promoting food. This aligns with previous findings that children struggle to evaluate the healthiness of packaged foods (Elliott & Brierley, 2012). Research by Koyuncu Şahin et al. (2018) similarly demonstrated the substantial sway of advertisements on children's consumption habits.

Subsequently, during the board study on healthy and unhealthy foods, it was notable that the children adeptly categorized their foods in line with the information provided by the researcher. This highlights the children's receptiveness to learning and their capacity to build awareness. An experiment conducted in this context unveiled the children's lack of knowledge about food contents and their misconception that colorful foods obtain their hues from fruits. Heller et al. (2015) corroborated this observation, suggesting that colorful, artificially dyed foods may be misconstrued as containing actual fruit due to their appearance.

Media analysis training revealed that a combination of sound, effects, and music in advertisements had a more pronounced impact on children. Prior studies have indicated that preschool children can recognize logos of unhealthy foods (McAlister & Cornwell, 2010; Tatlow Golden et al., 2014), with some even identifying products by brand logos and characters under the age of 3 (Aktaş Arnas et al., 2016).

The study also explored the fictionality of advertisements. By engaging the children with products and the advertisements promoting them, it was evident that the children struggled to replicate the effects showcased in the commercials during their playtime. Some children recognized the fictional nature of the advertisements and attributed their embellishments to encourage consumption. This aligns with research by Vanwesenbeeck et al. (2020), indicating that preschool children can grasp the persuasive intent of advertisements.

The study's evaluation activities included assessing children's abilities to create menus for a healthy food café. The children predominantly opted for healthy food choices and offered informative explanations to peers who favored unhealthy items. This phase demonstrated a substantial improvement in children's knowledge and awareness. In the sharing activities segment, the children

presented their prepared presentations about healthy and unhealthy foods to their peers and a younger class.

The study's outcomes showcased an enhanced ability among children to discuss media content, reason, decipher underlying advertisement meanings, comprehend food knowledge, question foods instead of accepting them uncritically, and critically interpret healthy and unhealthy foods featured in both traditional and digital media. When revisiting the children's opinions with questions similar to those posed initially, it was evident that the children offered more confident and aware responses.

Collectively, the action plan fostered heightened media literacy and nutritional awareness among the children. This perspective finds support in numerous studies highlighting the efficacy of media literacy activities on children (Papachristou & Nikolakaki, 2022; Šramová, 2014; Harris & Bargh, 2009; Evans et al., 2006; Hindin et al., 2004). However, it's worth noting that while most children displayed improved knowledge throughout the action plan, a few struggled to cultivate awareness or translate it into practice. These variations in outcomes might be attributed to the influence of older siblings or family lifestyles removed from media literacy and healthy eating concerns.

**Conflicts of Interest:** There is no potential conflict of interest to declare.

**Funding Details:** No financial support was received to carry out the study.

**CRedit Author Statement:** Author 1: Data Curation, Investigation, Visualization, Writing – Original Draft Preparation. Author 2: Conceptualization, Methodology, Supervision, Writing – Reviewing & Editing.

**Ethical Statement:** Ethics committee approval (No: 2022-138, Uşak University Ethical Review Board) was procured for the study. In accordance with the ethical guidelines set forth by Uşak University Social and Human Sciences Scientific Research and Publication Ethics Committee, parental consent was obtained from the parents of all participants. All original names were replaced with pseudonyms to protect the privacy of the participants.

## REFERENCES

- Agnoletti, M. *et al.* (2021) *Media literacy: eMedia*. Retrieved on 11.06.2023 from: <https://all-digital.org/wp-content/uploads/2021/03/Media-Literacy-Booklet-Emedia-Project-Final-ENG-1.pdf>.
- Aktaş Arnas, Y., Taş, I., & Gürgah Oğul, İ. (2016). The development of brand awareness in young children: How do young children recognize brands?. *International Journal of Consumer Studies*, 40(5), 536-542.
- Asqarova, S., & Zengin, T. T. (2022). Ekran maruziyeti bulunan çocuklarda ergoterapinin duysal etkileri. *Pearson Journal of Social Sciences & Humanities*, 7(19), 140-145.
- Baltacı, A. (2018). Nitel araştırmalarda örnekleme yöntemleri ve örnek hacmi sorunsalı üzerine kavramsal bir inceleme. *Bitlis Eren Üniversitesi Sosyal Bilimler Dergisi*, 7(1), 231-274.
- Bar-on, M. E. (2000). The effects of television on child health: Implications and recommendations. *Archives of Disease in Childhood*, 83(4), 289-292.
- Bogdan, R. C., & Biklen, S. K. (2003). *Qualitative research for education: An introduction to theory and methods* (3rd ed.). Allyn&Bacon

- Calvert, S.L. (2008). Children as consumers: Advertising and marketing. *The Future of Children*, 18(1), 205-234.
- Chaudron, S., Beutel, M. E., Donoso Navarrete, V., Dreier, M., Fletcher-Watson, B., Heikkilä, A. S., ... & Wölfling, K. (2015). *Young Children (0-8) and digital technology: A qualitative exploratory study across seven countries*. Publication Office of the European Union (JRC93239).
- Cheung, C. H., Bedford, R., Saez De Urabain, I. R., Karmiloff-Smith, A., & Smith, T. J. (2017). Daily touchscreen use in infants and toddlers is associated with reduced sleep and delayed sleep onset. *Scientific Reports*, 7(1), 1-7.
- Çetintaş, H. B., & Turan, Z. (2018). Through the eyes of early childhood students: Television, tablet computers, Internet and smartphones. *Central European Journal of Communication*, 11(1), 56-70.
- Dardanou, M., Unstad, T., Brito, R., Dias, P., Fotakopoulou, O., Sakata, Y., & O'Connor, J. (2020). Use of touchscreen technology by 0–3-year-old children: Parents' practices and perspectives in Norway, Portugal and Japan. *Journal of Early Childhood Literacy*, 20(3), 551-573.
- Demir, R., & Kargin, T. (2020). Çocuk YouTuberlar ve paylaştıkları videolar üzerine bir doküman analizi. *Turkish Studies - Education*, 15(6), 4091–4116.
- Elliott, C., & Brierley, M. (2012) Healthy choice? Exploring how children evaluate the healthfulness of packaged foods. *Canadian Journal of Public Health*, 103(6), 453–458.
- European Food and Nutrition Action Plan. (2015–2020). Retrieved on 11.06.2023 from: [https://hsgm.saglik.gov.tr/depo/Yayinlarimiz/Eylem\\_Planlari/Avrupa-Gida-ve-Beslenme-Eylem-Plani-2015-2020.pdf](https://hsgm.saglik.gov.tr/depo/Yayinlarimiz/Eylem_Planlari/Avrupa-Gida-ve-Beslenme-Eylem-Plani-2015-2020.pdf).
- Evans, A. E., Dave, J., Tanner, A., Duhe, S., Condrasky, M., Wilson, D., & Evans, M. (2006). Changing the home nutrition environment: Effects of a nutrition and media literacy pilot intervention. *Family and Community Health*, 29(1), 43-54.
- Fraenkel, J. R., & Wallen, N. E. (2003). *How to design and evaluate research in education* (5th Ed.). Mac Graw Hill.
- Gökçe, A., Arslan, İ. Ülgen Öz, S., Mete, U., Taşcı, D. ve Yengil Tacı, D. (2021). Yedi yaş altı çocuklarda mobil ekran maruziyeti. *Ankara Eğitim ve Araştırma Hastanesi Dergisi*, 54(2), 188-193.
- Guo, Y., Liao, M., Cai, W., Yu, X., Li, S., Ke, X. Zeng, F. (2021). Physical activity, screen exposure and sleep among students during the pandemic of COVID-19. *Scientific Reports*, 11(1), 8529. <https://doi.org/10.1038/s41598-021-88071-4>.
- Harris, J. L., & Bargh, J. A. (2009). Television viewing and unhealthy diet: implications for children and media interventions. *Health Communication*, 24(7), 660-673.
- Heller, R., Martin-Biggers, J., Berhaupt-Glickstein, A., Quick, V., & Byrd-Bredbenner, C. (2015). Fruit-related terms and images on food packages and advertisements affect children's perceptions of foods' fruit content. *Public Health Nutrition*, 18(15), 2722-2728.
- Hindin, T. J., Contento, I. R., & Gussow, J. D. (2004). A media literacy nutrition education curriculum for head start parents about the effects of television advertising on their children's food requests. *Journal of the American Dietetic Association*, 104(2), 192-198.

- Hobbs, R. (2011). *Digital and media literacy*. Sage Publications.
- Johnson, A. P. (2003). *What every teacher should know about action research*. Pearson Education.
- Kabali, H. K., Irigoyen, M. M., Nunez-Davis, R., Budacki, J. G., Mohanty, S. H., Leister, K. P., & Bonner, R. L. (2015). Exposure and use of mobile media devices by young children. *Pediatrics*, 136(6), 1044-1050.
- Kargın, T. (2022). Erken çocukluk döneminde dijital okuryazarlıklar. In D. Altun & F. Tantekin Erden (Eds.), *Erken çocukluk döneminde dijital teknoloji: Uygulamalar, araştırmalar ve eğilimler* (pp. 180–210). Nobel.
- Akademik Yayıncılık.Kejanoğlu, D.B. (2011). Türk medyasında haberin manipülasyonu ve dezenformasyon. In M.C. Şimşek & N. Türkoğlu (Eds.), *Medya Okuryazarlığı* (pp. 261-268). Parşömen Yayınları.
- Kelly, B., Halford, J. C., Boyland, E. J., Chapman, K., Bautista-Castaño, I., Berg, C., ... & Summerbell, C. (2010). Television food advertising to children: a global perspective. *American Journal of Public Health*, 100(9), 1730-1736.
- Koshy, V. (2005). *Action research for improving practice*. Paul Chapman Publishing.
- Koyuncu Şahin, M., Esen Çoban, A., & Güney Karaman, N. (2018). Okul öncesi öğretmenlerinin medyanın çocukların beslenme alışkanlıkları ve bozuklukları üzerindeki etkisine yönelik bakış açıları. *İlkogretim Online*, 17(1), 125-142.
- Kraak, V. I., Gootman, J. A., & McGinnis, J. M. (2006). *Food marketing to children and youth: Threat or opportunity?*. National Academies Press.
- Ling, L., Yelland, N., Hatzigianni, M., & Dickson-Deane, C. (2022). The use of Internet of things devices in early childhood education: A systematic review. *Education and Information Technologies*, 27, 6333-6352.
- McAlister, A. R., & Cornwell, T. B. (2010). Children's brand symbolism understanding: Links to theory of mind and executive functioning. *Psychology & Marketing*, 27(3), 203-228.
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. John Wiley-Sons.
- Ministry of Health (2022). 22 Mart 2022 Dünya Obezite Günü. Retrieved on 11.06.2023 from: <https://hsgm.saglik.gov.tr/tr/beslenmehareket-haberler/4-mart-2022-dunya-obezite-gunu.html>.
- Mukherji, P., & Dryden, L. (2014). *Foundations of early childhood: Principles and practice*. Sage.
- Nobre, J. N. P., Santos, J. N., Santos, L. R., Guedes, S. C., Pereira, L., Costa, J. M., Souza Morais, R. L. (2019). Determining factors in children's screen time in early childhood. *Ciencia & Saude Coletiva* 26(3), 1127-1136.
- Norris, S. (2013). Multimodal (inter)action analysis. In P. Albers, T. Holbrook, & A.S. Flint. (Eds), *New Methods of Literacy Research* (pp. 70-84). Routledge.
- Ofcom. (2021). Children and parents: Media use and attitudes report 2020/21. Retrieved on 11.06.2023 from: <https://www.ofcom.org.uk/research-and-data/media-literacy-research/childrens/children-and-parents-media-use-and-attitudes-report-2021>.

- Özdemir B. (2020). Televizyonda yayınlanan gıda reklamlarının çocuklara etkisi uzman görüşlerinin incelenmesi. *Akademik Matbuat*, 4, 17-40.
- Papachristou, E., & Nikolakaki, M. (2022). Necessity of implementing advertising literacy programs in preschool curricula in Debt-Ridden Greece. *European Journal of Education and Pedagogy*, 3(3), 135-146.
- Pempek, T. A. & Calvert, S. L. (2009). Tipping the balance: Use of advergames to promote consumption of nutritious foods and beverages by low-income African American Children. *Archives of Pediatrics & Adolescent Medicine*, 163, 633-637.
- Pew Research Center (2020). *Parenting children in the age of screens*. Retrieved on 11.06.2023 from: <https://www.pewresearch.org/internet/2020/07/28/childrens-engagement-with-digital-devices-screen-time/>
- Potter, J. (2005). *Media literacy* (3th ed.). Sage.
- Recalde, M., & Gutiérrez-García, E. (2017). Digital natives: The engagement experience to online protection. *Young Consumers*, 18(2), 159-179.
- Sahoo, K., Sahoo, B., Choudhury, A. K., Sofi, N. Y., Kumar, R., & Bhadoria, A. S. (2015). Childhood obesity: Causes and consequences. *Journal of Family Medicine and Primary Care*, 4(2), 187-192.
- Seo, E. & Ma, J. (2021). Infants' Use of Video Content and Caregivers' Media Literacy. *Korea Communication Journal*, 20(3), 123-160.
- Šramová, B. (2014). Media literacy and marketing consumerism focused on children. *Procedia- Social and Behavioral Sciences*, 141, 1025-1030.
- Staples, A. D., Hoyniak, C., McQuillan, M. E., Molfese, V., & Bates, J. E. (2021). Screen use before bedtime: Consequences for nighttime sleep in young children. *Infant Behavior and Development*, 62, Article 101522.
- Tatlow-Golden, M., Hennessy, E., Dean, M., & Hollywood, L. (2014). Young children's food brand knowledge: Early development and associations with television viewing and parent's diet. *Appetite*, 80, 197-203.
- Truman, E., & Elliott, C. (2020). Health-promoting skills for children: Evaluating the influence of a media literacy and food marketing intervention. *Health Education Journal*, 79(4), 431-445. <https://doi.org/10.1177/0017896919889647>
- Truman, E., Daroux-Cole, L., & Elliott, C. (2022). Educating for children's health: Lessons learned on facilitating media literacy & food marketing programming. *Health Promotion Practice*, 24(3), 584-587. <https://doi.org/10.1177/15248399211072532>.
- Ural, B. & Özmaden, M. (2022). Televizyon reklamları: Çocukluklarda obezite ve besin seçimine etkileri. *Sağlık Akademisyenleri Dergisi*, 9(3), 294-293.
- Vanwesenbeeck, I., Hudders, L., & Ponnet, K. (2020). Understanding the YouTube generation: How preschoolers process television and YouTube advertising. *Cyberpsychology, Behavior, and Social Networking*, 23(6), 426-432.
- Vodopivec, J. L. (2011). Some aspects of teaching media literacy to preschool children in Slovenia from a perception standpoint of teachers and parents. *Acta Didactica Napocensia*, 4, 69-78.

- Vuksan, V., Bagaric, Z., & Lasic-Lazic, J. (2022). Croatian youth media literacy, dietary habits and healthy diet information: A pilot. *Proceedings of INTED2022 Conference*, 7, 8.
- Wartella, E. A. (2013). Medya, beslenme ve çocukluk obezitesi. P. Şengözer Şiraz (Trans.) and in H. Toker (Ed.), I. Türkiye Çocuk ve Medya Kongresi Bildiriler Kitabı (pp. 243-252). Çocuk Vakfı Yayınları.
- We Are Social, & Hootsuite. (2021). *Digital 2021: Turkey*. Retrieved on 11.06.2023 from: <https://datareportal.com/reports/digital-2021-turkey>
- Wei, M. H., & Chuang, S. Y. (2016). A study of 3C product use, behavioral performance, and learning attitude among young children of the touch-screen generation. *Journal of Computer Science and Application*, 8(2), 47-69.
- Yang, C., & Chang, C. J. (2021). Use of electronic products by Taiwanese children and their effect on children's development: applying data from kids in Taiwan study. *Bulletin of Educational Psychology*, 53(2), 257-284.
- Yıldız Ö. E., & Eneçli C. (2013). Reklamda animasyon karakter kullanımının çocukların beslenme alışkanlıkları üzerindeki etkileri. *İletişim Kuram ve Araştırma Dergisi*, 36, 241-253.

## Gender Equality in Math-Themed Picture Books: The Example of “Math Matters”

Özge Nurlu Üstün<sup>i</sup>

Erzincan Binali Yıldırım University

Serap Uzuner<sup>ii</sup>

Erzincan Binali Yıldırım University

### Abstract

The purpose of this study is to examine the extent to which math-themed illustrated children's books reflect gender equality. Document analysis, a qualitative research method, was used in the study. The research object consists of a 16-book series published by TUBITAK under the name "Math Matters," determined through criterion sampling. Descriptive analysis and chi-square test were used in the data analysis process. The books were analyzed based on categories created through a literature review ("frequencies of genders in title/main character/secondary character/general in text and picture", "parental roles", "occupational roles", "location of genders", "activities of genders"). MAXQDA 2022 data analysis software was used in the analysis process. The findings were summarized using graphs. Then, one-sample chi-square tests were conducted using the SPSS program to determine whether the differences in codes and categories were significant by gender. As a result, it was found that math-themed illustrated children's books, which were written to make math enjoyable and understandable, contain traditional gender stereotypes such as the underrepresentation of females, the emphasis on maternal roles, their limited portrayal in the home and its surroundings, their presentation in service-oriented and limited stereotypical professions, their activities being based on low cognitive skills and household chores, and their clothing emphasizing their sexual attractiveness and beauty, and being depicted in a home environment.

**Keywords:** Gender Equality, Picture Books, Mathematics Education.

**DOI:** 10.29329/ijpe.2023.603.15

**Submitted:** 05/04/2023

**Accepted:** 04/07/2023

**Published:** 16/08/2023

---

<sup>i</sup> **Özge Nurlu Üstün**, Assist. Prof. Dr., Classroom Education, Erzincan Binali Yıldırım University, ORCID: 0000-0002-3429-8162

<sup>ii</sup> **Serap Uzuner**, Assoc. Prof. Dr., Basic Training, Erzincan Binali Yıldırım University

**Correspondence:** suzuneryurt@gmail.com

## INTRODUCTION

In Türkiye, the proportion of women working in more prestigious and high-paying professions related to mathematics is quite low. According to 2022 data from the Union of Chambers of Engineers and Architects of Türkiye, approximately 24% of its members are women, while 76% are men. When the number of students studying in higher education in 2020-2021 is analysed, it is seen that male students are overrepresented in fields such as Information and Communication Technologies, Engineering, Manufacturing and Construction (TÜİK, 2022).

There are many factors that prevent girls, who are as successful as boys in mathematics during their school years (Ayvaz, 2013; Ergün, 2003; Yücel & Koç, 2011), from pursuing a career in mathematical fields. These factors include families' expectations of girls (Chaffee & Plante, 2022), peer norms (Wolff, 2021), teachers' beliefs about gender and classroom practices (Nurlu Üstün & Aksoy, 2022), gender biased elements in mathematics textbooks (Moser & Hannover, 2014; Nurlu, 2021), media with all its components (Hall & Suurtamm, 2020), and children's picture books written specifically on mathematics (Ladd, 2011).

Picture books play a significant role in shaping their understanding and adoption of gender roles. Every subject in the natural and social environment can be addressed in picture story books. The events and people fictionalized by the author to explain the chosen subject to the child are the reflection of real life in books and the child takes a step in the process of socialization as well as personal development (Ural, 2013). Children learn from picture books what other girls and boys do, what they say and how they feel, distinguish between right and wrong, and fulfil societal expectations for their age group (Weitzman et al., 1972).

Works of children's literature contain certain stereotypes about the male and female gender that exist in society. Gender stereotypes can be perpetuated through both the written and illustrated elements of picture books (Poarch & Monk-Turner, 2001). For this reason, children may be exposed to works that contain gender stereotypes and discrimination, which could result in the development of prejudiced attitudes and biases (Sever & Aslan, 2012). In this respect, women and men should be given egalitarian roles in works instead of subjects that emphasize and glorify male dominance (Demirel, 2011: 54).

Many studies have investigated the reflection of traditional gender stereotypes in picture books in Türkiye. Generally, these research have revealed that there is an inappropriate presentation of gender equality in the representation of women and men, division of labour within the family, occupational life, appearance and clothing of the heroes, and the places where they are located (Bagceli Kahraman & Özdemir, 2019; Oğuz Rollas, 2017; Erden, 2019). Similar results were obtained in studies abroad (Hamilton, 2006; Gooden & Gooden, 2021). There have been a few studies on children's picture books that focus on a field such as mathematics, which is under the influence of gender stereotypes (Ladd, 2011). However, it is seen that studies focusing on a gendered field such as mathematics have not been conducted in Türkiye.

Further studies on this subject are of great importance to understand how gender roles and stereotypes affect children's learning of mathematics. Children's books are one of the tools that help children learn gender roles at an early age and therefore have a great responsibility in terms of gender equality. As a result, examining mathematics-themed picture books in terms of gender equality can not only increase children's interest in mathematics, but also help raise awareness of gender equality. Such studies can help children's books fulfil their responsibilities in terms of gender equality and contribute to the questioning of gender roles and stereotypes by reaching a wider audience. This study aims to examine the extent to which math-themed picture books reflect gender equality.



## Related Studies

Many studies discussing gender differences in mathematics focus on innate differences in brain development. In particular, factors such as fetal exposure to male hormones, brain size, different development of brain lobes and gray-white matter ratios are emphasized (Chapman et al., 2006; Ankney, 1992; Benbow & Lubinski, 2006; Leonard et al., 2008). There is no definitive answer as to exactly why gender differences in mathematics arise. However, studies on this subject suggest that social and cultural factors may play an important role in addition to innate factors.

Duffy, Warren, and Walsh (2001) found that female mathematics teachers interacted more with male students, provided them with more academic feedback, and offered more critiques that stimulated their thinking, compared to female students. Similarly, Tiedemann (2000) concluded that teachers evaluated average-performing female students as having less logical thinking ability than male students with the same academic performance and attributed the math achievements of female students more to effort while attributing unexpected failure to lack of ability.

Children may adopt these negative attitudes from many sources, including their parents, during the socialization process. Rätty et al. (2002) found that parents of boys perceived their children as more capable in mathematics than parents of girls. When it comes to mathematical success, parents of boys tend to attribute it to innate ability, whereas parents of girls emphasize the role of effort in achieving success.

In addition, one of the issues examined in terms of gender equality is children literature. Since picture books, introduced to children at a young age, are an important tool for them to learn cultural and social values (Körükçü et al., 2016), they are believed to play a significant role in early gender role socialization (Weitzman et al., 1972).

Books have the potential to influence children's attitudes and gender roles, and are often a source for transmitting gender stereotypes. Numerous scholars have investigated various aspects of gender equality in children's picture books. In a study conducted by Creany in 1995, it was discovered that in children's picture books published during the 1970s, male characters were more frequently represented than female characters, and both genders were frequently portrayed in conventional, stereotypical roles. In the same study, it was observed that although there were some improvements in books published between 1980 and 1995, the number of male main characters still outnumbered the number of female main characters. The results of Temellioğlu's (2021) study on gender roles in Andersen Fairy Tales also support this study. In the study, it was concluded that male and female characters do not appear equally, and male characters are approximately three times more than female characters.

Daily activities in children's books are important for readers to recognize and understand real world experiences. These activities are common experiences that children experience many times in their lives and therefore readers can identify with the stories. Brugeilles and colleagues (2002) conducted a study on the characters depicted in children's picture books, focusing on their daily activities. They also investigated whether the gender and characteristics of the male and female characters were influenced by the authors of the books. The study found that all of the children's picture books analyzed had a male-dominated narrative, with the majority of the characters being adults.

The role of parents has a great influence on children's development and the shaping of their personality. A well-written parental character can help readers identify with the character and understand their experiences. Anderson and Hamilton (2005) concluded that fathers are generally underrepresented in the gender roles of parents in the 200 picture books they analysed and that they are presented as shadowy and ineffective male parents. In a similar study (Dewitt et al., 2013), 300 children's picture books were analysed for their depictions of mothers and fathers in terms of companion, disciplinary, caregiving, nurturer, and provider roles. It was found that the traditional

model of the man as the breadwinner and the woman as the caregiver of the children was consistently portrayed in children's picture books. Another study was conducted to determine how the father figure in children's picture books is reflected through written and visual indicators. According to the results of this study, the roles of father figures in children's picture books are generally parallel to the stereotypes of society, although they do not completely overlap (Bencik Kangal et al., 2017).

In children's books, the setting is a factor that affects the environment and atmosphere in which the story takes place and the behaviour of the characters. Based on this fact, Tognoli et al. (1994) examined how male and female characters are depicted in children's picture books indoors and outdoors, at home and at work. According to the results of the study, the pre-1980 data showed that adult male characters were more likely to be depicted outside the home, while female characters were more likely to be depicted indoors. However, in post-1980 examples, the number and variety of occupations of male characters increased compared to female characters.

Occupations in children's books can help children explore different career options and see the world from a different perspective. Occupations can also influence the personalities, abilities, and life experiences of the characters in the story. In Günay and Gürşişmek's (2005) study on the evaluation of linguistic and non-linguistic indicators used in the treatment of gender roles in children's books, it was found that social value judgments play an important role in determining the occupations of women and men. In another study, the relationship between occupations and gender was examined, and it was found that more male characters were included in occupational groups, while female characters were generally attributed to traditional professions such as teachers and housewives (Özen et al., 2022).

Clothing is a significant element in children's picture books that can provide insight into the characters' personalities, lifestyles, and the setting of the story. İnar (2015) examined the clothing styles of female characters in picture books and discovered that the characters were often depicted wearing clothing that reflected social stereotypes and traditional beliefs. Kaynak (2017) conducted a study to investigate how gender roles are communicated through both linguistic and non-linguistic cues in story and fairy tale books. It was found that while traditional gender roles are still present in the examined books, they are portrayed in a more egalitarian way that is somewhat distinct from traditional approaches and stereotypes.

Studies show that gender discrimination can have an impact on children's math skills. Therefore, in materials that children frequently use, such as children's picture books, it is important to include math problems and problem-solving in all characters without gender discrimination. According to the findings of Ladd's (2011) study on gender discrimination in mathematics-themed picture books for children, it was observed that female characters were much less common than male characters and math problems were usually solved by male characters.

## **METHOD**

### **Study Design**

The research utilised document analysis, which is a qualitative research method, to investigate whether math-themed picture books reflect gender equality. Document analysis is a systematic and detailed qualitative research method that involves analysing the content of written documents (Wach, & Ward 2013). Analysing any type of document through document analysis can assist the researcher in uncovering meaning, gaining understanding, and discovering insights into the research problem. (Merriam, 1988). In this study, children's books, which are text-based documents according to Geray's (2006) classification, primary documents according to Balcı's (2007) classification and institutional documents according to Corbetta's (2003) classification, were analysed.

## **Objects of the Study**

The object of study was determined through the use of criterion sampling strategy, which is one of the purposive sampling methods. In criterion sampling, situations that meet certain criteria are included in the study (Patton, 2014, p.243). Within the scope of the study, some criteria were determined for the identification of the books. These criteria are (1) being a children's picture book, (2) appealing to the primary school age group, (3) containing a fictional text, (4) having literary qualities, (5) being written in Turkish or translated into Turkish, and (6) having a mathematics theme.

Accordingly, a series of 16 books translated into Turkish by TUBITAK under the title Math Matters was selected in accordance with these characteristics. The reason for the selection of TUBITAK children's books in the study is that the publication of the books and the continuation of the printing is decided by an advisory board based on their recommendations. Another reason is that the age range of the book is determined by this advisory board based on objective criteria.

## **Researcher Role**

In qualitative research, the researcher is viewed as an integral part of the data collection process (Denzin & Lincoln, 2008). For this reason, it is important that the researcher sincerely expresses his/her assumptions, biases, and expectations regarding the study (Greenbank, 2003). After conducting studies on the extent to which mathematical gender stereotypes exist in primary school teachers and how they affect their students, and whether mathematics textbooks and children's picture books have a fair presentation in terms of gender equality, it was aimed to examine gender presentations in mathematics-themed children's picture books. It is known that mathematics as a scientific field is gendered and attributed a masculine characteristic (Koblitz, 2002). However, it is also known that children's picture books carry gender stereotypes and sexist elements, thus limiting children's developmental potential and especially hindering girls' professional dreams and goals (Emir et al. 2022; Nahara, 1998). For this reason, it is thought that mathematics-themed picture books may also be a factor that can reproduce gender inequalities.

## **Data Analysis**

In this study, descriptive analysis and chi-square test were used in the data analysis process. According to Miles and Huberman (1994), descriptive analysis is generally used in cases such as processing data that do not require detailed examination of a qualitative data set, describing different qualities and defining general characteristics. In this study, the descriptive analysis process was carried out within the framework of the stages specified by Dawson (2009). Accordingly, a framework was created from the study questions, the conceptual framework of the study, and the dimensions obtained from the literature review, and the categories under which the data would be organized were determined. Then, the textual and visual items in the series were examined many times by the researchers and an analysis system was created in accordance with the categories (Çınar, 2015; Gooden & Gooden, 2001; Ladd, 2011; Şeren et al., 2022; Tognoli et al., 1994; Dewitt et al., 2013) defined as a result of the literature review. The categories used to analyse the books can be listed as "frequencies of genders in title/main character/secondary character/general in text and picture", "parental roles", "occupational roles", "location of genders", "activities of genders". In order to ensure consistency between the researchers in the analysis process, 6 books corresponding to approximately 30% of the data set were analysed simultaneously and together by two researchers based on the code and category system created. MAXQDA 2022 data analysis program was used in the analysis process. The findings were summarized with the help of graphs. Then, one-sample chi-square tests were conducted with the SPSS program to reveal whether the differences in codes and categories were significant according to gender. The analysing process on the basis of categories was carried out as follows:

## Frequency

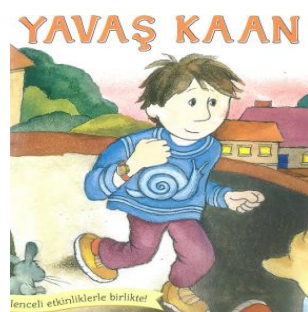
The frequency of appearance of characters as girls, boys, women, and men in titles, main/side characters, and overall textual and visual elements has been examined. The study excluded names that were unisex and had no corresponding picture. If a first name was followed by "Hanım" (an honorific for women, similar to Miss/Mrs) or "Bey" (an honorific for men, similar to Mr.), it was assumed that the character was an adult. Additionally, adults were identified by kinship terms like mother, aunt, father, or uncle. Conversely, characters with only a first name were considered to be children. When necessary, pictures were used to distinguish between children and adults, based on factors such as clothing (e.g., school uniform or suit) and physical characteristics (e.g., height, beard). The following examples illustrate this approach:

### Title

Sample analysis: Grandma's Button Box. This title was coded as women because it includes the term "grandma" is a kinship term used to refer to an adult female relative.

Sample analysis: Where's That Bone? Since this title does not contain any gendered expressions, it was coded as undefinable.

Sample analysis: Slowpoke. The original title of this work was "Slowpoke," but it was translated into Turkish as "Yavaş Kaan" (Slow Kaan). Even though the original title did not contain any gendered expressions, the Turkish translation was used for coding. As "Kaan" is a male name however, since it was not possible to determine whether the character was an adult or a child from the title alone, the cover image was examined (See Figure 1 below). Based on the image on the cover page, the title was coded as male.



**Figure 1. The Cover Page of Slowpoke**

### Main/Side characters

In the analysed books, the person who guides the narration, drives the story forward is coded as the main character. The person who has an indirect relation to the events is coded as the secondary character. Sample analysis: In a book that is based on a group of girls sharing the cleaning duties at camp, Ayşe, who narrates the events by writing letters to her parents, is coded as the "girl-main character". However, the camp counsellors, Jale and Nazlı, are coded as "woman-secondary characters".

### Overall characters in textual and visual elements

Sample analysis: One day, they went to the zoo as a class. Since Kaan was the last one to get on the bus, he had to sit next to a teacher. And that teacher was Mr. Murat (Murat Bey). As "Murat" is a male name and the suffix "Bey" is added to the name, which is a Turkish honorific typically used for men, and also because a profession is assigned to the character, this case was coded as man.

Sample analysis: Pizza delivery person says having seen a rabbit. As the gender of the pizza delivery person cannot be determined from the text, the visual given below was investigated. Based on the image, the case was coded as a man.



**Figure 2. The pizza delivery person**

### **Parental roles**

To identify parental roles, first, the frequency of the appearance of parents as mothers and fathers in visual and textual elements was determined.

Sample analysis: Dear Mom and Dad, Here's what happened after my letter... The words 'mother and father' were individually coded in the text.

Secondly, the parental roles in which the characters were engaged were classified as nurturing, caregiving, disciplinary, companion, and providing behaviours. Examples of these parental behaviours were classified as follows:

*Nurturing* behaviours have been defined as parental roles, including physical and verbal expressions of affection, verbal encouragement, emotional comfort, inquiries about thoughts, and praise for a completed task or activity, and listening to problems.

Sample analysis: The day after Kocapati arrived, Bingo did not eat his bone. Instead, he buried it somewhere in the backyard. Banu was looking out the window at that moment. She saw what he did.

"Why is he doing that?" she asked her mother.

"I think he's hiding his food from Kocapati," her mother said. This case was coded as a nurturing behaviour, as Banu's mother listened to her, answered her question, and provided an explanation.



**Figure 3. Banu and her mother**

The *caregiving* behaviours have been defined as parental roles, involving performing tasks related to the child's hygiene (such as bathing, cleaning, and changing diapers), attire (such as selecting clothes and dressing), and nutrition (such as preparing meals and feeding).

Sample analysis: I even knitted while my mother was removing the splinter stuck in my thumb. The case was coded as a caregiving behaviour, as the mother fulfilled her daughter's physical needs.



**Figure 4. The girl and her mother**

*Disciplinary* behaviours consist of parental roles that involve physical punishment, such as hitting to prevent harm to the child, or non-physical punishments such as sending the child to their room to reduce bad behaviour.

Sample analysis: My brother Melih chipped in, "Let me guess. Your mind was elsewhere, right? On another planet." "Don't tease your sibling," scolded my mother. The case was coded as a disciplinary behaviour, since the mother was warning the child.

The *companion* behaviours involve three observed variables, which are taking the child on recreational trips, engaging in physical and non-physical play.

Sample analysis: Mr. Yiğit laughed and took Efe to the zoo at that hour on that day. Mr. Yiğit's behaviour of taking his son Efe to the zoo for the purpose of having fun was coded as a companion role.



**Figure 5. Mr. Yiğit and Efe at the Zoo**

Finally, the *provider* role is fulfilled by any parent who works outside of the home.

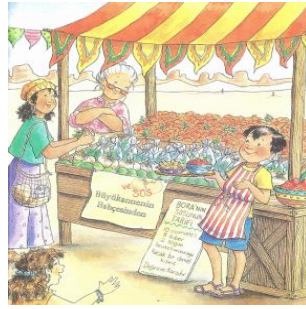
Sample analysis: The next day, Efe left post-its all over the house with the message "Don't forget to increase Efe's pocket money." His father ignored them. The case was coded as providing behaviour as there is a request for an increase in pocket money.

### **Occupations**

The textual and visual elements were directly analysed to determine the occupations of the characters regarding genders. Here are some examples of the analyses performed:

Sample analysis: Nowadays, customers flock to my grandmother's stand. They buy the necessary ingredients to make Bora's famous sauce. The case was coded as a woman vendor. The text

and picture indicate that the character is a vendor, and the term "grandma" is a kinship term commonly used to refer to an older female relative. Therefore, the case was classified as a female vendor.



**Figure 6. The grandma's stand in the marketplace**

### **Locations**

The characters' locations were analysed to determine whether they were presented indoors or outdoors, with respect to their gender. Below are some examples of the analysis:

Sample analysis: This case was classified as featuring a boy-indoors and a girl-indoors, because they are both in the kitchen looking for something in the refrigerator to feed their rabbit.



**Figure 7. Mine and Mert in the kitchen**

Sample analysis: My grandmother said, "That's it. A scarf like no other in this world. This scarf is for two people. Let's go for a walk. I want to get some fresh air with my scarf.". The case was classified as featuring a woman-outdoor and a girl-outdoors, as they were walking on the street.



**Figure 8. The girl and her grandmother**

### **Activities**

The characters' activities were classified into different contexts, including leisure time, school related, mathematical, daily life, and work life activities. Below are some examples of the 'activities of genders' code:



*Leisure time* activities involve various activities such as engaging in social responsibility activities, having a picnic, or participating in cultural activities such as reading.

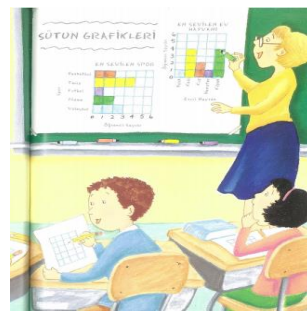
Sample analysis: As can be seen from the figure, the character is a girl who is sitting in an armchair and knitting. Therefore, the case was coded as "a girl in a leisure time activity."



**Figure 9. The girl who is knitting**

*School related* activities involve a range of tasks including listening to a lecture, working on a project, doing homework, or studying.

Sample analysis: As shown in the picture, there were a girl and a boy who were in a classroom and listening to a lecture. Therefore, the case was coded as "a girl in a school-related activity" and "a boy in a school-related activity".



**Figure 10. Students who are listening to a lecture**

*Activities related to mathematics* include various tasks such as problem-solving, counting, graphing, and making inferences.

Sample analysis: In the image, a girl and a boy are seen engaged in making a table, thus the case is coded as "a girl in a mathematical activity" and "a boy in a mathematical activity".



**Figure 11. Students who were making a table**

*Daily life* activities refer to routine activities that individuals engage in on a regular basis as part of their daily life, such as eating, sleeping, working, shopping, exercising, and so on.



Sample analysis: Efe asked his classmates how much pocket money they received during lunchtime. He took notes. As it is seen in the picture, Efe and his classmates are having lunch, therefore the case was coded as “a girl in daily life activity” and “three boys in daily life activities”.



**Figure 12. Efe and his classmates**

*Work life* activities include various occupational activities, such as teaching, working on a construction project, and harvesting.

Sample analysis: Bora called out to his grandmother from the window. "Grandma, is it time to go?"

"Not yet, we can't leave without gathering the things we will sell," his grandmother said. Based on the text and picture, Bora's grandmother is shown gathering vegetables to sell. Therefore, the case should be coded as “a woman in a working life activity.”

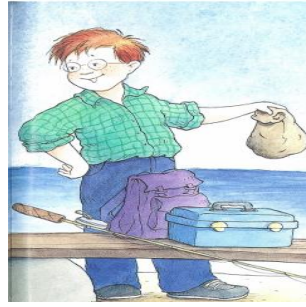


**Figure 12. Bora's grandmother**

### **Clothes**

The visual elements were analysed to determine the clothing of the characters in terms of their types, colours, and accessories, based on their genders. Here are some examples of the analyses performed:

Sample analysis: As seen in the picture, Bora is wearing a green shirt and blue pants. In addition, he has glasses and a bag as accessories. There are multiple codes that need to be analysed here. The cases were coded as follows: “a boy with shirt”, “a boy with pants”, “a boy with green”, “a boy with blue”, “a boy with glasses” and “a boy with bag”.



**Figure 13. Bora fishing**

### **Validity and Reliability**

Lincoln and Guba (1985) state that the reliability of a qualitative research should include features such as credibility, transferability, dependability, and confirmability. In this study, these features will be tried to be provided as listed below:

1. Depth-oriented data collection technique was applied in order to ensure credibility. According to Yıldırım and Şimşek (2013), the researcher should reveal some patterns by constantly comparing, interpreting, and conceptualizing the results obtained. Thus, the researcher will go beyond functioning as a recorder. In this study, the findings were constantly compared with each other. It was found that the findings of each research question pointed to a similar pattern. For example, the study found that women were presented as mothers and portrayed as caregivers of children at a higher rate than men. Fathers, on the other hand, fulfil the duty of provider. In parallel with this finding, it was observed that women were more often presented indoors, while men were presented in public life. Similarly, father characters, who fulfil the function of provider, were portrayed more in professional roles. Therefore, all of these findings confirm each other and underline the judgment that women are presented as an entity that needs to be watched, protected and controlled.

2. Thick description and purposive sampling strategies were used to ensure transferability (Yıldırım & Şimşek, 2013). In the study, the details of the analysis process, such as the selection strategy of the data source, the presentation of analysis examples for each category, and the expression of researcher expectations and biases were revealed. In addition, the data set of the study was determined by purposive sampling method. As qualitative research whose aim is to reveal typical events and phenomena and their varying characteristics rather than obtaining generalizable information to the universe, the objects of study that meet certain criteria were selected as the data set.

3. A consistency review was conducted to ensure dependability. In this respect, it should be taken into consideration whether there is consistency in the activities carried out from the beginning to the end of the study (Yıldırım & Şimşek, 2013). Neuendorf (2002) mentioned the importance of ensuring consistency in coding when analysing the same text by two or more people. Within the scope of this study, to prevent the interpretation of codes and categories from differing from researcher to researcher, the analysis process of 6 books corresponding to approximately 30% of the series was carried out together and simultaneously.

4. Reflexibility was used to ensure confirmability. The perspective and position of the researcher shapes all study, including quantitative, qualitative, and even laboratory science. Malterud (2001) stated that the background and position of researchers influence the topic they choose to study, the methods they deem appropriate, and the framework of findings and conclusions. In this context, it was sincerely expressed that the researchers were oriented to the topic of this study with the results of their past studies and their expectations regarding the results of the study.

## RESULTS

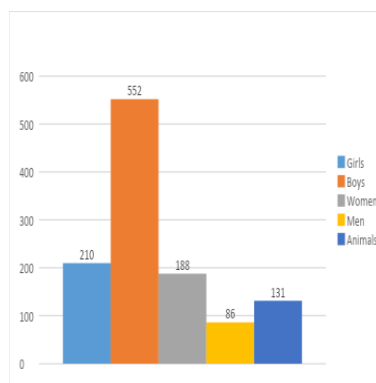
In this section, the study results were presented using descriptive statistics and graphs to depict the number of cases and determine whether gender equality was observed. Additionally, the chi-square test was used to analyze whether there were any significant differences between females and males.

### Frequencies

#### Main/secondary characters/title

To determine whether genders were fairly represented in a series of math-themed children's books, an investigation was conducted into the representation of adult and child characters, including title characters, main characters, and secondary characters. A total of 1167 characters were coded, with 131 animals with no gender description excluded for comparison purposes. Of the remaining characters, 762 were children, comprising 210 girls and 552 boys, and 274 were adults, comprising 188 women and 86 men.

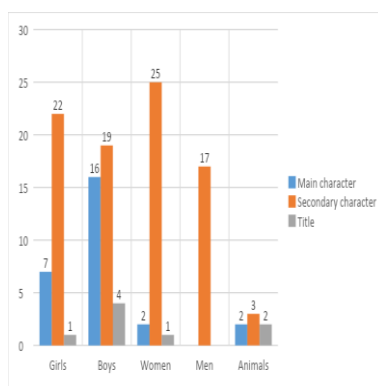
The analysis showed that children were represented more frequently than animals and adults in the series. However, it was found that girls were significantly underrepresented compared to boys ( $\chi^2=0.00$ ,  $df=1$ ). Surprisingly, women were significantly overrepresented compared to men ( $\chi^2=0.00$ ,  $df=1$ ).



**Figure 14. Gender representation of the characters**

A total of 27 main characters were coded, consisting of 23 children (7 girls, 16 boys), 2 adults (2 women, 0 men), and 2 non-gendered animal main characters. For secondary characters, 86 codes were determined, with 41 children (22 girls, 19 boys), 42 adults (25 women, 17 men), and 3 non-gendered animals. Additionally, 8 titles were coded, including 5 children (1 girl, 4 boys), 1 adult (a woman), and 2 non-gendered animals.

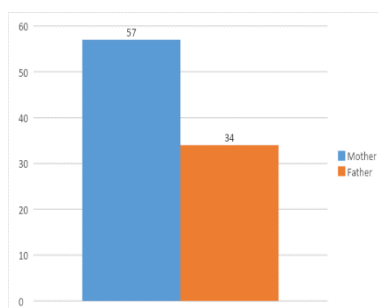
Gender comparisons revealed that boys were portrayed more frequently than girls as main characters ( $\chi^2=0.061$ ,  $df=1$ ) and mentioned more often in titles ( $\chi^2=0.180$ ,  $df=1$ ). In contrast, girls were mostly portrayed as secondary characters ( $\chi^2=0.639$ ,  $df=1$ ). Women were represented more frequently than men as both main and secondary characters ( $\chi^2=0.217$ ,  $df=1$ ) and in titles. However, none of these comparisons were found to be statistically significant.



**Figure 15. Gender representations of main/supporting/title characters**

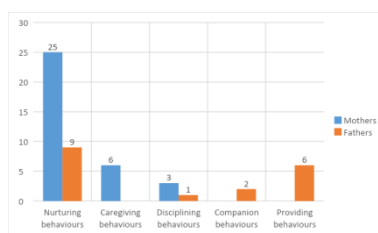
### Parents

To assess whether parents are fairly represented in a series of math-themed children's books, the study examined the frequency and parental behaviours of both mothers and fathers. Out of the 91 parental characters identified in the series, mothers were found to be significantly more dominant, with a total of 57 characters, whereas fathers were represented by only 34 characters. The difference in frequency between mothers and fathers was statistically significant ( $\chi^2=0.016$ ,  $df=1$ ).



**Figure 16. Frequencies of parents**

Additionally, the study noted the parental behaviours exhibited by the mother and father characters in the series. The analysis revealed that the mothers tended to display significantly more nurturing ( $\chi^2=0.006$ ,  $df=1$ ), caring, and disciplinary behaviours compared to fathers. On the other hand, fathers were more likely to perform only companion and provider roles.

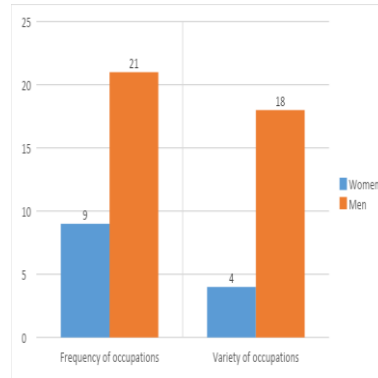


**Figure 17. Frequencies of parental roles**

### Occupations

In the series of math-themed children's books, the frequencies and variations of the occupations were examined to determine whether the occupations are evenly distributed among the genders. Children were not portrayed in any professional roles. The number of professional roles was 21 for men and only 9 for women. Additionally, men tended to be portrayed in a variety of professional roles (18), and most of them were traditionally stereotyped such as school principal, dentist, business person, mail carrier, school bus driver, etc. On the other hand, women were depicted

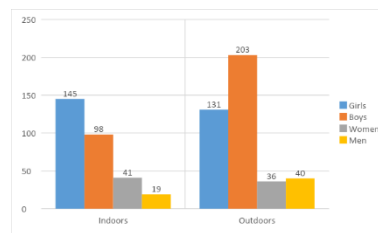
in some limited traditional professional roles (4) such as teacher, shop assistant. The differences in the occupational presentations of the genders were found to be statistically significant both in terms of frequency ( $\chi^2=0.028$ ,  $df=1$ ) and variety ( $\chi^2=0.003$ ,  $df=1$ ).



**Figure 18. Frequencies and variations of occupations**

### Location

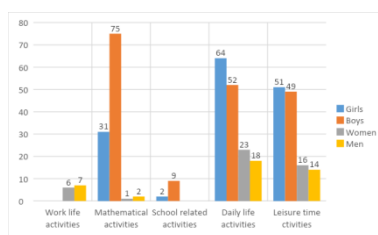
In the series of math-themed children's books, the frequencies of the locations male and female characters describe were examined in order to determine whether the genders systematically perform their activities indoors or outdoors. A total of 703 locations were coded and analysed for indoor/outdoor information. The presence of male characters was more common in outdoors compared to indoors (boys ( $\chi^2=0.00$ ,  $df=1$ ); men ( $\chi^2=0.06$ ,  $df=1$ )), with the reverse being true for female characters (girls ( $\chi^2=0.399$ ,  $df=1$ ); women ( $\chi^2=0.569$ ,  $df=1$ )). However, the outdoor/indoor difference was only statistically significant for boys. In addition, comparisons by gender were examined to explore whether there were any significant variations between the location of male and female characters. Women were significantly more likely to be depicted indoors compared to men ( $\chi^2=0.005$ ,  $df=1$ ), while men were more commonly portrayed outdoors than women. However, this difference was not statistically significant ( $\chi^2=0.646$ ,  $df=1$ ). Also, girls were significantly more frequently shown indoors than boys ( $\chi^2=0.003$ ,  $df=1$ ), and boys were significantly more often depicted outdoors than girls ( $\chi^2=0.00$ ,  $df=1$ ).



**Figure 19. Location of genders**

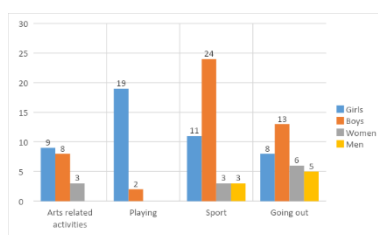
### Activities

In the math-themed book series, it was examined whether the activities in which the genders were engaged were stereotypically presented. A total of 333 activities were coded for boys and girls. Mathematics ( $\chi^2=0.00$ ,  $df=1$ ) and school-related ( $\chi^2=0.035$ ,  $df=1$ ) activities showed statistically significant differences in frequency between the genders, while the others did not. For women and men, 84 activities were coded. None of the activities differed significantly between the genders.



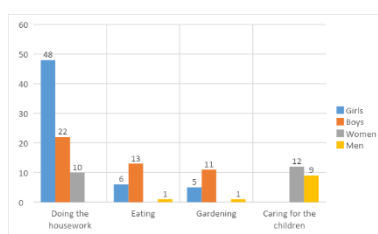
**Figure 20. Activities of genders**

In addition, the frequencies of the four most common leisure time activities such as art, playing games, sports and going out were compared between genders. Only a small number of comparisons yielded statistically significant differences. Girls portrayed in more playing activities than boys ( $\chi^2=0.00$ ,  $df=1$ ) when boys did more sports than girls ( $\chi^2=0.02$ ,  $df=1$ ).



**Figure 21. Leisure time activities of genders**

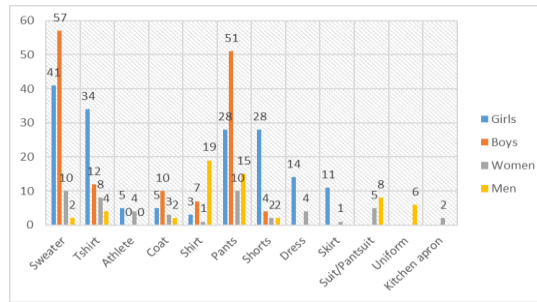
Also, the four most common daily living activities, doing housework, cooking, taking care of children and gardening, were compared by gender. Except for doing the housework, none of these activities showed reliable differences in frequency between the genders. While this difference in doing the housework could be proved statistically significant for girls and boys ( $\chi^2=0.001$ ,  $df=1$ ), the difference between men (0) and women (10) could not be calculated as the men did not engage in any housework activities. However, the difference is clearly visible.



**Figure 22. Daily living activities of genders**

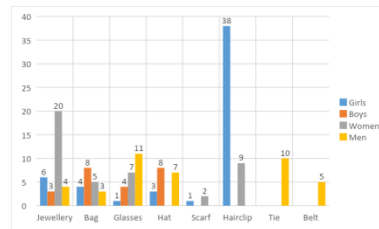
### Clothing-type

In the math-themed book series, it was examined whether clothes, accessories and colours were chosen in a stereotyped way according to gender. A total of 310 clothes were coded for boys and girls. In the book series, girls were shown with more shorts ( $\chi^2=0.00$ ,  $df=1$ ), skirts, dresses, t-shirts ( $\chi^2=0.001$ ,  $df=1$ ) and athletes than boys, and boys with more pants ( $\chi^2=0.010$ ,  $df=1$ ) than girls. For women and men, 108 clothes were coded. It has been concluded that women wore clothes such as sweaters ( $\chi^2=0.021$ ,  $df=1$ ), t-shirts, athletes, coats, and kitchen aprons that are preferred in daily life and housework compared to men, whereas men were more often shown with business-specific clothes such as suits, shirts ( $\chi^2=0.000$ ,  $df=1$ ) and trousers than women.



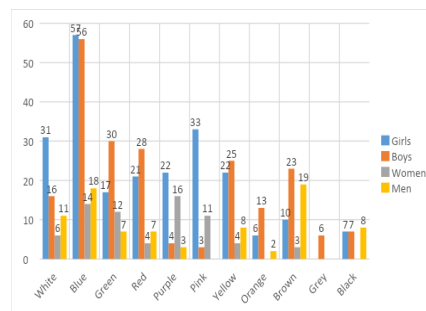
**Figure 23. Clothes of genders**

In addition, accessories worn by characters were compared by genders. Only one comparison revealed statistically significant differences. Women wore jewellery more often than men ( $\chi^2=0.001$ ,  $df=1$ ). However, although there is no statistical significance, it is clearly seen that men wear glasses, hats, ties and belts that indicate business life and intelligence more than women, while women wear jewellery, scarves, hair clips that emphasise their sexual attractiveness and beauty more than men. A similar picture is also found in the comparison of accessories for boys and girls.



**Figure 24. Accessories of genders**

Also, colours chosen for the characters' clothes were compared by gender. It was observed that girls wore white ( $\chi^2=0.02$ ,  $df=1$ ), purple ( $\chi^2=0.001$ ,  $df=1$ ) and pink ( $\chi^2=0.001$ ,  $df=1$ ) coloured clothes more than boys, and boys wore brown coloured clothes ( $\chi^2=0.024$ ,  $df=1$ ) more than girls, and these differences were statistically significant. Also in the book series, grey is clearly shown as a boy colour. Adults comparisons revealed that purple ( $\chi^2=0.003$ ,  $df=1$ ) and pink were presented as woman colours, and again brown was shown as a man colour ( $\chi^2=0.001$ ,  $df=1$ ).



**Figure 25. Clothing colour or genders**

## DISCUSSION AND CONCLUSION

Within the scope of the study, a series of 16 mathematics-themed children's picture books was analysed, and the series was evaluated in terms of whether it reflects gender equality. The frequency of gender representation in the series for children and adults was analysed separately, and it was concluded that boys were featured more than girls in both visual elements and texts, titles, and main characters. This finding is similar to the results obtained in the literature. Hamilton and colleagues (2006) found that the ratio of the number of boys to the number of girls per book was 1,2:1 and concluded that there was a significant difference. McCabe et al. (2011), on the other hand, found that

boys were given more space than girls in the titles and main characters of 5618 children's books they analysed. Weitzman et al. (1972) noted that a child who skims the titles of even the best-chosen children's books is likely to think that girls are unimportant because no one has bothered to write books about girls. Similarly, Casey and Lourenco (2021) stated that the underrepresentation of female characters in children's books contains an implicit message that they play a less important role in society. However, the findings of this study show that the same is not true for adults, and that female characters are generally more visible than male characters in titles, main and secondary characters. Although a complete numerical equality has not been achieved, studies conducted in the last few years show that a more egalitarian outlook has begun to prevail in children's picture books. In particular, there has been an increase in the number of female characters in titles, main roles and in illustrations and texts in general (Bağçeli-Kahraman & Özdemir, 2019; Bernstein, 2023; Gooden & Gooden, 2001; Paynter, 2011; Şeren et al., 2022).

Although it is a welcome development that female characters are more visible than male characters, it should be noted that the content is still sexist. For example, the findings of this study reveal that women's maternal role is significantly more emphasized than men's paternal role and that parenting behaviours are shaped based on traditional gender stereotypes. In the study, it was observed that mothers mostly assumed nurturing, caring and disciplinary parenting roles, while fathers fulfilled companion and providing roles. Similarly, researchers have stated that the father figure is given less space than the mother figure in children's picture books (Bencik Kangal, Karaaslan, & Arslan, 2017), women are mostly defined as mothers or wives, and they perform care-giving actions such as cooking for children, giving them hot chocolate, disciplinary actions such as yelling at them (Filipović, 2018; Weitzman et al., 1972) or nurturing actions such as meeting children's emotional needs (Dewitt et al., 2013). In other words, in children's picture books, mothers are portrayed as socio-emotional leaders of the household (Dewitt et al., 2013) and affectionate nurturers (Anderson & Hamilton, 2005). However, they underline that fathering behaviours are mostly limited to providing behaviours such as shopping for children and companion behaviours such as taking them on outings (Oğuz Rollas, 2017; Pang Abdullah, 2015; Dewitt et al., 2013).

The findings of the study revealed that in mathematics-themed children's picture books, women are presented in indoor spaces more than men and girls are presented in indoor spaces more than boys. When the literature is examined, it is seen that this finding is similar to the results of many studies. Researchers have revealed that males are presented in a wide variety of places such as parks and gardens, while females are presented in places limited to the house and home environment (Bağçeli Kahraman & Özdemir, 2019; Oğuz Rollas, 2022; Pang Abdullah, 2015; Şeren et al., 2022).

Similarly, Çınar (2015) analysed female figures in children's picture books and found that women are usually depicted in the home and deprived of the blessings of social life. Weitzman et al., (1972) stated that 40% of women and only 31% of men are depicted indoors in children's picture books. Hamilton et al., (2006) state that females are portrayed indoors more than outdoors, but the opposite is true for males.

The fact that women are frequently depicted in children's picture books in and around the home is also reflected in their representations in professional life. The findings of the study revealed that men are portrayed both more frequently and in more diverse occupational groups than women. In addition, it is seen that these professions are shaped based on traditional gender stereotypes and men are presented in more prestigious and high-paying positions than women. For example, in the series of mathematics-themed children's picture books analysed, it is seen that half of the professions given to women consist of the teaching profession. On the other hand, the school principal is portrayed as a man. This finding is also supported by the literature. For example, Bağçeli-Kahraman and Özdemir (2019) found that the number of female characters with any profession in children's books is even less than half of the number of male characters. Weitzman et al., (1972) also stated that in contrast to the limited range of women's professional roles, the roles played by men are diverse and interesting. Similarly, Emir et al., (2022) found that in children's books, men are presented in a wide variety of occupational groups such as tradesmen, drivers, doctors, police officers, and astronauts. On the other



hand, as Temellioğlu (2022) stated, service-based professions such as teaching, nursing, and nannying were deemed appropriate for women in children's picture books.

In the mathematics-themed picture books included in the study, boys were found to be more engaged in school and mathematics-related activities than girls. In parallel with the results of this study, Weitzman et al., (1972) concluded that most of the professions requiring advanced education in children's picture books were occupied by boys, and therefore four of the boys and only one of the girls were presented in school life in the works they examined. Ladd (2011), in his study on mathematics-themed picture books for children, stated that only one female character is engaged in mathematical activities compared to seven male characters. When the characteristics of these mathematical activities were examined, it was found that the female characters performed actions requiring lower cognitive ability such as counting numbers or performing mathematical operations specified by the male characters, while the male characters were in the position of solving mathematical problems. However, when leisure time activities were analysed in the study, it was concluded that girls mostly played games while boys were engaged in sportive activities. It was observed that about half of the games of girls are carried out indoors and in small groups, shaped based on traditional gender stereotypes such as playing five stones or cards. On the other hand, boys were found to engage in a wide range of sporting activities such as fishing, boating, swimming, and running. In this respect, it is possible to state that the findings are in line with the literature. Researchers concluded that sports activities in children's picture books are mostly performed by male characters (Bağçeli Kahraman & Özdemir, 2019; Chick et al., 2010). Similarly, Yılmaz and Pala (2019), in their study examining the sports element in children's picture books, found that boys are the main characters of books about competitive sports such as football and basketball. In addition, in math-themed picture books, females are presented in housework activities significantly more than males. This finding, which is a manifestation of traditional gender stereotypes, is supported by many studies in the literature. Studies reveal that the main task of women is limited to housework, women are presented as the one who washes dishes and does laundry, cooks, sweeps the house and mops the floors, in short, cleans, tidies and shapes, and girls learn from their mothers to be good housewives (Çınar, 2015; Oğuz Rollas, 2017; Weitzman et al. 1972).

In the series of mathematics-themed children's picture books examined, it was observed that girls wore t-shirts, tank tops and shorts more often than boys, whereas boys were more frequently depicted in pants, sweaters, and shirts. Interestingly, the study findings revealed that girls are portrayed in a way that draws attention to their bodies. In parallel with this finding, Oğuz Rollas (2017) states that in story illustrations, the sexual attractiveness of females' bodies is revealed and presented to the reader. Beasley and Standley (2002) reveal that in computer games, another media item whose target audience is children, the female body is at the forefront and attention is drawn to the bodies of females, especially breasts, which carry strong sexual meaning. In parallel with this finding, the results of the study revealed that both women and girls are commonly represented in skirts and dresses in children's picture books. Weitzman et al. (1972) stated that the background behind the presentation of females in skirts and dresses in children's picture books is to pacify and immobilize them. After all, it is obvious that it is not possible to go from adventure to adventure in dresses with frills, sleeves, and ribbons. However, in children's picture books, the presentation of dresses and skirts is so integrated with females that it is possible to see females in these outfits regardless of the fiction of the story (Tsao, 2008). Researchers have found that artists depict female characters in dresses and skirts even when they are running, flying, working in the field, walking on a rope (Creany, 1995), riding a bicycle, playing ball or going to the zoo (Weitzman et al., 1972). For example, Filipović (2018) noted that in one of the books she analysed, a family on a bear hunt struggle with harsh natural conditions such as snowstorms on the road, and the men's clothing is appropriate for these conditions, but the females are still depicted in skirts and dresses.

In addition, when the clothes of women and men are compared, the study findings reveal that women are mostly depicted in clothes suitable for domestic life and work such as cleaning, while men are depicted in clothes suitable for business life such as shirts, suits, or uniforms. This finding regarding clothing also recalls the stereotype that women are integrated with the home. Vannicopoulou

(2004) indicated that in children's picture books, women are most commonly dressed in a kitchen apron, which both protects them from dirt and becomes a symbol of their place in the social stratum, unlike men who are depicted with briefcases. Temellioğlu (2022) stated that traditional gender stereotypes confine women to the home and see them as a weak being who needs to be kept under protection. For this reason, women are not adequately represented in business life and the role of men as breadwinners has remained unchanged from past to present (Dewitt et al., 2013). The study findings reveal that a similar situation is found in the accessories used by the characters in the series. Males are more often depicted with accessories that evoke business life such as glasses, hats, belts, and ties. On the other hand, females are depicted with accessories such as jewellery, hairpins and scarves that emphasize their beauty and sexual attraction. In addition, as Taylor (2003) stated, it is seen that females are depicted with certain coloured clothes and accessories to meet cultural beauty criteria in children's picture books. The findings of the study revealed that white, the symbol of purity and cleanliness, is predominantly used in the visuals, while pink and purple colours are used for the female characters. This finding is supported by many studies in the literature (Bağçeli Kahraman, Özdemir, 2019; Çınar, 2015; Şeren et al., 2022). Therefore, the beauty of females is at the forefront in illustrated children's books. As Temellioğlu (2022) stated, the stereotype that women find meaning with their beauty and beauty is what makes them important has found a place even in children's books.

As a result, it is seen that mathematics-themed picture books, which are written with the aim of making mathematics popular and understandable, contain traditional gender stereotypes, as females are underrepresented, their maternal roles are underlined, they are limited to the home and the home environment, they are presented in limited stereotypical occupational groups based on service, their activities are based on low cognitive skills and housework, their clothes are pictured in relation to the home environment, revealing their sexual attractiveness and beauty. It is thought that these books cause girls to move away from mathematics, which is already a gendered field (Koblitz, 2002). Weitzman et al. (1972) stated that girls who read children's books containing sexist elements have their ego and sense of self damaged and feel more inadequate and worthless. In this respect, it is known that children's books with sexist language and visual elements affect children's future lives by limiting their interests and even their skills (Chick et al., 2010; Taso, 2008). It is thought that a girl who reads the series examined in the study will decrease her sense of self regarding mathematics (Keller & Dauenheimer, 2003), which has a decisive role in access to higher levels of education and thus to more lucrative and prestigious professions (Keller & Dauenheimer, 2003), will feel inadequate to do mathematics, will lose interest in mathematics with the perception that mathematics is a man's job, and her professional preferences will be shaped in accordance with more traditional stereotypes.

Based on the results of the study, some suggestions can be made in the field of children's books. First, it is important that females, who make up about half of the society, are represented as much as males in main characters, titles and both visual and textual elements, especially in mathematics-themed picture books. In addition, attention should be paid to the use of text and visuals that show that mothers and fathers share domestic and family responsibilities equally, and to increase the number of father figures. Women's roles in public life should also be given more space. Women should be presented in alternative professional roles instead of traditional professional stereotypes. Women should be given more space in the presentation of professional, intellectual, and sporting activities. For example, messages containing gender stereotypes, such as male characters are more interested in or more successful in math or sports-related activities, should not be included in children's picture books. On the other hand, characters of different genders should be preferred in the presentation of housework activities. The occupations of the characters in the books should also push the boundaries of gender roles and emphasize that girls can also be successful in occupations related to mathematics. It is also expected that the clothing styles of the characters should be designed in accordance with the principle of child appropriateness. It is thought that mathematics-themed picture books designed in this way can increase awareness of gender equality and enable children to be freer and more flexible in their mathematics-related goals and dreams.

This study was not without limitations. It can be said that the limitations of the study are related to the process of determining the objects of study. This study is not a study that deals with all

children's picture books related to mathematics. The study is limited to 16 books of the series that were selected based on certain criteria such as appealing to the primary school age group, containing a fictional text, having literary qualities, being translated into Turkish or written in Turkish. In this respect, it is recommended that similar studies should be conducted with a group with a wider range of objects of study. In addition, there is no criterion such as being a best seller in the selection of the works examined, and therefore there is no information that the series examined in the study are the mathematics-themed children's books that reach children the most and affect them the most. For this reason, it is thought that it would be beneficial for the field to conduct studies examining the best-selling mathematics-themed picture books in terms of gender equality.

**Conflicts of Interest:** No potential conflict of interest was declared by the authors.

**Funding Details:** No funding or grant was received from any institution or organization for this research.

**CRedit Author Statement:** Author 1 : Conceptualization, Visualization, Investigation, Writing- Reviewing and Editing. Author 2 : Methodology. Writing- Original draft preparation, Supervision .

**Ethical Statement:** The ethics committee approval was not required for this study since the use of data, documents or records that are all publicly available does not require ethical approval.

## REFERENCES

- Abdullah, N. A. P. (2015). *Language Use and gender representation in children's picture books by malaysian authors* [Doctoral dissertation, University Malaya]. <https://core.ac.uk/download/268877470.pdf>
- Anderson, D. A. & Hamilton, M. (2005). Gender role stereotyping of parents in children's picture books: The invisible father. *Sex Roles*, 52. DOI: 10.1007/s11199-005-1290-8
- Ankney, C. D. (1992). Sex differences in relative brain size: The mismeasure of woman, too? *Intelligence*, 16(3-4), 329-336.
- Ayvaz, M. (2013). *Examination of strategies used by primary school students in solving mental rotation tasks in relation to their mathematical achievement, gender and grade level* (Publication No. 349987) [Master's thesis, Marmara University].
- Balcı, A. (2007). *Sosyal bilimlerde araştırma: Yöntem, teknik ve ilkeler (Research in social sciences: Methods, techniques and principles)*. Ankara: Pegem Academy.
- Beasley, B., & Collins Standley, T. (2002). Shirts vs. skins: Clothing as an indicator of gender role stereotyping in video games. *Mass Communication & Society*, 5(3), 279-293.
- Benbow, C. P. (1988). Sex differences in mathematical reasoning ability in intellectually talented preadolescents: Their nature, effects, and possible causes. *Behavioral and Brain Sciences*, 11(2), 169-183.
- Bernstein, M. S. (2023). *Gender stereotypes in children's picture books: A study of authors, illustrators, and main characters in a classroom library collection* [Doctoral dissertation, St. John's University]. [https://scholar.stjohns.edu/cgi/viewcontent.cgi?article=1531&context=theses\\_dissertations](https://scholar.stjohns.edu/cgi/viewcontent.cgi?article=1531&context=theses_dissertations)

- Brugeilles, C., Cromer, I. & Cromer, S. (2002). Male and female characters in illustrated children's books or how children's literature contributes to the construction of gender. *Population*, 57(2), ss.237-267.
- Casey, K., Novick, K., & Lourenco, S. F. (2021). Sixty years of gender representation in children's books: Conditions associated with overrepresentation of male versus female protagonists. *Plos One*, 16(12).
- Chapman, E., Baron-Cohen, S., Auyeung, B., Knickmeyer, R., Taylor, K., & Hackett, G. (2006). Fetal testosterone and empathy: evidence from the empathy quotient (EQ) and the "reading the mind in the eyes" test. *Social Neuroscience*, 1(2), 135-148.
- Chick, K. A., Slekar, T. D., & Charles, E. P. (2010). A gender analysis of NCSS Notable picture book winners: 2006-2008. *Social Studies Research and Practice*.
- Corbetta, P. (2003). *Social Research: Theory, method and techniques*. London: Sage Publications.
- Creany, A. D. (1995). *The appearance of gender in award-winning children's books*. <https://files.eric.ed.gov/fulltext/ED391510.pdf>
- Çınar, P. (2015). Female characters in children's pictorial books. *Ankara University Journal of Faculty of Educational Sciences (JFES)*, 48(1), 1-18.
- Demirel, Ş. (2011). *Çocuk edebiyatı [Children's literature]* Ş. Demirel (Ed.), In children's literature with literary texts (ss. 43-68). Ankara: Pegem Academy.
- Denzin, N. K., & Lincoln, Y. S. (2008). *Introduction: The discipline and practice of qualitative research*. In N. K. Denzin & Y. S. Lincoln (Eds.), *Strategies of qualitative inquiry* (pp. 1–43). Sage Publications, Inc.
- Dewitt, A. L., Cready, C. M., & Seward, R. R. (2013). Parental role portrayals in twentieth century children's picture books: More egalitarian or ongoing stereotyping?. *Sex Roles*, 69, 89-106. <https://doi.org/10.1007/s11199-013-0285-0>
- Dawson, C. (2009). *Introduction to research methods*. Oxford: How To Books.
- Duffy, J., Warren, K., & Walsh, M. (2001). Classroom interactions: Gender of teacher, gender of student, and classroom subject. *Sex Roles*, 45(9-10), 579-593.
- Erden, S. Y.T. (2019). *Examining the gender phenomenon in children's picture books* (Publication No. 589287) [Master's Thesis, Aydın Adnan Menderes University].
- Ergun, S. (2003). Comparison of mathematical successes and ability of the first year students who studied in kindergartens in primary school to those who didn't (Tez No.133583) [Master's Thesis, Marmara University].
- Filipović, K. (2018). Gender representation in children's books: Case of an early childhood setting. *Journal of Research in Childhood Education*, 32:3, 310-325, <https://doi.org/10.1080/02568543.2018.1464086>
- Foster, M. C. (2014). *Representations of gender and embodiment in children's picture books*. [Unpublished doctoral dissertation]. University of Toronto, Toronto, Canada.
- Geray, H. (2006). *Toplumsal araştırmalarda nicel ve nitel yöntemlere giriş iletişim alanından örneklerle (Introduction to quantitative and qualitative methods in social research with examples from the field of communication )*. Ankara: Siyasal bookstore.

- Gooden, A. M., & Gooden, M. A. (2001). Gender representation in notable children's picture books: 1995–1999. *Sex roles*, 45, 89-101.
- Greenbank, P. (2003). The role of values in educational research: The case for reflexivity. *British Educational Research Journal*, 29(6), 791-801.
- Gündüz, Ş. S. (2015). An Investigation of Picture Story Books Published for Preschool Children in Terms of Gender Stereotypes (Publication No. 384135) [Master's Thesis, Ege University].
- Gürşimşek, I., ve Günay, D. (2005). Çocuk kitaplarında cinsiyet rollerinin işlenişinde kullanılan dilsel ve dildışı göstergelerin değerlendirilmesi. *Dokuz Eylül University Journal of Buca Education Faculty* (18).
- Hall, J., & Suurtamm, C. (2020). Numbers and nerds: Exploring portrayals of mathematics and mathematicians in children's media. *International Electronic Journal of Mathematics Education*, 15(3).
- Hamilton, M. C., Anderson, D., Broaddus, M., & Young, K. (2006). Gender stereotyping and under-representation of female characters in 200 popular children's picture books: A twenty-first century update. *Sex Roles*, 55(11-12), 757–765. <https://doi.org/10.1007/s11199-006-9128-6>
- Kahraman, P. B., ve Özdemir, H. (2019). The investigation of illustrated children's books in terms of gender roles. *Mediterranean Journal of Educational Research*, 13(27) 64-85. 10.29329/mjer.2019.185.4
- Karaaslan, A., Kangal, S. B., ve Arslan, S. (2018). Okul öncesi dönem resimli çocuk kitaplarında yer alan baba figürünün incelenmesi. *International Journal of Childrens Literature and Education Researches (CHEDAR)*, 2(2), 18-31.
- Kaynak, D. (2017). *Gender roles in preschool story and fable books* (Publication No. 497538) [Master's thesis, Recep Tayyip Erdogan University ].
- Keller, J., & Dauenheimer, D. (2003). Stereotype threat in the classroom: Dejection mediates the disrupting threat effect on women's math performance. *Personality and Social Psychology Bulletin*, 29(3), 371-381.
- Koblitz, A. H. (2002). Mathematics and gender: Some cross-cultural observations. *Towards Gender Equity in Mathematics Education: An ICMI Study*, 93-109.
- Körükçü, Ö., Kapıkıran, N. A., ve Aral, N. (2016). An Investigation of the Values in Illustrated Books of Children Aging 3-6 Years Based on Schwartz's Model, *Mehmet Akif Ersoy University Journal of Education Faculty*, 1(38), 133-151.
- Ladd, P. R. (2011). A study on gendered portrayals in children's picture books with mathematical content. *International Journal of Knowledge Content Development & Technology*, 1(2), 5-14. <http://dx.doi.org/10.5865/IJKCT.2011.1.2.005>
- Leonard C.M., Towler S., Welcome S., Halderman L.K., Otto R., Eckert M.A., & 170 Chiarello C. (2008). Size matters: cerebral volume influences sex differences in neuroanatomy. *Cerebral Cortex*, 18(2008), 2920-2931.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. sage.
- Malterud, K. (2001). Qualitative research: standards, challenges, and guidelines. *The lancet*, 358(9280), 483-488.

- McCabe, J., Fairchild, E., Grauerholz, L., Pescosolido, B. A., & Tope, D. (2011). Gender in twentieth-century children's books: Patterns of disparity in titles and central characters. *Gender & Society*, 25(2), 197-226.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education. revised and expanded from "Case study research in education."*. Jossey-Bass Publishers, 350 Sansome St, San Francisco, CA 94104.
- Miles, M. B. & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. (2nd ed). Thousand Oaks, CA: Sage.
- Moser, F. & Hannover, B. (2014). How gender fair are German schoolbooks in the twenty-first century? An analysis of language and illustrations in schoolbooks for mathematics and German. *European Journal of Psychology of Education*, 29(3), 387-407. <https://doi.org/10.1007/s10212-013-0204-3>.
- Münevver, Ö., Baysan, M. P., Koyunoğlu, E., ve Yükselen, A. (2022). 3-6 Yaş Resimli Öykü Kitaplarındaki Kadın ve Erkek Karakterlerin Mesleki Açıdan İncelenmesi. *International Journal of Children's Literature and Education Researches (CHEDAR)*, 5(2), 77-90.
- Denzin, N. K., & Lincoln, Y. S. (Eds.). (2011). *The Sage handbook of qualitative research*. sage.
- Nahara, M. M. (1998). *Gender stereotypes in children's picture books*. Calirfonia: Long Beach.
- Neuendorf, K. A. (2017). *The content analysis guidebook*. sage.
- Nurlu, Ö. (2021). Analysis of gender fairness of primary school mathematics textbooks in Turkey. *International Journal of Psychology and Educational Studies*, 8(4), 78-95. <https://dx.doi.org/10.52380/ijpes.2021.8.4.543>
- Nurlu-Ustun, O., & Aksoy, N. (2022). Determination of primary school teachers' mathematical gender stereotypes and examination of their reflection on students. *Journal of Qualitative Research in Education*, 29, 235-264. doi: 10.14689/enad.29.9
- Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications.
- Paynter, K. C. (2011). *Gender stereotypes and representation of female characters in children's picture books*. Liberty University.
- Poarch, R., & Monk-Turner, E. (2001). Gender roles in children's literature: A review of non-award-winning "easy-to-read" books. *Journal of Research In Childhood Education*, 16(1), 70-76.
- Räty, H., Vänskä, J., Kasanen, K., & Kärkkäinen, R. (2002). Parents' explanations of their child's performance in mathematics and reading: A replication and extension of Yee and Eccles. *Sex Roles*, 46(3-4), 121-128.
- Rollas, O.B. (2017). *Gender presentation in picture child story books for ages 0-6* (Publication No. 477363) Master's thesis, Yaşar University].
- Sever, S., & Aslan, C. (2012). The framework of character in children's literature works presentation of gender roles in creating. In *Proceedings of the III. National Youth and Children's Literature Symposium* (pp. 691-702).

- Şeren, N., Aydoğmuş, M., & Ateş, S. (2022). Gender roles in illustrated children's books: An example of the reading fish electronic library. *Journal of Kırşehir Education Faculty*, 23(3), 10.29299/kefad.1119177
- Taylor, F. (2003). Content analysis and gender stereotypes in children's books. *Teaching Sociology*, 31(3), 300-311.
- Temellioğlu, Ş. H. (2021). Gender Roles in Andersen Tales. *ACU International Journal of Social Sciences*, 7(1), 165-178.
- Tiedemann, J. (2000). Gender-related beliefs of teachers in elementary school mathematics. *Educational Studies in Mathematics*, 41(2), 191-207.
- Tognoli, J., Pullen, J., & Lieber, J. (1994). The privilege of place: Domestic and work locations of characters in children's books. *Children's Environments*, 272-280.
- Tsao, Y. L. (2008). Gender issues in young children's literature. *Reading Improvement*, 45(3), 108-115.
- Türkiye İstatistik Kurumu. (2022). Yükseköğretim istihdam göstergeleri, 2021 (Publication No: 45865). <https://data.tuik.gov.tr/Bulten/Index?p=Yuksekogretim-Istihdam-Gostergeleri-2021-45865>
- Ural, S. (2013). Okul öncesi çocuk kitaplarının tanımı. M.Gönen (Ed.), *Çocuk Edebiyatı İçinde* (s.33-35). Eğiten Book store.
- Vannicopoulou, A., ve Yeşiltuna, D. Ç. (2004). Resimli çocuk kitaplarında kadın karakterler. *Ege Journal of Education*, 5(2), 65-73.
- Wach, E., & Ward, R. (2013). Learning about qualitative document analysis. *IDS Practice Paper in Brief*, ILT Brief 13 August 2013.
- Weitzman, L. J., Eifler, D., Hokada, E., & Ross, C. (1972). Sex-role socialization in picture books for preschool children. *American journal of Sociology*, 77(6), 1125-1150.
- Yıldırım, A. ve Şimşek, H. (2013). *Sosyal bilimlerde nitel araştırma yöntemleri (Qualitative research methods in the social sciences)*. (9. Baskı). Ankara: Seçkin publishing.
- Yılmaz, A., & Pala, S. (2019). Sports in children's picture books. *Universal Journal of Educational Research*, 7(3), <https://doi.org/824-838>. 10.13189/ujer.2019.070324
- Yücel, Z., & Koç, M. (2011). The relationship between the prediction level of elementary school students' math achievement by their math attitudes and gender. *Elementary Education Online*, 10(1), 133-143.

