BUEFAD
International Refereed Journal

Bartın University
Journal of Faculty of Education
dergipark.org.tr/buefad

Volume 10, Issue 3

October, 2021

e-ISSN: 1308-7177

BUEFAD | June 2021, Volume 10, Issue 3

Bartın University Journal of Faculty of Education
International Refereed Journal
dergipark.org.tr/buefad

Owner

Prof. Dr. Çetin Semerci (Dean)
On behalf of Bartın University, Faculty of Education

Contact
Faculty of Education, Bartın University, 74100 BARTIN – TURKEY
e-mail: buefad@bartin.edu.tr Tel: +90 378 223 54 59

Bartın University Journal of Faculty of Education (e-ISSN 1308-7177) is an online, open-access, free of charge, international and refereed journal which is published by Bartın University Faculty of Education. Scientific articles conducted in various areas of research in teaching and related disciplines which have a general place in the community are published in the journal. The journal provides a platform for the publishing of studies in the fields of; learning, teaching and education.

Index List

EBSCO ProQuest CiteFactor SOBIAD OAJI.net
arastirmax Google Scholar TR DİZİN tei türk eğitim indeksi

SCIENTIFIC BOARD

REVIEWERS OF THE 10th VOLUME

Prof. Dr. Ahmet KARA - *İnönü University*
Prof. Dr. Ali TAŞ – *Kırıkkale University*
Prof. Dr. Alper ÇİLTAŞ – *Atatürk University*
Prof. Dr. Çetin SEMERCI – *Bartın University*
Prof. Dr. Feyza TANTEKİN ERDEN – *Middle East Technical University*
Prof. Dr. Gökhan ÖZSOY – *Ordu University*
Prof. Dr. Mehmet BEKDEMİR – *Erzincan Binali Yıldırım University*
Prof. Dr. Nilgün TATAR – *Alanya Alaaddin Keykubat University*
Prof. Dr. Şirin DİLLİ – *Giresun University*
Assoc. Prof. Dr. Aylin GÜRBÜZ – *Trakya University*
Assoc. Prof. Dr. Ayşe Derya IŞIK – *Bartın University*
Assoc. Prof. Dr. Cemalettin YILDIZ – *Giresun University*
Assoc. Prof. Dr. Eralp BAHÇİVAN – *Bolu Abant İzzet Baysal University*
Assoc. Prof. Dr. Esef Hakan TOYTOK – *Kahramanmaraş Sütçü İmam University*
Assoc. Prof. Dr. Esma EMMİOGLU - *Tokat Gaziosmanpaşa University*
Assoc. Prof. Dr. Fikret KORUR – *Burdur Mehmet Akif Ersoy University*
Assoc. Prof. Dr. Hatice YILDIZ DURAK - *Bartın University*
Assoc. Prof. Dr. Hüseyin KAYGIN - *Bartın University*
Assoc. Prof. Dr. İbrahim Yaşar KAZU – *Fırat University*
Assoc. Prof. Dr. Murat Ince – *Zonguldak Bülent Ecevit University*
Assoc. Prof. Dr. Mustafa SARITEPECİ – *Necmettin Erbakan University*
Assoc. Prof. Dr. Nilüfer DİDİŞ KÖRHASAN - *Zonguldak Bülent Ecevit University*
Assoc. Prof. Dr. Seda ARIKAN – *Fırat University*
Assoc. Prof. Dr. Veli BATDI – *Gaziantep University*
Asst. Prof. Dr. Ahmet Rıfat KAYİŞ – *Kastamonu University*
Asst. Prof. Dr. Ahmet TANHAN – *Adıyaman University*
Asst. Prof. Dr. Alpaslan GÖZLER – *Erciyes University*
Asst. Prof. Dr. Ayfer SU BERGİL – *Amasya University*
Asst. Prof. Dr. Beyza AKSU DÜNYA - *Bartın University*
Asst. Prof. Dr. Burcu SARI UĞURLU – *Çanakkale Onsekiz Mart University*
Asst. Prof. Dr. Burcu Seher ÇALIKOĞLU – *İzmir Demokrasi University*
Asst. Prof. Dr. Ceyhun KARABIYIK – *Ufuk University*
Asst. Prof. Dr. Davut SARITAŞ – *Nevşehir Hacı Bektaş Veli University*
Asst. Prof. Dr. Duygu METİN PETEN – *Ege University*
Asst. Prof. Dr. Eda ÇÜRÜKVELİOĞLU KÖKSAL – *Bartın University*
Asst. Prof. Dr. Emre ÇAM – *Tokat Gaziosmanpaşa University*
Asst. Prof. Dr. Emrullah YILMAZ – *Bartın University*
Asst. Prof. Dr. Erdi ŞİMŞEK - *Bartın University*
Asst. Prof. Dr. Fikriye Eda KARAÇUL - *Burdur Mehmet Akif Ersoy University*
Asst. Prof. Dr. Gül ÖZÜDOĞRU – *Kırşehir Ahi Evran University*
Asst. Prof. Dr. Hafiz BEK – *Uşak University*
Asst. Prof. Dr. Hasan Basri KANSIZOĞLU - *Bartın University*
Asst. Prof. Dr. İsmail Fırat ALTAY – *Hacettepe University*
Asst. Prof. Dr. Mahmut ÇİTİL – *Gazi University*
Asst. Prof. Dr. Mahmut POLATCAN – *Karabük University*
Asst. Prof. Dr. Meral MELEKOĞLU – *Eskişehir Osmangazi University*
Asst. Prof. Dr. Murat DEBBAĞ – *Bartın University*
Asst. Prof. Dr. Mustafa FİDAN - *Bartın University*
Asst. Prof. Dr. Mustafa Öztürk AKCAOĞLU – *Kastamonu University*
Asst. Prof. Dr. Mustafa FİDAN - *Bartın University*
Asst. Prof. Dr. Mustafa TÜYSÜZ – *Van Yüzüncüyıl University*
Asst. Prof. Dr. Nilüfer ATMAN USLU – *Manisa Celal Bayar University*
Asst. Prof. Dr. Nurdan KAVAKLI – *İzmir Demokrasi University*
Asst. Prof. Dr. Oktay KIZKAPAN – *Nevşehir Hacı Bektaş Veli University*
Asst. Prof. Dr. Özlem ÇAMLIBEL ÇAKMAK - *Bolu Abant İzzet Baysal University*
Asst. Prof. Dr. Pelin AKSÜT - *Bolu Abant İzzet Baysal University*
Asst. Prof. Dr. Rabia VEZNE – *Akdeniz University*
Asst. Prof. Dr. Reha SARIKAYA – *Bartın University*
Asst. Prof. Dr. Seda ÇAVUŞ GÜNGÖREN – *Çanakkale Onsekiz Mart University*
Asst. Prof. Dr. Selçuk BILGIN – *Gazi University*
Asst. Prof. Dr. Serap AKBABA DAĞ - *Kütahya Dumlupınar University*
Asst. Prof. Dr. Semin KAZAZOĞLU – *Yıldız Technical University*
Asst. Prof. Dr. Sezen ARSLAN – *Van Yüzüncü Yıl University*
Asst. Prof. Dr. Şenay BAŞ – *Trabzon University*
Asst. Prof. Dr. Tuğba UYGUN – *Alanya Alaaddin Keykubay University*
Asst. Prof. Dr. Ümran ÜSTÜNBAŞ - *Zonguldak Bülent Ecevit University*
Asst. Prof. Dr. Ümit DİLEKÇİ - *Batman University*
Asst. Prof. Dr. Vahide Nilay KIRTAK AD - *Balıkesir University*
Asst. Prof. Dr. Volkan DURAN – *Iğdır University*
Asst. Prof. Dr. Yasemin KUŞDEMİR – *Kırıkkale University*
Dr. Ayça SESİGÜR – *Muğla Sıtkı Koçman University*
Dr. Cansu AYAN- *Ankara University*
Dr. Figen DEMİREL UZUN – *Gazi University*
Dr. Kevser HERDEM – *Turkey's Ministery of National Education*
Dr. Ömer Bilgehan SONSEL – Gazi University
Dr. Özgül ÖZÖNDER – *Abdullah Gül University*
Dr. Pınar AKYILDIZ – *Bartın University*
Dr. Sedat TURGUT – *Bartın University*
Dr. Seval KARTAL – *Pamukkale University*
Dr. Süleyman AKÇIL – *Zonguldak Bülent Ecevit University*
Dr. Şebnem SOYLU -*Abdullah Gül University*
Dr. Turgut BAHÇALI – *Eskişehir Osmangazi University*
Dr. Ümmügülsüm DURUKAN – *Giresun University*
Dr. Yakup YILMAZ – *Necmettin Erbakan University*
Dr. Yeşim AYDOĞAN – *İnönü University*

CONTENT

BUEFAD | 2021, Volume 10, Issue 3, 471-481
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.934504

Developing the Digital Literacy Barriers (DILBAR) Scale: A Validity and Reliability Study

Çetin SEMERCİ[a*] & Nuriye SEMERCİ[b]

a* Prof. Dr., Faculty of Education, Bartın University, Turkey (https://orcid.org/ 0000-0002-6337-5876), *csemerci@bartin.edu.tr

b Prof. Dr., Faculty of Education, Bartın University, Turkey (https://orcid.org/ 0000-0002-5347-9858)

Research Article | Received: 07.05.2021 | Revised: 26.08.2021 | Accepted: 05.09.2021

Abstract

This research aims to develop a digital literacy barriers (DILBAR) scale. The survey method was used to collect the data required to develop the scale. A total of 278 participants, including 177 students and 101 faculty members from Akdeniz University, Bartın University and Bayburt University in Turkey, were included in the study. According to the factor analysis results KMO value of DILBAR scale is 0.905 and the value of Barlett's test is 1023.211 (Df= 55, p=0.000). The DILBAR scale can be used in single and multidimensional forms. The scale explains 60.113% of the total variance. In the analysis results for DILBAR scale, it is seen that the factor loads vary between 0.453-0.819 and the item-total correlations vary between 0.523-0.752. The correlation coefficient between the two halves of the scale was 0.769. The Cronbach's Alpha Coefficient of DILBAR scale is 0.859. The scale consists of 11 items. Confirmatory factor analysis of the DILBAR scale was performed with the AMOS program (Chi-square = 59.882, Df = 40, GFI = 0.965, CFI = 0.980, RMSEA = 0.042). CFA results and reliability analysis showed that the scale is valid and reliable. DILBAR scale can be applied to university students and faculty members.

Keywords: Digital literacy barriers, validity, reliability, scale development.

Dijital Okuryazarlık Engelleri Ölçeğinin Geliştirilmesi: Geçerlik ve Güvenirlik Çalışması

Öz

Araştırmanın amacı, Dijital Okuryazarlık Engelleri (DILBAR) ölçeğinin geliştirilmesidir. Araştırmanın yöntemi tarama modeli şeklindedir. Uygulamada Türkiye'de Akdeniz Üniversitesi, Bartın Üniversitesi ve Bayburt Üniversitesi'nde bulunan 177 öğrenci ve 101 öğretim üyesi olmak üzere toplam 278 katılımcıyla çalışılmıştır. Faktör analizi sonuçlarına göre, DILBAR ölçeğinin KMO değeri 0.905, Bartlett testi değeri 1023.211'dir (Sd= 55, p=0.000). DILBAR ölçeği tek ve çok boyutlu olarak kullanılabilir. Ölçek, varyansın % 60.113'ünü karşılamaktadır. DILBAR ölçeği için yapılan analiz sonuçlarında, faktör yüklerinin 0.453-0.819 arasında ve madde toplam korelasyonlarının 0.523-0.752 arasında değiştiği görülmektedir. Ölçeğin iki yarı puanları arasındaki korelasyon katsayısı 0.769 bulunmuştur. DILBAR ölçeğinin Cronbach Alpha katsayısı 0.859'dur. Ölçek, 11 maddeden oluşmuştur. DILBAR ölçeğinin AMOS programı ile doğrulayıcı faktör analizi yapılmıştır (Kay kare=59.882, Sd=40, GFI=0.965, CFI=0.980, RMSEA=0.042). DFA sonuçları ve güvenirlik analizleri ölçeğin geçerli ve güvenilir olduğunu göstermiştir. DILBAR ölçeği üniversite öğrencilerine ve öğretim üyelerine uygulanabilir.

Anahtar kelimeler: Dijital okuryazarlık engelleri, geçerlik, güvenirlik, ölçek geliştirme.

To cite this article in APA Style:

Semerci, Ç., & Semerci, N. (2021). Developing the Digital Literacy Barriers (DILBAR) Scale: A Validity and Reliability Study. Bartın University Journal of Faculty of Education, 10(3), 471-481. https://doi.org/10.14686/buefad.934504

1 | Introduction

Today, stunning developments are experienced in science and technology and adaptation to these developments is difficult. The only way to adapt to the 21st century is to acquire the skills required by this century. According to Partnership for 21st Century Skills (2009), it is stated that one of the 21st century skills is digital literacy. True and false information spreads very quickly with the support of technology. Çubukçu and Bayzan (2013) state that the biggest factor in the formation of internet risks is the sharing of inaccurate and misleading information. In this case, digital literacy skills of individuals come to the fore (Ainley, Schulz, & Fraillon, 2016; Mohammadyari & Singh, 2015).

Digital literacy can be defined as "the ability to understand and use information in multiple formats" with an emphasis on critical thinking (Gilster, 1997). The indicator of an individual being digitally literate is adaptation to new or emerging technologies (Ng, 2012). On the other hand, according to Eshhet-Alkali and Amichai-Hamburger (2004), digital literacy includes technological, social and cognitive skills in the digital environment. Digital literacy is having the necessary skills to select, evaluate and reuse the information we encounter on the internet (Van Dijk, 2005).

In this context, there are many scale studies developed or adapted regarding digital literacy in the literature (Hamutoğlu et al., 2017; Hargittai, 2005; Ng, 2012; Ocak & Karakuş, 2018; Rodríguez-de-Dios, Igartua & González -Vázquez, 2016; Sulak, 2019; Toker, Akgün, Cömert & Edip, 2021; Üstündağ, Güneş & Bahçıvan, 2017). The sub-factors of these scales focused on issues related to attitude, technique, technology, information and communication, cognitive, social, digital resource use and digital material production.

It is a fact that a considerable number of people are not digitally literate. There are some factors that prevent people from being digitally literate. These factors are called digital literacy barriers. Regarding digital literacy barriers, Hew and Brush (2007) listed lack of resources and information, lack of vision in the institution, and the negative attitudes and beliefs of teachers as main barriers. In addition, Miranda and Russell (2011) emphasized access to technology resources and technical support as major problems. Ertmer (1999) categorized digital literacy barriers as first degree or second-degree barriers. First-degree barriers are related to technology integration in an enterprise sense. Second-degree barriers are personal barriers and include beliefs and attitudes about technology.

When the related literature is reviewed, it is observed that some studies were carried out on barriers to digital literacy. In Hosseini's (2018) study titled "Digital Literature in Early Elementary School: Barriers and Support Systems in the Era of the Common Core", teachers identified the high student to teacher ratio, lack of time to plan and teach technology lessons, and students' limited self-management and independence skills as major impediments to digital literacy instruction in the early elementary grades. In the study titled "Barriers to Digital Literacy: Learning to Program" conducted by Cartile (2020), the digital literacy barriers of engineering students were investigated. This thesis discusses digital literacy barriers to acquiring the digital literacy needed to learn end-user programming, or programming as a tool to support activities in a non-computer science domain.

Digital literacy barriers were examined in five categories: They can be classified as attitude, educational-cognitive, technical, social-economic and physical (Eshhet-Alkali & Amichai-Hamburger, 2004; Hargittai, 2005; Ng, 2012; Rodríguez-de-Dios, Igartua & González -Vázquez, 2016). The keywords such as adoption, reluctance, prejudice, burnout, dislike of technology, lack of vision, staying away from new technologies, weak belief in technology, fear of technology and lack of curiosity about technology can be listed under the category of attitude. The keywords such as dictatorial education, traditional education, teacher-centred education, learning disability, inability to receive education or inaccessibility, and ignorance about technology can be placed under the education-cognitive category. Inadequacy of technological infrastructure, lack of technical knowledge, inability to access the internet, lack of technical skills, inability to cooperate over the

internet, inability to use technology, the absence of people using technology in the environment, the use of too many foreign words, adherence to the philosophy of perennialism and essentialism, inability to find time to learn technology and inability to integrate digital technology into education can be grouped under the technical category. Under the category of social-economic, the keywords such as low budget, economic difficulties, poor social life, expensive technology and technology poverty can be included. The keywords such as physical defects, old age, parental inhibition and digital bullying can be included under the physical category.

One way of acquiring and gaining digital literacy skills is to identify digital literacy barriers and remove these barriers through teaching programs. Unless these barriers are identified, teaching digital literacy skills would take more time and a positive result cannot be guaranteed. In order to prepare the curriculum, first of all, it is necessary to develop a measurement tool to measure the digital literacy barriers. That's why this study was carried out.

Purpose of the Research

Based on this situation, the purpose of the research is to develop the digital literacy barriers (DILBAR) scale. Validity and reliability studies were conducted to develop the scale in the study.

2 | METHOD

Survey method was used in this research. With survey method, events and objects are described (Büyüköztürk vd., 2009, 16-17; Kaptan, 1998, 59; Karasar, 1995, 77; Sönmez ve Alacapınar, 2011, 46). The digital literacy barriers (DILBAR) scale was developed in this study.

DATA COLLECTION PROCESS

The study group was selected from the universities in the top, middle and lower levels in the general satisfaction ranking of university students in Turkey and in the ranking of "satisfaction with the richness of learning opportunities and resources" of universities (Karadağ & Yücel, 2020). The draft scale was applied to students and faculty members at Akdeniz University (Upper group), Bartın University (Middle group) and Bayburt University (Lower group) in Turkey in 2021. Table 1 shows the distribution of students and faculty members by universities.

Table 1. Distribution of Study Group by Universities

Universities	Students	Teaching Staff
Akdeniz University	58	31
Bartin University	70	43
Bayburt University	49	27
Total	177	101

The draft scale was applied in Akdeniz University (58 students, 31 faculty members), Bartın University (70 students, 43 faculty members) and Bayburt University (49 students, 27 faculty members). The distribution of the study group by faculties is given in Table 2.

Table 2. Distribution of Study Group by Faculties

Faculty	Students	Teaching Staff
Letters	38	18
Education	51	27
Science	22	11
Islamic Science	15	8
Engineering	24	15

Sports Science	16	13
Medicine	21	9
Total	177	101

The draft scale was applied in the Faculty of Letters (38 students, 18 faculty members), Faculty of Education (51 students, 27 faculty members), Faculty of Science (22 students, 11 faculty members), Faculty of Islamic Studies (15 students, 8 faculty members), Faculty of Engineering (24 students, 15 faculty members), Faculty of Sports Sciences (16 students, 13 faculty members) and Faculty of Medicine (38 students, 18 faculty members).

Data Analysis and the Stages of Development of the Digital Literacy Barriers (DILBAR) Scale

A statistical package program was used for data analysis in the study. Data analysis was given during the development of the scale. The stages of development of the digital literacy barriers (DILBAR) scale are given below:

1. Literature review and formation of the item pool,
2. Getting expert views,
3. Factor analysis and identification of the themes (sub-dimensions) of the multidimensional scale,
4. Finding item-total correlations,
5. Finding correlations between factors,
6. Finding the correlation between two equivalent semi-scores,
7. Finding the internal consistency coefficient (Cronbach alpha),
8. Confirmatory factor analysis with AMOS.

3 | Findings

Developing a Digital Literacy Barriers (DILBAR) Scale

As a result of the examination of the related literature and the scales related to digital literacy, an item pool was formed. Then, the draft scale was formed consisting of 29 items, all of which were included in the item pool. The grading of the scale is as follows: "Totally agree (5), Mostly agree (4), Partially agree (3), Slightly agree (2), Totally disagree (1)".

The DILBAR scale was given to five (5) faculty members (2 Professors and 3 Assistant Professors) working in the field of Educational Sciences at a state university in order to get expert opinion. In addition, opinions of 5 graduate students were taken. In line with the opinions of experts and students, a consensus was reached on 15 out of 29 items. Corrections on expressions were made in some of the items, and it was concluded that the scale could measure the digital literacy barriers of students and faculty members. The draft scale consists of 15 items. These items which were identified in line with expert opinions, were applied to a total of 278 participants, 177 students and 101 faculty members in Akdeniz University, Bartın University and Bayburt University in Turkey.

Factor analysis was performed with the collected data. Factor analysis is a multivariate statistics that aims to find and discover fewer unrelated and conceptually meaningful new dimensions by bringing together p interrelated variables (Büyüköztürk, 2002, 117). Firstly, the Kaiser-Meyer-Olkin (KMO) value, which demonstrates the suitability of factor analysis, was calculated. In addition, the Bartlett's Test was conducted

to test the hypothesis that "the correlation matrix is equal to the unit matrix" (UYTES, 1995, 4). In this sense, it can be seen that the distribution in the population is normal. Items with factor loads below 0.45 were not included in the DILBAR scale. The factor loads of the scale are given in Table 3. The DILBAR scale has three factors: attitude, technique and cognitive.

According to the results of the factor analysis, the KMO value of the DILBAR scale was 0.905 and the Bartlett's test value was 1023.211 (Df=55, p=0.000). The DILBAR scale can be used in single and multidimensional forms. The scale accounts for 60.113% of the total variance. In the analysis results for the DILBAR scale, it is seen that factor loads vary between 0.453-0.819 and item-total correlations vary between 0.523-0.752.

Correlations between the factors were analyzed according to the answers given by the participants (N=278). There is a high correlation of 0.719 between "technical" and "cognitive". A moderate correlation was found between "attitude" and "cognitive" (r=0.516) and between "attitude" and "technique" (r=0.534). The correlations are positive and significant at 99% confidence interval.

On the other hand, two equivalent half-score correlations were calculated in the scale. The scale was applied once to a group of 278 students and faculty members, and it was divided into two halves with the approach of "odd and even numbered" items. The correlation between the scores of the students from both halves was found 0.769. In addition, the internal consistency coefficient of the scale was calculated. The Cronbach Alpha coefficient of the scale was 0.859. As a result, the scale consisted of a total of 11 items, all of which were positive according to the purpose. There are no items that need to be reverse scored (Appendix-1).

Table 2. Factor Loadings of the Scale and Item-Total Correlations

Draft Scale Item Number	Scale Item Number	Items	Factor loadings	Item-total correlation
Attitude Factor				
1	1	I have negative bias towards new technologies.	0.786	0.536**
2	2	I have no interest in digital technologies	0.761	0.583**
20	3	Instructors' pedagogical attitudes about technology are negative.	0.453	0.556**
Technical Factor				
10	4	I have difficulty in integrating digital technologies into learning environments.	0.729	0.678**
16	5	I have difficulty in systematically integrating technology into lessons	0.752	0.742**
26	6	I do not have the technical skills required to develop digital teaching materials (videos, digital materials, presentations, blogs, wikis, etc.).	0.472	0.743**
28	7	I can not communicate over the Internet (Social network applications, forums, blogs, etc)	0.682	0.581**
Cognitive Factor				
15	8	My technical knowledge about technology is insufficient.	0.550	0.740**
24	9	I cannot learn new technologies easily.	0.490	0.752**
25	10	I am unaware of many of the new technologies.	0.516	0.702**
29	11	I can not use cloud computing technologies.	0.819	0.523**
Removed Items				
3	-	I am reluctant to use technologies.	-	-
4	-	I did not receive training on new technologies.	-	-
5	-	My managers do not guide me on technology.	-	-
6	-	The technological infrastructure of the classrooms is insufficient.	-	-
7	-	Instructors do not embrace technology.	-	-
8	-	I have difficulty in using technology.	-	-
9	-	In-service training activities for technology by our institution are insufficient.	-	-
11	-	I am afraid of digital bullying.	-	-
12	-	The institution does not have a vision for new technologies.	-	-
13	-	Instructors stay away from new technologies.	-	-

14	-	Instructors' beliefs about technology are weak.	-	-
17	-	Digital technology equipment is lacking in schools.	-	-
18	-	Vocational training for digital technology is insufficient.	-	-
19	-	Instructors' pedagogical beliefs about technology are weak.	-	-
21	-	The trainings I receive for digital technologies are not student-centered.	-	-
22	-	Those who adopt traditional approaches have a low tendency to use digital technologies.	-	-
23	-	I am afraid of new technologies.	-	-
27	-	I do not feel confident in collecting and evaluating information from the Internet.	-	-

Confirmatory factor analysis was performed with the AMOS program on the DILBAR scale (Figure 1). Confirmatory Factor Analysis is used in validity analysis in scale development (Bollen, 2007, 40-51; Sümer, 2000, 49-52). With this analysis, it is tested or verified how the factor analytic structure of the research data fits the hypothesized model (Bayram, 2010, 42). In the studies using structural equation models (SEM), the reliability and validity of parameter estimations for the population and the appropriateness of model evaluation criteria depend on the size of the sample size (Tezcan, 2008, 30). In this regard, it is considered sufficient to collect data from 278 people in the study.

Confirmatory factor analysis of the DILBAR scale was performed with the AMOS program. The results of the AMOS program are given in Figure 1. The chi-square value in the program output was found 59.882. Since chi-square ($\chi 2$) / degree of freedom is 59.882 / 40 < 2, it can be asserted that there is a very strong model fit. In addition, the fact that the goodness of fit index (GFI=0.965) of the model is close to 1 and the mean square root of the approximate errors (RMSEA=0.042) value is less than 0.05 supports this fit.

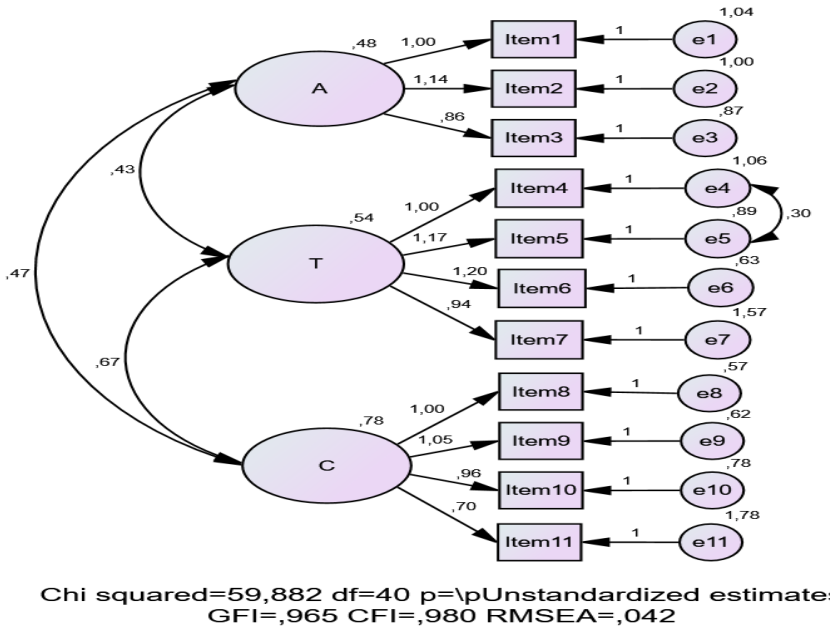


Figure 1. *The Results of Confirmatory Factor Analysis of DILBAR Scale (A:Attitude, T:Technical, C:Cognitive)*

Figure 1 shows the results of confirmatory factor analysis of the DILBAR scale. The observed variables between item 1 and item 11 and digital literacy barriers are latent variables. In the figure, e1 to e11 are the measurement error of each observed variable. In the modification measurement errors, it was concluded that there was a higher level of correlation between the item 4 and item 5 variables (e4-e5) than the model predicted, and their errors were highly correlated. In this case, the covariance was added to the model and

the model was re-estimated. One-way arrows in the figure are the regression coefficients from the latent variable to the observed variables.

Table 4. Confirmatory Factor Analysis Results of the Scale

Model Fit Indexes	Goodness of Fit Standart Measures	The DILBAR Scale	Decision
χ2/sd	0 ≤ χ2/sd ≤ 2	1,497	Well Compatible
RMSEA	0 ≤ RMSEA ≤ 0.05	0,042	Well Compatible
SRMR	0 ≤ SRMR ≤ 0.05	0,037	Well Compatible
GFI	0.95 ≤ GFI ≤ 1.00	0,965	Well Compatible
AGFI	0.90 ≤ AGFI ≤ 1.00	0,942	Well Compatible
CFI	0.97 ≤ CFI ≤ 1.00	0,980	Well Compatible
NFI	0.95 ≤ NFI ≤ 1.00	0,942	Acceptable

(Bayram, 2010; Bryne, 2016; Schumacker, & Lomax, 2004; Schermelleh-Engel, Moosbrugger & Müller, 2003)

In the estimated model, χ2/sd (CMIN/DF) value was found to be 1.497. This result is suitable according to the standard measures of good fit (0≤χ2 /sd ≤2). The root mean square error of approximation (RMSEA) was found to be 0.042. RMSEA values of 0.05 or less indicate good fit. In this study, the RMSEA value of 0.042 indicates a perfect fit and there is no difference between population and sample covariance.

According to the SRMR, GFI and AGFI fit indices, evaluation can be made as follows: The fact that the value of the standardized root mean square residual (SRMR) value is close to zero indicates a perfect fit (Bayram, 2010, 72). In the research, this situation is seen as a perfect fit (SRMR=0.037). The goodness of fit index (GFI) is calculated by calculating the covariance between the observed variables. The GFI result of the study was found to be 0.965, and it was among the standard measures of good fit. Adjusted goodness of fit index (AGFI) was calculated considering the degrees of freedom. The AGFI was found 0.942 and the result is suitable.

NFI and CFI were calculated from the fit indices based on the independent model. The normed fit index (NFI: Normed fit index) is given by the relative position of the current model between the saturated model and the independent model (Schermelleh-Engel, Moosbrugger & Müller, 2003). As a result of the research, NFI was found 0.942. Compliance with standard measures (0.95≤NFI≤ 1.00) seems acceptable. Comparative fit index (CFI: Comparative fit index) is found 0.980, which indicates that the model is in strong fit.

4 | Discussion & conclusion

In the research, the digital literacy barriers (DILBAR) scale was developed. The scale was applied to 278 students and faculty members. In practice, when the DILBAR scale was developed, 29 items were reduced to 15 according to expert opinions. Experts eliminated 14 items due to the large number of items measuring the same behavior. These 15 items were processed in factor analysis. According to Tavşancıl (2002, 31), in order to increase the reliability of the scale, it is necessary to increase the number of items. However, while increasing the number of items in order to increase reliability, if more items measuring the same behavior are included in the scale, reliability will still be damaged. On the other hand, a large number of items may not be read by the student and lecturer. For this reason, a sufficient number of items were included in the DILBAR scale.

The measuring power of the scales is debatable. Scales are indirect measurements. Therefore, it is not possible to replace direct measurements with the scales. Therefore, care should be taken when interpreting measurements obtained with the DILBAR scale. For example, a measurement from the first item should be interpreted as follows. “I have a negative bias towards new technologies.” Considering that a student gives a score of 1 out of 5 in the item, it should not be ignored that although this student has a prejudice against new

technologies, s/he may want to reflect it in that way. For this reason, a description to be made should be checked from different angles.

The points supporting the usability of the scale are as follows: In the analysis results for the DILBAR scale, it is seen that factor loads vary between 0.453 and 0.819 and item-total correlations vary between 0.523 and 0.752. The Cronbach Alpha coefficient of the DILBAR scale is 0.859. On the other hand, the fit index values obtained as a result of the confirmatory factor analysis with the AMOS program show that the scale has a valid structure. The fact that the Chi-square value divided by the degree of freedom (χ2/df) of these values is less than 3 indicates that the factor structure is compatible (Kline, 1998; Segars and Grover, 1993).

Digital literacy barriers are related to digital divide. The digital divide is basically the difference between those who use information and communication technologies (ICT) and those who do not (Hargittai, 2003; OECD, 2001; Salinas, 2003). In other words, it refers to the differences between individuals or communities in owning and benefiting from information and communication technologies.

Societies do not have equal opportunities to use ICT due to reasons such as lack of equipment or infrastructure, lack of technical knowledge and skills (OECD, 2001). The technical factor of the DILBAR scale is partly linked to the digital divide. In the technical dimension of the scale, there are technical information deficiencies and items related to usage. For example, one of the items is as follows: "I do not have the technical skills required to develop digital teaching materials (videos, digital materials, presentations, blogs, wikis, etc.)".

As a result of the research, the following suggestions can be made: The DILBAR scale can be applied to university students and faculty members. In addition, digital literacy barriers scales can be developed for teachers, administrators, parents and primary and secondary school students.

Research Ethics

Bartin University Social and Human Sciences Ethics Committee issued an ethics committee approval certificate for the "Digital literacy barriers scale" with the decision no. 5 on 07 April 2021 (2021-SBB-0111).

Researchers' Contribution Rate

The first author collected data and contributed to article revisions. The second author contributed with data analysis and reported the results. All authors contributed to the literature review, read and approved the final article.

Conflict of Interest

The authors of this article declare that there is not conflict of interest.

References

Ainley, J., Schulz, W., & Fraillon, J. (2016). *A global measure of digital and ICT literacy skills*. Global Education Monitoring Report, Education for People and Planet: Creating Sustainable Futures for All.

Bayram, N. (2010). *Yapısal eşitlik modellemesine giriş: Amos uygulamaları [Introduction structural equation modeling: AMOS applications]*. Bursa: Ezgi Kitapevi.

Bollen, K. A. (2007). *An overview of structural equation models with latent variables*, The Miami University Symposium on Computational Research, March 1-2. Miami University, Oxford, UK.

Byrne, B. M. (2016). *Structural equation modelling with AMOS: Basic concepts, applications, and programming* (3rd ed.). New York: Routledge.

Büyüköztürk, Ş. (2002). *Veri analizi el kitabı [Data analysis manual]*. Ankara: Pegem A Yayıncılık.

Büyüköztürk, Ş.; Çakmak, E. K.; Akgün, Ö.E.; Karadeniz, Ş. ve Demirel, F. (2009). *Bilimsel araştırma yöntemleri [Scientific research methods]* (3. Baskı). Ankara: Pegem Akademi.

Cartile, A. (2020). Barriers to digital literacy: learning to program. *Proceedings 2020 Canadian Engineering Education Association (CEEA-ACEG20) Conference* (p. 170-176). Kanada: Concordia and McGill Universities.

Çubukçu, A. ve Bayzan, Ş. (2013). Türkiye'de Dijital Vatandaşlık Algısı ve Bu Algıyı İnternetin Bilinçli, Güvenli ve Etkin Kullanımı ile Artırma Yöntemleri [Perception of Digital Citizenship in Turkey and Methods of Increasing this Perception by Using the Internet Conscious, Safe and Effective]. *Middle Eastern & African Journal of Educational Research*, 5, 148-174.

Eshet-Alkali, Y. & Amichai-Hamburger, Y. (2004). Experiments in digital literacy. *Cyber Psychology & Behavior, 7*(4), 421–429.

Gilster, P. (1997). *Digital literacy*. New York: John Wiley & Sons.

Hargittai, E. (2005). Survey measures of web-oriented digital literacy. *Social Science Computer Review, 23*(3), 371-379.

Hargittai, E. (2003), "The digital divide and what to do about it", Derek, C. Jones (der), New Economy Handbook, Elsevier Academic Press, New York, ss. 822-841.

Hamutoğlu, N.B., Canan Güngören, Ö., Kaya Uyanık, G., & Gür Erdoğan, D. (2017). Dijital Okuryazarlık Ölçeği: Türkçe 'ye Uyarlama Çalışması [Adapting Digital Literacy Scale into Turkish]. *Ege Eğitim Dergisi, 18*(1), 408- 429.

Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development, 55*(3), 223-252.

Hosseini, D. (2018). *Digital literacy in early elementary school: Barrıers and support systems ın the era of the common core.* Doktoral Thesis, San josé state unıversıty, The Faculty of the Educational Doctoral Program in Educational Leadership.

Kaptan, S. (1998). *Bilimsel araştırma ve istatistik teknikleri [Scientific research and statistical methods].* Ankara: Tekışık Web Ofset Tesisleri.

Karadağ, E. & Yücel, C. (2020). *Türkiye üniversite memnuniyet araştırması 2020 [Turkey's university satisfaction survey 2020].* Üniar Yayınları.

Karasar, N. (1995). *Bilimsel araştırma yöntemi [Scientific research method]* (7. Basım). Ankara: Alkım Yayınevi.

Kline, R. B. (1998). *Principal and practice of structural equation modeling*. New York: The Guilford Press.

Mohammadyari, S., & Singh, H. (2015). Understanding the effect of e-learning on individual performance: The role of digital literacy. *Computers & Education, 82*, 11-25.

Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education, 59*(3), 1065-1078.

Ocak, G., & Karakuş, G. (2018). Öğretmen adaylarının dijital okur-yazarlık öz-yeterliliği ölçek geliştirme çalışması [Pre-Service Teachers' Digital Literacy Self-Efficacy Scale Development]. *Kastamonu Education Journal, 26*(5), 1427-1436. doi:10.24106/kefdergi.1931

OECD (2001), Understanding The Digital Divide, France. http://www.oecd.org/internet/ieconomy/1888451.pdf, (Erişim Tarihi: 07.06.2021)

Partnership for 21st Century Skills (2009). Framework for 21st century learning. Erişim adresi: http://www.p21.org/our-work/p21-framework, Retrieved on: 06.01.2021

Rodríguez-de-Dios, I., Igartua, J. J., & González-Vázquez, A. (2016). Development and validation of a digital literacy scale for teenagers. In Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality (pp. 1067-1072). ACM.

Salinas, R. (2003), "Addressing The Digital Divide Through Collection Development", *Collection Building*, 22(3), 131-136.

Schermelleh-Engel, K.; Moosbrugger, H. & Müller, H. (2003). Evaluating the fit of structual equation models: test of significance and descriptive goodness –of-fit measures. *MPR-Online*, *8*(2), 23-74.

Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling* (2nd ed.). Lawrence Erlbaum Associates Publishers.

Segars, A. H., & Grover, V. (1993). Re-examining perceived ease of use and usefulness: A confirmatory factor analysis. *MIS Quarterly*, *17*(4), 517-525.

Sönmez, V. & Alacapınar, F.G. (2011). *Örneklendirilmiş bilimsel araştırma yöntemleri [Exemplified scientific research methods]*. Ankara: ANI Yayıncılık.

Sulak, S. E. (2019). Dijital okuryazarlık ölçeğinin geliştirilmesi: Geçerlik ve güvenirlik çalışması [Development of The Digital Literacy Scale: Validity and Reliability Study]. *International Social Sciences Studies Journal*, *5*(31): 1329-1342.

Sümer, N. (2000). Yapısal eşitlik modelleri: Temel kavramlar ve örnek uygulamalar [Structural Equation Modeling: Basic Concepts and Applications]. *Türk Psikoloji Yazıları*, *3*(6), 49-74.

Tavşancıl, E. (2002). *Tutumların ölçülmesi ve SPSS ile veri analizi [Measuring the attitudes and data analysis with SPSS]*. Ankara: Nobel Yayınevi.

Tezcan, C. (2008). *Yapısal eşitlik modelleri [Structural equation models]*. Yayımlanmamış yüksek lisans tezi, Hacettepe Üniversitesi, Ankara.

Toker, T., Akgün, E., Cömert. Z., & Edip, S. (2021). Eğitimciler için dijital yeterlilik ölçeği: Uyarlama, geçerlik ve güvenirlik çalışması [Digital competency scale for educators: adaptation, validity and reliability study]. *Milli Eğitim*, 50(230), 301-328.

UYTES (1995). *SPSS Bilgisayar Paket Kullanma Kursu [Course for using SPSS Computer Package]* (Nisan 1995), (Uluslarası İleri Teknoloji Sistemleri), Elazığ.

Üstündağ, M.T., Güneş, E., & Bahçıvan, E. (2017). Turkish adaptation of Digital Literacy Scale and investigating pre-service science teachers' digital literacy. *Journal of Education and Future*, *12*, 19-29.

Van Dijk, J. (2005). *The deepening divide: Inequity in the information society*. London: Sage Publications.

APPENDIX 1. DIJITAL OKURYAZARLIK ENGELLERI (DILBAR) ÖLÇEĞI (A SCALE DEVELOPED IN TURKISH)

1- Hiç katılmıyorum 2- Çok az katılıyorum 3- Kısmen katılıyorum
4- Çoğunlukla katılıyorum 5- Tamamen katılıyorum

	Rakam Değeri
1. Yeni teknolojilere karşı olumsuz bir önyargım var	[ ]
2. Dijital teknolojilere karşı merakım olmadı.	[ ]
3. Öğreticilerin teknoloji hakkındaki pedagojik tutumları olumsuzdur.	[ ]
4. Dijital teknolojileri öğrenme ortamlarına entegre etmekte zorlanıyorum.	[ ]
5. Teknolojiyi sistemli bir şekilde derslerle bütünleştirmede zorluk yaşıyorum.	[ ]
6. Dijital öğretim materyallerini (videolar, dijital materyaller, sunumlar, bloglar, wikiler vb.) geliştirmek için gereken teknik becerilere sahip değilim.	[ ]
7. İnternet üzerinden (Sosyal ağ uygulamaları, forumlar, bloglar vb.) yardımlaşamıyorum.	[ ]
8. Teknolojiyle ilgili teknik bilgim yetersizdir.	[ ]
9. Yeni teknolojileri kolay öğrenemiyorum.	[ ]
10. Yeni teknolojilerin birçoğundan habersizim.	[ ]
11. Bulut bilişim teknolojilerini kullanamıyorum.	[ ]

BUEFAD | 2021, Volume 10, Issue 3, 482-494
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.917064

The Mediator Role of Work-Related Need Satisfaction between Subjective Well-Being and Work Engagement of Teachers

Ali ERYILMAZ[a*], Ahmet BAŞAL[B], & Betül Bal GEZEGiN[C]

a* Prof. Dr., Yıldız Technical University, (https://orcid.org/0000-0001-9301-5946),*erali76@hotmail.com

b* Assoc. Prof. Dr., Yıldız Technical University, (https://orcid.org/0000-0003-4295-4577)

c* Asst. Prof. Dr., Ondokuz Mayıs University, (https://orcid.org/0000-0001-9818-9347)

Research Article | Received: **16.04.2021** | Revised: **10.05.2021** | Accepted: **10.05.2021**

Abstract

Teachers have a critical role in the fulfillment of educational objectives. One of the fundamental factors affecting teachers while doing their demanding job is their subjective well-being state. This study investigates the subjective well-being of high-school teachers in terms of work engagement and work-related need satisfaction. The mediator role of work-related need satisfaction between subjective well-being and work engagement was also investigated. The sample consisted of 250 teachers (n=131 males; 52.4%, n=119 females; 47.6%). Data collection tools included the Satisfaction with Life Scale (SWL), Positive and Negative Affect Scale (PANAS), Utrecht Work Engagement Scale (UWES), and Work-Related Basic Need Satisfaction Scale. In the analysis of the data, structural equation modeling method was employed. The results revealed that both work engagement and satisfaction of work-related needs positively contribute to teachers' subjective well-being. The mediator role of satisfaction of work-related needs between work engagement and teachers' subjective well-being was also observed. Based on these results, this study concludes with a few pedagogical implications considered important.

Keywords: Need satisfaction, subjective well-being, teachers, work engagement.

Öğretmenlerin Öznel İyi Oluşları ile İşe Bağlılıkları Arasındaki İlişkide İşle İlgili İhtiyaç Doyumunun Aracı Rolü

Öz

Öğretmenler, eğitim hedeflerinin gerçekleştirilmesinde kritik bir role sahiptir. Öğretmenleri, zorlu işlerini yaparken etkileyen temel faktörlerden biri öznel iyi oluş durumudur. Bu çalışma, lise öğretmenlerinin öznel iyi oluşunu işe bağlılık ve işle ilgili ihtiyaç tatmini açısından incelemektedir. Öznel iyi oluş ile işe bağlılık arasındaki işle ilgili ihtiyaç tatmininin aracı rolü de araştırıldı. Örneklem 250 öğretmenden (n = 131 erkek;%52,4, n = 119 kadın;%47,6) oluşmaktadır. Veri toplama araçları, Yaşamdan Memnuniyet Ölçeği (SWL), Olumlu ve Olumsuz Duygulanım Ölçeği (PANAS), Utrecht İş Bağlılığı Ölçeği (UWES) ve İşle İlgili Temel İhtiyaç Memnuniyeti Ölçeğini içermektedir. Verilerin analizinde yapısal eşitlik modelleme yöntemi kullanılmıştır. Sonuçlar hem işe bağlılığın hem de işle ilgili ihtiyaçların tatmininin öğretmenlerin öznel iyi oluşuna olumlu katkıda bulunduğunu ortaya koymuştur. İşe bağlılık ile öğretmenlerin öznel iyi oluşları arasındaki işle ilgili ihtiyaçların tatmininin aracı rolü de gözlemlenmiştir. Bu sonuçlara dayanarak, mevcut çalışma, önemli olduğu düşünülen birkaç pedagojik çıkarımda bulunmaktadır.

Anahtar kelimeler: İhtiyaç doyumu, öznel iyi oluş, iş tatmini.

To cite this article in APA Style:

Eryılmaz, A., Basal, A. & Bal Gezegin, B. (2021). The mediator role of work-related need satisfaction between subjective well-being and work engagement of teachers.. *Bartın University Journal of Faculty of Education, 10*(3), 482-494. https://doi.org/10.1016/buefad.917064

1 | Introduction

Various factors are affecting the quality of education and students' success. Teachers, being one of the main parties in the educational context, directly affect achieving educational goals and objectives and they are considered as the most influential factor (Eryılmaz & Basal, 2021; Hattie, 2003). Teachers' efficacy depends on many factors such as their well-being, work engagement, and work satisfaction, etc. Teaching is one of the most emotional occupations and it has many challenges which yield high stress, burnout, and negative well-being. Maintaining effectiveness in such a stressful occupation (Johnson et al., 2005) is not easy for teachers. As is the focus of this study, subjective well-being has attracted mounting attention in recent times. It is a vital issue in teaching because it can change the educational environment along with all its parties such as students, teachers, school administration, parents, etc.

Subjective well-being contributes positively to individuals' productivity and their working to their full capacity (Bakker, 2009; Fisher, 2003; Maslach et al., 2001) and is essential at work since many people spend one-third of their life in the workplace. Regarding the educational environment and subjective well-being, it seems that there is a close relationship between students' and teachers' subjective well-being. Students need teachers with higher subjective well-being to guide them in their learning and development. A lack of subjective well-being could negatively influence the student's well-being (Harding et al., 2019). Teachers with more positive well-being contribute to their student's academic achievement (Caprara et al., 2006). Yet, it is not easy to achieve positive well-being since teachers have the demanding task of addressing students' various learning needs, which yields high stress. Their mental health is of utmost importance to fulfill their jobs (Gray et al., 2017). However, for a teacher to function as a supportive teacher, his/her subjective well-being becomes to the fore. To fully accomplish such a vital role, teachers should have higher subjective well-being (Evers et al., 2004). This indicates a need for studies to understand the motives that can lead teachers to a more positive subjective well-being in their occupational life.

Subjective well-being, investigated by a growing body of literature, refers to evaluating and judging individuals' affection and life (Diener, 1984) and composes of three dimensions: positive affection, negative affection, and (Myers & Diener, 1995). Individuals with high subjective well-being frequently experience positive emotions and rarely experience negative ones, and are more satisfied with their lives (Diener, 1984). Studies investigating teachers' subjective well-being in their occupational life can be subsumed under two broad categories: pathology-oriented and positive-oriented. Pathology-oriented studies have investigated the subjective well-being of teachers in terms of various indicators such as stress (Ben-Ari et al., 2003; Richards, 2012), burnout (Burke, & Greenglass, 1995; Chan, 2011), and workload (Yin et al., 2016). On the other hand, positive-oriented studies examined the issues concerning indicators such as job satisfaction, work engagement, and organizational commitment (Chan, 2013; Hakanen et al., 2005; Meriläinen & Pietarinen, 2007; Scott & Dinham, 2003). These studies focusing on the relationship between teacher's well-being and other factors have reported that teachers with positive well-being are satisfied with their life and health and commit themselves to school more (Kern et al., 2014).

NEED SATISFACTION AND SUBJECTIVE WELL-BEING

The expectations from teachers have always been high in teaching environments. As is well-known, teachers are of the most important factor when it comes to student and school success. They have a key role in addressing the learning needs of students and engaging them. To achieve this role, engagement of the teachers is also important. When teachers are engaged in their job, they may increase their students' positive academic attitudes and satisfaction and support their autonomy (Klem & Connell, 2004). Considering the heavy responsibilities of the teachers, their subjective well-being has become a crucial factor that has direct influence on their job performance. Therefore, it is important to focus on the subjective well-being of the teachers in their working environment.

Various factors have been associated with the subjective well-being of individuals including need satisfaction. According to self-determination theory humans need to satisfy three essential psychological needs: autonomy, relatedness, and competence (Baard et al., 2004). The need for autonomy involves the desire of organizing one's behaviors and experiences by themselves. The satisfaction of the need for autonomy involves making decisions and implementing them freely. The satisfaction of the need for autonomy in a work setting involves taking initiative for a given task, feeling free in how to do it, and achieving adequate independence to make decisions related to work (Deci & Ryan, 2000). The need for relatedness refers to connecting oneself to other people and the desire to establish healthy relationships with them. The satisfaction of the need for relatedness in a work setting involves establishing intimate, healthy, satisfactory, and mutual trust-based relationships with those in the workplace (Deci & Ryan, 2000; Ryan, 1995). Failure of satisfaction of the need for relatedness could result in alienation and loneliness in the workplace on the part of the individual (Wright et al., 2006). Finally, the need for competence is about achieving the desired outcomes and challenging to feel optimally competent. The satisfaction need for competence in the work setting involves feeling competent at work, fulfilling a duty successfully, and having high levels of work-related self-confidence (Ryan, 1995).

Satisfaction need for relatedness, autonomy, and competence is a basic human feature that can be observed universally. Studies have shown that satisfying these needs is critical for the effective functioning and mental health of the individual (Deci et al., 2001; Ryan et al., 1996). Furthermore, the satisfaction of these needs contributes to increasing the subjective well-being of the individual (Gagné & Deci, 2005; Ryan & Deci, 2008; Vansteenkiste et al., 2008). However, studies on the relationship between need satisfaction and subjective well-being in teachers is lacking, particularly in Turkey.

WORK ENGAGEMENT AND SUBJECTIVE WELL-BEING

Pathology-oriented studies generally focus on teachers' stress and burnout in their working environment. These are two important factors that negatively affect teachers' well-being in the profession (Viac & Fraser, 2020). On the other hand, positive psychology-oriented studies generally focus on increasing positive emotions and life satisfaction and decreasing negative emotions of the teachers. It is crucial to determine what negatively affects teachers in their profession and put forward solutions to them. In this respect, subjective well-being of the teachers can act as protective response to eliminate these factors and may contribute to the engagement of the teachers in their jobs.

Work engagement refers to "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli et al., 2002, p. 74). Vigour is related to high levels of energy while working and keeping perseverance in the face of difficulties. At the same time, dedication refers to committing oneself to work, thanks to which the individual develops a sense of significance and enthusiasm. With dedication, individuals find their work significant and meaningful. Absorption is being completely focused and happily immersed in work; that is, people devote their entire attention to their work (Bakker, 2009; Schaufeli & Bakker, 2010). Work engagement is known to yield some very positive consequences. For instance, individuals with higher work engagement levels are found more productive and are also known for higher levels of work performance (Bakker, 2009; Demerouti & Cropanzano, 2010). Subjective well-being is associated with general satisfaction with life and the experience of positive affections more often and negative ones less often (Diener, 1984) while work engagement accounts for the domain-specific subjective well-being of the individual at work (Bakker & Leiter, 2010; Bakker et al., 2008). As a result, the relationship between general and domain-specific subjective well-being must be explained (Hakanen & Schaufeli, 2012), particularly in the case of teachers.

NEED SATISFACTION AND WORK ENGAGEMENT

According to self-determination theory, satisfying the needs of the individuals results in the psychological development, motivation and attachment to life (Deci & Ryan,1991). From humanistic perspective, satisfying

the needs of the individuals contributes to self-actualization. Need satisfaction is important for people from all walks of life including the students and teachers. When evaluated from the perspective of life-span developmental approach, development process of people extends from birth to death (Eryılmaz, 2011). Studies generally focus on students' need satisfaction and there is a need to investigate teachers' need satisfaction and work engagement.

Satisfying the needs helps individuals function optimally in their lives (Reis et al., 2000). There appear to be three spatial contexts people spend their lives: indoors life, outdoors life, and work life. The workplace is an essential context for individuals to meet their needs and get satisfaction. If individuals are satisfied in their workplaces, this leads to positive well-being, increased work engagement, and production. In earlier studies, it was also highlighted that satisfying work-related needs helps individuals function more productively in their work-life (Gagné & Deci, 2005; Markland & Tobin, 2010; Van den Broeck et al., 2008). It also contributes positively to the subjective well-being of individuals and their psychological functioning (Baard et al., 2004; Deci & Ryan, 2000; Gagné & Deci, 2005). A strong relationship between subjective well-being, productivity, and optimal functioning of individuals exists (Myers & Diener, 1995).

It is essential that teachers' functioning and productivity be enhanced by increasing their subjective well-being levels (Meriläinen & Pietarinen, 2007) in consideration of both teaching and learning processes. Academic achievement levels and the sense of competence of students are closely related to teachers' increased subjective well-being (Scott & Dinham, 2003). Recently, scientific studies have mainly focused on how to increase the subjective well-being of the students in the school (Coleman, 2009; Eryılmaz, 2012; Murray-Harvey, 2010). However, improving teachers' subjective well-being who have a crucial role in learning should be investigated (Soini et al., 2010). The present study investigates the subjective well-being of teachers considering two of the positive indicators: work engagement and work-related need satisfaction. Due to the lack of studies on teachers from Eastern Europe, the current study seeks to obtain data on a sample of teachers from Turkey.

Building upon the above arguments, the following hypotheses are proposed:

a) Work engagement has a positive effect on the subjective well-being of high school teachers.

b) Satisfaction of work-related needs has a positive effect on the subjective well-being of high school teachers

c) Satisfaction of work-related needs has a significant mediator effect on the relation between subjective well-being and work engagement.

2 | Method

RESEARCH DESIGN AND PROCEDURE

The present study investigates the subjective well-being of high-school teachers in terms of work engagement and work-related need satisfaction along with the mediator role that work-related need satisfaction serves between subjective well-being and work engagement. A cross-sectional research pattern was adopted accordingly, and the hypothetical model shown in Figure 1 was developed.

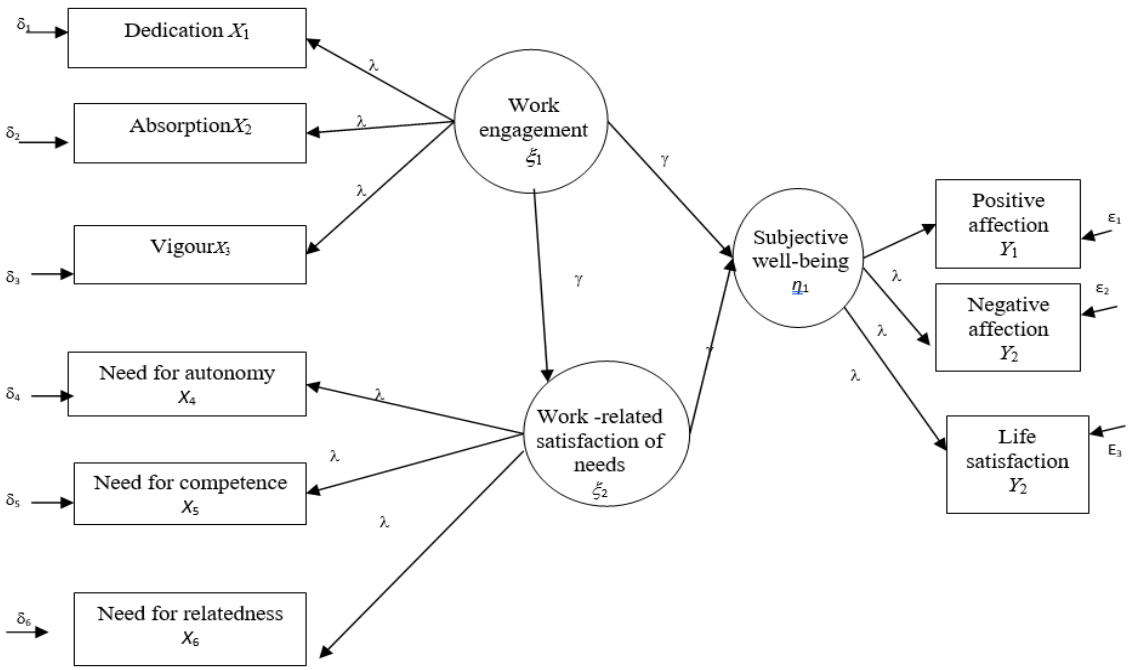


Figure1. *Hypothetical Model*

Purposive sampling technique was employed for the participant selection in the study. Only those who met three pre-set criteria were included. These criteria are theoretical knowledge, knowledge of the researcher, and the general purpose of the study (Fraenkel & Wallen, 1993). The sample size is crucial for achieving consistency between the theoretical model and the data obtained by structural equation modeling (Kline, 1998). This study followed Kline's (1998) suggestions in determining the sample size; that is, the sample size should be big enough for the model to yield good results. The optimal number for a sufficiently large sample is acknowledged to vary between 100 and 200 individuals. In the implementation of the scales as data collection instruments, the necessary information was given to the participants, and the objectives were explained. The study was conducted with the voluntary contribution of teachers.

THE STUDY GROUP

The sample of the present study consists of 140 male (51.9 %) and 130 (48.1%) female teachers, aged between 26 and 58, who work in various state high schools in Ankara, Turkey. After the initial analysis was carried out, 20 teachers were excluded from the data set because they either missed the majority of the items (at least 5%) or made central tendency errors. The sample comprises 250 teachers (131 males; 52.4%, 119 females; 47.6%). The distribution of the teachers according to their academic fields was as follows: 45 English (18%), 43 Turkish literature (%17.2), 43 mathematics (%17.2), 42 biology (16.8%), 40 history (16%), and 37 physics teachers (14.8%).

DATA COLLECTION TOOLS

A demographic information form and four scales were used in the data collection process. The demographic information form was used for identifying the participants' demographic features such as age, gender, and branch of the teachers. As four scales Satisfaction with Life Scale (SWL), Positive and Negative Affect Scale (PANAS), Utrecht Work Engagement Scale (UWES), and The Scale of Work-Related Basic Need Satisfaction were used.

Designed by Diener et al. (1985), Satisfaction with Life Scale (SWL) assesses subjective life satisfaction as a whole independent of specific domains. Adapted to Turkish by Yetim (1993), the 7-point Likert scale has five items. The items are: "In most ways, my life is close to my idea"; "The conditions of my life are excellent";

"I am satisfied with my life"; "So far I have gotten the important things I want in my life"; and "If I could live my life over, I would change almost nothing." The Cronbach's alpha for internal consistency of the scale was 0.87 with a test-retest correlation of 0.82. (Diener et al., 1985).

Developed by Watson et al. (1988), Positive and Negative Affect Scale (PANAS) consists of 20 items accompanied by ten positive (i.e., interested, inspired, enthusiastic, and alert) and ten negative affections (i.e., scared, nervous, distressed, irritable). Participants rated these mood adjectives on a five-point scale. The options to choose are "very slightly or not at all", "a little", "moderately", "quite a bit", and "extremely". It was later adapted to Turkish by Gençöz (2000).

Developed by Schaufeli et al. (2002), Utrecht Work Engagement Scale (UWES) has 3 subdimensions; vigor, dedication, and absorption. There are two forms of this scale, with the long one having 17 items and the short one having 10. Psychometric properties of short-form were determined based on the data collected from 10 different countries. The present study opted to use the short form of this scale adapted to Turkish by Eryılmaz and Doğan (2012). The explanatory and confirmatory factor analyses, as well as reliability and validity analyses, were performed.

Lastly, developed by Van den Broeck et al. (2010), the Scale of Work-Related Basic Need Satisfaction was used. This 5-point Likert scale consisted of 18 items with three sub-dimensions: competence, relatedness, and autonomy. Adapted to Turkish by Doğan and Eryılmaz (2012), the descriptive and confirmatory factor analyses, along with reliability and validity analyses of the scale, were performed. The reliability and validity of this scale and other scales used in this study were found sufficiently acceptable.

3 | Findings

Descriptive statistics relating to variables were computed for this study. The mean and standard deviation levels is presented in Table 1.

Table 1. Descriptive statistics

Variables	$\overline{X}$	Sd
Need for autonomy	16,59	3,80
Need for competence	27,71	4,47
Need for relatedness	22,52	4,19
Vigour	10,81	2,71
Dedication	11,44	2,72
Absorption	10,80	2,62
Positive emotion	33,07	6,08
Negative emotion	21,03	6,08
Life satisfaction	21,50	6,02

The results of observed and latent variables regarding the participants' subjective well-being model are presented in Figure 2. Additionally, this structural equation model's fit index values have been presented in Table 2 (CFI, NNFI, IFI, RFI, GFI, AGFI, RMSEA, $\chi 2$ and the value of $\chi 2$/df were computed). The fit index values were CFI = 0.97, IFI = 0.97, NFI = 0.95, NNFI = 0.95, RFI = 0.93, GFI = 0.96, AGFI = 0.92, RMSEA = 0.073, $\chi 2$/df = 2.70. Based upon the values, this theoretical model seems to be consistent with the data obtained (Kline, 1998).

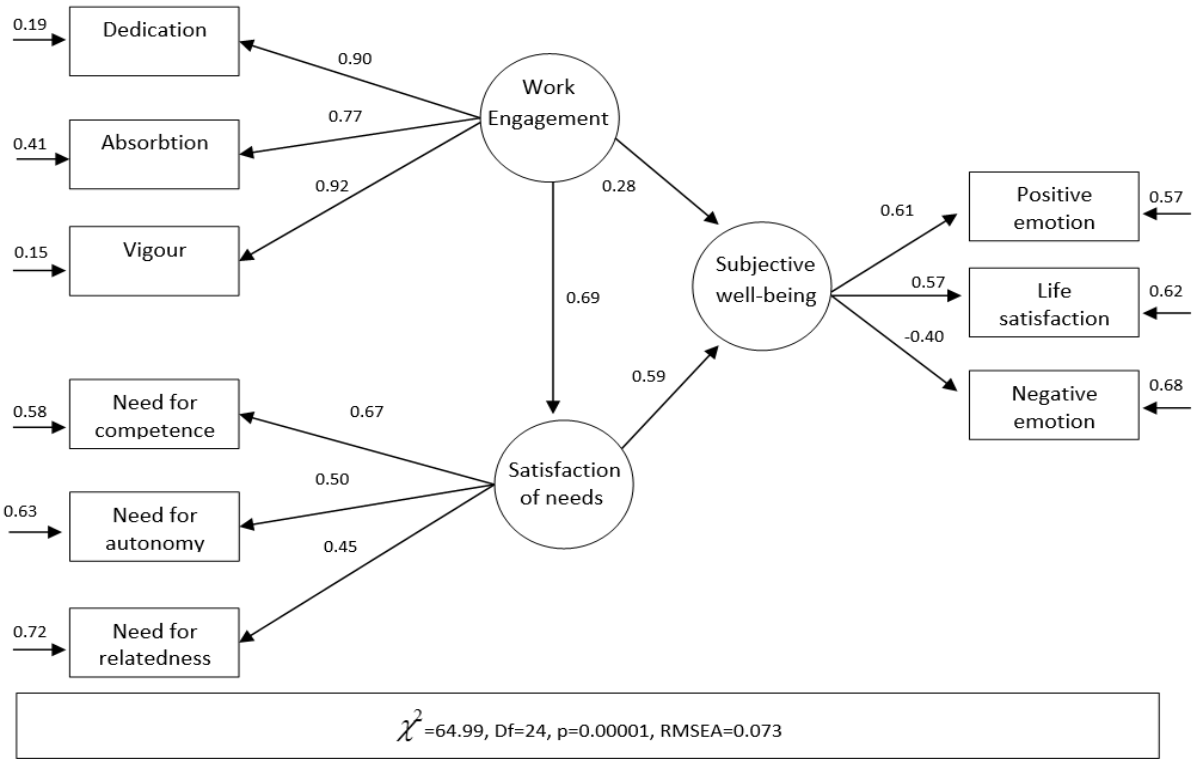


Figure 2. *Structural Model*

Table 2. Fit Indexes

Indexes	Values
GFI	0.96
AGFI	0.92
CFI	0.97
IFI	0.97
NFI	0.95
NNFI	0.95
RFI	0.93
RMSEA	0.073
Df	24
x^2	64.99
x^2/Df	2.70

The effects of the need satisfaction and work engagement on the subjective well-being of teachers have been calculated by means of standard coefficients. The effect size is accepted as small when the coefficients are smaller than 0.10, moderate when between 0.11-0.30, and big when bigger than 0.30 (Kline, 1998). According to these assumptions, teachers' subjective well-being increases 0.59 with a one-unit increase in need satisfaction. Another finding of the study is that an increase of one unit in the observed variable, namely work engagement, increases teachers' subjective well-being by 0.28. The mediator variable, need satisfaction contributes highly to the relationship between subjective well-being and work engagement (0.41). As a result, high-school teachers combine their work engagement with need satisfaction, which is a combination that increases the subjective well-being levels of teachers.

Table 3. Evaluations of Model

Variables	Coefficients	Effect size
Direct effect of work engagement	0.28	Moderate
Direct effect of work-related need satisfaction	0.59	High
Mediator effect of work-related need satisfaction	0.41	High
Total effect of work engagement	0.69	High

For Kline (1998), we are more likely to attain appropriate models as we develop alternative models. Therefore, the present study seeks to analyze the mediator role of work engagement concerning the relationship between teachers' subjective well-being and need satisfaction. An alternative model was tested for this purpose but failed to work. In conclusion, all the proposed hypotheses of the study were confirmed: work engagement increases the subjective well-being of high school teachers and satisfaction of work-related needs increases directly and indirectly the subjective well-being of high school teachers.

4 | Discussion and Conclusion

The study revealed that teachers' subjective well-being increases in line with an increase in their work engagement levels. Hakanen and Schaufeli (2012) suggested that the relationship between general and domain-specific subjective well-being should be investigated. This study contributes to existing knowledge by investigating the relationship between teachers' general and domain-specific subjective well-being. Some researchers have found that individuals having positive work engagement tend to develop positive attitudes towards their work. Moreover, these individuals experience a sense of mastery, recognition, and achievement through work engagement. However, they cannot simply be considered workaholics, since they can get engaged in activities that could enable them to have positive affections outside the work setting (Bakker, 2009; Schaufeli et al., 2006). It was observed that teachers' subjective well-being might have increased due to the positive consequences of their work engagement.

The present study found that need satisfaction has both direct and mediator effects upon teachers' subjective well-being. In addition, need satisfaction is the most powerful variable that affects the subjective well-being of teachers. In some of the studies conducted on different samples and contexts, it was found that general need satisfaction is a significant mediator (Eryılmaz, 2012; Eryılmaz & Doğan, 2013; Ivancevich & Matteson, 1999; Sheldon, & Elliot, 1999). Similarly, some other studies have also revealed that general need satisfaction is a significant mediator in educational settings. For instance, Hui et al. (2011) determined the mediator role of need satisfaction between student motivation and teacher support, and Faye and Sharpe (2008) found this role in academic motivation and identity formation. The current study differs from the other studies, in that, it focuses on the mediator role of work-related need satisfaction rather than general on teachers' need satisfaction. According to self-determination theory, general need satisfaction is related to gains such as personal growth, motivation, and striving (Deci & Ryan, 1991). These gains valid not only for domain-general need satisfaction but also, they are valid for work-related need satisfaction. Therefore, the satisfaction of work-related needs seems to affect the subjective well-being of the teachers positively.

Several studies have focused on the students to increase the educational quality. However, teachers are equally involved in the learning processes with their social transaction roles (Piaget, 1970) and scaffolding (Vygotsky, 1963). For an effective teaching process, teachers' subjective well-being must be increased in a positive way (Chan, 2013) because studies have shown that experiencing positive affections by individuals contributes very highly to their work performance (Waterman, 1993). Besides, increasing teachers' subjective well-being has contributory effects upon satisfaction of teaching processes (Singh & Billingsley, 1998).

Increasing teachers' subjective well-being is vital for successful teaching and learning (Meriläinen & Pietarinen, 2007). In the current study, a structural equation model was developed and tested to determine high-school teachers' subjective well-being. The results showed that not only work engagement but also satisfaction of work-related needs positively contribute to the subjective well-being of teachers. There are diverse discussions as to how to increase the subjective well-being of teachers in organizational contexts (Hamann & Gordon, 2000; Taylor & Tashakkori, 2010). The results of the present study provide support for these discussions. For instance, this study assumes that work engagement is not sufficient on its own for an increase in the general subjective well-being of teachers. Moreover, this study suggests that further methods should be sought for the achievement of work-related need satisfaction of teachers.

In psychology, many psychological constructs were found related to each other. In the present study, the domain-specific subjective well-being (work engagement) has been considered as an independent variable concerning the relationship between domain-general subjective well-being and satisfaction of needs. It is suggested that domain-general subjective well-being could be used as an independent variable concerning the relationship with domain-specific subjective well-being (engagement) in future studies.

The study has pedagogical implications that need to be taken into consideration. It seems evident that teachers' well-being has a crucial role in the achievement of educational goals. As the study suggests, when work engagement is combined with need satisfaction, it increases teachers' subjective well-being. A happy teacher with work satisfaction has the potential to create a comfortable setting, engage in activities, develop themselves both personally and professionally, foster learning, and motivate students. Therefore, it is worth paying attention to improving teachers' work conditions to have work engagement and work satisfaction. Overall, professional well-being needs to be focused more on the field of education. Teachers who are preparing and shaping our future should work in working environments where the load is reduced, positivity is encouraged, and a high level of well-being is intended. Only resilient teachers who are able to cope with unexpected and difficult times can contribute to educational achievements. School administrators, school psychologists, curriculum developers, and any related stakeholder need to take action to support teachers' work-related need satisfaction and work engagement to positively affect their subjective well-being and regulate working conditions of the teachers accordingly.

Statements of publication ethics

In this research, ethical considerations such as confidentiality of the data, the anonymity of the participants and informed consent were guaranteed.

Researchers' contribution rate

Research data was collected and analyzed by the first author. All three authors contributed to the other parts of the study equally.

Conflict of interest

The authors declare no conflict of interest.

References

Baard, P. P., Deci, E. L., & Ryan, R. M. (2004). Intrinsic need satisfaction: a motivational basis of performance and well-being in two work settings. *Journal of Applied Social Psychology*, *34*, 2045-2068. https://doi.org/10.1111/j.1559-1816.2004.tb02690.x

Bakker, A. B. (2009). Building engagement in the workplace. In R. J. Burke & C.L. Cooper (Eds.), *The peak performing organization* (pp. 50-72). Routledge. https://doi.org/10.1111/j.1559-1816.2004.tb02690.x

Bakker, A. B., & Leiter, M. P. (2010). *Work engagement: A handbook of essential theory and research*. Psychology Press. https://doi.org/10.4324/9780203853047

Bakker, A. B., Schaufeli, W. B., Leiter, M. P., & Taris, T. W. (2008). Work engagement: An emerging concept in occupational health psychology. *Work & Stress, 22*, 187-200. https://doi.org/10.1080/02678370802393649

Ben-Ari, R., Krole, R., & Har-Even, D. (2003). Differential effects of simple frontal versus complex teaching strategy on teachers' stress, burnout, and satisfaction, *International Journal of Stress Management*, *10*(2), 173-195.

Burke, R. J., & Greenglass, E. (1995). A longitudinal study of psychological burnout in teachers, *Human Relations*, *48*(2), 187-202. https://doi.org/10.1177/001872679504800205

Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology*, *44*(6), 473-490. https://doi.org/10.1016/j.jsp.2006.09.001

Chan, D. W. (2011). Burnout and life satisfaction: does gratitude intervention make a difference among Chinese school teachers in Hong Kong?, Educational Psychology: An International *Journal of Experimental Educational Psychology*, *31*(7), 809-823. https://doi.org/10.1080/01443410.2011.608525

Chan, D. W. (2013). Counting blessings versus misfortunes: positive interventions and subjective well-being of Chinese school teachers in Hong Kong, *Educational Psychology: An International Journal of Experimental Educational Psychology*, *3*(4), 504-519. https://doi.org/10.1080/01443410.2013.785046

Coleman, J. (2009). Well-being in schools: empirical measure, or politician's dream? *Oxford Review of Education*, *35*(3), 281-292. https://doi.org/10.1080/03054980902934548

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: integration in personality. In: R. Dienstbier (Ed.), Nebraska symposium on motivation: Vol. 38. *Perspectives on motivation* (pp. 237-288). University of Nebraska Press.

Deci, E. L., & Ryan, R. M. (2000). The what and why of goal pursuits: human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227-268.

Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former Eastern Bloc country: A cross-cultural ctudy of self-determination. *Personality and Social Psychology Bulletin*, *27*(8), 930-942. https://doi.org/10.1177/0146167201278002

Demerouti, E., & Cropanzano, R. (2010). From thought to action: Employee work engagement and job performance. In A.B. Bakker & M.P. Leiter (Eds.), *Work engagement: A handbook of essential theory and research* (pp. 147-163). Psychology Press.

Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95, 542-575. https://doi.org/10.1037/0033-2909.95.3.542

Diener, E., Emmons, R. A., Larsen, R. J., & Griffen, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49, 71-75. https://doi.org/10.1037/t01069-000

Doğan, T., & Eryılmaz, A. (2012). Work-Related Basic Need Satisfaction and Subjective Well-Being Among Academicians. *Ege Academic Review*, *12*(3), 383-389.

Eryılmaz, A. (2011). Life span developmental approach. *Current Approaches in Psychiatry*, *3*(1), 49- 66.

Eryılmaz, A. (2012). A model of subjective well-being for adolescents in high school. *Journal of Happiness Studies*, *13*(2), 275-289.

Eryilmaz, A., & Basal, A. (2021). Student and Teacher Perspectives: Developing the Scale of Coping Strategies for Pessimism and Subjective Well-Being Model Based on Coping Strategies for COVID-19 and Goal Striving. *International Online Journal of Education and Teaching*, *8*(1), 546-563.

Eryılmaz, A., & Doğan, T. (2012). Subjective well-being at work: investigating of psychometric properties of utrecht work engagement scale. Journal *of Clinical Psychiatry (Klinik Psikiyatri Dergisi), 15*(1): 49-55).

Eryılmaz, A., & Doğan, T. (2013). The mediator role of need satisfaction between subjective well-being and romantic relationship quality. *Eğitim Araştırmaları- Eurasian Journal of Educational Research*, 53, 79-96.

Evers, W. J., Tomic, W., & Brouwers, A. (2004). Burnout among teachers: Students' and teachers' perceptions compared. *School Psychology International*, *25*(2), 131-148. https://doi.org/10.1177/0143034304043670

Faye, C., & Sharpe, D. (2008). Academic motivation in university: the role of basic psychological needs and identity formation. *Canadian Journal of Behavioural Science,40*, 189-199.

Fisher, C. D. (2003). Why do lay people believe that satisfaction and performance are correlated? Possible sources of a commonsense theory. *Journal of Organizational Behavior*, *24*, 753-777. https://doi.org/10.1002/job.219

Fraenkel, J. R., & Wallen, N. E. (1993). *How to design and evaluate research in education*. Mcgraw Hill.

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26, 331-362. https://doi.org/10.1002/job.322

Gençöz, T. (2000). Positive and negative affect schedule: A study of validity and reliability. *Turkish Journal of Psychology*, 46, 1926.

Gray, C., Wilcox, G., & Nordstokke, D. (2017). Teacher mental health, school climate, inclusive education and student learning: A review. *Canadian Psychology/Psychologie canadienne*, *58*(3), 203-210. https://doi.org/10.1037/cap0000117

Hakanen, J. J., Bakker, A. B., & Schaufeli, W. B. (2005). Burnout and work engagement among teachers. *Journal of School Psychology*, *43*(6), 495-513. https://doi.org/10.1016/j.jsp.2005.11.001

Hakanen, J. J., & Schaufeli, W. B. (2012). Do burnout and work engagement predict depressive symptoms and life satisfaction? A three-wave seven-year prospective study. *Journal of Affective Disorders*, 141, 415-424.

Hamann, D. L., & Gordon, D. G. (2000). Burnout: An occupational hazard. *Music Educators Journal*, *87*(3), 34-39. https://doi.org/10.2307/3399661

Harding, S., Morris, R., Gunnell, D., Ford, T., Hollingworth, W., Tilling, K., Evans, R., Bell, S., Bell J., Brockman, R., Campbell, R., Araya, R., Murphy, S., & Kidger, J. (2019). Is teachers' mental health and wellbeing associated with students' mental health and wellbeing? *Journal of affective disorders*, 242, 180-187. https://doi.org/10.1016/j.jad.2018.08.080

Hattie, J. A. C. (2003). *Teachers Make a Difference: What is the Research Evidence?* Paper Presented at the Building Teacher Quality: What does the Research Tell Us? ACER Research Conference, Melbourne, Australia.

Hui, E. K. P., Sun, R. C. F., Chow, S. S. Y., & Chu, M. H. T. (2011). Explaining Chinese students' academic motivation: filial piety and self-determination. *Journal of Educational Psychology*, *31*(3) ,377-392. https://doi.org/10.1080/01443410.2011.559309

Ivancevich, J. M., & Matteson, M. T. (1999). *Organizational behaviour and management* (5th Edition). Irwin McGraw-Hill.

Johnson, S., Cooper, C., Cartwright, S., Donald, I., Taylor, P., & Millet, C. (2005). The experience of work related stress across occupations. *Journal of Managerial Psychology*, *20*(2),178-87. https://doi.org/10.1108/02683940510579803

Kern, M. L., Waters, L., Adler, A., & White, M. (2014). Assessing employee wellbeing in schools using a multifaceted approach: Associations with physical health, life satisfaction, and professional thriving. *Psychology*, *5*(6), 500-513. https://doi.org/10.4236/psych.2014.56060

Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health*, *74*, 262-273.

Kline, R. B. (1998). *Principles and practice of structural equation modelling*. Guilford Press.

Markland, D., & Tobin, V. J. (2010). Need support and behavioural regulations for exercise among exercise referral scheme clients: The mediating role of psychological need satisfaction. *Psychology of Sport and Exercise*, 11, 91-99. https://doi.org/10.1016/j.psychsport.2009.07.001

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology*, *52*, 397-422. https://doi.org/10.1146/annurev.psych.52.1.397

Meriläinen, M., & Pietarinen, J. (2007). Stress as a barrier to professional development. In J. Löwstedt, P. Larsson, S. Karsten, & R. Van Dick (Eds.), *From intensified work to professional development* (pp. 111-128). P.I.E. Peter Lang.

Murray-Harvey, R. (2010). Relationship influences on students' academic achievement, psychological health and wellbeing at school. *Educational and Child Psychology*, 27(1) 104-115.

Myers, D., & Diener, E. (1995). Who is happy. *American Psychological Society*, *1*, 1-19. https://doi.org/10.1111/j.1467-9280.1995.tb00298.x

Piaget, J. (1970). *Genetic epistemology*. W. W. Norton and Company. https://doi.org/10.7312/piag91272

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin*, 26, 419-435. https://doi.org/10.1177/0146167200266002

Richards, J. (2012). Teacher stress and coping strategies: A national snapshot. *The Educational Forum*, *76*(3), 299-316. https://doi.org/10.1080/00131725.2012.682837

Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes. *Journal of Personality*, 63:397-427. https://doi.org/10.1111/j.1467-6494.1995.tb00501.x

Ryan, R. M., & Deci, E. L. (2008). Self-determination theory and the role of basic psychological needs in personality and the organization of behavior. John et al. (eds.) *Handbook of Personality: Theory and Research*. The Guilford Press.

Ryan, R. M., Sheldon, K. M., Kasser, T., & Deci, E. L. (1996). All goals are not created equal: an organismic perspective on the nature of goals and their regulation. Gollwitzer et al.(eds.) *The Psychology of Action: Linking Cognition and Motivation to Behavior*. Guilford Press.

Schaufeli, W. B., & Bakker, A. B. (2010). Defining and measuring work engagement: Bringing clarity to the concept. In A.B. Bakker & M.P. Leiter (Eds.), *Work engagement: A handbook of essential theory and research* (pp. 10-24). Psychology Press.

Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies*, *3*, 71-92.

Schaufeli, W. B., Taris, T. W., & Bakker, A. B. (2006). Dr Jekyll or Mr Hyde? On the differences between work engagement and workaholism. In R. J. Burke (Ed.), *New horizons in management. Research companion to working time and work addiction* (p. 193-217). Edward Elgar Publishing. https://doi.org/10.4337/9781847202833.00018

Scott, C., & Dinham, S. (2003). The development of scales to measure teacher and school executive occupational satisfaction. *Journal of Educational Administration*, *41*(10), 74-86.

Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology*, *76*, 482-497.

Singh, K., & Billingsley, B. (1998). Professional support and its effects on teachers' commitment. *The Journal of Educational Research*, *91*(4), 229-239. https://doi.org/10.1080/00220679809597548

Soini, T., Pyhältö, K., & Pietarinen, J. (2010). Pedagogical well-being: reflecting learning and well-being in teachers' work. *Teachers and Teaching: Theory and Practice*, 16(6), 735-751.

Taylor, D. L., & Tashakkori, A. (2010). Decision participation and school climate as predictors of job satisfaction and teachers' sense of efficacy. *Journal of Experimental Education*, *63*(3), 217-231.

Van den Broeck, A., Vansteenkiste, M., De Witte, H., & Lens, W. (2008). Explaining the relationships between job characteristics, burnout and engagement: The role of basic psychological need satisfaction. *Work and Stress*, 22, 277-294. https://doi.org/10.1080/02678370802393672

Van den Broeck, A., Vansteenkiste, M., De Witte, H., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the work-related basic need satisfaction scale. *Journal of Occupational and Organizational Psychology*, *83*, 981-1002. https://doi.org/10.1348/096317909X481382

Vansteenkiste, M., Ryan, R. M., & Deci, E. L. (2008). Self-determination theory and the explanatory role of psychological needs in human well-being. In L. Bruni, F. Comim, & M. Pugno (Eds.), Capabilities and happiness (pp. 187-223). Oxford University Press.

Viac, C., & P. Fraser (2020). Teachers' well-being: A framework for data collection and analysis. *OECD Education Working Papers*, No. 213, OECD Publishing. https://dx.doi.org/10.1787/c36fc9d3-en

Vygotsky, L. S. (1963). Learning and mental development at school age (J. Simon, Trans.). In B. Simon & J. Simon (Eds.), *Educational psychology in the U.S.S.R.* (pp. 21-34). Routledge & Kegan Paul.

Waterman, A. S. (1993). Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of Personality and Social Psychology*, *64*, 678-691. https://doi.org/10.1037/0022-3514.64.4.678

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063-1070. https://doi.org/10.1037/0022-3514.54.6.1063

Wright, S. L., Burt, C. D., & Strongman, K. T. (2006). Loneliness in the workplace: construct definition and scale development. *New Zealand Journal of Psychology*, *35*, 59-68.

Yetim, U. (1993). Life satisfaction: A study based on the organization of personal projects. *Social Indicators Research*, 29, 277-289. https://doi.org/10.1007/BF01079516

Yin, H., Huang, S., & Wang, W. (2016). Work environment characteristics and teacher well-being: The mediation of emotion regulation strategies. *International Journal of Environmental Research and Public Health*, *13*(9), 907. https://doi.org/10.3390/ijerph13090907

BUEFAD | 2021, Volume 10, Issue 3, 495-511
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.935410

A Study on the Awareness of the Teachers Working in Special Education Schools towards Mathematical Problem-Solving Process

Sedat TURGUT[a], Özlem DOĞAN TEMUR[b], Mahir UĞURLU[c*]

a Dr., Bartın University (http://orcid.org/0000-0002-6612-9320)

b Prof. Dr., Kütahya Dumlupınar University (http://orcid.org/0000-0002-1877-0973)

c*Res.Asst., Bartın University (http://orcid.org/0000-0003-4005-4882) *mahirugurlu34@hotmail.com

Research Article | Received: 10.05.2021 | Revised: 01.08.2021 | Accepted: 04.08.2021

Abstract

This study aims to examine the awareness of teachers working in special education schools towards mathematical problem-solving process. The study was carried out in two stages. In the first stage of the study, a scale was developed for the awareness of problem-solving process. The draft scale form was administered to 215 teachers working in special education schools. In order to determine the structural integrity of the scale, exploratory factor analysis (EFA) was conducted for the data obtained. The findings of the EFA indicated that the scale, which contains twenty-nine items, has a three-factor structure. It was calculated that the three factors explained 52.40% of the total variance. The Cronbach's alpha value of the scale is .93. The three-factor structure revealed by EFA was tested with confirmatory factor analysis (CFA). As a result of CFA, it was calculated as SRMR=.06, RMSEA=.06, CFI=.90, IFI=.90. In the second stage of the study, the teachers' awareness of mathematical problem-solving process was examined in terms of several variables. For this purpose, the scale was administered to 181 teachers working in special education schools. As a result of the analysis of the obtained data, there is no statistically significant in teachers' awareness of mathematical problem-solving process in terms of their gender and professional seniority; however, there is a statistical significance in terms of the variables such as graduation, the school and the group taught. The results were interpreted based on the previous studies in the literature.

Keywords: Special needs education, mathematics instruction, problem-solving, awareness, scale

Özel Eğitim Okullarında Görev Yapan Öğretmenlerin Matematiksel Problem Çözme Sürecine Yönelik Farkındalıkları Üzerine Bir Araştırma

Öz

Bu araştırmada özel eğitim okullarında görev yapan öğretmenlerin matematiksel problem çözme sürecine yönelik farkındalıklarının incelenmesi amaçlanmıştır. Araştırma iki aşamada gerçekleştirilmiştir. Araştırmanın birinci aşamasında problem çözme süreci farkındalığına yönelik bir ölçek geliştirilmiştir. Hazırlanan taslak ölçek formu özel eğitim okullarında görev yapan 215 öğretmene uygulanmıştır. Ölçeğin yapısını belirlemek için uygulama sonucunda elde edilen verilerin açımlayıcı faktör analizi (AFA) yapılmıştır. AFA sonucunda ulaşılan bulgura göre yirmi dokuz madde içeren ölçek üç faktörlü bir yapıya sahiptir. Üç faktörün açıkladıkları toplam varyans oranı %52.40 olarak hesaplanmıştır. Ölçeğe ilişkin hesaplanan Cronbach Alfa değeri .93'tür. AFA ile ortaya çıkarılan üç faktörlü yapı doğrulayıcı faktör analizi (DFA) ile test edilmiştir. DFA sonucunda SRMR=.06, RMSEA=.06, CFI=.90, IFI=.90 olarak hesaplanmıştır. Araştırmanın ikinci aşamasında geliştirilen ölçek aracılığıyla öğretmenlerin matematiksel problem çözme sürecine yönelik farkındalıkları çeşitli değişkenler açısından incelenmiştir. Bu amaçla ölçek özel eğitim okullarında görev yapan 181 öğretmene uygulanmıştır. Elde edilen verilerin analizi sonucunda öğretmenlerin matematiksel problem çözme sürecine yönelik farkındalıklarının cinsiyet ve görev süresi değişkenlerine göre istatistiksel olarak anlamlı bir farklılık göstermediği; mezun olunan bölüm, görev yaptığı kurum ve öğretim yapılan grup değişkenlerine göre ise istatistiksel olarak anlamlı bir farklılık gösterdiği belirlenmiştir. Bulgular literatüre dayalı olarak yorumlanmıştır.

Anahtar kelimeler: Özel eğitim, matematik öğretimi, problem çözme, farkındalık, ölçek

To cite this article in APA Style:

Turgut, S., Doğan Temur, Ö., & Uğurlu, M. (2021). A study on the awareness of the teachers working in special education schools towards mathematical problem-solving process. *Bartın University Journal of Faculty of Education, 10*(3), 495-511. https://doi.org/10.14686/buefad.935410

1 | Introduction

Special education is a kind of education designed by individualizing for the needs of learners with disabilities. This education includes preventive, remedial and compensatory interventions, and covers a systematic and intensive process which is planned by experts towards the purpose (Heward, 2012; Zigmond et al., 2009).

Every child demonstrates some different developmental characteristics in terms of their learning abilities. Since these differences are relatively smaller in children who grow typically, they benefit from general curricula. They need an individualized curriculum because children with special needs differ in a broader context in terms of learning characteristics. This situation causes the necessity of curriculum adaptation and in-class educational arrangements for children with special needs (Fuchs et al., 2010; Heward, 2012).

It can be said that one of the reasons for the difficulties of students with special needs in mathematics education is related to the content of the prepared instruction and the presentation of the content. Teaching content should be presented effectively in order to minimize these difficulties. At this point, the importance of mathematics knowledge of the teacher comes into effect. Shulman (1987) addresses the teacher knowledge which is necessary for effective teaching as general pedagogical knowledge, educational content knowledge, educational aims and values knowledge, recognition of student characteristics, field knowledge, curriculum knowledge, and pedagogical field knowledge. While the first four of these characteristics determine general aspects of teacher knowledge, Shulman concentrates fundamentally on the last three characteristics which constitute the content dimension of teacher knowledge (Ball et al., 2008).

Field knowledge includes information on the subject and the organization of information. It requires to go beyond knowledge of the realities or concepts of a field (Shulman, 1986). Therefore, it can be stated that not only knowledge is sufficient to understand a subject, but also the structure of knowledge should be understood. Curriculum knowledge includes curricula designed to teach the subject at a special level and current teaching materials related to curricula (Shulman, 1986). In other words, it includes the curricula adapted for the application of the instruction, the textbooks to be used and various educational materials. Pedagogical field knowledge involves the subject knowledge dimension for teaching related to the teacher's field (Shulman, 1986). More specifically, it includes the teacher's teaching strategies, context-focused presentations, examples, and numerous practices that the teacher uses to make the subject more comprehensible. Based on this knowledge, it can be said that for effective mathematics teaching, the teacher should have the necessary equipment in terms of field knowledge, curriculum knowledge, and pedagogical field knowledge.

Fennema and Franke (1992) developed the framework drawn by Shulman and suggested a teacher knowledge model that includes four components: field knowledge, pedagogical knowledge, students' cognitive knowledge, and teachers' beliefs. According to this model, the teacher's field knowledge is related to pedagogy knowledge and student cognition. Pedagogical knowledge and student cognition are combined with beliefs to create a set of knowledge that determines teacher's classroom practices and behaviors. Knowledge has a dynamic formation and teaching is a process in which teachers can adapt their current knowledge and generate new knowledge (Petrou & Goulding, 2011).

Field knowledge encompasses the concepts related to the field, relationships among the concepts, procedures, problem-solving processes, the use of concepts and procedures in the problem-solving process. Pedagogical knowledge indicates the elements of teaching such as effective approaches in planning teaching, classroom procedures, behavior management, and motivation techniques. Student cognition expresses knowing how students think and learn during the learning process and the difficulties that may occur (Fennema & Franke, 1992). Therefore, it can be stated that the knowledge required for effective

mathematics education consists of more than one component. Strong field knowledge is necessary among mathematics teachers, and this necessity shows a significant importance in Turkey.

In Turkey; to be able to use mathematical skills in everyday life by associating them with each other, solve problems based on the relationships between numbers, and solve mathematical problems encountered in everyday life by using these processes are among the aims of mathematics curricula followed in schools where the students with special needs are taught (Ministery of National Education-MNE, 2018, 2018b, 2018c). At this point, the role of problem-solving skills appears. It can be said that problem-solving technique is an inseparable part of mathematics teaching. The National Council of Teachers of Mathematics (NCTM) (2000) stated that all students should have access to new mathematical knowledge with the help of problem-solving and develop and apply suitable strategies to solve problems. Problem-solving is additionally a means of improving mathematical knowledge. Through problem-solving, students can explore and strengthen their knowledge of numbers. Students' operational fluency and conceptual understanding abilities also develop (NCTM, 2000).

Problem solving has a place in all parts of mathematics taught at schools. Students have the chance to use mathematical concepts and procedures by means of problem-solving. Teachers should motivate students to use different strategies with the problems which they choose so that students can discover new strategies, reach generalizations and comprehend mathematical relationships. In this way, it will be helpful for the development of mathematical ideas in students and they will be able to perceive mathematical concepts. During the problem-solving process, students can develop their high-level thinking skills. To this end, students should be asked to clarify and confirm their answers. Students' self-confidence will also increase in learning environments where they can discuss solution strategies. Moreover, students will be able to realize the strengths and weaknesses of different strategies and develop alternative solution strategies. Therefore, students 'tendencies towards solving mathematical problems will be formed by the teachers' decisions and teaching practices.

Students with special needs may have difficulties in problem-solving process just as much as their typically developing peers. These difficulties especially appear in their abilities such as abstract thinking and transferring knowledge. It is important to teach students with special needs what to do when solving problems. In this process, there is a necessity to develop suitable strategies for planning and solving problems for students with special needs. Teachers working in the field of special education have serious responsibilities in this regard, and teachers' awareness of the problem-solving process plays a determining role in planning and developing appropriate strategies (Goldman, 1989; Jitendra & Hoff, 1996). Awareness is related to teacher knowledge and has a critical role for a teacher to realize, express, interpret and make immediate decisions about the characteristics of classroom practice (Potari, 2013). In the process of problem-solving, it will be effective for teachers to determine the required strategies, methods and approaches by having awareness about this process in achieving competence for students with special needs (Friend & Bursick, 2011; Stein et al., 2006; Woodward et al., 2012).

In the learning process, students with special needs may not develop at the same level as their peers in general education since these students have difficulty in abstract thinking. They should, therefore, be encouraged to express their thoughts in concrete ways. Concrete experiences in the problem-solving process may enable them to set relationships between concepts and reach generalizations. These students should be provided with the opportunity to solve problems in different ways. Being aware of how they solve problems reveals teachers how to lead students to the next step (Bahr & de Garcia, 2010). Therefore, it can be said that teachers' awareness of the mathematical problem-solving process is one of the requirements of effective teaching. This study aims to investigate the awareness of teachers working in special education schools of the mathematical problem-solving process. The study was conducted in two stages. In the first stage, a scale for awareness of problem-solving process was developed. In the second stage, the awareness of teachers of the

mathematical problem-solving process was investigated in terms of various variables by means of the developed scale.

2 | Method (Stage I)

At this stage of the study, a scale was developed to examine the awareness of teachers working in special education schools towards mathematical problem-solving process. For this purpose, exploratory factor analysis (EFA) was conducted using the data obtained from the draft form of the scale and the structure of the scale was determined. Afterwards, this determined structure was tested with confirmatory factor analysis (CFA).

Study Group

The study group was selected by the convenience sampling method. It is thought that the size of the study group should be at least five times the number of observed variables in order to estimate the relationships reliably while developing a scale (Büyüköztürk, 2002). In this context, the study group for EFA consists of 215 teachers who work at special education schools in Istanbul and took part in the research voluntarily. 152 (70.7%) of these teachers are female and 63 (29.3%) of them are male. 57 (26.5%) of the teachers have an associate's degree, 153 (71.2%) of them have bachelor, and 5 (2.3%) of them have a master's degree. 73 (34%) of the teachers graduated from special education, 25 (11.6%) of them graduated from primary education, 57 (26.5%) of them graduated from child development, and 60 (27.9%) of them graduated from various departments in the faculties of education (for example; Turkish teaching, preschool teaching, science teaching, psychological counseling and guidance). 112 (52.1%) of the teachers have professional seniority of 1-5 years, 57 (26.5%) have professional seniority of 6-10 years, 32 (14.9%) have professional seniority of 11-15 years, and 14 (6.5%) have a professional seniority 16 years and more. 189 (87.9%) of the teachers work in public schools and 26 (12.1%) of them work in private schools. 67 (31.2%) of the teachers teach the students with mild mental disabilities, 69 (32.1%) teach the students with moderate mental disabilities, 68 (31.6) teach the students with severe mental disabilities and 11 (5.1%) teach the students with autism.

The study group for CFA consists of 216 teachers who work at special education schools in Istanbul and took part in the research voluntarily. 152 (70.4%) of these teachers are female and 64 (29.6%) of them are male. 55 (25.5%) of the teachers have an associate's degree, 154 (71.3%) of them have bachelor, and 7 (3.2%) of them have a master's degree. 70 (32.4%) of the teachers graduated from special education, 29 (13.4%) of them graduated from primary education, 31 (14.4%) of them graduated from child development, and 86 (39.8%) of them graduated from various departments in the faculties of education (for example; Turkish teaching, preschool teaching, science teaching, psychological counseling and guidance). 116 (53.7%) of the teachers have professional seniority of 1-5 years, 51 (23.6%) have professional seniority of 6-10 years, 33 (15.3%) have professional seniority of 11-15 years, and 16 (7.4%) have a professional seniority 16 years and more. 183 (84.7%) of the teachers work in public schools and 33 (15.3%) of them work in private schools. 73 (33.8%) of the teachers teach the students with mild mental disabilities, 69 (31.9%) teach the students with moderate mental disabilities, 66 (30.6) teach the students with severe mental disabilities and 8 (3.7%) teach the students with autism.

Structure of the Scale

After examining the scientific studies on the problem-solving process in detail, a draft form containing twenty-nine items was prepared. The opinions of six academicians and two special education teachers were asked to determine the validity and comprehensibility of the items in terms of content validity, language, and expression. According to expert opinions, items that may have the same meaning and contain expression disorders have been corrected. The Likert-type five-point rating was used to determine the agreement in the

item expressions in the scale as "5 strongly agree, 4 agree, 3 neutral, 2 disagree, 1 absolutely disagree". There are no items scored reversely among the scale items.

Data Collection

The draft scale form consisting of twenty-nine items was administered to 215 teachers working in special education schools in the second term of the 2018-2019 academic year for EFA. The scale was administered to 216 teachers for CFA. Before applying the scale, the teachers were informed about the purpose of the scale. The scale was voluntarily filled out by the teachers in their institutions in a way that would not interfere with their teaching process.

Data Analysis

EFA was applied to determine the construct validity of the scale. Factor analysis reduces a large number of variables observed to a smaller number of factors (Tabachnick & Fidell, 2014). It also determines the number and quality of factors (Brown, 2015). EFA is a statistical tool that allows examining the basic structure of data. It examines all the relationships between the items in the scale and tries to reveal the hidden factors from the measured variables (Osborne & Banjanovic, 2016). In other words, it enables researchers to define and summarize the data by grouping the related variables together (Tabachnick & Fidell, 2014). Thus, independent variables that measure the same property are brought together as factors.

Item-total correlations of items in the scale were examined before applying the EFA. It is accepted that if the item-total score correlation value is .30 and above, it has a good level of item discrimination; if it is between .20 and .30, it should be corrected; and if it is below .20, it should be removed from the scale (Büyüköztürk, 2012).

CFA is used to validate a developed scale or model with obtained data (Gürbüz, 2019). For this purpose, goodness-of-fit indices are evaluated. There is no consensus on which goodness-of-fit indices to use. However, it is recommended that the χ^2/df value be below 5 and the CFI, NFI, TLI values above .90 (Byrne, 2016; Kline, 2016). IBM SPSS AMOS 24 and IBM SPSS Statistics 25 programs were used in the analysis.

Research ethics

All ethical procedures were performed in this study. Ethical permission of the research was approved by Bartın University Social and Human Sciences Ethics Committee. Ethics committee document number is 2021-SBB-0240.

3 | Findings

Findings related to EFA.

The item total score correlation values of the items in the scale are presented in Table 1.

Table 1. Item Total Score Correlations for Scale Items

Item Number	Item Total Score Correlation	Item Number	Item Total Score Correlation	Item Number	Item Total Score Correlation
1	.46	11	.53	21	.73
2	.32	12	.54	22	.76
3	.72	13	.41	23	.81
4	.30	14	.46	24	.53
5	.56	15	.54	25	.69
6	.62	16	.68	26	.70

7	.63	17	.62	27	.38
8	.61	18	.34	28	.67
9	.31	19	.33	29	.49
10	.71	20	.62		

When Table 1 is examined, it is seen that item total score correlations between items ranged between .30 and .81. Based on this finding, it can be stated that the item discrimination is suitable.

Kaiser-Meyer-Olkin (KMO) value and Bartlett Sphericity Test results were examined in order to determine the suitability of scale items for factorization according to the data obtained from the scale. The calculated KMO value of .60 and above shows that the data are suitable for factorization. The chi-square value calculated as a result of the Bartlett Sphericity Test indicates that the data matrix is suitable for factorization (Büyüköztürk, 2012; Tavşancıl, 2005). KMO value was calculated as .88 in the result of the analysis. The Bartlett Sphericity Test value (χ^2 = 3715.18; p =.00) is significant. Based on these findings, it can be concluded that the data are appropriate in terms of EFA.

Eigenvalue graphic was used to determine the number of factors in EFA. Factors with an eigenvalue of 1 or more are considered as important (Büyüköztürk, 2012). The eigenvalue graph of the scale obtained as a result of the analysis is presented in Figure 1.

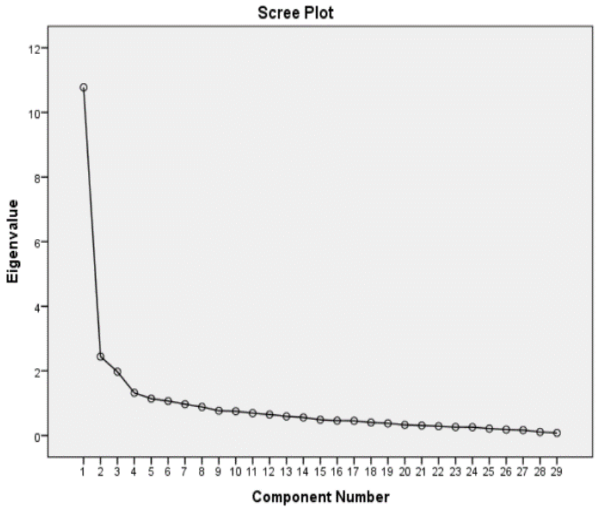


Figure 1. *Eigenvalue Graphic of the Scale*

When Figure 1 is examined, it can be said that the scale has a three-factor structure whose eigenvalue bigger than 1. The variance explained by these factors for the scale is 29.08% for the first factor, 12.21% for the second factor, 11.10% for the third factor, and 52.08% in total. It can be said that 40-60% of the total variance was explained is satisfactory (Tavşancıl, 2005).

Factor load values are taken into consideration in determining the items to be included in the factors as a result of EFA. It is stated that this value should be a minimum of .30 and if it is .45 and more, it is a good criterion (Büyüköztürk, 2012). In case the items in the scale have high load value in more than one factor, it is taken into consideration that the load difference is at least .10 (Büyüköztürk, 2012). As a result of the analysis, it was determined that there are no overlapped items in the factors. Factor load value, mean and standard deviation values of the items in the scale are presented in Table 2.

Table 2. Factor Load Value, Mean and Standard Deviation Values of Scale Items

Factor	Item Numbers	Rotated Factor Loads	Mean	Standard Deviation
Factor	23	.81	3.92	.91

	21	.79	3.70	1.00
	10	.78	3.97	.98
	26	.77	4.13	.84
	25	.75	3.64	.98
	22	.74	3.89	.97
	17	.74	3.79	.99
	28	.73	3.76	1.01
	3	.66	3.92	1.06
	15	.65	3.67	1.07
	20	.57	4.07	.75
	5	.57	3.65	1.10
	7	.54	4.01	.92
	29	.50	3.62	.98
	24	.40	4.22	.69
Factor 2	4	.70	4.03	.98
	2	.70	4.49	.60
	16	.63	3.94	.95
	18	.58	4.43	.65
	8	.58	4.18	.84
	6	.58	3.68	.96
	9	.55	4.69	.54
	12	.45	3.75	.92
	11	.37	4.04	.89
Factor 3	19	.71	4.51	.64
	1	.64	4.20	.80
	27	.63	4.39	.67
	14	.53	4.28	.65
	13	.49	4.33	.81

When Table 2 is examined, it is seen that the rotated factor load values of the scale items range from .37 and .81. Twenty-nine items in the scale were divided into 15 items in the first factor, nine items in the second factor and five items in the third factor.

The factors that developed as a result of EFA were named according to the meaning relationship between the items they contain. Factor names and item expressions related to factors are presented in Table 3.

Table 3. Scale Factors and Item Expressions Related to Factors

Factors	Items	Expressions
Understanding and Solving the Problem	23	When she/he can't solve a problem, I ask the student to identify the points she/he has difficulty with.
	21	I ask the student to stop and examine the ways of solving problems while solving problems.
	10	I ask the student to explain the necessary procedures for solving a problem.
	26	I ask the student to re-read the problem when she/he has difficulty in solving it.
	25	I ask the student what she/he thinks about whether he comes to the solution.
	22	After solving a problem, I ask the student to check the correctness of her/his strategies and operations.
	17	I ask the student to make explanations about a problem and its solution at every step.
	28	I ask the student if she/he comes across a similar problem.
	3	I ask the student to make explanations (predictions) for the solution to the problem.
	15	I find the clues about the solution and let the student reach the solution.

	20	I ask the student to use the strategies she/he knows to solve the problem.
	5	In the process of problem-solving, I firstly ask the student read the problem.
	7	After the solution, I let the student check the answer, shapes and diagrams, and the calculations made.
	29	I ask the student how much time she/he needs to solve the problem.
	24	I suggest different solutions for problem-solving.
Teaching Problem Solving	4	I draw / use shapes or schemes in problem-solving process.
	2	I pay attention to using a clear and understandable language in problem-solving process.
	16	I do studies for the student to be able to determine the important numbers and words necessary for the solution of the problem.
	18	I use tools for concretization in problem-solving process.
	8	I do studies for the student to recognize and use mathematical words and concepts (equal, equality, add, part, whole, etc.) while solving-problems.
	6	I do studies for the student to write an equality for the solution of the problem.
	9	When choosing a problem, I make sure that the language of the problem is understandable.
	12	In the process of problem-solving, I ask the student to draw a figure or schema.
	11	I make the student do exercises to internalize the strategies he will use in problem-solving process.
Role of Teacher in Problem Solving Process	19	My role in the problem-solving process is to be a guide and facilitator.
	1	I feel enough in problem-solving.
	27	I remind the student that she/he may ask for help in the problem-solving process.
	14	I get prepared for problem-solving.
	13	I encourage the students to solve problems.

When Table 3 is examined, it can be seen that the items in the first factor are named as "Understanding and Solving the Problem" since it usually included expressions for understanding and solving the problem. The second factor is named as "Teaching Problem-Solving" because it includes items mostly related to the teaching process of problem-solving. As the items in the third factor usually included expressions about the tasks of the teacher in the problem-solving process, it is named as "The Role of the Teacher in the Problem-Solving Process".

Pearson correlation coefficients (r) were calculated to determine the relationship between the factors appeared in the results of the EFA. If Pearson value is .00-.29, it is interpreted as low-level relationship; if it is between .30-.69, it is interpreted as medium-level relationship; and if it is between .70-1.00; it is interpreted as high-level relationship (Büyüköztürk, 2012). Table 4 shows the Pearson correlation coefficient values.

Table 4. Pearson Correlation Coefficients Calculated for the Relationship Between Scale Factors

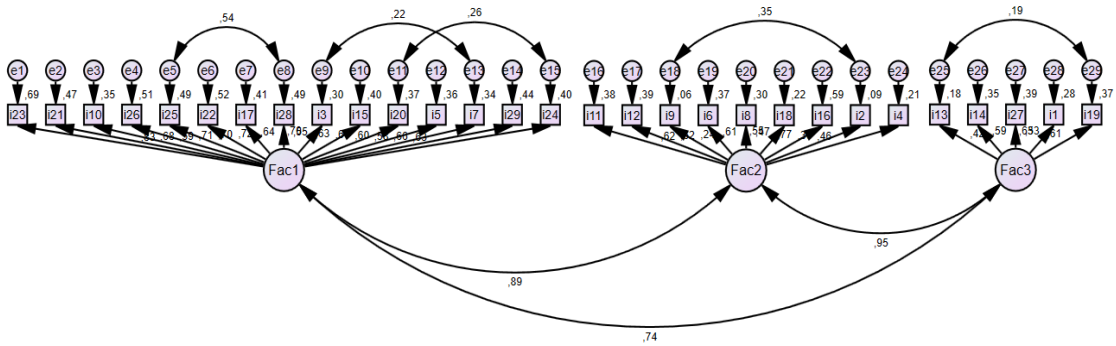
	Factor 1	Factor 2	Factor 3
Factor 1	-		
Factor 2	.72*	-	
Factor 3	.55*	.66*	-
Total	.96*	.87*	.71*

When Table 4 is examined, it is seen that the Pearson correlation coefficients calculated for the relationship between the factors vary between .55 and .72, the relationships between the factors are moderate, positive and significant in the level of "p<.01" (p=.00).

The internal consistency reliability coefficient of Cronbach's alpha, which was calculated to determine the internal reliability of the scale, is .93. When Cronbach's alpha value is .70 and more, it means that the scale is interpreted as reliable (Büyüköztürk, 2012). The Cronbach's alpha value of the first factor is .93, the Cronbach's alpha value of the second factor is .76, and the Cronbach's alpha value of the third factor is.63. Based on these findings, it can be said that the reliability of the scale is satisfying.

FINDINGS RELATED TO CFA.

Path diagram of the scale obtained as a result of the analysis is presented in Figure 2.



i=Item, Fac= Factor

Figure 2. *Path Diagram of the Scale*

As a result of the analysis, fit indices calculated as χ^2 = 735.357, *df*=369, χ^2/df=1.99, *p*<.001, SRMR=.06, RMSEA=.06, CFI=.90, IFI=.90. Based on this, it can be said that the scale has acceptable goodness-of-fit indices and has been validated.

4 | METHOD (STAGE II)

In the second stage of the study, the aim was to examine the awareness of teachers working at special education schools towards mathematical problem-solving process in terms of various variables. In this respect, it can be said that the study was conducted in the descriptive survey model. In descriptive survey studies, specific characteristics can be identified for a group (Büyüköztürk et al., 2012). While examining a situation in detail, the aim is giving detailed information about the situation without interruption (Karasar, 2012).

STUDY GROUP

The study group consists of 181 teachers working at special education schools in Istanbul. 118 (65.2%) of these teachers are female and 63 (34.8%) of them are male. 33 (18.2%) of the teachers have an associate's degree, 143 (79%) of them are bachelor and 5 (2.8%) have a master's degree. 73 (40.3%) of the teachers graduated from special education, 25 (13.8%) are primary teachers, 16 (8.8%) of them graduated from children development and 67 (37%) of them graduated from various departments of the faculties (e.g. Turkish teaching, preschool teaching, science teaching, psychological counselling and guidance). 82 (45.3%) of the teachers have professional seniority of 1-5 years, 53 (29.3%) of them have professional seniority of 6-10 years, 32 (17.7%) of them have professional seniority of 11-15 years and 14 (7.7%) of them have professional seniority of office is 16 years or more. 155 (85.6%) of the teachers work in public schools and 26 (14.4%) of them work in private schools. 62 (34.3%) of the teachers teach the students with mild mental

disabilities, 60 (33.1%) teach the students with moderate mental disabilities, 48 (26.5%) teach the students with severe mental disabilities and 11 (6.1%) teach the students with autism.

Data Collection

Data were obtained by using the "Problem-Solving Process Awareness Scale" developed by the researchers in order to determine the awareness of teachers working in special education schools of mathematical problem-solving process. Before applying the scale, the teachers were informed about the study. Volunteer participation and time periods according to the teaching schedules of teachers were taken into consideration while collecting the data. The scale was administered to 181 teachers working at special education schools in the second term of 2018-2019 academic year.

Data Analysis

In the analysis of the data, the total scores of teachers from the scale were used. The normality test (Kolmogorov-Smirnov), measures of central tendency (mean, median, mode) and the ratio of skewness-kurtosis coefficients to standard error (Can, 2013) were examined in determining normality distribution of data. As a result of this analysis, it was determined that the data were not distributed normally and Mann-Whitney U test among nonparametric tests was used for comparing the averages of two groups and Kruskal-Wallis H test was used for comparing the averages of more than two groups.

5 | Findings

The mean (*M*), standard deviation (*SD*) and median (*Mdn*) values of the total scores of the teachers are presented in Table 5.

Table 5. Mean, Standard Deviation and Median Values of Scale Total Scores

Variable		*M*	*SD*	*Mdn*
Gender	Female	117.60	15.75	121
	Male	113.20	14.50	118
Graduation field	Special Education	110.60	15.78	115
	Primary Education	118.04	14.72	119
	Child Development	125.62	12.84	128
	Other	119.01	14.00	122
Professional seniority	1-5 years	117.04	15.20	119
	6-10 years	116.54	13.11	118
	11-15 years	112.28	19.46	117
	16 years and more	117.21	14.89	120
School	Public school	118.62	13.59	120
	Private school	100.84	17.18	97
Group taught	Students with Mild Mental Disabilities	108.04	17.61	113
	Students with Moderate Mental Disabilities	118.26	14.45	122
	Students with Severe Mental Disabilities	121.68	8.88	123
	Students with Autism	124.81	11.24	118
Total		116.07	15.43	119

When Table 5 is examined, it is seen that mean and median values of independent variables do not have similar values in each case. This indicates that there is a deviation from the normal distribution. Also, the Kolmogorov-Smirnov value is significant (p<.01) and skewness-kurtosis coefficients as a result of the ratio of standard error are not all within the limits of ±1.96 shows that the data are not normally distributed.

Table 6 presents the test results to determine the statistical significance of teachers' awareness of mathematical problem-solving process in terms of gender variable.

Table 6. Mann-Whitney U Test in terms of Gender Variable

Group	*N*	Range Mean	Total Range	*U*	*p*
Female	118	96.03	11331	3124	.07
Male	63	81.59	5140		

Table 6 shows that there is no statistically significance between the groups in terms of gender (U=3124; p>.05). According to this finding, it can be stated that teachers' awareness of mathematical problem-solving process does not differ in terms of their gender.

Table 7 presents the test results to determine the statistical significance of teachers' awareness of mathematical problem-solving process in terms of the graduation variable.

Table 7. Kruskal-Wallis H Test in terms of Graduation Field Variable

Groups	*N*	Range Mean	*df*	χ^2	*p*	Significance
Special Education (1)	73	73.80	3	13.44	.00	1-2 1-3 1-4
Primary Education (2)	25	98.12				
Child Development (3)	16	105.16				
Other* (4)	67	103.70				

*Turkish Teaching, Preschool Teaching, Science Teaching, Psychological Counselling and Guidance

When Table 7 is reviewed, it is seen that there is a statistical significance between the groups in terms of the department graduated ($\chi^2_{(3)}$=13.44; p<.01). As a result of multiple comparisons, this significance was determined to be between special education and primary education, between special education and child development, and between special education and other groups. The scores of the teachers who graduated from primary education, child development and other groups are higher than those who graduated from special education department. According to this finding, it can be stated that teachers who graduated from primary education, child development and other groups have higher awareness of mathematical problem-solving process than teachers who have graduated from special education department.

Table 8 shows the test results to determine the statistical significance of the teachers' awareness of mathematical problem-solving process in terms of professional seniority variable.

Table 8. Kruskal-Wallis H Test in terms of Professional Seniority Variable

Groups	*N*	Range Mean	*df*	χ^2	*p*	Significance
1-5 years (1)	83	92.29	3	.50	.9	–
6-10 years (2)	53	90.75				
11-15 years (3)	32	85.84				
16 years and more (4)	13	96.50				

When Table 8 is examined, it is seen that there is no statistical significance between the groups in terms of professional seniority variable ($\chi^2_{(3)}$=.50; p>.05). According to this finding, it can be stated that teachers' awareness of mathematical problem-solving process does not differ in terms of professional seniority variable.

The results of the test conducted to determine the statistical significance of teachers' awareness of mathematical problem-solving process in terms of the school variable is presented in Table 9.

Table 9. Mann-Whitney U Test in terms of School Variable

Group	*N*	Range Mean	Total Range	*U*	*p*
Public School	155	98.66	15293	827	.00
Private School	26	45.31	1178		

When Table 9 is examined, it is seen that there is a statistical significance between the groups in terms of the institution variable (U=827; p<.01). The scores of teachers working in public schools are higher than those of teachers working in private schools. According to this finding, it can be stated that teachers working in public schools are more aware of mathematical problem-solving process than teachers working in private schools.

The results of the test conducted to determine the statistical significance of the teachers' awareness of mathematical problem-solving process according to the group taught variable are presented in Table 10.

Table 10. Kruskal-Wallis H Test in terms of the Group Taught Variable

Group	*N*	Range mean	*df*	χ^2	*p*	Significance
Students with Mild Mental Disabilities (1)	62	64.61	3	25.73	.00	1-2 1-3 1-4
Students with Moderate Mental Disabilities (2)	60	98.49				
Students with Severe Mental Disabilities (3)	48	110.25				
Students with Autism (4)	11	114.86				

When Table 10 is examined, it is seen that there is a statistical significance between the groups in terms of the group taught variable ($\chi^2_{(3)}$=25.73; p<.01). As a result of multiple comparisons, this significance was found to be between students with mild mental disabilities and students with moderate mental disabilities, between students with mild mental disabilities and students with severe mental disabilities and between students with mild mental disabilities and students with autism. The scores of the teachers who teach students with moderate mental disabilities, severe mental retardation, and autism groups are higher than the teachers who teach students with mild mental disabilities. According to this finding, it can be stated that the teachers who teach students with moderate mental disabilities, severe mental disabilities and autism are more aware of the mathematical problem-solving process than the teachers who teach students with mild mental disabilities.

6 | Discussion & Conclusion

This study aimed to investigate the awareness of teachers working at special education schools towards mathematical problem-solving process in two stages. In the first stage of the study, a scale was developed to determine teachers' awareness. The draft form of the scale consisting of twenty-nine items was administered to 215 teachers. EFA was done to determine the structure of the scale. As a result of the EFA, the scale was found to have a three-factor structure. The first factor was named as "Understanding and Solving the Problem", the second factor was named as "Teaching Problem-Solving" and the third factor was named as "The Role of the Teacher in Problem-Solving Process". The factor of the "Understanding and Solving the Problem" contains fifteen items with a factor load value ranging from .40 to .81. The first factor explains 29.08% of the total variance. The Cronbach's alpha reliability coefficient of the factor is .93. The factor of the "Teaching Problem-Solving" includes nine items with a factor load value ranging from .37 to .70. The second factor explains 12.21% of the total variance. The Cronbach's alpha reliability coefficient of the factor is .76. The factor of the "Role of the Teacher in the Problem-Solving Process" includes five items with a factor load value ranging from .49 to .71. The third factor explains 11.10% of the total variance. The Cronbach's alpha reliability coefficient of this factor is .63. The three factors in the scale explain 52.40% of the total variance. The Cronbach Alpha internal consistency reliability coefficient of the scale is .93. According to the results of EFA, no items were removed from the scale. The structure of the scale determined by EFA was tested with CFA and validated. The last form of the scale contains twenty-nine items. Each of these items is scored as "5 strongly agree, 4 agree, 3 neutral, 2 disagree, 1 absolutely disagree". Total score can be obtained from each factor and the whole scale. The maximum point which can be rated from the entire scale is 145 and the minimum point which can be rated from the whole scale is 29. The scale presents an opportunity to examine the awareness of teachers working in special education schools of mathematical problem-solving process and to compare them in terms of different variables.

In the second stage of the study, the statistical significance of the teachers' awareness of mathematical problem-solving process in terms of gender, professional seniority, graduation department, institution and the group taught was examined. As a result of the study, there was no statistical significance between the awareness of teachers of mathematical problem-solving process in terms of gender and professional seniority variables. It was determined that there is a statistical significance in terms of the variables of department, institution and the group taught.

It was concluded that teachers who graduated from special education department were less aware of mathematical problem-solving process than primary teachers and the teachers who graduated from child development and other departments. This result can be explained by the fact that special education teachers have less mathematical problem-solving opportunity with their students. Because the students with special needs have limitations compared to their peers in terms of cognitive skills, special education teachers also implement basic functional skills and life skills teaching with their students; mathematical problem-solving is studied at a simple level when students reach the required readiness. Therefore, it can be said that special education teachers have lower awareness of mathematical problem-solving than teachers in other fields. Problem-solving is generally taught mechanically to students affected by disability and ineffective problem-solving strategies are used in the teaching process (Jones et al., 1997; Van Luit & Naglieri, 1999). Special education teachers should have strategies to help students who struggle with mathematics gain access to the general education curriculum (Gargiulo & Metcalf, 2013; Powell et al., 2013). Strategy education will be effective in supporting special education teachers' awareness of problem-solving process (Hott & Isbell, 2014). Special education teachers should also use the strategies such as FAST DRAW (Mercer & Miller, 1992), SOLVE IT (Montague et al., 2000), STAR (Gagnon & Maccini, 2001), TINS (Owen, 2003), RIDE (Mercer et al., 2011) and other strategies that help students learn mathematical concepts and procedures in problem-solving process. Therefore, special education teachers should be aware of problem-solving strategies.

It is concluded that the teachers working at public schools are more aware of mathematical problem-solving process than the teachers working in private schools. In public schools, teachers are able to design and develop curricula, lesson plans, and programs in line with the interests and abilities of their students. This situation suggests that special education teachers implement this action more often in their classrooms. The reason for this suggestion is that individual education is more prominent in special education and an Individualized Education Plan (IEP) is prepared for each student and the educational needs of the student are taken into consideration. However, teachers working at private schools implement the teaching module prepared for the student directly in the Guidance Research Centre (GRC) and try to provide the students with the targeted skills in the teaching module. Moreover, the teachers at public schools spend more time with their students and get to recognize them better than the teachers at private schools. This indicates that the teachers working at public schools have a more positive attitude towards their students than the teachers working at private schools. Positive attitudes contribute to teachers 'positive tendencies in teaching students with special educational needs (Sharma et al., 2008; Slinigner et al., 2000; Thaver & Lim, 2014), positive or negative attitudes affect teachers' teaching performance (Avramidis et al., 2000; Buell et al., 1999; Campbell et al., 2003; Park et al., 2010). Consequently, it can be said that positive attitudes of special education teachers will affect their awareness of problem-solving process positively. It was determined that teachers who teach the students with moderate and severe mental disabilities and the students with autism are more aware of mathematical problem-solving process than teachers who teach the students with mild mental disabilities. Children with mild mental disabilities are the closest group to the children growing typically in having cognitive skills. Children with moderate and severe mental disabilities and children with autism generally have more limitations in terms of cognitive skills. Therefore, it can be stated that teachers who teach the students with moderate and severe mental disabilities and the students with autism use different teaching techniques for teaching mathematical problem-solving skills, develop and use alternative strategies, and make more efforts for concrete, clear and understandable instruction. The students struggling with mathematics need explicit instruction to understand concepts and relationships between concepts (Fuchs, Fuchs, Hamlett, et al., 2002). Explicit instruction of mathematics is precise, distinct and complicated (Stein et al., 2006). Explicit instruction often includes mathematical practices and teacher demonstrations under the guidance and direction of the teacher (Miller et al., 2011) and is extremely effective in teaching the students struggling with mathematics (Baker et al., 2002; Kroesbergen & Van Luit, 2003). The use of concrete and representative models in mathematics teaching is useful to promote conceptual understanding (Butler et al., 2003; Gersten et al., 2009). Therefore, it can be stated that the teachers who teach the students with moderate and severe mental disabilities and the students with autism are more aware of mathematical problem-solving process than teachers who teach the students with mild mental disabilities.

STATEMENTS OF PUBLICATION ETHICS

Ethical permission of the research was approved by Bartın University Social and Human Sciences Ethics Committee. Ethics committee document number is 2021-SBB-0240.

RESEARCHERS' CONTRIBUTION RATE

All authors contributed equally rate to the research.

CONFLICT OF INTEREST

We confirm that there are no conflicts of interest associated with this study.

REFERENCES

Avramidis, E., Bayliss, P., & Burden, R. (2000). A survey into mainstream teachers' attitudes towards the inclusion of children with special educational needs in the ordinary school in one local education authority. *Educational Psychology*, *20*(2), 191-211. https://doi.org/10.1080/713663717

Bahr, D. L., & de Garcia, L. A. (2010). *Elementary mathematics is anything but elementary: Content and methods from a developmental perspective*. Wadsworth.

Baker, S., Gersten, R., & Lee, D. (2002). A synthesis of empirical research on teaching mathematics to low-achieving students. *The Elementary School Journal*, *103*(1), 51-73.

Ball, D. L., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of Teacher Education*, *59*(5), 389-407. https://doi.org/10.1177/0022487108324554

Brown, T. A. (2015). *Confirmatory factor analysis for applied research (2nd ed.)*. The Guildford Press.

Buell, M. J., Hallam, R., Gamel-McCormick, M., & Scheer, S. (1999). A survey of general and special education teachers' perceptions and inservice needs concerning inclusion. *International Journal of Disability, Development and Education*, *46*(2), 143-156. http://dx.doi.org/10.1080/103491299100597

Butler, F. M., Miller, S. P., Crehan, K., Babbitt, B., & Pierce, T. (2003). Fraction instruction for students with mathematics disabilities: Comparing two teaching sequences. *Learning Disabilities Research & Practice*, *18*(2), 99-111. http://dx.doi.org/10.1111/1540-5826.00066

Büyüköztürk, **Ş**. (2002). Faktör analizi: Temel kavramlar ve ölçek geli**ş**tirmede kullanımı [Factor analysis: Basic concepts and its use in scale development]. *Kuram ve Uygulamada Eğitim Yönetimi*, *32*, 470-483.

Büyüköztürk, **Ş**. (2012). *Sosyal bilimler için veri analizi el kitabı* [Manual of data analysis for social sciences]. Pegem Akademi.

Büyüköztürk, **Ş**., Kılıç-Çakmak, E., Akgün, Ö., Karadeniz, **Ş**., & Demirel, F. (2012). *Bilimsel ara**ş**tırma yöntemleri* [Scientific research methods]. Pegem Akademi.

Byrne, B. M. (2016). *Structural equation modeling with Amos.* Routledge.

Campbell, J., Gilmore, L., & Cuskelly, M. (2003). Changing student teachers' attitudes towards disability and inclusion. *Journal of Intellectual and Developmental Disability*, *28*(4), 369-379. https://doi.org/10.1080/13668250310001616407

Can, A. (2013). *SPSS ile bilimsel ara**ş**tırma sürecinde nicel veri analizi* [Quantitative data analysis in scientific research process with SPSS.]. Pegem Akademi.

Fennema, E., & Franke, L. M. (1992). Teachers' knowledge and its impact. In D. A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 147-164). Macmillan.

Friend, M., & Bursick, W. D. (2011). *Including students with special needs: A practical guide for classroom teachers.* Pearson Education Inc.

Fuchs, D., Fuchs, L. S., & Stecker, P. M. (2010). The "blurring" of special education in a new continuum of general education placements. *Exceptional Children*, *76*(3), 301-323. https://doi.org/10.1177/001440291007600304

Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Appleton, A. C. (2002). Explicitly teaching for transfer: Effects on the mathematical problem-solving performance of students with mathematics disabilities. *Learning Disabilities Research and Practice*, *17*(2), 90-106. https://doi.org/10.1111/1540-5826.00036

Gagnon, J. C., & Maccini, P. (2001). Preparing students with disabilities for algebra. *Teaching Exceptional Children*, *34*(1), 8-15. https://doi.org/10.1177/004005990103400101

Gargiulo, R. M., & Metcalf, D. (2013). *Teaching in today's inclusive classrooms: A universal design for learning approach (2nd ed.)*. Cengage Learning.

Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., & Witzel, B. (2009). Assisting students struggling with mathematics: Response to Intervention (RtI) for elementary and middle schools (NCEE 2009-4060). National Center for Education Evaluation and Regional Assistance, Institute of

Education Sciences, U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/publications/practiceguides/

Goldman, S. R. (1989). Strategy instruction in mathematics. *Learning Disability Quarterly*, *12*(1), 43-55. https://doi.org/10.2307/1510251

Gürbüz, S. (2019). *AMOS ile yapısal eşitlik modellemesi* [Structural equation modeling with AMOS]. Seçkin.

Heward, W. L. (2012). *Exceptional children: An introduction to special education.* Pearson Education Inc.

Hott, B. L., & Isbell, L. (2014). *Strategies and interventions to support students with mathematics disabilities.* Retrieved from https://www.council-for-learning-disabilities.org/wp-content/uploads/2014/12/Math_Disabilities_Support.pdf

Jitendra, A. K., & Hoff, K. (1996). The effects of schema-based instruction on the mathematical word-problem-solving performance of students with learning disabilities. *Journal of Learning Disabilities*, *29*(4), 422-431. https://doi.org/10.1177/002221949602900410

Jones, E. D., Wilson, R., & Bhojwani, S. (1997). Mathematics instruction for secondary students with learning disabilities. *Journal of Learning Disabilities*, *30*(2), 151-163. https://doi.org/10.1177/002221949703000203

Karasar, N. (2012). *Bilimsel araştırma yöntemi* [Scientific research method]. Nobel Yayın Dağıtım.

Kline, R. B. (2016). *Principles and practice of structural equation modeling.* The Guilford Press.

Kroesbergen, E. H., & Van Luit, J. E. H. (2003). Mathematics interventions for children with special educational needs. *Remedial and Special Education*, *24*, 97-114. https://doi.org/10.1177/07419325030240020501

Mercer, C. D., & Miller, S. P. (1992). *Multiplication facts 0 to 81.* Edge Enterprises.

Mercer, C. D., Mercer, A. R., & Pullen, P. C. (2011). *Teaching students with learning problems (8th ed.)*. Pearson Education.

Miller, S. P., Stringfellow, J. L., Kaffar, B. J., Ferreira, D., & Mancl, D. B. (2011). Developing computation competence among students who struggle with mathematics. *TEACHING Exceptional Children*, *44*(2), 38-46. https://doi.org/10.1177/004005991104400204

Millî Eğitim Bakanlığı, (2018a). Orta-ağır zihinsel engeli ve otizm spektrum bozukluğu olan öğrenciler için matematik dersi öğretim programı. I. kademe (1, 2, 3 ve 4. sınıf). Retrieved from https://orgm.meb.gov.tr/www/ozel-egitim-ile-ilgili-yayimlar/icerik/123

Millî Eğitim Bakanlığı, (2018b). Orta-ağır zihinsel engeli ve otizm spektrum bozukluğu olan öğrenciler için matematik dersi öğretim programı. II. kademe (5, 6, 7 ve 8. sınıf). Retrieved from https://orgm.meb.gov.tr/www/ozel-egitim-ile-ilgili-yayimlar/icerik/123

Millî Eğitim Bakanlığı, (2018c). Orta-ağır zihinsel engeli ve otizm spektrum bozukluğu olan öğrenciler için matematik dersi öğretim programı. III. kademe (9,10, 11 ve 12. sınıf). Retrieved from https://orgm.meb.gov.tr/www/ozel-egitim-ile-ilgili-yayimlar/icerik/123

Montague, M., Warger, C., & Morgan, T. H. (2000). Solve it! Strategy instruction to improve mathematical problem solving. *Learning Disabilities Research & Practice*, *15*(2), 110-116. https://doi.org/10.1207/SLDRP1502_7

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics.* NCTM.

Osborne, J. W., & Banjanovic, E. S. (2016). *Exploratory factor analysis with SAS®.* SAS Institute Inc.

Owen, M. J. (2003). *It's elementary! 275 math word problems book 3.* Educator Publishing Service.

Park, M., Chitiyo, M., & Choi, Y. S. (2010). Examining pre-service teachers' attitudes towards children with autism in the USA. *Journal of Research in Special Educational Needs*, *10*(2), 107-114. https://doi.org/10.1111/j.1471-3802.2010.01150.x

Petrou, M., & Goulding, M. (2011). Conceptualising teachers' mathematical knowledge in teaching. In T. Rowland & K. Ruthven (Eds.) *Mathematical knowledge in teaching* (pp. 9-25). Springer.

Potari, D. (2013). Promoting teachers' mathematical and pedagogical awareness. *Journal of Mathematics Teacher Education*, *16*(2), 81-83. https://doi.org/10.1007/s10857-013-9238-3

Powell, S. R., Fuchs, L. S., & Fuchs, D. (2013). Reaching the mountaintop: Addressing the common core standards in mathematics for 9 students with mathematics difficulties. *Learning Disabilities Research and Practice*, *28*(1), 38-48. https://doi.org/10.1111/ldrp.12001

Sharma, U., Forlin, C., & Loreman, T. (2008). Impact of training on pre-service teachers' attitudes and concerns about inclusive education and sentiments about persons with disabilities. *Disability & Society*, *23*(7), 773-785. https://doi.org/10.1080/09687590802469271

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, *15*(2), 4-14. https://doi.org/10.2307/1175860

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, *57*(1), 1-23. https://doi.org/10.17763/haer.57.1.j463w79r56455411

Slininger, D., Sherrill, C., & Jankowski, C. M. (2000). Children's attitudes toward peers with severe disabilities: Revisiting contact theory. *Adapted physical activity quarterly*, *17*(2), 176-196. https://doi.org/10.1123/apaq.17.2.176

Stein, M., Kinder, D., Silbert, J., & Carnine, D. W. (2006). *Designing effective mathematics instruction: A direct instruction approach*. Pearson Merrill Prentice Hall.

Tabachnick, B. G., & Fidell, L. S. (2014). *Using multivariate statistics*. Pearson.

Tav**ş**ancıl, E. (2005). *Tutumların ölçülmesi ve SPSS ile veri analizi* [Measuring attitudes and data analysis with SPSS.]. Nobel Yayıncılık.

Thaver, T. & Lim, L. (2014). Attitudes of pre-service mainstream teachers in Singapore towards people with disabilities and inclusive education. *International Journal of Inclusive Education*, *18*(10), 1038-1052. https://doi.org/10.1080/13603116.2012.693399

Van Luit, J. E. H., & Naglieri, J. A. (1999). Effectiveness of the MASTER program for teaching special children multiplication and division. *Journal of Learning Disabilities*, *32*(2), 98-107. http://dx.doi.org/10.1177/002221949903200201

Woodward, J., Beckmann, S., Driscoll, M., Franke, M., Herzig, P., Jitendra, A., & Koedinger, K. R. (2012). *Improving mathematical problem solving in grades 4 through 8*. National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences.

Zigmond, N., Kloo, A., & Volonino, V. (2009). What, where, and how? Special education in the climate of full inclusion. *Exceptionality*, *17*(4), 189-204. https://doi.org/10.1080/09362830903231986

BUEFAD | 2021, Volume 10, Issue 3, 512-525
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.862149

How Do EFL Teachers in Turkey Perceive Creativity?

Vildan ÇELİK [a*] Seçil TÜMEN AKYILDIZ [b*]

a* English Language Teacher, The Ministry of National Education (https://orcid.org/0000-0001-5418-7243) * vldncelikk@gmail.com

b* Assoc. Prof. Dr., Fırat University, English Language and Literature Department (https://orcid.org/0000-0003-4116-7344)* stakyildiz@firat.edu.tr

Research Article | Received: 15.01.2021 | Revised: 06.08.2021 | Accepted: 07.08.2021

Abstract

As one of the 21st-century skills, creativity should become one of the primary focuses of education. This is because developing students' creativity in all educational contexts certainly makes significant contributions to their lives both for now and for the future. Creative thinking should be stimulated diligently within the field of English as a foreign language (EFL). As the biggest and most crucial role belongs definitely to the teachers, who are expected to encourage and nurture creativity in their students through creative teaching, EFL teachers also should be well aware of their leading role for creativity in their classes. From this standpoint, understanding EFL teachers' perceptions of creativity is significant. Thus, the purpose of this study is to investigate Turkish EFL teachers' perceptions of creativity and to determine whether gender, age, teaching experience and undergraduate area of study influence their perceptions. This study was designed as a quantitative descriptive method research and was conducted with 200 EFL teachers working currently at the secondary schools in Elazığ. The data analysis was performed using SPSS 21. The results revealed that Turkish EFL teachers' perceptions of creativity are high in general. Yet, it was found that the majority of EFL teachers do not always provide novel and efficient opportunities for the development of creative thinking. It was also determined that EFL teachers' gender, age, teaching experience and undergraduate area of study do not influence their perceptions on creativity.

Keywords: Creativity, Creative Teaching, EFL, Teacher Perception

Türkiye'deki İngilizce Öğretmenleri Yaratıcılığı Nasıl Algılıyor?

Öz

21. yüzyıl becerilerinden biri olarak yaratıcılık, eğitimin temel odak noktalarından birisi olmalıdır. Çünkü öğrencilerin yaratıcılıklarını tüm eğitim bağlamlarında geliştirmek, onların yaşamlarına hem şuan hem de gelecek için muhakkak ki önemli katkılarda bulunmaktadır. Yabancı dil olarak İngilizce öğretimi alanında da yaratıcı düşünme özenle ve sebatla teşvik edilmelidir. Kuşkusuz en büyük ve en mühim rol öğrencilerindeki yaratıcılığı yaratıcı öğretimle cesaretlendirmesi ve geliştirmesi beklenen öğretmenlere ait olduğu için, İngilizce öğretmenleri de derslerindeki yaratıcılığa yönelik kendi başlıca rollerinin tamamen farkında olmalıdır. Bu açıdan, İngilizce öğretmenlerinin algılarını anlamak önemlidir. Bu yüzden, bu çalışmanın amacı İngilizce öğretmenlerinin yaratıcılık üzerine algılarını araştırmak ve cinsiyet, yaş, deneyim ve lisans bölümünün öğretmenlerin yaratıcılık üzerine algılarına etkisi olup olmadığını belirlemektir. Bu çalışma betimsel bir araştırma olarak tasarlanmış ve Elazığ'daki ortaokullarda halen çalışmakta olan 200 İngilizce öğretmeniyle yürütülmüştür. Veri analizi SPSS 21 kullanılarak yapılmıştır. Sonuçlar, İngilizce öğretmenlerinin yaratıcılık üzerine algılarının genel olarak yüksek olduğunu ortaya çıkmıştır. Fakat çoğu İngilizce öğretmeninin yaratıcı düşünmeyi geliştirmek için yeni ve etkili fırsatları her zaman sunmadıkları görülmüştür. İngilizce öğretmenlerinin cinsiyet, yaş, deneyim ve lisans bölümlerinin, onların yaratıcılık üzerine algılarını etkilemediği de belirlenmiştir.

Anahtar kelimeler: Yaratıcılık, Yaratıcı Öğretim, Yabancı Dil Öğretimi, Öğretmen Algısı

To cite this article in APA Style:

Çelik, V. & Tümen Akyıldız, S. (2021). How do EFL teachers in Turkey percieve creavity? *Bartın University Journal of Faculty of Education, 10*(3), 511-525. https://doi.org/10.1016/buefad.862149

1 | Introduction

The twenty-first century has brought uncertainty to life as a result of the rapid social, economic and global changes (Beghetto, 2010). These rapid changes, as well as the political and technological ones, are the main reasons for the increasing value of creativity around the world (Craft, 2005). Consequently, schools are expected to reorganize their education policies with a stronger emphasis on improving the students' creativity to respond all of these factors (Li, 2016a) and to prepare them for an unpredictable, rapidly changing future (Vygotsky, 1967/2004). From these standpoints, notable policy changes in education have been carried out, and thinking skills like creativity have been integrated into the curriculums in many countries around the world (Gunawardena, Sooriyampola, & Walisundara, 2017; Li, 2016b; Lin, 2011). Schools and teachers have been encouraged to develop students' creativity through government initiatives. Also curriculum reforms focusing on the development of creativity in education have been performed in many countries like America, France, Germany, Sweden, Australia, China, Hong Kong and Japan (Lin, 2011).

Although creativity has received considerable attention in education and has recently been a significant area of interest within the field of EFL around the world (Maley & Bolitho, 2015), it is believed not to be addressed and emphasized in EFL as it should be in Turkey. A considerable amount of studies on creativity have been conducted about Turkish language, math, music, art, science and many others whereas the number of creativity research carried out in the EFL context is highly scarce compared to them. Therefore, this study is presumably one of the very few EFL studies conducted in Turkey. Moreover, attention has been paid to the perceptions of pre-service EFL teachers on creativity in Turkey until recently. Thus, to our knowledge, this study is one of the first studies conducted with in-service EFL teachers.

The major objectives of this study were to investigate the perceptions of Turkish EFL teachers on creativity and to determine whether gender, age, teaching experience and undergraduate area of study influence their perceptions. Regarding the aim of the study the research questions were determined as follows:

1. What are the perceptions of Turkish EFL teachers on creativity?

2. Is there any significant difference among the perceptions of EFL teachers on creativity in terms of gender, age, teaching experience, and undergraduate area of study?

Creativity in educational contexts

As pointed out by Hondzel and Hansen (2015), "schools, if they are to be the source of relevant learning for future adults, must understand not only the 'how' of a creativity-based curriculum, but also the 'why' " (p.179). Realizing the reason why creativity should be integrated into education is one of the prerequisites for creativity development.

Creativity is an essential skill in terms of both individual and social levels (NACCCE, 1999; Sternberg & Lubart, 1999). At an individual level, creativity is regarded as a necessary condition for human survival (Maley, 2013; Richards, 2010; Vygotsky, 1967/2004). As beneficial for problem-solving (Runco, 2004; Smith & Smith, 2010; Sternberg & Lubart, 1999), creativity plays an incredible role to overcome the difficulties of daily life (Lin, 2011). It might help individuals to find solutions that are novel, extraordinary and more efficient (Cimermanova, 2015). It also has a positive impact on health (Richards, 2007a; Runco, 2004) and it promotes the development of 'adaptability', 'self-expression' (Runco, 2004, p. 677), 'curiosity' and 'ingenuity' (Smith & Smith, 2010, p. 251). People need to adapt to the changes swiftly to be efficient in this rapidly changing and unpredictable world. Creativity, one of the most influential capacities people have (Richards, 2007a), helps them adjust to new and challenging circumstances. As also emphasized by Richards (2007b), being creative offers substantial benefits for people's identity. Creative people become more dynamic, conscious, nondefensive, open, integrating, observing, caring, collaborative, androgynous, developing, healthier and braver according to him. As for UCLES (2018), fostering personal creative abilities is the most significant thing for students because throughout their lives they will be constructing everything by means of these

abilities. All of the individual-level benefits of creativity, in turn, have a positive impact on society. At a social level, creative people may contribute significantly to the growth of their society. Sternberg and Lubart (1999) pointed out that creativity can result in new artistic movements, scientific discoveries, innovations or new social initiatives. As new occupations flourish due to the new goods or services produced, creativity has an economic value as well, which is good for society.

In terms of educational level, creativity has numerous advantages for students besides (NACCCE, 1999). It is seen as a fundamental part of the learning process (UCLES, 2018; Rinkevich, 2011). Contrary to rote learning which does not offer meaningful learning conditions, creativity promotes effective learning, and it increases students' academic achievement and cognitive development (Schacter, Thum, & Zifkin, 2006). It offers students to develop and shape new knowledge effectively (Craft, 2005; Li, 2016a). Moreover, it is remarkably influential in affecting students' attitude towards school and motivation for learning (Maley, 2013; Fisher, 2006; Richards, 2013). Through creativity, students become more confident and responsible (UCLES, 2018) as well as "more motivated and more involved with their schoolwork, and their work becomes more interesting" (Sternberg & Williams, 1996, p. 49).

Traditional teaching may stifle creativity as a result of a barren condition in which teaching and learning are separate procedures that do not often encounter (Lin, 2011). In it, students are transferred knowledge without being encouraged to participate in the development of knowledge (Baghaei & Riasati, 2015). Teachers expect students to think reactively instead of thinking proactively. Students listen, answer the questions, do the exercises and solve the tests in accordance with the teachers' expectations. They do not think uncommonly, produce new ideas, ask novel questions and answer questions uniquely. So creative thinking is not encouraged (Iakovos, 2011). However, in the 21st century, it is excessively significant to provide proper conditions to nourish the students' creativity through education. Applying creative pedagogy in the educational context rather than conventional teaching is the best way to ensure it efficiently (Lin, 2011; NACCCE, 1999).

NACCCE (1999) proposed two separate but interrelated concepts for creative teaching; teaching creatively and teaching for creativity. Teaching creatively was defined as "using imaginative approaches to make learning more interesting, exciting and effective" (p. 102). According to Copley (2001, cited in Baghaei & Riasati, 2015), teaching creatively requires a long time for teachers to gain this skill and consists of three steps. The first step requires teachers to grasp what creativity is; the second step is to make use of their own creative thinking skill; and the last step is to apply techniques and methods that can foster students' creativity. In this process, teachers by using their creativity develop and use diverse approaches, methods, and materials which may arouse students' attention and increase their motivation for learning (NACCCE, 1999). For Smith and Smith (2010), teaching creatively means for teachers to search novel and distinctive ways for teaching, to encourage creativity in the classroom and to attach great importance to creativity both in their and students' works.

Teaching for creativity, on the other hand, is the "forms of teaching that are intended to develop young people's own creative thinking or behaviour" (NACCCE, 1999, p.103). As for Kaufman and Sternberg (2007), teaching creativity cannot be accomplished directly but a teacher can teach for creativity which "require the recognition that creativity is, in large part, an attitude toward life" (p.58). Three tasks were proposed for teachers who will teach for creativity; encouraging, identifying, and fostering. It is suggested that having strong self-belief and positive self-image contributes to the development of creativity. Thus, encouraging students to believe in their creative capacity and to be confident, enterprising, independent, strong in the presence of failures, highly motivated, willing to take risks is a crucial step for the improvement of creative performance. The second task is identifying students' creative abilities and strengths. The third task is fostering creativity by developing typical capacities and skills such as curiosity, memory, and awareness; by having a clear understanding of the creative processes (NACCCE, 1999). As understood, teaching creatively highlights a teacher-oriented perspective, whereas teaching for creativity focuses on a learner-oriented perspective (Craft, 2005; Cremin, 2009). Both of the concepts are reasonably significant, and thus teachers should teach creatively and teach for creativity (Cimermanova, 2015).

It is reasonable to assume that teachers are the most essential and indispensable part of creative teaching. They, therefore, have a big role in fostering or undermining the creative potential of students (Birkmaier, 1971; Li, 2016b; Sternberg & Williams, 1996). They may have some misconceptions and lack of knowledge about creativity, which can influence the creative teaching performance of the teachers negatively (Aljughaiman & Reynolds, 2005; Huang, Lee, & Yang, 2019). In contrast, they may hold views that can help them stimulate creativity in the classrooms. Meanwhile, even though they have positive views or perceptions about creativity, teachers sometimes may not display and apply them in their instructional practices (Bereczki & Kárpáti, 2018). Thus, understanding how they perceive creativity is an essential step in creativity in educational contexts. Similarly, EFL teachers' perceptions of creativity should be identified well to encourage and cultivate creativity in EFL classes efficiently.

Even though the number of academic research and books on creativity is high, creativity research particularly in the EFL context is less than the other fields. However, due to the increasing popularity of thinking skills and their development in EFL, the literature on creative thinking has shown gradual growth in recent years. Maley & Peachey (2015) and Xerri & Vassallo (2016a) with their books, Birkmaier (1971), Iakovos (2011), Maley & Bolitho (2015) and Richards (2013) with their articles provided profound information about the central philosophy of creativity in EFL, put forward various suggestions and proposed many creative activities to foster creativity in EFL classrooms. Although they do not focus on the EFL context by name, Cremin's (2009) and Jones & Richards' (2015) books offer both theoretical and practical information for creative language teaching. Avila (2015) and Tin (2013) also suggested creative activities that can promote creativity alongside language skills. The studies of Al-Qahtani (2016), Al-Nouh et al., (2014), Fitriah (2017), Wang & Kokotsaki (2018), Nedjah & Hamada (2017) and Popescu (2013) are in parallel with the focus of this current study as they tend to investigate EFL teachers' knowledge, perception, belief or attitude on creativity.

For instance, Al-Nouh, Abdul-Kareem, & Taqi (2014) explored primary school EFL teachers' attitudes on creativity and their perceptions of classroom practice using a survey, making a focus group interview and analysing exam papers. While the participants of the survey were four hundred thirty-four EFL teachers working at primary schools in Kuwait, the focus group interviews were held with nineteen principals and one hundred forty-nine teachers. The findings showed that although teachers indicated some significant constraints like time and curriculum, their attitudes and perceptions were, in general, high. Teachers' age, major, school zone, experience and training had also a great impact on perceptions and attitudes of teachers. According to principals, teachers were the main factor that discouraged the development of creativity in students. Both teachers and principals believed that providing in-service teacher training, resource and parents' assistance was essential for effective implementation of creative activities. The study carried out by Nedjah & Hamada (2017) examined EFL teachers' knowledge and perceptions about creative thinking and its implementation in EFL classrooms. Twenty-seven EFL teachers working at a university in Algeria participated in the study. With the questionnaire applied, it was revealed that teachers mostly had positive perceptions to foster creativity in EFL classrooms, and they were aware of the benefits of creativity on students in various aspects. However, they had limited knowledge about the concept of creativity, its characteristics and its effective integration into the teaching process. Therefore, it was offered to take training on creativity and creative pedagogy as well as to highlight its position in the EFL curriculum

In Turkey, creativity research in EFL is limited in contrast with the other domains and school subjects. Furthermore, the creativity studies in EFL context are not mostly about EFL teachers or their perceptions of creativity (e.g. Akçay, 2019; Cubukcu, 2010; Özbek, 2006; Özcan, 2010). Akçay (2019) and Özbek (2006) contributed to the literature with their thesis studies on creativity. Akçay (2019) examined ELT coursebooks whether they contain 21st-century skills including creativity. Özbek (2006) investigated if a creative thinking programme had profound effects on students' attitudes on creativity in writing. Şenel (2018) carried out a study to investigate the efficiency of creative writing on students' academic writing skills. Özcan (2010) examined the relationship between the teachers' behaviours and students' creative thinking skill while Yagcioglu (2017) conducted a study to find out whether creativity and humour had an impact on students in

EFL classes as well as she suggested sample classroom activities, books and websites. Cubukcu (2010) provided important information and suggestions about how creativity could be fostered through poetry while teaching language.

Bedir's (2019), and Kurt and Önalan's (2018) studies were akin to the focus of the present study. However, they examined pre-service EFL teachers' beliefs and perceptions of creativity. The study conducted by Bedir (2019) examined pre-service EFL teachers' beliefs and perceptions on 21st-century skills called as 4Cs, namely critical, creative thinking, collaboration and communication skills. The researcher intended to find out, first, teachers' general perceptions on 21st-century skills; second, their specific perceptions on 4Cs separately; third, their specific beliefs on 4Cs' integration in terms of curriculum and instruction, assessment, and professional development. One hundred twenty-four pre-service EFL teachers from a state university attended the study's quantitative phase and filled a questionnaire consisting of both open-ended and closed-ended questions. Twelve teachers participated in the qualitative phase of the study, and semi-structured interviews were conducted through a focus group. The findings showed that they had positive perceptions of 4Cs, but they were not able to identify and implement 21st-century skills clearly, which was linked by the researcher to the curriculum and test system in Turkey. Most of the teachers perceived integration of the technology into classroom activities as the requirements of these skills. Moreover, it was found out that their perceptions of creative thinking were limited in that they had some misconceptions about creativity and its integration into teaching. Although they indicated that creativity was essential and beneficial in education, they had difficulty in defining creativity.

Kurt & Önalan (2018) also conducted a similar study and aimed to find out pre-service EFL teachers' perceptions of creativity. The data was collected only through qualitative way with semi-structured focus-group interview. Eight pre-service teachers from a state university in Turkey participated in the study. The results revealed that their conceptualization of creativity was limited according to their creativity definitions. However, they were aware of the fact that every individual had the creative ability and it could be developed or undermined due to some significant factors such as family, culture and school. They also offered teachers to use specific tasks in order to stimulate the creative thinking of students. In addition, it was reported that they were not ready to teach creativity even though they thought themselves almost creative. They asserted that teacher education played an absolutely great role in pre-service teachers' creative teaching practices.

On the other hand, Tümen Akyıldız and Çelik's (2020) study emphasized the in-service EFL teachers' perceptions of creativity. Yet, it was qualitative research conducted with only 15 teachers. Interviews were held with these teachers currently working at state secondary schools in a Turkish city. The results of the study showed that the central philosophy of creativity was not comprehended and creative teaching was not applied thoroughly by most of the teachers. Some creative activities were utilized in EFL classrooms to foster students' creativity such as brainstorming, storytelling and games. However, some of the activities mentioned by the teachers were not suitable for the creative approach, which showed the teachers' limited perceptions as well. In the study, factors inhibiting and facilitating creativity in the Turkish context were found out. Constraining factors were reported as curriculum, time, exams, administrators and class size while facilitating ones as teacher motivation. Student and technology factors were regarded as both constraining and facilitating factors for creativity development in EFL classrooms. As seen, the current study is different from the previous studies in terms of its focus and research design.

2 | Method

Research Design

The present study explored Turkish EFL teachers' perceptions on creativity, and whether there was any significant difference among their perceptions on creativity in terms of gender, age, teaching experience and undergraduate area of study. Therefore, descriptive quantitative research was preferred. To collect the data, a questionnaire by Al-Nouh, Abdul-Kareem and Taqi (2014) was used.

PARTICIPANTS

The participants of the study consisted of 200 EFL teachers, who were teaching from 5th to 8th-grade students at state schools. They were currently working at secondary schools in Elazı**ğ**, a city located in the East Anatolian Region of Turkey. In Table 1, the descriptive statistics of the participants' background information were given.

Table 1. Descriptive Statistics of the Participants' Background Information

		N	%
Gender	Female	136	68
	Male	64	32
Age	22-30	121	60,5
	31-39	63	31,5
	40-48	14	7
	49-above	2	1
Experience	1st year	19	9,5
	1-4	66	33
	5-10	69	34,5
	11-above	46	23
Undergraduate area of study	English Language Teaching	144	72
	English Language & Literature	45	22,5
	Linguistics	4	2
	Others	4	2
	American Culture & Literature	2	1
	Translation & Interpreting	1	.5

Table 1 demonstrates that the majority of the teachers were female and between the ages of 22-30. As for the years of experience in teaching, the majority of the teachers had been working for 1-10 years. Lastly, in terms of the undergraduate area of study, the ratios indicate that most of the participants graduated from ELT departments of universities.

DATA COLLECTION

For the study, the questionnaire prepared by Al-Nouh, Abdul-Kareem and Taqi (2014) was used after the necessary permission was obtained to administer it. Cronbach Alpha coefficient of this questionnaire was calculated by these researchers and it was found as 0.86, which demonstrated high reliability.

The original questionnaire consisted of three parts; demographic information, attitude and perception. However, only the demographic information part and perception part of it was utilized for the current study. Moreover, the first part of the original questionnaire involved demographic information in terms of age, nationality, major, degree, in-service training, teaching experience, and educational zone. The researchers of the present study changed the demographic questions to gender, age, teaching experience, and undergraduate area of study to make this part more suitable for the current study. The second part of the questionnaire consisted of 20 items which aimed to discover the perceptions of teachers on creativity and their creative practices. A five-point Likert scale was used in the questionnaire; "1: never, 2: rarely, 3: sometimes, 4: usually, 5: always".

DATA ANALYSIS

The researchers analysed the collected data via Statistical Package for the Social Sciences (SPSS) 21. First of all, the questionnaire's Cronbach's alpha value was calculated to measure its reliability and it was calculated as .903, which indicated a high level of reliability for the questionnaire. For each item in the questionnaire, descriptive statistics were used, and mean values, standard deviations and percentages were calculated. For

the second research question, Levene's Test was applied for the variance homogeneity. As Buyukozturk (2016) stated that the Levene's Test may be used to provide the equality of variance. When the variance is equal parametric analysis; otherwise, the non-parametric analysis is more appropriate. Therefore, in this research One Way ANOVA parametric tests and Kruskal Wallis non-parametric tests were applied to demonstrate if teachers' perceptions show a meaningful and significant difference in terms of gender, age, teaching experience and undergraduate area of study.

Research ethics

This research was evaluated at the meeting (no: 23/2019) by the Ethics Committee of Social Sciences and Humanities of Fırat University in 11.04.2019 and found ethically acceptable.

3 | Findings

In this section, the first research question aimed to find out the perceptions of Turkish EFL teachers on creativity is answered through the data obtained from the questionnaire which consists of twenty items.

Table 2. Descriptive Statistics of the Turkish EFL Teachers' Perceptions on Creativity

		N	R	S	U	A	Mean	STD
P1. I remind and encourage pupils to be creative.	F	2	6	41	93	58	3,99	0,84
	%	1,0	3,0	20,5	46,5	29,0		
P2. I develop pupils' creative thinking skills.	F	2	6	63	90	39	3,79	0,82
	%	1,0	3,0	31,5	45,0	19,5		
P3. I encourage pupils to question and think independently.	F	1	4	36	85	74	4,13	0,81
	%	0,5	2,0	18,0	42,5	37,0		
P4. I listen to pupils when they ask questions.	F	1	2	9	49	139	4,61	0,67
	%	0,5	1,0	4,5	24,5	69,5		
P5. During discussion, I ask pupils questions to encourage them to think deeply about the topic.	F	1	5	28	78	88	4,23	0,82
	%	0,5	2,5	14,0	39,0	44,0		
P6. I urge pupils to tell me about what they have learned by themselves.	F	5	20	38	93	44	3,75	0,98
	%	2,5	10,0	19,0	46,5	22,0		
P7. I push pupils to experiment with what they have learned in varied situations.	F	2	17	69	81	31	3,61	0,88
	%	1,0	8,5	34,5	40,5	15,5		
P8. I inspire my pupils to find more than one solution to a problem.	F	2	9	52	88	49	3,86	0,87
	%	1,0	4,5	26,0	44,0	24,5		
P9. I prepare questions for my pupils to answer by themselves.	F	1	12	57	80	50	3,83	0,89
	%	0,5	6,0	28,5	40,0	25,0		
P10. I allow pupils to learn in groups.	F	-	18	58	70	54	3,80	0,94
	%	-	9,0	29,0	35,0	27,0		
P11. I allow pupils to exchange ideas and opinions.	F	-	7	50	84	59	3,97	0,82
	%	-	3,5	25,0	42,0	29,5		
P12. I allow pupils to ask about things of interest to them.	F	-	7	42	91	60	4,02	0,80
	%	-	3,5	21,0	45,5	30,0		
P13. I praise pupils who provide unexpected answers.	F	2	3	44	66	85	4,14	0,88
	%	1,0	1,5	22,0	33,0	42,5		
P14. I take a boring exercise and turn it into a game.	F	2	23	76	63	36	3,54	0,95
	%	1,0	11,5	38,0	31,5	18,0		
P15. I use a discovery or problem solving approach in teaching pupils.	F	5	18	73	78	26	3,51	0,91
	%	2,5	9,0	36,5	39,0	13,0		
P16. I use a range of communication technologies in my class.	F	2	16	65	78	39	3,68	0,91
	%	1,0	8,0	32,5	39,0	19,5		

P17. I use authentic situations to encourage language use.	F %	4 2,0	27 13,5	61 30,5	72 36,0	36 18,0	3,54	1,00
P18. I reward originality and creativity.	F %	2 1,0	17 8,5	46 23,0	62 31,0	73 36,5	3,93	1,01
P19. I allow pupils to choose their own projects to demonstrate their knowledge.	F %	6 3,0	14 7,0	48 24,0	77 38,5	55 27,5	3,80	1,01
P20. I do not criticize pupils' ideas.	F %	6 3,0	6 3,0	37 18,5	76 38,0	75 37,5	4,04	0,97

"N: never, R: rarely, S: sometimes, U: usually, A: always"

As it is seen in Table 2, the perception level of Turkish EFL teachers is quite high varying between X= 3.51 and X= 4.61.

To reveal whether there is any significant difference among the perceptions of EFL teachers on creativity in terms of gender, age, teaching experience, and undergraduate area of study, Levene's Test was used to check the equality of variance. It was revealed that the homogeneity values was calculated in terms of gender F=.047, age F=.919, teaching experience F=.029 and undergraduate area of study F=.321 (p>.05). Therefore, a One Way ANOVA parametric test was conducted for the variables of age and undergraduate area of study; a Kruskal Wallis nonparametric test was applied to the gender and teaching experience.

Table 3. A One Way ANOVA Test for Turkish EFL Teachers' Perceptions on Creativity in terms of Age and Undergraduate Area of Study

		Sum of Squares	df	Mean Square	F	sig
Age	Between groups	.378	3	.126	.441	.724
	Within groups	55.984	196	.286		
	Total	56.362	199			
Undergraduate area of study	Between groups	.913	5	.183	.639	.670
	Within groups	55.450	194	.286		
	Total	56.362	199			

As illustrated in Table 3, a One Way ANOVA test revealed no significant difference in the perceptions of EFL teachers on creativity regarding both age p=.724 and undergraduate area of study p=.670 (p>.05). Thus, regarding the results it seems likely that age and undergraduate area of study do not affect teachers' perceptions of creativity.

Table 4. A One Way ANOVA Test for Turkish EFL Teachers' Perceptions on Creativity in terms of Gender and Teaching Experience

Gender	n	Mean Rank	$\chi 2$	df	p
Male	64	98.66	.096	1	.757
Female	136	101.37			
Teaching Experience	**n**	**Mean Rank**	**$\chi 2$**	**df**	**p**
1st year	19	121.53	3.284	3	.350
1-4	66	95.08			
5-10	69	102.05			
10-above	46	97.26			
Total	200				

A Kruskal-Wallis nonparametric test was applied to investigate whether there was a meaningful difference between the perceptions of teachers and their gender and teaching experience. As seen from Table 4, no significant difference was detected between the perceptions of EFL teachers on creativity and their gender p=.757 and teaching experience p=.350 (p>.05). Thus, according to these results, gender and teaching experience appears to have no effect on teachers' perceptions of creativity as well.

4 | Discussion

The objective of the first research question of this study was to identify the perceptions of Turkish EFL teachers on creativity. When the data were analysed, remarkable findings emerged about the Turkish EFL teachers' perceptions on creativity.

As emphasized by the several researchers in the literature (Beghetto, 2007; Read, 2015; Sternberg & Lubart, 1991; Torrance, 1977), encouraging students for questioning or allowing them to ask questions is an essential factor for creative thinking. Beghetto (2007) underlined the importance of raising new questions by placing it in his creativity definition. Read (2015), as an EFL researcher, also mentioned it among the seven pillars for creativity development. As pointed out by Sternberg and Williams (1996), integrating questioning into the teaching process by teaching students what kind of questions to ask and how to ask as well as how to answer is a step for creativity development. Hence, students toned to decrease their dependency on rote learning and learn asking questions of high quality, intriguing and challenging. In the current study, it was found that most of the EFL teachers also emphasize encouraging students to ask questions and listening carefully to their questions. For example, more than half of the teachers stated they always listen to students when they ask questions, which is in line with the finding of Al-Nouh et al. (2014) who explored primary school EFL teachers' attitudes on creativity and their perceptions of classroom practice using a survey, making a focus group interview and analysing exam papers. Most of them also stated that they usually encourage students to question and think independently, allow students to ask about things of interest, and prepare questions for students to answer on their own.

As highlighted by Yagcioglu (2017), motivation has a pivotal role in the enhancement of creativity. Therefore, to increase students' enthusiasm and make them more creative, teachers should somehow motivate their students. This can be achieved through praising or rewarding. Fasko (2001), Sternberg and Lubart (1991), and Torrance (1977) are among the researchers who supported the idea of rewarding for a creative achievement or idea. Torrance's (1977) ideas for appropriate rewarding are, particularly, significant in that they stress and show the means of rewarding without giving students a physical or tangible object. In this respect, the results of the current study indicated that nearly half of the participants always praise pupils who provide unexpected answers. Similarly, many of them reported that they always reward originality and creativity in their classrooms. This finding is again in line with the findings of Al-Nouh et al. (2014).

The current study found that less than half of the EFL teachers indicated that they always develop students' creative thinking skills. The rest of them stated that they develop it either usually or sometimes. This echoes the previous finding of Al-Nouh et al.'s (2014) study in which many teachers said that they sometimes develop creativity in the classroom. Moreover, nearly thirty percent of the teachers reported that they always remind and encourage students to be creative. Teachers' responses to some of the other items in the questionnaire had similar results confirming that a small number of them always encourage and develop students' creativity at school. For instance, only thirteenth percent of the EFL teachers reported that they always use a discovery or problem-solving approach in teaching. What is more, the number of teachers who always use authentic situations to encourage language use in the classroom is less than twenty percent. Using authentic materials in EFL classrooms are recommended by Clarke (2005), Cremin (2009), Formosa and Zammit (2016), Tin (2013), Xerri and Vassallo (2016a) to enhance students' creative thinking and language skills better.

It was also found that the majority of the participants do not always use a range of communication technologies. So, they do not benefit from technology to encourage creative thinking. On the contrary, the

teachers in Al-Nouh et al.'s (2014) and Fitriah's (2017) studies reported that they utilize technology to foster creativity. Besides, Sternberg and Williams (1996) suggested that providing students opportunities to define and redefine problems can promote creativity by making them choose their assignments' topics. They also offer teachers to encourage creative collaboration by making students work together in the classroom. The findings of the present study, however, differ from the strategies suggested. Since the EFL teachers who always allow students to choose their own projects and to learn in groups were nearly thirty percent. These data should be interpreted with caution because it may reflect the common paradox about creativity in education. On the one hand, teachers value creativity and support the idea that it should be developed. On the other hand, they do not always try to encourage or develop it at schools in actual practice. This is what Makel (2009, cited in Rinkevich 2011, p. 220) calls "creativity gap". Since the number of teachers who always try to improve and encourage creativity in EFL classrooms is less than expected.

Another important finding is that less than twenty percent of the participants reported that they always take a boring exercise and turn it into a game. As this item is related to the creativity of teachers, a possible explanation for this can be that teachers may lack creative thinking skill as stated by Constantinides (2015). They may not be flexible while thinking properly in situations that they do not predict or expect and also they may not change something appropriately to make it more suitable for their students in such an absence of creativity (Constantinides, 2015). As Xerri and Vassallo (2016b) pointed out, being creative is having the courage to do something unusually and to push the limits. Clarke (2005) also associated creativity with adaptation and noted that it is "coming up with imaginative ways of doing what might be considered otherwise mundane tasks" (p. 2).

With the second research question, it was aimed to determine whether there is any significant difference in the perceptions of EFL teachers on creativity in terms of gender, age, teaching experience and undergraduate area of study. It was found that teachers' gender, age, teaching experience and undergraduate area of study do not have an impact on their perceptions of creativity. The finding concerning the teaching experience is in line with the Al-Nouh et al.'s (2014) study in which they also could not find any significant differences in teachers' perceptions according to experience. On the other hand, in the same study, it was detected that age of the teachers has a meaningful impact on their perceptions, which is not in parallel with the present study. In addition, Fitriah's (2017) findings are not in agreement with the current study's finding regarding teachers' gender and age because Fitriah (2017) discovered significant differences in EFL teachers' perceptions based on these two variables. He found out that their perceptions about creative teaching practices were different in females and males. Additionally, younger and older teachers differ in their perceptions.

5 | CONCLUSION

Creativity should become one of the primary focuses of education since developing students' creativity in all educational contexts certainly makes significant contributions to their lives both for now and for the future. Creative thinking should be stimulated diligently within the field of EFL and EFL teachers also should be well aware of their leading role for creativity in their classes. "Change is occurring so rapidly that we cannot survive if we insist on thinking and living in static terms. We must accept the creative challenge" (Torrance, 1965, p.679). With the current study which explored the perceptions of EFL teachers on creativity, this creative challenge was accepted in a sense, and it is hoped to contribute to the literature and attract teachers' attention to that essential 21st-century skill.

Returning to the first research question, it is understood that EFL teachers in the study usually or sometimes provide novel and efficient opportunities through which students can display and improve their creative thinking skills. Most of the teachers are not able to always allocate time for the development of creativity. Indeed, they have high perceptions of creativity in general. Further, the second research question was designed to determine the effect of participants' gender, age, teaching experience and undergraduate

area of study on their perceptions. This study has shown that participants' gender, age, teaching experience and undergraduate area of study do not influence their perceptions on creativity.

There are some notable issues for future research on creativity in the EFL context. First, further work is required to consist of a larger number of participants, which would help to generalize the results. Second, the current study was conducted in Elazığ, which is a small city in the east of Turkey. What is now needed is a cross-national study involving different cities in Turkey. Third, as the current research was conducted with the secondary school EFL teachers, further research can be done with the pre-school, primary or high school EFL teachers to understand different perceptions on creativity at different levels. Lastly, classroom observations are recommended to monitor EFL teachers' perceptions of creativity and their creative teaching practices.

As regards to policy and practice, the findings of this study provide significant suggestions as well. First, creativity should be integrated into teacher education programmes in ELT departments to make teacher candidates more concerned with creative thinking and more knowledgeable about creative pedagogy before they start their teaching careers. Additionally, as many teachers graduate from other departments related to English and work as an English language teacher at schools, such programmes like English Language and Literature, Linguistics, and American Culture and Literature should also include courses about creativity. Lastly, training or workshops about creativity and creative teaching should be held for in-service teachers.

Statements of publication ethics

Throughout this study, research and publication ethics were observed. In all steps of the research, researchers followed the ethical principles. It was evaluated at the meeting (no: 23/2019) by the Ethics Committee of Social Sciences and Humanities of Fırat University in 11.04.2019 and found ethically acceptable.

Researchers' contribution rate

The first author involved in every stage of the research as this article is based on her master's thesis. As the supervisor of the first author, the second author made contributions to each stage as well.

Conflict of interest

This study does not have any conflict of interest.

Acknowledgement

This article is based on the master's thesis of the first author.

References

Akçay, A. (2019). *An analysis of ELT coursebooks in terms of 21st century skills: Communication, collaboration, critical thinking, creativity*. Master's Dissertation, Akdeniz University, Antalya, Turkey.

Aljughaiman, A., & Reynolds, E. (2005). Teachers' conceptions of creativity and creative students. *Journal of Creative Behavior*, 39(1), 17-34.

Al-Nouh, N. A., Abdul-Kareem, M. M., & Taqi, H. A. (2014). Primary school EFL teachers' attitudes towards creativity and their perceptions of practice. *English Language Teaching*, 7(9), 74-90.

Al-Qahtani, A. A. (2016). Do Saudi EFL teachers promote creativity in their classrooms? *English Language Teaching*, *9*(4), 11-23.

Baghaei, S., & Riasati, M. J. (2015). An investigation into the relationship between teachers' creativity and students' academic achievement: A case study of Iran EFL context. *Journal of Studies in Learning and Teaching English*, 4(2), 21-32.

Bedir, H. (2019). Pre-service ELT teachers' beliefs and perceptions on 21st century learning and innovation skills (4Cs). *Journal of Language and Linguistic Studies*, 15(1), 231-246.

Beghetto, R. A. (2007). Does creativity have a place in classroom discussions? Teachers' response preferences. *Thinking Skills and Creativity*, 2(1), 1-9.

Beghetto, R. A. (2010). Creativity in the classroom, In J. Kaufman, & R. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 447-463). USA: Cambridge.

Bereczki, E. O., & Kárpáti, A. (2018). Teachers' beliefs about creativity and its nurture: A systematic review of the recent research literature. *Educational Research Review*, 23, 25-56.

Birkmaier, E. M. (1971). The meaning of creativity in foreign language teaching. *The Modern Language Journal*, 55(6), 343-353.

Buyukozturk, **Ş**. (2016). *Sosyal bilimler için veri analizi el kitabı*. Ankara: Pegem Akademi.

Cimermanova, I. (2015). Creativity in EFL teacher training and its transfer to language teaching. In *Proceedings of the 7th World Conference on Educational Sciences (WCES)* (pp. 1969-1975), Athens, Greece.

Clarke, M. A. (2005). Creativity in modern foreign languages teaching and learning. *Subject Perspectives on Creativity, Higher Education Academy*, 1-8.

Constantinides, M. (2015). Creating creative teachers. In A. Maley, & N. Peachey (Eds.), *Creativity in the English language classroom* (pp. 115-122). London: British Council.

Copley, A. J. (2001). *Creativity in education & learning: A guide for teacher and educators*. London: Koran Page.

Craft, A. (2005). *Creativity in schools: Tensions and dilemmas*. UK: Routledge.

Cremin, T. (2009). *Teaching English creatively*. London: Routledge.

Cubukcu, F. (2010). Creative thinking and poetry in ELT classes. In *Proceedings of International Conference on New Trends in Education and Their Implications* (pp. 786-791), Antalya,Turkey.

Fasko, D. (2001). Education and creativity. *Creativity Research Journal*, 13(3-4), 317-327.

Fisher, R. (2006). Expanding minds: Developing creative thinking in young learners. *The IATEFL Young Learners SIG Journal*, 5-9.

Fitriah, F. (2017). *Teachers' beliefs about creativity in EFL classrooms in Indonesian higher education*. Doctorate Dissertation, University of Canberra, Canberra.

Formosa, M., & Zammit, S. (2016). Colouring outside the lines. In D. Xerri, & O. Vassallo (Eds.), *Creativity in English language teaching* (pp. 25-33). Malta: ELT Council.

Gunawardena, M., Sooriyampola, M., & Walisundara, N. (2017). Scaffolding thinking in ESL lessons: Negotiating challenges. *Thinking Skills and Creativity*, 24, 279-285.

Hondzel, C., & Hansen, R. (2015). Associating creativity, context, and experiential learning. *Education Inquiry*, 6(2), 177-190.

Huang, X., Lee, J., & Yang, X. (2019). What really counts? Investigating the effects of creative role identity and self-efficacy on teachers' attitudes towards the implementation of teaching for creativity. *Teaching and Teacher Education*, 84, 57-65.

Iakovos, T. (2011). Critical and creative thinking in the English language classroom. *International Journal of Humanities and Social Science*, 1(8), 82-86.

Jones, R. H., & Richards, J. C. (2015). *Creativity in language teaching: Perspectives from research and practice*. New York: Routledge.

Kaufman, J. C., & Sternberg, R. J. (2007). Creativity. *change: The Magazine of Higher Learning*, 39(4), 55-60.

Kurt, G., & Önalan, O. (2018). Turkish pre-service EFL teachers' perceptions of creativity. *International Online Journal of Education and Teaching (IOJET)*, 5(3), 636-647.

Li, L. (Ed.). (2016a). Thinking skills and creativity in second language education: Where are we now? *Thinking Skills and Creativity*, 22, 267-272.

Li, L. (2016b). Integrating thinking skills in foreign language learning: What can we learn from teachers' perspectives? *Thinking Skills and Creativity*, 22, 273-288.

Lin, Y. (2011). Fostering creativity through education-A conceptual framework of creative pedagogy. *Creative Education*, 2(3), 149-155.

Makel, M. (2009). Help us creativity researchers, you're our only hope. *Psychology of Aesthetics, Creativity, and the Arts*, 3(1), 38-42.

Maley, A. (2013). Creative approaches to writing materials. In B. Tomlinson (Ed.), *Developing materials for language teaching* (pp. 167-189). UK: Bloomsbury.

Maley, A., & Bolitho, R. (2015). Creativity. *ELT Journal*, *69*(4), 434-436

Maley, A., & Peachey, N. (Eds.). (2015). *Creativity in the English language classroom*. London: British Council.

NACCCE. (1999). *All our futures: Creativity, culture and education*. London: Department for Education and Employment.

Özbek, A. (2006). *The effect of a creative thinking programme on Efl students' attitudes towards their own creativity in writing*. Master's Dissertation, Gazi University,Ankara, Turkey.

Özcan, D. (2010). Contributions of English teachers' behaviours on students' creative thinking abilities. . In *Proceedings of the World Conference on Educational Sciences (WCES)* (pp. 5850-5854).

Read, C. (2015). Seven pillars of creativity in primary ELT. In A. Maley, & N. Peachey (Eds.), *Creativity in the English language classroom* (pp. 29-36). London: British Council.

Richards, R. (2007a). Introduction. In R. Richards (Ed.), *Everyday creativity and new views of human nature: Psychological, social, and spiritual perspectives* (pp. 3-23). Washington: American Psychological Association.

Richards, R. (2007b). Twelve potential benefits of living more creatively. In R. Richards (Ed.), *Everyday creativity and new views of human nature: Psychological, social, and spiritual perspectives* (pp. 289-319). Washington: American Psychological Association.

Richards, R. (2010). Everyday creativity: Process and way of life- four key issues. In J. Kaufman, & R. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 189-216). USA: Cambridge.

Richards, J. (2013). Creativity in language teaching. *Iranian Journal of Language Teaching Research*, 1(3), 19-43.

Rinkevich, J. L. (2011). Creative teaching: Why it matters and where to begin. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 84(5), 219-223.

Runco, M. A. (2004). Creativity. *Annual Review of Psychology*, 55, 657-687.

Schacter, J., Thum, Y. M., & Zifkin, D. (2006). How much does creative teaching enhance elementary school students' achievement? *Journal of Creative Behavior*, 40(1), 47-72.

Smith, J. K., & Smith, L. F. (2010). Educational creativity. In J. Kaufman, & R. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 250-265). USA: Cambridge.

Sternberg, R. J., & Lubart, T. I. (1991). An investment theory of creativity and its development. *Human Development*, 34, 1-31.

Sternberg, R. J., & Lubart, T. I. (1999). The concept of creativity: Prospects and paradigms. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 1-14). USA: Cambridge University Press.

Sternberg, R. J., & Williams, W. M. (1996). *How to develop student creativity*. Alexandria, VA: Association for Supervision and Curriculum Development.

Şenel, E. (2018). The integration of creative writing into academic writing skills in EFL classes. *International Journal of Languages' Education and Teaching*, 6(2), 115-120.

Tin, T. B. (2013). Towards creativity in ELT: the need to say something new. *ELT Journal*, 67(4), 385-397.

Torrance, E. P. (1965). Views of creativity and factors affecting its growth. *Daedalus*, 94(3), 663-681.

Torrance, E. P. (1977). *Creativity in the classroom: What research says to the teacher*. Washington, D.C.: National Education Association.

Tümen Akyıldız, S., & Çelik, V. (2020). Thinking outside the box: Turkish EFL teachers' perceptions of creativity. *Thinking Skills and Creativity*, 36, 1-14.

UCLES. (2018, March). *Developing the Cambridge learner attributes*. Retrieved from Cambridge Assessment International Education: https://www.cambridgeinternational.org/support-and-training-for-schools/teaching-cambridge-at-your-school/cambridge-learner-attributes/

Vygotsky, L. S. (1967/2004). Imagination and creativity in childhood. *Journal of Russian and East European Psychology*, 42(1), 7-97.

Xerri, D., & Vassallo, O. (Eds.). (2016a). *Creativity in English language teaching*. Malta: ELT Council.

Xerri, D., & Vassallo, O. (2016b). Creativity in ELT: An introduction. In D. Xerri, & O. Vassallo (Eds.), *Creativity in English language teaching* (pp. 1-7). Malta: ELT Council.

Yagcioglu, O. (2017). Increasing the power of humor and creativity in ELT classes. *International Journal of English Language Teaching*, 5(9), 83-90.

BUEFAD | 2021, Volume 10, Issue 3, 526-540
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.823743

Are Special Education Teachers Ready for Distance Education? Experiences and Needs During the Covid-19 Outbreak

Sinan HOPCAN[a*], Elif POLAT-HOPCAN[b], & Mehmet Emin ÖZTÜRK[c]

a* Res. Asst., İstanbul University, (0000-0001-8911-3463) *sinan.hopcan@gmail.com

b* Res. Asst., İstanbul University, (0000-0002-6086-9002) *polatelif88@gmail.com

C* Assoc. Prof. Dr., Erciyes University, (0000-0002-8868-5520) *memozturk@erciyes.edu.tr

Research Article | Received: 12.11.2020 | Revised: 20.05.2021 | Accepted: 25.06.2021

Abstract

This study was conducted to determine the experiences and needs of special education teachers regarding distance education during the COVID-19 pandemic. Screening model and convenient sampling technique were used. Participants were 191 active special education teachers from İzmir, Turkey in the academic year of 2019-2020. Special Education Teacher Needs Analysis Form developed by the researchers was used as data collection tool. Orange and SPSS programs were used for analyzing. Results indicate that most of the teachers stated they are technology literate and few had been trained in distance education. Most of them have developed at least one of the homework, IEP (individualized education plan), computer/web supported materials, educational mobile applications, materials, educational video applications. Only a quarter of teachers taught live lessons. They mostly provide feedback and interact partially, individualize lessons partially, cooperate with their colleagues partially in distance education. They stated that if there was an e-mentor to support them in this environment, they would feel ready. Moreover, the most encountered difficulty is their students' use of technology. These findings indicate that teachers should customize for individual students' needs, provide frequent feedback, keep the teacher family communication strong and receive in-service training on distance education.

Keywords: Covid-19, special education teachers, distance education, educational technology in special education

Özel Eğitim Öğretmenleri Uzaktan Eğitime Hazır mı? Covıd-19 Sürecinde Öğretmenlerin Deneyimleri ve İhtiyaçları

Öz

Bu araştırmanın amacı özel eğitim öğretmenlerinin pandemi sürecindeki uzaktan eğitimle ilgili deneyimleri ve ihtiyaçlarının belirlenmesidir. Çalışmada betimsel araştırma yöntemlerinden tarama modeli ve elverişli örnekleme tekniği kullanılmıştır. Katılımcılar, 2019-2020 eğitim ve öğretim yılında görev yapan, İzmir ilinden 191 özel eğitim öğretmenidir. Veri toplama aracı olarak araştırmacılar tarafından geliştirilen Özel Eğitim Öğretmeni İhtiyaç Analizi Formu kullanılmıştır. Verilerin analizinde Orange ve SPSS programları kullanılmıştır. Bulgular yüzde ve frekans şeklinde tablolaştırılarak sunulmuştur. Çalışmanın sonuçlarına göre öğretmenlerin hemen hepsi teknoloji okuryazarı olduklarını belirtmişlerdir. Öğretmenlerin neredeyse hiçbiri uzaktan eğitim konusunda eğitim almamıştır. Öğretmenlerin çoğu ödevler, BEP (bireyselleştirilmiş eğitim planı), bilgisayar/web destekli materyaller, eğitsel mobil uygulamalar, basılı materyaller, eğitsel video uygulamalarından en az birini geliştirmiştir. Öğretmenlerin sadece dörtte biri canlı ders yapmıştır. Öğretmenlerin çevrimiçi eğitimde çoğunlukla kısmen dönüt verebildiği ve kısmen etkileşim sağlayabildiği, kısmen bireyselleştirme sağladığı, meslektaşlarıyla kısmen işbirliği yaptığı görülmüştür. Öğretmenler bu ortamda kendilerine destek olacak e-mentor olsa hazır hissedeceklerini belirtmişlerdir. Ayrıca en fazla karşılaşılan güçlük öğrencilerin teknoloji kullanımıdır. Bulgular, öğretmenlerin öğrencilerin bireysel ihtiyaçlarını dikkate alarak öğretim yapması, sık geri bildirim vermesi, aile ile iletişimi güçlü tutması ve uzaktan eğitim konusunda öğretmenlerin hizmet içi eğitim alması gerektiğini göstermektedir.

Anahtar kelimeler: Covid-19, özel eğitim öğretmenleri, uzaktan eğitim, özel eğitimde eğitim teknolojisi

To cite this article in APA Style:

Hopcan, S., Polat-Hopcan E., & Öztürk, M. E. (2021). Are special education teachers ready for distance education? Experiences and needs during the covid-19 outbreak. *Bartın University Journal of Faculty of Education, 10*(3), 526-540. https://doi.org/10.1016/buefad. 823743

1 | Introduction

The Coronavirus pandemic has taken over the world. Besides the damage it does to health, it has had a significant impact on our lives, particularly in the field of education. Since the coronavirus can spread rapidly and easily through social contact, many institutions have suspended work to slow the spread of the virus. Schools, universities, training courses and special education institutions have all taken such measures. A distance education system has been put into place to minimize the disruption in education. A change in education is extremely critical, based on the irrefutable significance of education in the lives of human beings. In this process, special education, in particular, is an issue that needs to be addressed more sensitively by both educators and families. With the introduction of the virus into our lives, it has become imperative to move to distance education (Sun et al., 2020). This new system has caused a great deal of debate, appears to be the only solution to continue education contact constraints during the pandemic.

The Effect of the Pandemic on Education

Because of coronavirus, societies around the world have been asked to comply with a range of measures to prevent and protect against the spread of a disease with such a high level of infection. The most effective measure against the spread of the virus is social distancing. This means keeping a distance with other people around us and avoiding contact with them as much as possible. For this reason, everyone should keep at least a distance of 2 meters from others. Since the Coronavirus is quickly transmitted, countries have closed their borders, canceled flights, and imposed curfews and restrictions in order to protect its spread. Moreover, cafés, restaurants, hair salons, shops, schools and businesses have been shut down.

It is clear that education has also been affected by coronavirus. The most challenging effect of the pandemic on education is school closures (Van Lancker & Parolin, 2020). According to Van Lancker & Parolin (2020), school closures have negative effects on children especially in low-income households such as increasing food insecurity and opening gap in academic achievement between low-income and high-income households. Due to the Coronavirus pandemic, more than 1.5 billion students have been suspended from formal education in all schools in 143 countries, including Turkey (UNESCO, 2020). In Turkey approximately 26 million students (including K-12 and higher education) are directly affected by the pandemic process due to the closure of schools. During this school closure period of time, it is stated that there are students who cannot be reached by distance education and many students are negatively affected (Pınar & Dönel Akgül, 2020).

School closures can be a short-term solution for preventing spread of the pandemic. However, when school closures take longer, it affects students academically and socially (Akat & Karatas, 2020). Due to the problems related to online education, student motivation decreases dramatically (Hartnett, 2016). Hence, this lack of motivation causes online learners being less successful compared to face-to-face learners (Baber, 2020).

Distance Education

Distance education is a type of education conducted via the technology where instructors and students are located in different locations. It is divided into two categories: online education and offline education. In online education, lessons are taught live on the internet; the instructor and the student attend the course simultaneously. In offline training, however, lessons are taught only by using video recordings. Students can watch lessons at their convenience, but there is no live instructor that meets with them in person.

The first distance education course offered were stenography courses offered by the Boston Gazette through a letter on March 20, 1728 (Holmberg, 1987) In 1890, an out-of-campus training program was established at the University of Queensland in Australia. Distance education has made great progress, particularly since World War II. Then, in the 1960s, distance education was carried out on television, thus

information was transported to students in various geographical regions. Subsequently, thanks to computers and the Internet, distance education has grown to be significant. Today distance education is used widely also due to technological advancements.

There are advantages and limitations of distance education that have begun to take place during the pandemic. Distance education has advantages. Students have a chance to attend classes whenever and wherever they want. It is also a great advantage that students who are unable to attend a scheduled session of a course. Instead, they can login and follow the course afterwards. In addition to that, it provides a great advantage in terms of accessibility and individualization for especially students with special needs.

In contrast, one of the primary limitations is that students do not have the opportunity to communicate face-to-face. This situation can be a disadvantage for students (Tiene, 2000). Students improve their social skills by communicating face-to-face with their peers, instructors and other people. Since face-to-face communication is not possible in distance education, students move away from social life, and this can harm students' mental and psychological health (Kmietowicz, 2020; Xiao, 2020). Face to face learning is important for both learning and personal development because improving social skills helps students succeed in their academic lives (Cartledge & Milburn, 1978). In face-to-face education, students also gain an understanding of how to communicate effectively and behave within the community. In traditional face-to-face education, students interact with others in many different places such as classrooms, dormitories, meetings, conferences, clubs, and activities. They meet and observe new people in all these different settings. In distance education, however, they do not recognize the environment because there is no face-to-face interaction.

At school, students briefly move away from the complexity of lessons by holding discussions and spending time with their peers between classes. Additionally, they can exchange ideas about lessons with their peers. It becomes easier for students to understand topics because they learn by attending classes with their teachers in face-to-face education in addition to being in circles of friends. If they have any questions or problems, they can communicate instantly. This, however, is not feasible in distance education. Responses typically take longer since contact is done by email. In addition, some scholars argue distance education produces unqualified graduates because it cannot provide one-to-one communication (Simpson, 2013).

Moreover, distance education, especially in applied science departments, is not feasible. In order to teach applied courses, laboratory environments, various materials, and certain tools are needed. It is also not possible to learn through the Internet courses that necessitate dexterity. For instance, for departments such as architecture, medicine, hairdressing, sculpting, painting and cooking, distance education cannot offer the appropriate environment. Therefore, distance education may not be the most effective way to teach or learn certain courses and limits learning (Toquero, 2020).

Furthermore, the classroom environment allows students to conduct teamwork. Interacting in person prepares students for business. This skill is developed in face-to-face courses, communication is a necessary skill in many fields. Technology has advanced, but face-to-face communication is still sine qua non. In fact, despite the advancing technology, the number of business trips is increasing day by day for this reason. This is because the most effective conversations are achieved through face-to-face communication (Kiesler, 2002). Schools teach students how to work in cooperation with their future colleagues, giving them knowledge on how to work together. This cannot be achieved to the same in distance education because students often work independently (Slavin, 1996). In addition, distance education gives students easiness and flexibility. While there are positive aspects to this situation, it takes them away from discipline. In the school building, a mandatory routine occurs which must be followed by students. For instance, students arrive in classrooms on a set class schedule and follow exam schedule as set by the school. In this way, they learn how to plan to become punctual and organized throughout their academic lives. Moreover, being accountable for what they do makes them stronger individuals (Fayden, 2005). These routines and rules are essential because

skills learned at a young age are typically retained in adulthood. However, distance education is more flexible, so students don't adhere to strict schedules and get used to being comfortable.

Another limitation is that there are families who do not have Internet access or equipment in their homes such as televisions, computers, telephones, and so on. Connection to the Internet is challenging for students living in rural areas, such as villages and towns. Since cellular access in villages is not as reliable as in cities, it is not easy to provide coverage (Jurriens, 2017). In addition, there are very few K-12 educational institutions in developed and developing countries that offer distance education programs. Although we are in the age of technology, there are disruptions and malfunctions in the courses due to lack of infrastructure and Internet problems. It is also possible the stress of going through a difficult time period and uncertainties about the future will diminish students' enthusiasm for lessons, as our adverse thoughts about coronavirus can affect our behavior and reactions (Metin & Çetinkaya, 2020).

Despite the pros and cons, distance education has been the only way to prevent students' educational lives from being interrupted. Consequently, whether distance education in special education is an issue that is debated, both face-to-face education and distance education have advantages in different ways. In other words, it is obvious that in distance education, students with special needs may face some limitation in some ways. For this reason, distance education environments should be tailored in terms of students' needs. During this difficult time, the problems in the field of education should be minimized, and care should be taken to survive as few losses as possible.

The definitions should be emphasized in order to reduce the negative perception that may occur towards distance education and the negative experiences of learners and teachers who experience distance education for the first time. Defining the practices made during the Covid-19 crisis as emergency remote education is important in order not to increase the current negative opinions about distance education (Bozkurt, 2020). Bozkurt et al. (2020) mention the key four distinctions between the concepts of emergency remote education and distance education. (1) ERE is a must, whereas distance education is an option. (2) ERE tries to produce temporary solutions for the current need, whereas distance education tries to produce ongoing and permanent solutions within the framework of lifelong learning. (3) Although ERE is an effort to keep education alive with the facilities available in times of crisis, distance education is an effort to make education sustainable with planned and systematic activities in line with the specific theoretical and practical knowledge of the field. (4) Although ERE and distance education is expressed with the same word in Turkish, the concept of "remote" emphasizes physical distance, while the concept of "distance" emphasizes physical, interactional and psychological distance.

The Impact of the Pandemic and Distance Education on Special Education

In all aspects of life, the coronavirus pandemic has had a greater impact on people with special as compared to nondisabled people (Pineda & Corburn, 2020). This impact has been observed in the field of education, due to the implementation of distance education for students with special needs. Distance education environments must be set up to meet all students' needs, leaving no students with or without special needs behind. It is clear that people with special needs experience problems when distance education replaces or becomes superior to face-to-face education (Burdette et al., 2013). This is because students with special needs differ from their peers in terms of mental, emotional, communicational, social and physical characteristics (Lee et al., 2003). In distance education, it is also vital that students are supported socially and emotionally, not just academic needs. Therefore, more attention should be given to these students, to ensure that students reach their potential and to make education more accessible. In this context, it is necessary to interact and communicate with learners.

Planning for students with special needs have faced a variety of problems in distance education is more complex for students with special needs. Students with special needs need more help and guidance in

distance education (Rose & Blomeyer, 2007). Moreover, more time and resources are needed for students with special needs to actively engage in learning. This includes equipment, access to the Internet and specially designed materials and individualized support. But this makes schooling more expensive and challenging for students and their families (Rice & Carter, 2015). Additionally, they lose the opportunities to communicate with other peers in an overarching environment that is extremely important for students' social development.

Distance education were implemented during the pandemic in Turkey. The Ministry of National Education decided to carry out the courses within the scope of distance education through the Educational Informatics Network (EIN, EBA in Turkish), an online social educational platform run by the Innovation and Educational Technologies General Directorate and the national television channel, Turkish Radio and Television Corporation (TRT).

The Educational Informatics Network, which has been in operation since the 2011–2012 academic year and is the gateway to the future of education. This platform offers a variety of learning materials, including videos, documents, e-books, tests, activities, from the preschool to high school. EIN offers a variety of course and activity videos for students with special needs (Özer, 2020). For example, there are educational materials prepared in sign language for students with hearing impairments and over 400 educational activities for students with mild intellectual impairments or autism spectrum disorder.

Finally, another barrier is teachers' inability to adequately use information and communication technologies. One of the key issues is that teachers are not equipped to teach distance education and are not knowledgeable on how to engage students in courses, especially those with special needs (Hamilton et al., 2020).

Overcoming Problems Related to Pandemic in Special Education

In order to overcome these challenges, educators and families should collaborate to assess students' conditions individually and make the appropriate adjustments for distance education. This is because teacher–family collaboration positively influences all students, including students with special needs, both academically and socially (Desforges & Abouchaar, 2003; Evans, 2013; Henderson & Mapp 2002; Jeynes, 2007; Uludag, 2008). Additionally, the joint undertaking between the family of a student with special needs and the school is even more essential during special education, because a supportive family structure provides a positive contribution to the education and development of students with special needs (Öztürk, 2017). The importance of family–school collaboration is understood better particularly during this pandemic, and it is imperative to develop methods to improve or facilitate such collaboration (Hamilton et al., 2020).

Moreover, one of the most common mistakes made during the pandemic was to imitate face-to-face lessons in online lessons. Two hours of face-to-face lesson are not equivalent to two hours of online lessons. Instead, learners can be offered a 20-minute online course and asynchronous content supporting this course. A balanced instructional design should be made with both synchronous and asynchronous content presentations (Bozkurt, 2020). Curriculum and students' expectations of courses should be updated, as distance education implemented during the pandemic has been unlike any classroom-based educational environment. For example, homework can be simplified, students can dictate instead of writing, or audio resources can be given for reading assignments. Therefore, if necessary, IEPs of students with special needs should be updated to reflect the changes, or new IEPs should be created for the students taking into consideration their personal needs during this period.

Another practice that may be useful to people with special needs during the pandemic is the Universal Design for Learning (UDL). UDL is defined as an educational framework that facilitates the creation of a variety of learning environments for people of different backgrounds, learning styles, skills and barriers in order for them to acquire adequate training. The implementation of UDL weakens barriers and provides opportunities for all students to access the curriculum and engage and advance in education (Rose & Meyer,

2006). UDL aims to help teachers reach a wide range of students by concentrating on how students learn information and display their knowledge.

Research shows that students with special needs learn better through a project-based learning approach (Olnes, 2008). Project-based learning also improves self-esteem and promotes positive participation. As schools have migrated to distance education during the pandemic, teachers have to have support and in-service training on how to teach special education courses in distance education and online environments.

There is no research on the experiences and needs of special education teachers during the pandemic. Therefore, this study addresses this gap. This study was conducted to determine the experiences and needs of special education teachers related to distance education during the pandemic. In this context, answers to the following research questions were sought:

1. What are special education teachers' experiences in distance education during the COVID-19 pandemic?

2. What are special education teachers' needs in distance education during the COVID-19 pandemic?

2 | METHOD

This study aims to explore the experiences and needs of special education teachers in distance education. Therefore, this research has screening model. In addition, since the study aims to describe past or present facts as they are, it was patterned according to the descriptive model (Karasar, 2005).

PARTICIPANTS

Convenience sampling technique was used to recruit participants for the study. The participants consisted of 191 volunteer special education teachers who taught at elementary, secondary and high school level in İzmir province. Demographic information of the teachers who participated in the study are shown in Table 1. 65% of the participants were female, and 35% were male. More than half of the teachers had over 11 years of working experience. Those with 21 years or more of working experience constituted the largest proportion with 27%. Almost half of participants (43%) taught at the elementary school level, while the rest taught at the levels of secondary school (28%) and high school (29%). The study participants are K-12 special education teachers from districts of İzmir province. The largest number of participants were from the Bornova district (83%).

Table 1. Demographic Information (n = 191)

	n	%		n	%
Gender			Grade level taught		
Female	125	65	Elementary School	82	43
Male	66	35	Secondary School	53	28
Working Experience in Years			High School	56	29
1–5 years	30	16	District of duty		
6–10 years	26	14	Bornova	158	83
11–15 years	46	24	Buca	4	2
16–20 years	36	19	Güzelbahçe	8	4
21 years or more	53	27	Karabağlar	17	9
			Menemen	4	2

DATA COLLECTION TOOL

Special Education Teacher Needs Analysis Form: The researchers developed the Special Education Teacher Needs Analysis Form, to use as a data collection instrument. Researchers have prepared an item pool by reviewing available literature and interviewing with experts and teachers. This item pool is 50 questions. These questions were reduced to 42 questions by eliminating duplicate and ambiguous questions in line with expert opinions (educational technology and special education).

The final form has a total of 42 questions made up of multiple-choice, double-choice, and open-ended questions. The first 6 questions are demographic questions. There are 36 questions about teachers' technological competence, technological tools they had, their distance education experiences during the pandemic and their needs for distance education. Two special education specialists and a special education teacher were interviewed for the clarity, scope and face validity of the form.

Data Collection and Analysis

After the form was modified according to the experts' opinions, researchers conducted a pilot study with 30 K-12 special education teachers to test the functionality of the questions. The questions on the analysis form were functional and no problems were reported so researchers proceeded with data collection. The intent of the study was explained to the special education teachers participating in the study. The researchers explained their participation was on a voluntary basis. Consent forms were provided for parents. It took the teachers about 30 minutes to complete the form. The data were entered in an Excel file and transferred to the Orange software program through a file object. The Orange software was used to analyze the data (Figure 1). The column to be analyzed was selected by using the Corpus object. Words and word groups were parsed by using the Preprocess text object. This object separates words and word groups that have commas between them. Words and word groups were then counted by using the Word cloud object. This object counts each word and word groups that separated previous step. The data are presented in tables in the form of percentages and frequencies.

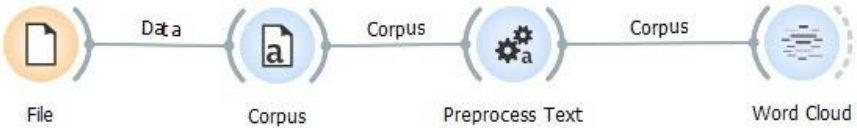


Figure 1. *Objects Used in the Orange Software*

Research Ethics

Erciyes University's ethical committee were approved the data collection procedures and the study was recruited by following the ethical standards.

3 | Findings

The information about the teachers' technological competences is presented in Table 2. Of the teachers who responded, 91% said they were technology literate while 9% said they were not technology literate. All of the teachers had at least one computer, phone or tablet. Among the teachers, 46% had all three technological devices. More than half of them (54%) used technological devices for 1–3 hours a day. In addition to that, few of the teachers (87%) had received in-service training in distance education.7

Table 2. Technological Competency

	n	%		n	%
Are you a technology literate?			Duration of your daily computer/tablet/phone use?		
No	17	9	Less than 1 hour	82	43
Yes	174	91	1–3 hours	53	28
Technological tools owned:			3–5 hours	56	29
Computer, Tablet PC, Phone	90	46	More than 5 hours	22	12
Computer, Phone	76	40	Have you received in-service training / seminars / certificates for distance education, etc.?		
Tablet PC, Phone	4	2	No	166	87
Phone (Only)	20	11	Yes	25	13
Computer (Only)	1	1			

Table 3 presents information on whether teachers developed instructional activities such as assignments, IEPs, computer/web-supported materials, educational mobile applications, printed materials, educational

videos, and so on for students with special needs during the pandemic. While 21% of the teachers developed no instructional activity, 79% of them developed at least one of the following: assignments, IEPs, computer/web-supported materials, educational mobile applications, printed materials, and educational videos. The most commonly developed instructional activity was homework (34%) while the least developed instructional activity was educational videos with (1%).

Table 3. Instructional Activities Developed by Teachers for Students with Special Needs During the Pandemic

Instructional Activities	f	%
Assignments	128	34
Individualized Educational Plan (IEP)	72	19
Computer/Web-supported materials	70	18
Educational mobile application	53	14
Printed materials	52	14
Educational video	2	1
Total	377	100
	n	%
I have not developed any	40	21

In Table 4, the teachers were asked about their use of instructional technologies. 57% responded they used technology-supported ready-made instructional applications/activities; 43% prepared an online IEP; 48% used instructional activities developed in this process; and 27% taught live lessons.

Table 4. Use of Instructional Technologies

		n	%
Have you employed any technology-supported ready-made activities or applications for your students with special needs?	No	82	43
	Yes	109	57
Are you preparing an online IEP for your students with special needs?	No	109	57
	Yes	82	43
Is there any instructional activity created during this process that you use for your students with special needs?	No	100	52
	Yes	91	48
Did you teach live during the pandemic?	No	140	73
	Yes	51	27

In Table 5, teachers were asked what they thought of the EIN. While 14% of the teachers thought the EIN did not meet the needs of students with special needs, 15% thought it met their needs, and 71% thought that it partially met their needs. Of them, 13% thought it did not meet the needs of teachers, and 60% thought it partially meet their needs.

Table 5. Teachers' Opinions on EIN

		n	%
Do current applications meet the needs of students?	No	26	14
	Somewhat	137	71
	Yes	28	15
Do the applications meet your needs?	No	25	13
	Somewhat	115	60
	Yes	51	27

Table 6 shows the teachers' views on instructional activities which would meet students' needs during the pandemic. Of the teachers, 98% recommended at least one instructional activity, but 2% did not recommend any activity and pointed out that face-to-face training should be a must. It was stated by 15% of the teachers that technology-supported activities could meet the needs of students. In addition to that, the teachers shared similar opinions expressing that materials, video lessons, educational mobile applications, psychologically supportive sessions and computer/web-supported materials could meet students' needs.

Table 6. Instructional Activities to Meet Students' Needs During the Pandemic

Instructional Activities	f	%
Technology-supported activities	126	15
Technology-supported materials	118	14

Lessons with videos	114	14
Educational mobile applications	107	13
Psychologically supportive sessions	107	13
Computer/web-supported materials (software programs teaching certain content, and practice/review software programs)	96	12
Live lessons	82	10
Daily planners	75	9
Total	825	100
	n	%
None of them could meet student needs (education should only be face-to-face)	3	2

Table 7 conveys teachers' views on instructional activities that would meet parents' needs. It was argued that mostly technology-based activities (42%) would meet the needs of parents, with video lessons being the least appropriate option for parents (24%).

Table 7. Instructional Activity (Activities) to Meet Parents' Needs

Instructional Activities	f	%
Technology-supported activities	126	15
Technology-supported materials	118	14
Lessons with videos	114	14
Total	825	100

Table 8 shows the tools and instructional activities, other than the EIN, that were employed by the teachers. While 0.5% of the teachers did not use any other instructional activity, 25% of them employed educational mobile applications. Participants also reported using tools such as Zoom and Skype (18%) and resource sites (16%) for educational material development often used by the teachers.

Table 8. Instructional Activities Other than EIN Used During the Pandemic

Instructional Activities	f	%
Educational Mobile Applications	117	25
Tools Such as Zoom/Skype	87	18
Resource Sites for Developing Educational Materials	75	16
Online Educational Portals	47	10
Kits and Booklets	45	9
Online Seminars and Webinars	38	8
Guides	24	5
Online Resources of Certain Foundations, Associations and Universities	22	5
Reports	10	2
Podcasts	6	1
My Own Resources	3	1
Total	474	100
	n	%
None	1	0.50

Table 9 presents how the teachers offered educational support to their students in addition to the EIN. While 1% of the teachers did not offer any other support, 41% of them offered support by meeting with parents and 39% by sharing and tracking activities/assignments.

Table 9. Instructional Support Offered to Students Other than EIN

Instructional Activities	f	%
Meeting with Parents	162	41
Activity/Assignment sharing and tracking	155	39
Live lessons	42	11
Measurement and Assessment	35	9
Total	394	100
	n	%
None	2	1

Table 10 shows the distance education experiences of the teachers. While 17% of the teachers were not able give their students feedback, 37% were able to give feedback, and 46% were partially able to give

feedback. While the proportion of teachers who were unable interact with their students in distance education was 13%, 35% of them were able to interact, and 52% were partially able to interact. While 20% of the teachers did not personalize content in this process, 29% did it, and 51% was able to do it in part. Moreover, 16% of the teachers were unable to collaborate with their colleagues, 38% collaborated, and 46% collaborated partially. As a result of this process, 69% of the teachers stated that blended education was the most appropriate method for students, while 18% stated that it was best to use the online method only as reinforcement and the rest (13%) stated that only online method was the most appropriate method. In addition to that, 49% of the teachers thought they were not ready for distance education, while 51% of them thought they were ready.

Table 10. Experiences During the Distance Education

		n	%
Have you been able to give feedback to your students during distance education?	No	32	17
	Somewhat	88	46
	Yes	71	37
Have you been able to interact with your students during distance education?	No	24	13
	Somewhat	99	52
	Yes	68	35
Have you been able to personalize distance education?	No	38	20
	Somewhat	97	51
	Yes	56	29
Have you been able to share equally the responsibilities of instructional planning, implementation and assessment with other colleagues in distance education?	No	30	16
	Somewhat	89	46
	Yes	72	38
In your opinion, what is the most suitable method for students?	Blended (Face-to-face + Distance)	132	69
	Distance only as reinforcements	34	18
	Completely Distance	25	13
Do you think you are ready for distance education?	No	94	49
	Yes	97	51

The teachers who responded no to the question, do you think you are ready for distance education? were asked what training they would like to receive to be prepared to teach in an online setting. Table 11 presents the responses from participants. 20% requested "training on being able prepare materials needed for distance education," 21% requested "training on effective communication with students," 16% requested "training on technical infrastructure", and 16% requested "training on easier communication with parents." In addition to that, 15% of the teachers said they would feel ready if they had an e-mentor who would support them in this environment. 5% of the teachers were undecided.

Table 11. Distance Educational Courses That Were Desired

Trainings	n	%
Being able to prepare materials needed for distance education	19	20
Being able to communicate with students effectively	20	21
Being able to communicate with parents easily	15	16
Being a technology literate	7	7
Sources of Support	n	%
An e-mentor who would support in this environment	13	15
Technical infrastructure	15	16
Total	89	95
	n	%
None	5	5

In Table 12, difficulties the teachers faced in distance education is presented. The most frequent difficulties they faced were problems related to the use of technology by students, which accounted for 19%. The problems that followed were Internet-related problems with 17%, the lack of motivation of students with 16%, and the inadequacy of technological tools with 11%. The rate of the teachers who did not experience any difficulty was 7%.

Table 12. Difficulties They Experienced in the Distance Education

Sources of Support	f	%
Students' problems related to technology use	139	19
Internet-related problems	126	17
Students' lack of motivation	114	16
Inappropriateness of technological tools	79	11
Lack of experience	73	10
The mismatch between the training program and distance education	62	9
Technical support	60	8
Time consuming	47	6
Problems about assessment	32	4
Total	732	100
	n	%
I did not have any difficulties	13	7

4 | Discussion & Conclusion

This study was conducted to explore the experiences and needs of special education teachers related to distance education during the pandemic. As indicated in the results section, nearly all of the participants, K-12 special education teachers, stated that they were technology literate, noted they had at least one computer, phone or tablet, and more than half said they were using technology devices for 1–3 hours a day. These results indicate the teachers were fully ready to use technology in the pandemic because of their high awareness about extraordinary conditions that pandemic created (Alea et al., 2020). However, 13 percent of the teachers received any distance education training. Although they were willing to use technology, it was difficult for them do so. Therefore, instructors who are teaching online were feeling underprepared, discouraged, secluded, and disappointed (Simone, 2006). Nevertheless, more than half of the participants used technology-supported ready-made instructional applications and activities but only a quarter of teachers taught live lessons.

Most teachers developed at least one of the following: assignments, IEPs, computer/web-assisted materials, educational mobile applications, printed materials, and educational videos. Although this may seem favorable, it is important to conduct these instructional activities in a way to individually meet the needs of every single student. Teachers reported they were able to partially give feedback and interact partly in distance education, partly achieved customization for individual student needs, and partly collaborated with their colleagues. According to Hilli (2020), the reasons behind lack of feedback, lack of modification for individual students needs and lack of collaboration with other teachers are they are being constrained by the technology and their unwillingness of developing new teaching strategies.

Similar to literature (Mouzakis, 2008; Rivera, 2017), our study indicated that most teachers thought blended learning was appropriate for students with special needs. Blended learning provides constructive and enriching learning experience for students with special needs (Rivera, 2017). In line with this view, a trend towards hybrid as well as blended learning applications in new normal can be mentioned. The lack of e-mentoring had a big impact in for not being ready for distance education and accordingly, the teachers indicated that they would think ready if they had an e-mentor to support them in this environment. Finally, the most frequent challenge faced by the teachers in special education was the difficulty of using technology. Strengthening educational interaction and communication between learners and learners, teachers and content can play a helpful role in overcoming these limitations. Blended learning and flipped learning approaches can be used to support social learning processes. The recommendations on the basis of the results of this study are as follows:

UDL is a practice that can be useful for people with special needs that teachers can be implement during the pandemic. Vitelli (2015) claims that UDL-based instruction enhances learning outcomes of students with and without special needs. For special education teachers, a distance education model based on UDL is recommended. UDL depends on 3 basic principles: Multiple representation tools that provide a variety of

ways for students to learn, multiple tools for action and expression that give students alternative ways of demonstrating their knowledge and skills, and multiple tools for interaction that enhance the interest and motivation of students and offer appropriate experiences (Rose & Meyer, 2006). Bozkurt (2020) underlines that there is a need to employ UDL principles in education by considering the needs of learners with special needs as well as those with normally developing peers. UDL principles can be employed in different ways in many areas of distance education. For example, iOS devices include numerous apps that teachers can use to create educational opportunities that are engaging, by using photography, videos, Internet access, multi-touch input, and their knowledge of the curriculum (McMahon & Walker, 2014).

It is essential to focus on positive behaviors in students with special needs, to give them reinforcing stimuli and feedback, and to support their behaviors than in normal students (Sugai & Horner, 2006). Moreover, all stakeholders must share responsibilities in order for a collaboration to succeed (Friend & Cook, 2007). Consequently, if teachers collaborate with their colleagues and share their personal experiences with each other, it is helpful for both teachers and students in this process. Based on the data, the participants were able to partially give feedback and interact partly in distance education, partly customized instruction for individual student needs, and partly collaborated with their colleagues.

Communication is a vital element of successful cooperation between family and school (Christenson, 2004; Epstein, 1995). Communication barriers restrict genuine and collaborative relationships between schools and families (Öztürk, 2017). Concordantly, 15 participants responded to the question "Having what opportunities would make you feel like you are ready for distance education?" with "Easier communication with parents." In this process, parents took on many roles. In addition to these roles, they should undertake roles directly related to learning and teaching processes of their children.

Teachers need support and in-service training provided by the Ministry of National Education. That being said, few of the participants indicated they had received in-service training on distance education. It was observed during the pandemic process that teachers had difficulties in technological competencies. In this context, it is important to integrate technological skills trainings and also technological, pedagogical and field knowledge, i.e. TPACK (Technological Pedagogical Content Knowledge) model, into teacher training. Teachers need professional development on distance education (Roberts, 2018). In this way, a contribution can be made to teachers' professional development by addressing their needs. It is clear, in line with the needs that arose within the scope of the study, professional development programs should be offered especially on distance education and use of ready-made educational materials, as well as technology-supported material and mobile application development. Teachers should also be offered coaching support for effective distance education tips, teaching live lessons, and to engage in effective parent–teacher and teacher–teacher interaction through online tools. Moreover, the EIN content should be updated according to teacher recommendations and needs (Fi**ş** Er**ü**mit, 2021).

Teachers' inadequate use of technology and lack of knowledge on how to involve students with special needs in the course are significant barriers for distance education (Hamilton et al., 2020). Therefore, teachers should be supported by e-mentors. It was indicated also by the majority of our participants they would feel better equipped if they had an e-mentor to support them in this environment.

Future research

Although the distance education-related experiences and needs of special education teachers during the pandemic were identified in this study, future research should also include families into the equation, as the process involves families of children with disabilities. Moreover, since the pandemic is a new phenomenon, education will continue to be affected in unknown ways. In fact, the usability of online platforms with students and parents can be investigated. Online training programs can be prepared for teachers, and its effectiveness could also be assessed.

Statements of publication ethics

Authors declare that the research has no unethical problems and observe research and publication ethics.

Researchers' contribution rate

First author Elif Polat managed the entire flow of the article, study design, organized the data collection tool and data analyzing process. Second author Sinan Hopcan managed the literature searches and the data collection process. Third author Mehmet Emin Öztürk managed data analysis and in the interpretation of the results and analysis. All authors managed in the interpretation of the results and in writing of the manuscript.

Conflict of interest

The authors of this article declare that there is not conflict of interest.

References

Akat, M., & Karataş, K. (2020). Psychological Effects of COVID-19 Pandemic on Society and Its Reflections on Education. *Electronic Turkish Studies*, *15*(4), 1-13.

Alea, L. A., Fabrea, M. F., Roldan, R. D. A., & Farooqi, A. Z. (2020). Teachers' Covid-19 awareness, distance learning education experiences and perceptions towards institutional readiness and challenges. *International Journal of Learning, Teaching and Educational Research*, *19*(6), 127-144.

Baber, H. (2020). Determinants of students' perceived learning outcome and satisfaction in online learning during the pandemic of COVID-19. *Journal of Education and E-Learning Research*, *7*(3), 285-292.

Bozkurt, A. (2020). Koronavirüs (Covid-19) pandemi süreci ve pandemi sonrası dünyada eğitime yönelik değerlendirmeler: Yeni normal ve yeni eğitim paradigması [Coronavirus (Covid-19) pandemic process and evaluations for education in the post-pandemic world: New normal and new education paradigm]. *Açıköğretim Uygulamaları ve Araştırmaları Dergisi*, *6*(3), 112-142.

Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., ... Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 Pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, *15*(1), 1-126.

Burdette, P. J., Greer, D. L., & Woods, K. L. (2013). K-12 Online Learning and Students with Disabilities: Perspectives from State Special Education Directors. *Journal of asynchronous learning networks*, *17*(3), 65-72.

Cartledge, G., & Milburn, J. F. (1978). The case for teaching social skills in the classroom: A review. Review of Educational Research, 48(1), 133-156.

Christenson, S. L. (2004). The family-school partnership: An opportunity to promote the learning competence of all students. *School Psychology Review*, *33*(1), 83.

Desforges, C., & Abouchaar, A. (2003). The impact of parental involvement, parental support and family education on pupil achievement and adjustment: A literature review (Vol. 433). DfES publications.

Epstein, J. L. (1995). School/family/community partnerships. *Phi delta kappan*, *76*(9), 701.

Evans, M. P. (2013). Educating preservice teachers for family, school, and community engagement. *Teaching Education*, *24*(2), 123-133.

Fayden, T. (2005). How Children Learn: Getting Beyond the Deficit Myth. Paradigm Publisher.

Fiş Erümit, S. (2021). The distance education process in K–12 schools during the pandemic period: evaluation of implementations in Turkey from the student perspective. *Technology, Pedagogy and Education*, 1-20.

Friend, M., & Cook, L. (2007). *Interactions: Collaboration skills for school professionals* (5th ed.). Allyn & Bacon.

Hamilton, L. S., Kaufman, J. H., & Diliberti, M. (2020). Teaching and Leading Through a Pandemic: Key Findings from the American Educator Panels Spring 2020 COVID-19 Surveys.

Hartnett, M. (2016). *Motivation in online education*. Singapore: Springer.

Henderson, A. T., & Mapp, K. L. (2002). A New Wave of Evidence: The Impact of School, Family, and Community Connections on Student Achievement. Annual Synthesis 2002. *National Center for Family and Community Connections with Schools*.

Hilli, C. (2020). Distance teaching in small rural primary schools: a participatory action research project. *Educational Action Research*, *28*(1), 38-52.

Holmberg, B. (1987). Research Review: The development of distance education research. *American journal of distance education*, *1*(3), 16-23.

Jeynes, W. H. (2007). The relationship between parental involvement and urban secondary school student academic achievement: A meta-analysis. *Urban education*, *42*(1), 82-110.

Jurriens, E. (2017). *Digital Indonesia*. ISEAS Publishing.

Karasar, N. (2005). *Scientific research method*. Nobel Publication Distribution.

Kiesler, S. (2002). *Distrubuted work*. The Mit Press.

Kmietowicz, Z. (2020). Rules on isolation rooms for suspected covid-19 cases in GP surgeries to be relaxed. *BMJ*, *368*(2020).

Lee, S., Yoo, S., & Bak, S. (2003). Characteristics of friendships between children with and without mild disabilities. Education and training in developmental disabilities, 157-166.

McMahon, D., & Walker, Z. (2014). Universal Design for Learning Features and Tools on iPads and Other iOS Devices. *Journal of Special Education Technology*, *29*(2), 39-49.

Metin, A., & Çetinkaya, A. (2020). According to Cognitive Model Possible Effects of Coronavirus Pandemic on Human Psychology.

Mouzakis, C. (2008). Teachers' perceptions of the effectiveness of a blended learning approach for ICT teacher training. *Journal of Technology and Teacher Education*, *16*(4), 461-482.

Olnes, L. (2008). Special Projects for Special People: Students with Disabilities Serve Others through Service-Learning Projects. *Teaching Exceptional Children Plus*, *5*(2), 2.

Özer, M (2020). Educational Policy Actions by the Ministry of National Education in the times of COVID-19 Pandemic in Turkey. *Kastamonu Education Journal*, *28*(3), 1124-1129.

Öztürk, M. E. (2017). IDEA and Family Involvement. *International Journal of Educational* Research Review, 2(1), 21-27.

Pınar, M. A., & Dönel Akgül, G. (2020). The opinions of secondary school students about giving science courses with distance education during the Covid-19 pandemic. *Journal of Current Researches on Social Sciences*, *10*(2), 461-486.

Pineda, V. S., & Corburn, J. (2020). Disability, Urban Health Equity, and the Coronavirus Pandemic: Promoting Cities for All. *Journal of Urban Health*, 1-6.

Rice, M. F., & Carter Jr, R. A. (2015). When We Talk about Compliance, It's Because We Lived It: Online Educators' Roles in Supporting Students with Disabilities. *Online Learning*, *19*(5), 18-36.

Rivera, J. H. (2017). The blended learning environment: A viable alternative for special needs students. *Journal of Education and Training Studies*, *5*(2), 79-84.

Roberts, J. (2018). Future and changing roles of staff in distance education: a study to identify training and professional development needs. *Distance Education*, *39*(1), 37-53.

Rose, D. H., & Meyer, A. (2006). *A practical reader in universal design for learning*. Harvard Education Press.

Rose, R. M., & Blomeyer, R. L. (2007). Access and equity in online classes and virtual schools. North American Council for Online Learning.

Simone, C. D. (2006). Preparing our teachers for distance education. *College Teaching*, *54*(1), 183-184.

Simpson, O. (2013). Student retention in distance education: are we failing our students?. *Open Learning: The Journal of Open, Distance and e-Learning*, *28*(2), 105-119.

Slavin, R. E. (1996). Research on cooperative learning and achievement: What we know, what we need to know. *Contemporary educational psychology*, *21*(1), 43-69.

Sugai, G., & Horner, R. R. (2006). A promising approach for expanding and sustaining school-wide positive behavior support. *School Psychology Review*, *35*(2), 245-259.

Sun, L., Tang, Y., & Zuo, W. (2020). Coronavirus pushes education online. *Nature Materials*, *19*(6), 687-687.

Tiene, D. (2000) Online Discussions: A survey of advantages and disadvantages compared to face-to-face discussions. *Journal of Educational Multimedia and Hypermedia*, *9*(4), 369-382.

Toquero, C. M. (2020). Challenges and Opportunities for Higher Education amid the COVID-19 Pandemic: The Philippine Context. *Pedagogical Research*, *5*(4), em0063.

Uludag, A. (2008). Elementary preservice teachers' opinions about parental involvement in elementary children's education. *Teaching and Teacher Education*, *24*(3), 807-817.

UNESCO. (2020). How are countries addressing the Covid-19 challenges in education? A snapshot of policy measures. Global Education Monitoring Reports. United Nations Educational, Scientific and Cultural Organization

Van Lancker, W., & Parolin, Z. (2020). COVID-19, school closures, and child poverty: a social crisis in the making. *The Lancet Public Health*, *5*(5), e243-e244.

Vitelli, E. M. (2015). Universal design for learning: Are we teaching it to preservice general education teachers?. *Journal of Special Education Technology*, *30*(3), 166-178.

Xiao, C. (2020). A novel approach of consultation on 2019 novel coronavirus (COVID-19)-related psychological and mental problems: structured letter therapy. *Psychiatry investigation*, *17*(2), 175.

BUEFAD | 2021, Volume 10, Issue 3, 541-550
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.831886

Examination of the Effect of Turkish Music Motifs on Teaching of Bowing Techniques Used in Violin Education: Example of Haydar Tatlıyay

Eta KOTAN[a*], Murat Kamil İNANICI[b*]

a* M.A., Atatürk University, Erzurum/Turkey, https://orcid.org/0000-0001-6445-6304, etakotan@hotmail.com

b* Asst. Prof. Dr. Atatürk University, Erzurum/Turkey, https://orcid.org/0000-0002-0908-9668, muratkamilinanici@hotmail.com

Research Article | Received: 26.11.2020 | Revised: 31.12.2020 | Accepted: 12.01.2021

Abstract

This study was carried out to analyse the impact of Turkish music motives on teaching bowing techniques used in violin education. In the study one-group pretest posttest design, one of the experimental designs was used. The study group of the research consists of 4 violin students studying at Ataturk University within Kazım Karabekir Faculty of Education in the department of the Fine Arts Education Music Education Program in the spring semester of 2018-2019 academic year. In the study, five forms (three for the study group, two for expert academicians) were used. In the experimental process of the research, the pretest performances of the students in the study group on performance of violin bowing techniques were recorded on the rating forms, and then an 8-week experimental program was applied. At the end of the experimental program, the posttest performances of the students in the study group performing the violin bowing techniques were recorded on the rating forms. A statistical package program was used to analyze the data. As a result of the research, upon examing the pretest and posttest results of the students in the study group, it was concluded that the program applied in the experiment process had a positive effect by increasing the performance of the bowing techniques of the students in the study group.

Keywords: Music education, violin education, violin string techniques, Haydar Tatlıyay

Keman Eğitiminde Kullanılan Yay Tekniklerinin Öğretiminde Türk Müziği Motiflerinin Etkisinin İncelenmesi: Haydar Tatlıyay Örneği

Öz

Bu araştırma keman eğitiminde kullanılan yay tekniklerinin öğretiminde Türk müziği motiflerinin etkisini incelemek amacıyla yapılmıştır. Araştırmada deneysel desenlerden "Tek grup öntest-sontest desen" kullanılmıştır. Araştırmanın çalışma grubunu 2018-2019 eğitim öğretim yılı bahar döneminde Atatürk Üniversitesi Kazım Karabekir Eğitim Fakültesi Güzel Sanatlar Eğitimi Bölümü Müzik Öğretmenliği Programı'nda öğrenim gören 4 keman öğrencisi oluşmuştur. Araştırmada veri toplamak amacıyla 3 adet çalışma grubuna, 2 adet ise uzman akademisyenlere uygulanmak üzere toplam 5 adet form kullanılmıştır. Araştırmanın deney sürecinde, çalışma grubundaki öğrencilerin, keman yay tekniklerini seslendirme öntest performansları derecelendirme formlarına kaydedilmiş, ardından 8 haftalık deneysel program uygulanmıştır. Deneysel programın sonunda çalışma grubundaki öğrencilerin, keman yay tekniklerini seslendirme sontest performansları derecelendirme formlarına kaydedilmiştir. Verilerin analizinde istatistik paket programı kullanılmıştır. Araştırman sonucunda çalışma grubunu oluşturan öğrencilerin öntest ve sontest sonuçları incelendiğinde, deney sürecinde uygulanan programının, çalışma grubunu oluşturan öğrencilerin yay tekniklerini seslendirme performanslarını arttırarak olumlu etki yaptığı sonucuna ulaşılmıştır.

Anahtar kelimeler: Müzik eğitimi, keman eğitimi, keman yay teknikleri, Haydar Tatlıyay

To cite this article in APA Style:

Kotan, E. & İnanıcı, M. K. (2021). Examination of the effect of Turkish music motifs on teaching of bowing techniques used in violin education: example of Haydar Tatlıyay. *Bartın University Journal of Faculty of Education, 10*(3), 541-550. https://doi.org/10.1016/buefad.831886

1 | INTRODUCTION

Education is regarded as the most important process enabling the improvement of individuals and societies. In this process, the main purpose of education is to develop the social, cultural, physical, cognitive, affective and psychomotor behaviors of the individual properly (Uçan, 1997). On the other hand, music education is one of the fields of study in education through which it is aimed to create and improve the cultural, cognitive, affective and psychomotor behaviors of the individual. Music education is the process enabling individuals to develop musical behaviors through their own life and change their musical behaviors (Say, 2005). And music education plays a vital role in the education process of individuals. In addition, it is a well- known fact that it contributes significantly to the social and psychological development of the individual during the education process (Şen, 2011). The musical life of the individuals is taken as basis throughout the musical education. In line with this basis, it is observed that certain objectives follow a planned, regular and methodical path and certain objectives are accomplished in this way. The interaction between music education and the individual's musical environment is expected to be regular, effective, well and productive (Uçan, 2005). In order to pursue a meaningful and efficient music education, it is necessary for the individual to recognize and perform the instruments in addition to vocal training. Instrument education, which is one of the important fields of music education, is the process of creating behavioral change in the individual by ensuring that the individual acquires the knowledge, skills and attitudes required in the instrumental field according to the objectives set in line with the needs (Baykal, 2012). The aim of instrument education is to educate students who attain advanced proficiency in musicality and technique, as well as individuals who can use their instruments in all areas of music and music education (Coşkuner, 2007). According to Tanrıverdi (1997), instrument education ensures the development of knowledge and skills learned and acquired in music education and plays a crucial role in the creation of music culture.

Violin education, which is one of the most important fields in the discipline of instrument education, is a practical, theoretical, physical and psychological process. The principles and rules that form the basis of violin education have acquired a scientific quality as a result of the experiences (Tarkum, 2006). Basic behaviors such as physically correct posture, the ability to hold the violin and the violin bow correctly, the coordination of arm and wrist movements, and the correct positioning of the fingers and the hand, constitute the techniques required in violin education (Uslu, 2012). In our country, violin education has an important place in institutions that provide volunteer and professional music education. And it is a long and challenging process, which requires being patient, self-sacrificing and disciplined (Yıldırım, 2009). One of the factors that will be efficient in the performance of this difficult process is the use of the correct methods. Upon examining the literature, it has been revealed in various studies that there are various violin education methods used in Turkey and abroad, which have been prepared according to different development levels of students (Baş, 2007; Delikara, 2002; Taşdemir, 2020). These methods are known to consist of works and studies based on western music motifs. During the violin education process, it is possible to state that the methods of western music are used adequately in terms of quantity and quality, but the methods based on Turkish music motifs are not widely available and therefore they are not used. However, it is known that there are many artists who vocalize Turkish music with the violin and composed compositions for the violin. It is a well- known fact that one of the pioneering names in this area is Kemani Haydar Tatlıyay. Kemani Haydar Tatlıyay is an artist who played the violin at the level of virtuosity with a superior musicality, as well as creating compositions to reveal the technical characteristics of the violin. This success of Tatlıyay in playing the violin and composing can be attributed to the recognition of Turkish music as well as the fact that he lived in different countries such as Egypt, Romania and Syria and was influenced by the music of those countries. Tatlıyay, who devoted his life to art, compositions and violin, left behind 144 works composed for violin when he passed away (Karadağ, 1997, p. 5).

In this context, music educators have great responsibilities in the development, proliferation and promotion of our traditional music in a contemporary sense, and its identification with education, and also in ensuring communication with all those general, volunteer and professional fields in Turkey, especially in the faculties of education, departments of music education, instrument/ violin education (Parasız, 2009). The idea of not using local and national music elements as educational material in the violin education constitutes the problem of this study. This research was carried out to examine the effect of Turkish music motifs on the teaching of bowing techniques used in violin education, based on the determined problem.

Accordingly, the hypotheses of the research are as follows.

Hypothesis 1: The use of Turkish music motifs in the teaching of bowing techniques used in violin education will increase the performance of the students in the study group to perform detaché legato staccato and spiccato bowing techniques in favor of the posttest.

Hypothesis 2: The use of Turkish music motifs in teaching bowing techniques used in violin education will increase the performance of the students in the study group to perform the detaché legato staccato and spiccato bowing techniques used in Haydar Tatlıyay Kürdilihicazkâr saz semai in favor of the posttest.

2 | Method

This section covers the topics of research design, study group, data collection tools and data analysis.

Research Design

This study was carried out to examine the impact of Turkish music motifs on the teaching of bowing techniques used in violin education. Accordingly, "one group pretest-posttest design", one of the experimental designs, was used in the research. In this design, the effect of the experimental process is tested by working on a single group. The measurements of the subjects related to the dependent variable are obtained by using the same subjects and the same measurement tools as pretest and posttest before the application. There is no randomness and matching (Büyüköztürk, Kılıç-Çakmak, Akgün, Karadeniz & Demirel, 2011). Information on the experimental application process is presented in Table 1.

Table 1. Information on Experimental Application Process

	Before Application (Pretest)	Application Process	After Application (Posttest)
Study Group	1. General Information Form 2. Performance Rating Form for Performing the Bowing Techniques Used in the Kurdilihicazkâr Study 3. Performance Rating Form for Performing Bowing Techniques Used in Kürdilihicazkâr Saz Semai	Implementation of the Eight-Week Instruction Plan for Teaching Bowing Techniques Used in Violin	1. Performance Rating Form for Performing the Bowing Techniques Used in the Kurdilihicazkâr Study 2. Performance Rating Form for Performing Bowing Techniques Used in Kürdilihicazkâr Saz Semai

Study Group

The study group of the research consists of 4 violin students studying at Ataturk University within Kazım Karabekir Faculty of Education in the department of the Fine Arts Education Music Education Program in the spring semester of 2018-2019 academic year. Information on the demographic data of the study group is put forward in Table 2.

Table 2. Information on the Demographic Characteristics of the Students

		f	%
Gender	Female	1	25.0
	Male	3	75.0
Age	20	3	75.0
	19	1	25.0
Grade	2nd grade	4	100.0
Graduated High School	GSL (Fine Arts High School)	3	75.0
	General High School	1	25.0

Data Collection Tools

Data collection tools used in the research process are as follows:

General Information Form: The General Information Form is a form that was developed by the researcher herself to gather information about the age, gender, and type of the high school the study group students graduated from, and it consists of questions to determine the demographic characteristics of the students.

Evaluation Form for Performing the Bowing Techniques Used in Kürdilihicazkâr Study: This form prepared by the researchers is a form that measures the performance level of the students in the study group regarding Detaché, Legato, Staccato and Spiccato bowing techniques and it is applied to the students in the study group before and after the teaching activities. In the form, the extent to which Detaché, Legato, Staccato and Spiccato bowing techniques are performed were evaluated over the criteria of "Completely Correct Performance" (4 points), "Large Scale Correct Performance" (3 points), "Half and Half Performance" (2 points), "Very Less Correct Performance" (1 point) and "Completely Incorrect Performance" (0 points). In order to determine whether this form was valid and applicable, academicians who are experts in the field were consulted and the "Expert Opinion Form Regarding Performance Rating Form for the Performance of Bowing Techniques Used in Kürdilihicazkâr Study" was applied. Based on the feedback received, it was determined that the form is both valid and applicable.

Performance Rating Form for The Performance of the Bowing Techniques Used in Kürdilihicazkâr Saz Semai: This form, prepared by the researchers, is the form that is applied to the students in the study group before and after the teaching activities, in which the students in the study group measure the correct performance levels of the bowing techniques used in the Kürdilihicazkâr saz semai. In the form, the extent to which Detaché, Legato, Staccato and Spiccato bowing techniques are performed were evaluated over the criteria of "Completely Correct Performance" (4 points), "Large Scale Correct Performance" (3 points), "Half and Half Performance" (2 points), "Very Less Correct Performance" (1 point) and "Completely Incorrect Performance" (0 points). In order to determine whether this form is valid and applicable, academicians were consulted and the "Expert Opinion Form Regarding Performance Rating Form for performing Bowing Techniques Used in Kürdilihicazkâr Saz Semai" was applied. Based on the feedback, it was determined that the form is valid and applicable.

Data collection

Preparation of exercises in Kürdilihicazkar maqam for teaching Detaché, Legato, Staccato and Spiccato bowing techniques among the bowing techniques used in the violin, determination of bowing techniques used in Kürdilihicazkar saz semai composed by Haydar Tatlıyay and the eight-week experimental process are as follows:

Preparation of Teaching Activities: The exercises prepared by the researchers in the Kürdilihicazkâr maqam for the teaching of Detaché, Legato, Staccato and Spiccato bowing techniques among the bowing techniques used in violin include a teaching plan based on the development of right-hand technical skills for performing the bowing techniques used in violin.

The exercises were prepared by considering the suitability in terms of violin education content, the introduction of right-hand bowing techniques and the teaching of these techniques, the acquisition of Turkish music maqam knowledge and its performance on the violin, its ranking from easy to difficult, and qualities such as being understandable and performed by undergraduate students, and so on.

A separate bowing movement for each note, which is the characteristic structure of the Detaché bowing technique, is the initial stage of the right hand technique used in the violin, and the exercises starting with the teaching of this technique are preparatory for the teaching of legato, staccato and spiccato techniques. By following the simple to complex principle, exercises were created so that firstly Detaché, then legato, then staccato and finally spiccato would be performed. As a result of the application of these exercises, it is aimed to obtain the knowledge of how to perform the bowing techniques that will be encountered in the work.

Detaché, legato, staccato, spiccato were determined by the researchers among the bowing techniques used in Haydar Tatlıyay Kürdilihicazkâr saz semai. Expert opinion was taken in the correct determination of the bowing techniques in the parts of the work. Studies have been prepared in order to perform the bowing techniques used and the level of accuracy in terms of the contribution of these studies to the work has been presented to the experts.

All of the exercises were written according to the sequence of the Kürdîlihicazkâr maqam and were prepared as a preliminary preparation for the performance of the Kürdilihicazkâr work in accordance with the maqam sequence. It is aimed to create both theoretical knowledge and to gain technical skills in practice by performing the maqam sequence of the work.

Application of the Pretests: The students in the study group were interviewed before the experiment process and information was given about the purpose and content of the eight-week teaching activities for teaching bowing techniques used in violin. 4 students in the study group were asked to perform Detaché, Legato, Staccato and Spiccato bowing techniques, which are used in violin, and the saz semai composed in the Kürdilihicazkâr maqam, and the student performances were recorded on camera.

The video recordings containing the pretest performances of the students in the study group were examined separately by 3 academicians who are experts in the field of violin education, and the performance of each student to performance the bowing techniques used in the Kürdilihicazkâr study was put on the "Performance Rating Form for Performing the Bowing Techniques Used in the Kürdilihicazkâr Study" and the performances of the bowing techniques used in the Kürdilihicazkar saz semai were recorded in the "Performance Rating Form for Performing the Bowing Techniques Used in Kürdilihicazkâr Saz Semai".

Implementation of the Teaching Activities: Explanation of the detaché technique in the first and second weeks, performing the detaché technique, which is among the goals, on the empty re (neva fret) string on the violin by pulling and pushing a bow, performing the kurdilihicazkâr quintet on Rast fret with quarter notes, and performing the Kurdi quartet on the Neva fret with quarter notes and performing the kurdilihicazkâr quintet on Rast fret with quarter notes in a rising and descending way were realized through the method of demonstration. Explaining the legato technique in the third and fourth weeks, performing the legato technique, which is also among the aims, on the empty re (neva fret) string on the violin by drawing and pushing a bow, performing the kurdilihicazkâr quintet on the Rast fret with quater notes, performing Kurdi quartet on the Neva fret with quarter notes and performing the kurdilihicazkâr quintet on Rast fret with quarter notes in a rising and descending way were also realized with the method of demonsration. Explaining

the staccato technique in the fifth and sixth weeks, performing the staccato technique, which is among the targets, on the empty re (neva fret) string on the violin by drawing and pushing a bow, performing the Kürdilihicazkâr quintet with quarter notes on the Rast fret, performing the Kurdi quartet on the Neva fret with quarter notes, performing the kurdilihicazkâr quintet on Rast fret with quarter notes in a rising and descending way were also realized through demonstration method. Explaining the spiccato technique in the seventh and eighth weeks, performing the spiccato technique, which is among the targets, on the empty re (neva fret) string on the violin by pulling and pushing a bow, performing the Kürdilihicazkâr quintet with quarter notes on the Rast fret, performing the Kurdi quartet on the Neva fret with quarter notes, performing the Kurdi quartet on the Neva fret with quarter notes, performing the kurdilihicazkâr quintet on Rast fret with quarter notes in a rising and descending way were also realized through demonstration method.

Implementation of Posttests: At the end of the implementation of the eight-week teaching plan for the teaching of bowing techniques used in violin, 4 violin students in the study group were asked to perform Detaché, Legato, Staccato and Spiccato bowing techniques, which are used in violin, and the saz semai composed in the Kürdilihicazkâr maqam and their performances were recorded. The video recordings of the posttest performances of the students in the study group were examined separately by 3 expert academicians in the field of violin education, and each student's performance of the bowing techniques used in the Kürdilihicazkâr study was recorded on the "Performance Rating Form for Performing the Bowing Techniques Used in the Kürdilihicazkâr Study", while performing the bowing techniques used in Kürdilihicazkâr saz semai was recorded on the “Performance Rating Form to Perform Bowing Techniques Used in Kürdilihicazkâr Saz Semai".

Data Analysis

Frequency analysis of pretest and posttest scores was used in data analysis due to the small number of students in the study group.

Research ethics

This research was evaluated at the meeting (no 56785782-050.02.04-E.2000143322) by the Ethics Committee of Social Sciences and Humanities of Ataturk University in 10.06.2020 and found ethically acceptable.

3 | Findings

In this study, it is aimed to examine the effect of Turkish music motifs on the teaching of bowing techniques used in violin education. The hypothesis which claims that the use of Turkish music motifs in the teaching of bowing techniques used in violin education will increase the performance of the students in the study group to perform detaché legato staccato and spiccato bowing techniques in favor of the posttest (Hypothesis 1) has been tested by analysing the pretest and posttest frequency levels and findings are given in Table 3.

Table 3. Pretest and Posttest Scores of the Study Group Students' Levels of Performing Bowing Techniques Used in the Kürdilihicazkâr Study

	Performance Level of Detaché Bowing Technique		Performance Level of Legato Bowing Technique		Performance Level of Staccato Bowing Technique		Performance Level of Spiccato Bowing Technique	
Subjects	Pretest (f)	Posttest (f)	Pretest (f)	Posttest (f)	Pretest (f)	Posttest (f)	Pretest (f)	Posttest (f)
Subject 1	4	4	4	4	0	4	0	4
Subject 2	4	4	4	4	2	4	0	4
Subject 3	2	4	4	4	0	4	0	4
Subject 4	3	4	4	4	0	4	0	4
Total (f)	13	16	16	16	2	16	0	16

Upon analyzing the pretest and posttest results of the performance rating form for the students in the study group to perform the bowing techniques used in the Kürdilihicazkâr study are examined, it is observed that there is no change in the level of performing the legato bowing technique used in the Kürdilihicazkâr study, but it has been succesful in the detaché staccato and spiccato bowing techniques. In addition, it was determined that the total pretest general scores of the students in the study group were 31, and the posttest general scores were 64. According to these results, it can be said that the plan applied in the experimental process did not have a positive or negative effect on the performance of the students in the study group to perform the legato bowing technique, and it had a positive impact by increasing the performance of the students in the detaché staccato and spiccato bowing techniques.

The other hypothesis of the study, namely "the use of Turkish music motifs in the teaching of bowing techniques used in violin education, will increase the performance of the students in the study group to perform the detaché legato staccato and spiccato bowing techniques used in Haydar Tatlıyay Kürdilihicazkâr saz semai in favor of the posttest (Hypothesis 2)" was examined by analyzing the pretest and posttest frequency levels and necessary findings are given in Table 4.

Table 4. Pretest Posttest Scores of the Students in the Study Group Regarding the Performance Levels of the Bowing Techniques Used in Haydar Tatlıyay Kürdilihicazkâr Saz Semai

	Performance Level of Detaché Bowing Technique		Performance Level of Legato Bowing Technique		Performance Level of Staccato Bowing Technique		Performance Level of Spiccato Bowing Technique	
Subjects	Pretest (f)	Posttest (f)	Pretest (f)	Posttest (f)	Pretest (f)	Posttest (f)	Pretest (f)	Posttest (f)
Subject 1	4	4	1	4	3	4	0	4
Subject 2	2	4	2	4	0	4	0	4
Subject 3	0	4	0	3	0	2	0	4
Subject 4	0	4	0	4	0	4	0	4
Total (f)	6	16	3	15	3	14	0	16

Upon examining the pretest and posttest results of the performance rating form of the students in the study group for performing the bowing techniques used in Haydar Tatlıyay Kürdilihicazkâr saz semai, it is seen that all of the detaché, legato, staccato and spiccato bowing techniques used in the Kürdilihicazkâr saz semai are successful. In addition, it was determined that the total pretest general scores of the students in the study group were 12 and the posttest general scores were 61. According to these results, it can be said that the teaching plan applied during the experimental process has a positive impact by increasing the performance of the students in the study group to perform the bowing techniques.

4 | Discussion & Conclusion

In the study, it was concluded that the use of Turkish music motifs in teaching bowing techniques used in violin education has a positive effect by increasing the performance of the students in the study group to perform the detaché, staccato and spiccato bowing techniques in favor of the posttest. This result is similar to some studies in the literature. In Haner's (2018) study titled “Violin education model based on Turkish music melody structures”, it was concluded that the applied model positively affected the students' skills of using detaché and legato techniques. Taşçı (2012), in his study titled “Investigation of Turkish folk music instrumental works in terms of their use in secondary vocational violin education '', determined that they are effective in improving students” skills of using detaché, legato, staccato and spiccato bowing technique in Turkish folk music works. Almzori (2017) found a significant difference in terms of the applicability of the

staccato bowing technique found in folk melodies adapted to the violin. However, Alpagut (2001) could not find a significant difference in the bowing techniques detaché legato and spiccato techniques found in Turkish folk music works. In addition, it was concluded that the use of Turkish music motifs in the teaching of bowing techniques used in violin education increased the performance of the detaché ache bowing technique used in Haydar Tatlıyay Kürdilihicazkâr saz semai in the study group in favor of the posttest. There are also studies in the literature that suggest the use of violin artists' works and violin bowing techniques as a pedagogical material. In the study of Miskelly (2018), the bowing techniques used by the famous violin artist Rodney Friend were analyzed and it was emphasized that these techniques could greatly contribute to violin education. In the study of Reeves's (2018), a pedagogical analysis of Berio's Duetti's violin works was carried out, and it was stated that the use of the artist's works in violin education could provide violin students with the opportunity to experience many difficulties that they may encounter in the violin playing process. These results confirm that the compositions of artists such as Kemani Haydar Tatlıyay, who play the violin with a superior musicality and at a level of virtuosity, should be used as educational music.

Based on the results of the research

- This research was conducted to examine the effect of Turkish music motifs on the teaching of bowing techniques used in violin education and the Kürdilihicazkâr maqam was chosen as an example. Based on the results of the research, the followings can be suggested:

- Measuring the effect of this method on teaching other Turkish music maqams,

- Measuring the effect of this method, whose effect was measured in the saz semai form, on other forms of Turkish music,

- Measuring the effect of this method, whose effect was measured in Aksak semai and nim sofyan meter, on the teaching of other Turkish music rhythms,

- This study was conducted in order to examine the effect of Turkish music motifs in the teaching of bowing techniques used in violin education, and undergraduate students in music teaching program were selected as the study group. It may be suggested to measure the effect of this experimental study on fine arts high schools, fine arts faculties and conservatory violin education.

- The use of Turkish music motifs in the teaching of bowing techniques used in violin education in the teaching of bowing techniques other than detaché, legato, staccato and spiccato bowing techniques,

- Increasing studies and works to be used in educational music based on other forms, modes and methods of Turkish music,

- Using works and studies reflecting Turkish music form, mode and style features in all stages of violin education,

- It can also be suggested to conduct studies on the use of western music and Turkish music violin training approaches in violin education.

Acknowledgments

This article is based on the first author’s master’s thesis.

Statements of publication ethics

Special attention was paid to scientific ethical rules at every stage of the research process. Since experimental design was used in the research, approval certificate was obtained from Atatürk University Educational Sciences Unit Ethics Committee. In the study, it was stated to the participants that the research was a voluntary study, that the identities of the participants would be kept confidential, that the data obtained from the study would not be used for any purpose other than the research and that the results would be

shared with them, and accordingly the consent of the participants was obtained. In addition, the sources used in the research text are quoted in accordance with scientific ethical rules and given in the references section.

Researchers' contribution rate

The first and second authors decided together on the problem of the research, its hypotheses, and how the experimental process would take place. The first author conducted the study experimentally. And the second author reviewed the experimental process and contributed to literature review. All authors read and approved the final version of the article.

Conflict of interest

The authors declare that there are no conflicts of interest associated with this paper. Funding: This study was not funded by any organization or institution.

References

Almzori A. (2017). *Keman eğitimi halk ezgilerinde yay tekniklerinin kullanımı*. [Teaching bowing techniqes in violin training using traditional folk melodies] Master Thesis. Yüzüncü Yıl University, Van, Turkey.

Alpagut, U. (2001). *Türk halk ezgilerinin kemana uyarlanmasının keman eğitimi yoluyla müzik öğretmenliği eğitimine yansıyabilirliği. [The Reflectibility of the adaptation of the Turkish folk tunes through violin training of the education of music teachers in Music Education Program]* Doctorate Dissertation, Gazi University, Ankara, Turkey.

Baş, A. H. (2007). Sivas ve Tokat Anadolu güzel sanatlar liselerindeki keman öğrencilerine uygulanan keman başlangıç yöntemlerinin Ankara Anadolu güzel sanatlar lisesinde uygulanan keman başlangıç yöntemleriyle karşılaştırılması. [The comparison of violin beginning methods applied to students in Tokat and Sivas Anatolian high school of fine arts with violin beginning methods applied in ankara anatolian high school of fine arts] Master Thesis. Cumhuriyet University, Sivas, Turkey.

Baykal, Ç. (2012). *Lisansüstü programlarda keman ve viyola eğitimi veren öğretim elemanlarının çalgı pedagojisi ders içeriğine ilişkin görüşleri*. [The views of the graduate school viola and violin instructors related to instrument pedagogy curriculum] Doctorate Dissertation, Afyon Kocatepe University, Afyonkarahisar, Turkey.

Büyüköztürk, Ş. Çakmak, E. K. Akgün, Ö. E. Karadeniz, Ş., & Demirel, F. (2011). *Bilimsel araştırma yöntemleri*. (10. baskı). [Scientific research methods] [10th edition] Ankara: Pegem Akademi Publishing.

Coşkuner, S. (2007). *Türkiye'de Anadolu güzel sanatlar liseleri (yaylı çalgılar) bireysel çalgı eğitimi dersinde piyano eşlikli çalışmalara ilişkin öğretmen görüşleri. Teachers opinions on piano accompanied studies in Turkish Anatolian high school of fine arts (strins) individual instrument education lesson] [* Master Thesis. Gazi University, Ankara, Turkey.

Delikara, A. (2002). Ülkemizdeki eğitim fakülteleri gseb müzik eğitimi abd keman eğitiminde yaygın olarak kullanılan keman metotlarının keman eğitimi ders programına yönelik olarak incelenmesi. [This is the study of violin education in the subject of commonly used violin education methods oriented in lesson programmes of violin education in education department of fine arts, department of main principals of music education in our country] Master Thesis. Abant İzzet Baysal University, Bolu, Turkey.

Haner, O. (2018). *Türk müziği ezgi yapılarına dayalı keman eğitimi modeli [*A model for violin education based on ethnic Turkish melody and motifs] Doctorate Dissertation, İnönü University, Malatya, Turkey.

Karadağ, E. (1997). Haydar tatlıyay hayatı, eserleri, besteciliği. [The biography of Haydar Tatlıyay, his works and composition] Master Thesis. Ege University, İzmir, Turkey.

Miskelly, J. (2018). Fifths: An approach to violin technique for the left hand as taught by rodney friend. Doctorate Dissertation University of Kentucky, Lexington, Kentucky

Parasız G. (2009). *Keman öğretiminde kullanılmakta olan çağdaş Türk müziği eserlerinin seslendirilmesine yönelik olarak oluşturulan hazırlayıcı alıştırmaların işgörüsellik ve etkililik yönünden incelenmesi* [Examining preparatory exercises directed towords vocalization in contemporary Turkish music works used in violin teaching with regard to usefulness and effectiveness] Doctorate Dissertation, Gazi University, Ankara, Turkey.

Reeves, J. S. (2018). Gateways to 20th century violin repertoire: Selections from Luciano Berio's Duetti per due Violini. Doctorate Dissertation The University of North Carolina, Greensboro.

Say, A. (2005). *Müzik sözlüğü*. (2. baskı) [Music dictionary] [2nd edition]. Ankara: Müzik Ansiklopedisi Publishing.

Şen, Ü. S. (2011). *Müzik öğretiminde bilgisayar destekli programlı öğretim yönteminin etkililiği [Efficiency of the computer-assisted programmed training in music teaching] Doctorate* Dissertation, Gazi University, Ankara, Turkey.

Tanrıverdi, A. (1997). Güzel sanatlar liselerinin müzik bölümlerinde uygulanan çalgı eğitimi ve viyolanın çalgı eğitimi içerisindeki yeri [Instrument education applied in the music departments of fine arts high schools and the place of viola in instrument education] Journal of *Mavi Nota Music and Arts*,16, 25.

Tarkum, E. (2006). Keman eğitiminde rol oynayan faktörler [Factors playing a role in violin education] Journal of *Zonguldak Bülent Ecevit Üniversity Social Sciences*, *2*(4), 169-173.

Taşçı, G. (2012). *Türk halk musikisi saz eserlerinin ortaöğretim mesleki keman eğitiminde kullanım olanakları yönüyle incelenmesi [Research of Turkish Folk Music instrument works at secondary school occupational violin education in terms of usage opportunities] Master* Thesis. Trakya University, Edirne, Turkey.

Taşdemir, T. (2020). Keman öğretiminin tarihsel gelişimi, uygulanan öğretim süreçleri, okulları ve günümüzdeki durumu üzerine bir inceleme. [An examination on the historical development of violin teaching, applied teaching processes, schools and the current situation] Doctorate Dissertation, İnönü University, Malatya, Turkey.

Uçan, A. (1997). *Müzik eğitimi temel kavramlar-ilkeler-yaklaşımlar*. (2. baskı) [Music education basic concepts-principles-approaches] [2nd edition]. Ankara: Müzik Ansiklopedisi Publishing.

Uçan, A. (2005). *Müzik eğitimi* (3. baskı) [Music Education] [3nd edition] Ankara: Evrensel Müzikevi.

Uslu, M. (2012). Nitelikli keman eğitimine yönelik yaklaşımlar [Approaches to qualified violin education] Journal *of Education and Training Research*, *1*(4), 1-11.

Yıldırım, K. (2009). *Kodaly yönteminin ilköğretim öğrencilerinin keman çalma becerisi, özyeterlik algısı ve keman çalmaya ilişkin tutumları üzerindeki etkisi* [The effects of the Kodaly Method on the primary school students' ability of playing the violin, perceptions of self-efficacy, and attitudes towards playing the violin] Doctorate Dissertation, Dokuz Eylül University, İzmir, Turkey.

BUEFAD | 2021, Volume 10, Issue 3, 551-570
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.945696

A Study on Pre-service English Teachers' Cyberloafing Behaviours During Online Courses

Ceyhun KARABIYIK[a*]

a* Asst. Prof. Dr., Ufuk University, (https://orcid.org/0000-0003-1408-931X), *ceyhun.karabiyik@ufuk.edu.tr

Research Article	Received: **31.05.2021**	Revised: **02.09.2021**	Accepted: **02.09.2021**

Abstract

Student cyberloafing is a concept that has been mainly investigated in face-to-face educational settings and there are only a few studies that concentrate on this issue in online settings. Therefore, to contribute to the existing line of literature in this respect, the current study sought to explore the types of cyberloafing activities students engage with during online classes, their reasons behind these behaviours, and their views on the possible solutions to prevent these. The sample of the study consisted of 68 preservice English teachers from a foundation university in Central Anatolia, Turkey. A qualitative survey research design was adopted in this study and to that end, data were collected using an online survey instrument that included a demographic information form and three open-ended questions related to the aims of the research. To seek answers to the research questions, data were analysed using thematic analysis. The results showed that preservice English teachers engaged with a wide variety of cyberloafing activities. Moreover, emerging themes with respect to reasons for cyberloafing were instructor, student, course-content, learning environment, and technology-related reasons for cyberloafing whereas themes regarding possible solutions to prevent it were instructor, student, and institution-based solutions.

Keywords: cyberloafing, preservice English teachers, higher education, online education.

İngilizce Öğretmen Adaylarının Çevrimiçi Dersler Sırasında Siberaylaklık Davranışları Üzerine Bir Araştırma

Öz

Öğrenci siberaylaklığı daha çok yüz yüze eğitim ortamlarında araştırılan bir kavramdır ve çevrimiçi ortamlarda bu konuya odaklanan yalnızca birkaç çalışma mevcuttur. Bu nedenle, mevcut alan yazına bu açıdan katkıda bulunmak amacıyla, bu çalışma, öğrencilerin çevrimiçi derslerde gerçekleştirdikleri siberaylaklık etkinliklerinin türlerini, bu davranışların arkasındaki yatan nedenleri ve bunları önlemek için olası çözümlere ilişkin öğrenci görüşlerini araştırmaya çalışmıştır. Araştırmanın örneklemini Orta Anadolu'da bir vakıf üniversitesinden 68 İngilizce öğretmeni adayı oluşturmuştur. Bu çalışmada nitel bir anket araştırma tasarımı benimsenmiş ve bu amaçla veriler demografik bilgiler ve araştırma sorularına ilişkin üç sorudan oluşan çevrimiçi bir anket aracı kullanılarak toplanmıştır. Araştırma sorularına cevap aramak için, veriler tematik analiz kullanılarak analiz edilmiştir. Sonuçlar, İngilizce öğretmen adaylarının çok çeşitli siberaylaklık faaliyetleriyle meşgul olduklarını gösterdi. Ayrıca siberaylaklık nedenleri ile ilgili olarak ortaya çıkan temalar siberaylaklık için eğitmen, öğrenci, ders içeriği, öğrenme ortamı ve teknoloji ile ilgili nedenler iken, bunun önlenmesine yönelik olası çözümlere ilişkin temalar ise eğitmen, öğrenci ve kurum bazlı çözümlerdir.

Anahtar kelimeler: siberaylaklık, İngilizce öğretmen adayları, yükseköğretim, çevrimiçi eğitim.

To cite this article in APA Style:

Karabıyık, C. (2021). A study on pre-service English teachers' cyberloafing behaviours during online courses. *Bartın University Journal of Faculty of Education, 10*(3), 551-570. https://doi.org/10.1016/buefad.945696

1 | INTRODUCTION

Availability and affordability of internet has brought about many opportunities in the field of education whether it be the wealth of resources or learning opportunities that can be utilized in and beyond the classroom. As many would agree the utilization of the internet for educational purposes can be facilitative and enhance the quality of both learning and teaching. Having said that, its use for non-academic purposes during class hours may be problematic. Such usage of the internet is termed as cyberloafing (Polito, 1997) or cyberslacking (Greengard, 2000) and is classified as a cyberdeviant act (Charlier, Giumetti, Reeves, & Greco, 2017). The concept first became popular in business environments and was defined by Lim (2002) as employees' voluntary use of their institutions' internet during working hours to surf web sites for personal affair and check personal e-mails. On the other hand, in educational contexts, whereas some researchers considered this concept as a tendency (Kalaycı, 2010; Varol & Yildirim, 2018) others treated it as an act (Akbulut, Dursun, Dönmez, & Şahin, 2016; Arabaci, 2017; Gerow, Galluch, Thatcher, 2010; Taneja, Fiore, & Fischer, 2015; Yilmaz, Yılmaz, Öztürk, Sezer, & Karademir , 2015). Kalaycı (2010), on the other hand, defined cyberloafing as the tendency and/or the act of using the internet during class hours for affairs that are not related to the course content. In general terms, it can be defined as the non-academic utilization of the internet during any mode of education.

Owing to the advancements in technology, internet access is no longer limited to desktop computers. It can be accessed via mobile phones, tablets, or even wristwatches all or some of which are owned by students and brought into learning environments. This in turn makes access to internet in educational settings a double-edged sword. As Adams (2006) asserts, it can either be a splendid teaching tool or a barrier to learning. Indeed, engagement in non-academic uses of the internet during class hours whether it be face to face education or online is a cause for concern (Akbulut et al., 2016; Baturay & Toker, 2015). At the end of the day, it is a form of multitasking and involves, as Ophir, Nass, and Wagner (2009) put it, "a person's consumption of more than one item or stream of content at the same time" (p. 15583). Past research has revealed that concurrent engagement with several tasks results in more unproductive performance compared to engagement with several tasks individually (Pashler, 2000). This is due to finite human cognitive capacity (Lepp, Barkley, Karpinski, & Singh, 2019), that is further divided when one attends more than one task at a time (May & Elder, 2018). This idea is also in keeping with the cognitive bottleneck theory (Welford, 1967), cognitive load theory (Sweller, van Merriënboer, & Paas, 1998), and cognitive theory of multimedia learning (Mayer, 2005), which prescribe that multitasking in learning environments will lead to reductions in performance.

According to Sarıtepeci (2019) cyberloafing hampers the effectiveness of learning and teaching activities carried out in educational environments. In fact, studies have shown some adverse educational effects and consequences of cyberloafing. Non-academic use of the internet in face-to-face educational settings was found to result in distraction, lower participation (Brubaker, 2006), lower engagement, academic dishonesty (Skolnik & Puzo, 2008), and lower academic achievement (Alghamdi, Karpinski, Lepp, & Barkley, 2020; Dursun, Dönmez, & Akbulut, 2018; Lepp et al., 2019; Ravizza, Hambrick, & Fenn, 2014, Wu, Mei, & Ugrin, 2018). Most media devices with which online education is carried out allow for multitasking; besides, nowadays most college students own multiple multimedia internet devices whether they be mobile or not. Indeed, studies that have concentrated on online education settings have also yielded similar results with respect to the negative link between cyberloafing and academic achievement in online education settings (Alghamdi et al., 2020; Lepp et al., 2019).

Insights into the kinds of cyberloafing behaviours that students engage during lectures are evident in past literature. Studies that concentrate on types of cyberloafing mainly rely on scales or checklists and report either descriptive statistics regards individual items or predetermined sub-dimensions. Some of these studies used Kalaycı's (2010) checklist and cyberloafing scale. Those that utilized or expanded on her checklist

formed for daily internet-based activities identified in-class behaviours like shopping online, visiting holiday/travel sites, visiting interesting sites, collecting information about notions irrelevant to lesson, searching biographic information of persons on search engines, pursuing interesting subjects in search engines, visiting web sites about banking or finance, visiting online shopping sites, visiting auction sites, visiting chat rooms, booking accommodation for travel/holiday, visiting sites about finding job or career, playing online games, developing personal web pages, checking e-mails, visiting discussion groups, visiting virtual communities, downloading files, reading blogs, visiting news groups and notice boards, sending and receiving instant messages, visiting news sites, visiting websites about sports, checking weather forecast, and visiting social networks (e.g. Kurt, 2011; Varol & Yıldırım, 2017, 2019; Yaşar & Yurdugül, 2013). On the other hand, whereas some studies (e.g., Arabacı, 2017; Baturay & Toker, 2015) used Kalaycı's (2010) cyberloafing scale that classified cyberloafing activities as personal, socializing, and news follow-up, other studies (e.g., Bağrıaçık-Yılmaz, 2017; Keser, Kavuk, & Numanoglu, 2016; Yılmaz et al., 2015) used a scale by Yaşar (2013), which is an updated version of Kalaycı's (2010) scale and reported sub-dimensions of cyberloafing as individual, search, social, and news. Moreover, Tanriverdi and Karaca (2018) identified Facebook, music/TV series/movie sites, and game sites as students preferred ways to cyberloaf using Yaşar's (2013) scale. Furthermore, using a scale developed by Bozanoğlu (2004), Çok and Kutlu (2018) also reported cyberloafing behaviours under the categories personal, search, social, and news.

Some other researchers (e.g. Knight, 2017; Koay, 2018; Şenel, Günaydın, Sarıtaş, & Çiğdem, 2019), on the other hand, used Akbulut et al.'s (2016) scale and reported checking posts, checking social networking profiles, sharing content on social networks, liking posts, commenting on shared photos, posting status updates on social networks, tagging friends on photos, chatting, watching shared videos, shopping online, visiting deal-of-the-day websites, visiting online shopping sites, visiting auction sites, using online banking services, visiting online shops for used products, checking job advertisements, downloading music, watching videos online, listening to music online, downloading videos, downloading applications, visiting betting/gambling sites, betting and gambling online, checking online sport sites, playing online games, commenting on trending topics, posting tweets, reading tweets, favouriting a tweet, and retweeting a tweet as types of cyberloafing behaviours students engage with during class hours. In addition to this, there are also studies (e.g., Akgün, 2020; Çok, 2018; Dursun et al., 2018; Sarıtepecı, 2019) that used the same scale and reported its sub-dimensions sharing, shopping, real-time updating, accessing online content, gambling as types of cyberloafing behaviours students carry out. Otherwise, Seçkin & Kerse (2017) identified visiting virtual communities, watching videos, reading blogs, social media, downloading music, video, and documents, playing online games, surfing on the internet, checking e-mails, online chatting, and internet search as cyberloafing behaviours realized by students using a scale developed by Kaplan and Çetinkaya (2014). Distinct from the aforementioned studies, a study undertaken by Lepp et al., (2019) that compared multitasking behaviours of college students in both online and face-to-face settings, used the focus group method and identified texting, e-mailing, social networking, watching videos, off-task Internet surfing, listening to music, video gaming, talking with friends, and scribbling absentmindedly as types of cyberloafing activities students engaged with.

Moreover, studies examining the reasons behind students' engagement with cyberloafing activities in classroom settings are also evident in literature. In a study carried out by Ergün and Altun (2012) student-stated reasons for cyberloafing were categorized under five themes that were motivation, environment, teacher, goal setting, and time. On the other hand, the study carried out by Bağrıaçık-Yılmaz (2017) showed that students' reasons for cyberloafing were categorized under three themes. These were personal factors, work-related factors, and external factors. In a study conducted by Dursun et al. (2018), the rationales behind students' cyberloafing behaviours were grouped under two themes that were student and instructor related. In another study that investigated students' perspectives on in-class cyberloafing behaviours, Varol and Yıldırım (2018) categorized student motives to undertake such behaviours under two themes that were

instructor and learner related. In the study undertaken by Şenel et al. (2019), unwillingness to learn, notices and communication, curiosity, and spending the time in an enjoyable way were the themes that aroused from the data. In a more recent study carried out by Varol and Yıldırım (2019) students' reasons for cyberloafing was grouped under four themes and were named as instructor-related, course-content-related, student-related, and learner environment-related reasons. In a study that elicited teachers' views about the reasons behind students' cyberloafing behaviours, Akgün's (2020) study revealed the education process and socio-psychological factors as main themes.

In addition, some studies explored student and instructor views on the possible solutions to prevent or minimize student cyberloafing during face-to face education. In one of those studies, Bağrıaçık-Yılmaz (2017) grouped the student-stated precautions taken by students for cyberloafing under the themes termed avoidance and self-control. In another study carried out with students, Varol and Yıldırım (2018), categorized students' views on possible solutions for cyberloafing under two categories which were solutions for instructor-based and learner-based reasons for cyberloafing. In another study carried out by Varol and Yıldırım (2019), views of students regard possible solutions to decrease cyberloafing were grouped under four themes named solutions to instructor-related reasons for cyberloafing, solutions to student-related reasons for cyberloafing, solutions to content-related reasons for cyberloafing, and solutions to environment-related reasons for cyberloafing. On the other hand, the study carried out by Akgün (2020) concentrated on teacher suggestions regard ways to prevent student cyberloafing and the emerging themes were labelled as giving seminars, course/course topic, warning /making public service announcement, and family effect.

The number of studies concentrating on cyberloafing behaviours in educational settings are on the rise. However, as it can be seen from the discussion above, most of these studies are quantitative in nature and there has been an ongoing call for undertaking more qualitative studies (Gökçearslan, Mumcu, Haşlaman, & Çevik, 2016; Rodriguez-Gomez, Castro, & Meneses, 2018; Şumuer, Gezgin, & Yıldırım, 2018; Tanrıverdi & Karaca, 2018; Sarıtepeci, 2019) to gain a deeper understanding of the phenomenon. There are studies (e.g., Varol & Yıldırım, 2019) that are based on qualitative inquiry concentrating on the reasons and views on possible ways to reduce or prevent cyberloafing behaviours in face-to-face educational settings. What is more, there is also a study carried out by Lepp et al., (2019) that concentrated on the types of behaviours in an online educational setting. However, to the best of my knowledge there is no study undertaken to date regard students' reasons for and possible ways to prevent cyberloafing in either online or emergency remote instruction settings as some scholars (e.g. Lepp et al., 2019) called for the necessity of such studies to promote student learning. Considering the debilitative effects of cyberloafing in educational contexts whether it be face-to-face or online, the current study aimed to explore cyberloafing during emergency remote instruction implemented due to the compulsory shift to online instruction because of the COVID-19 pandemic in an English teacher training program at a foundation university in Ankara, Turkey with a focus on the types of cyberloafing activities carried out by teacher trainees, their reasons for engaging with these, and possible solutions offered by them to prevent cyberloafing.

Research questions

The current study sought to explore preservice English teachers' cyberloafing activities during online instruction, their reasons, and possible solutions with respect to cyberloafing. To that end the following three research questions were formed and investigated:

1. What are the types of cyberloafing activities participants engage with during online instruction?
2. What are the reasons behind participants' engagement with cyberloafing during online instruction?
3. What are the participants' views about the possible solutions to prevent cyberloafing during online instruction?

2 | METHOD

RESEARCH DESIGN

A qualitative survey research design was adopted. To that end, a survey was utilised as a research tool to collect purely qualitative data (Terry & Braun, 2017). According to Braun, Clarke, Boulton, Davey, & McEvoy (2020), qualitative surveys include several open-ended questions designed by the researcher on a specific topic that are self-administered in a fixed and standard order to all participants. Rather than making selections from pre-determined options, participants type their responses in their own words (Braun & Clarke, 2013).

STUDY GROUP & CONTEXT

The study group of this research was composed of a purposeful sample of 68 pre-service instructors studying at the English Language Teaching Department of Ufuk University in Ankara, Turkey, who volunteered for the study and stated that they did cyberloaf during the emergency remote instruction period. Their department offers a 4-year teacher training program to students enrolled via a centrally administered university entrance exam. For that reason, it can be plausible to assume that they had homogeneous university entry levels. Normally, the classes were carried out in a face-to-face mode, however, due to the COVID-19 pandemic, a compulsory shift to emergency remote instruction was made and the last 8-week education was carried out in this way.

Initially, out of a possible 188 students 78 voluntarily responded to the online survey, which meant a 41.49% return rate. Moreover, 10 cases were excluded from the final data since they declared that they did not cyberloaf during emergency remote learning. Therefore, the final data set included 68 responses. When the data was collected, 22 of them were in their freshman year, 13 of them were sophomores, 14 of them were juniors, and 19 of them were seniors. Moreover, 53 of them were females whereas 15 of them were males. 54 out of 69 participants were aged between 18 and 24, 11 of them were 25 to 34 years old, and the ages of the remaining 3 students were between 35 and 44.

DATA COLLECTION TOOLS

To collect data an online survey was designed by the researcher and administered to the students. The survey contained two types of questions. These were demographic and topic related questions. The demographic questions had a multiple-choice response format and asked respondents to select an age category (i.e. 18-24, 25-34, 35-44, or 45-54), gender (i.e. female or female), and year of study (1, 2, 3, or 4). On the other hand, topic related questions were comprised of 3 open-ended questions. The questions were designed by the researcher considering the relevant line of literature. After that expert opinion was taken from two scholars who had expertise in English Language Teaching and in Computer Education and Instructional Technologies. As a next step, a small focus group of 7 students that did not take part in the study were invited to review the questions and comment on ambiguities. After discussion and consensus, the final versions of the questions that were administered to the study group were as follows:

1. What were the online activities you engaged with that were not related to the course content using your mobile device, personal computer, or laptop during online classes? Please specify.

2. What were your reasons behind engaging with online activities that were not related to the course content using your mobile device, personal computer, or laptop during online classes? Please specify.

3. What can be done to prevent students from engaging with online activities that are not related to the course content using their mobile device, personal computer, or laptop during online classes? Please specify.

Data Collection

Upon receiving ethical clearance, data were collected using an online survey creation and administration software (i.e., survey monkey). The classes were finished and since the education was carried out via online means, students were invited to take part in the study via announcements made on WhatsApp group chats. To that end, the web link to the survey was shared with the students and they were asked to participate in the study if they volunteered to do so and answer the questions in a week starting from the 6th of July 2020 till the 12th of July 2020. An analysis of logs showed that it took students approximately two minutes to answer all the questions on the online survey.

Data Analysis

Thematic analysis as set forth by Braun and Clarke (2019) was used to analyse the responses to the open-ended questions. To that end, the steps of the analysis included familiarization with the data, coding, searching for themes, reviewing themes, defining and naming themes, and reporting the results. As there was a limited number of studies (e.g. Lepp et al., 2019) exploring the types of cyberloafing and no studies with respect to the reasons and solutions for cyberloafing in online education settings coding was carried out using a conventional approach (Hsieh & Shannon, 2005), where the coding was based on emergent data. Even though preconceived themes were not imposed, some emerging codes with respect to the reasons for cyberloafing in the online education context matched the themes (i.e. instructor, content, learner, and environment-related) of Varol & Yıldırım (2019). Therefore, they were thematized as such; whereas the codes that did not fit these themes were grouped under unique themes. Additionally, the identities of the participants were kept anonymous throughout the analyses and reporting phases to ensure anonymity. To that end, each respondent was assigned a number and referred to as PX where P means participant and X stands for the number they were assigned.

Trustworthiness

After the analysis of the data, in line with the suggestions of Creswell and Creswell (2018), an expert in foreign language education and another expert in educational sciences were invited to examine the processes, meanings, and interpretations related to the data analyses to ensure its validity and reliability. The differences were discussed till consensus was reached.

Research Ethics

Prior to data collection ethical clearance was sought from the Social Sciences and Humanities Research and Publication Ethics Committee of the higher education institution the study was carried out. The committee granted ethical clearance for the study with its decree dated 30.06.2020 and numbered 2020/45. Ethical principles and guidelines were followed during all phases of this study.

3 | Findings

The findings are presented in four sections. First, the types of cyberloafing activities participants engaged with will be revealed. Next, their reasons for undertaking such behaviours will be unearthed. Lastly, their suggestions to prevent such behaviours will be presented.

Types of cyberloafing activities students engaged with during online classes

A quantitative content analysis of the responses provided by the 68 students who cyberloafed during online classes regard the types of cyberloafing they engaged with revealed many ways in which they multitasked. The frequencies related to student responses are shown in Table 1.

Table 1. Frequencies related to types of cyberloafing behaviours

Category	f	%
Online chatting	39	57.35
Online gaming	16	23.53
Online shopping	15	22.06
Social networking	11	16.18
Doing off-topic online research	5	7.35
Reading off-topic online content	4	5.88
Listening to music online	4	5.88
Watching online content	4	5.88
Surfing on the internet	2	2.94
Online drawing	1	1..47

An examination of Table 1 shows that most 39 (57.35%) students who cyberloafed during online courses engaged with online chatting. In this regard, whereas one female freshman (P44) stated "I chat on the chat section with my friends" another student who is a female sophomore (P43) wrote "I am chatting with my best classmate". Others simply typed "chat" (e.g., P5) or "chatting" (e.g., P9) as a response. On the other, hand, 23.53% of the students stated that they played online games during online class sessions. These students explicitly stated that they played online games by typing either "online games" (e.g., P68) or "playing online games" (e.g., P25). Moreover, 15 of the participants (22.06%) stated that they shopped online during online classes. On that note, one male freshman stated "…besides I check out online shopping sites for special offers from time to time" (P33). On the other hand, the rest of the participants openly wrote "shopping" (e.g., P3) as a response. Social networking was another type of cyberloafing behaviour that was mentioned by 11 participants (16.18%). In this respect whereas some typed "surfing the social media" (P64), some wrote "hanging out on social media" (P2), whereas the rest simply stated, "social media" (e.g., P22).

Some less commonly engaged types of cyberloafing were doing off-topic online research (7.5%), reading off-topic online content (5.88%), listening to music online (5.88%), watching online content (5.88%), surfing on the internet (2.94%), and online drawing (1.47%). The off-topic online research variety was formed in accordance with the five responses typed as "research" by the participants (e.g., P50). With respect to reading online content that is not related to the course content one male sophomore participant stated, "reading stories, reading news" (P6). Another just typed "reading news" (P34) whereas the rest just wrote news (P23 and P34). Moreover, four participants stated that they listened to music during online courses. The typed responses in this regard were "music" (e.g., P7) and "listening to music" (P56). On the other hand, 4 participants stated that they watched online content during online classes. The responses typed in this regard were "watching films" (e.g., P27), "TV series" (P28), and "video" (P62). Moreover, the frequency of responses to the surfing on the internet was 2 and was created based on participant responses typed as "surfing". Lastly, one student (P43) stated "Besides, I make drawings in some classes" which resulted in the forming of the online drawing variety.

Reasons for cyberloafing during online classes

The analysis of participant responses revealed 6 distinct themes with respect to their motivations to carry out cyberloafing. These themes were instructor, student, course content, learning environment, peer, and technology related reasons. The themes instructor, learner/student, content, and environment related reasons for cyberloafing were previously established themes by Varol and Yıldırım (2019) in face-to-face instructional contexts. On the other hand, emergent themes in the current study were peer and technology related reasons.

Theme 1: Instructor-related reasons for cyberloafing

This theme addressed reasons for cyberloafing resulting from the instructors. The codes included "teacher-centred instruction", "lack of student monitoring", "monotonous lecturing", "lack of breaks", "inefficiency in online lecturing", "reading from slides", "technological incompetence", and "lack of eye-contact". The frequencies and percentages related to each code are tabulated in Table 2.

Table 2. Instructor-related reasons for cyberloafing

Codes	f	%
Teacher-centered instruction	24	35.29
Lack of student monitoring	12	17.65
Monotonous lecturing	8	11.76
Lack of breaks	5	7.35
Inefficiency in online lecturing	4	5.88
Reading from slides	2	2.94
Technological incompetence	2	2.94
Lack of eye-contact	1	1.47

The code "teacher-centred instruction" was the most frequently reported teacher-related reason for cyberloafing by the participants attracting 24 (35.29%) mentions. On that note one female sophomore (P41) mentioned that the instructors did not encourage student participation, a female senior (P59) touched on the non-interactive nature of the online classes, and another female sophomore (P43) strikingly responded as "…because some classes were like a radio program". "Lack of student monitoring" was the second most frequent teacher-related code with 12 connotations (17.65%). One female junior (P5) wrote "the teacher does not see us" whereas a senior female (P17) mentioned that it was not compulsory to open the cameras during online courses. The third most frequent code that appeared in the data was "monotonous lecturing" with 8 representations (11.76%). In this context a senior male (P66) wrote "…the instructor might be lecturing in a monotonous way…". The fourth most frequent theme was "lack of breaks" with 5 enunciations (7.35%). With regards to this code a female junior (P55) stated "I think that long online classes distract the attention of students…", whereas a female sophomore (P56) wrote "…students don't like long class hours…". Another code that emerged from participant responses was "inefficiency in online teaching" with 4 responses (5.88%) to that end. In this regard, whereas a female junior (P1) stated "teachers…and should teach in a more efficient way", a male freshman (P43) stated "we are in a difficult period and I think the teachers are uncertain about how to conduct classes". "Reading from slides" was another category unearthed from the data with 2 mentions (2.94%). A female sophomore (P42) explicitly wrote "…the teacher reading from slides" as a reason for her cyberloafing behaviour. "Technological incompetence" was another code with 2 connotations (2.94%). To exemplify, a female junior (P61) wrote "I kill time when I wait for the teacher to figure out the system". Lastly, "lack of eye contact" was the least frequent code (1.47%) that emerged from participant responses with only a female freshman (P19) stating "lack of eye contact" as a reason for undertaking cyberloafing during online classes.

Theme 2: Student-related reasons for cyberloafing

The second theme referred to reasons for cyberloafing that were related to the students themselves. The relevant codes were "personal affairs", "boredom", "lack of concentration", "personal problems", "improving focus", and "not understanding the teacher". The frequencies and percentages related to each code are presented in Table 3.

Table 3. Student-related reasons for cyberloafing

Codes	f	%
Personal affairs	15	22.06
Boredom	9	13.24
Lack of concentration	4	5.88
Personal problems	1	1.47
Improving focus	1	1.47
Nonattendance of peers	1	1.47
Peer pressure	1	1.47

The most frequently reported code with respect to student-related reasons for cyberloafing was "personal affairs" with 15 mentions (22.06%). In this respect, a female freshman (P11) mentioned messaging regards personal affairs and a female senior (P63) responded as "completion of other work to be done". The second most frequent code was "boredom" with 9 mentions (13.24%). On that note, a female freshman (P21) stated "it is totally about me I get bored". Other sample replies in this respect were "I get bored after a while" (P37) and "I sometimes get bored" (P61). The third most frequent code was "lack of concentration" with 4 mentions (5.88%). Whereas a female senior (P36) explicitly responded as "lack of concentration", a female freshman (P65) wrote "inability to concentrate on the lesson". The least frequent codes with single mentions (1.47% each) that emerged from the data were "personal problems" with a freshman female (P45) explicitly writing "personal problems" as a response; "improving focus" with a female junior (P46) responding as "To focus better. I can focus better when I am busy with something", "not understanding the teacher" with a female sophomore (P42) producing a response with the same wording, and nonattendance of peers and peer pressure with a female sophomore (P30) stating "nonattendance during the class. No matter how much I would like to participate in the lesson, there is silence. When I talk, 'the lesson got longer' issue comes up".

Theme 3: Course content-related reasons for cyberloafing

The third theme with respect to reasons behind cyberloafing that emerged from the data was related to the course content. In respect thereof, "dullness", "repetitiveness", and "videos" were the codes. The frequencies and percentages related to these codes are presented in Table 4.

Table 4. Course content-related reasons for cyberloafing

Codes	f	%
Dullness	15	22.06
Repetitiveness	1	1.47

"Dullness" on the course content was the most frequently mentioned code with 15 mentions (22.06%). For example, when asked about participants' reasons for cyberloafing during online classes, a male senior (P47) wrote "there is nothing interesting in some courses", whereas another male senior (P66) responded as "the course content can be boring". Moreover, "repetitiveness" was another code that emerged from the data

with a single mention (1.47% each) with a male freshman (P33) stating "re-teaching of content that was covered before".

Theme 4: Learning environment-related reasons for cyberloafing

This theme addressed participants' reasons for cyberloafing that were related to the learning environment. The codes for this theme were the "virtual environment" and the "home environment" as presented in Table 5.

Table 5. Learning environment-related reasons for cyberloafing

Codes	f	%
Virtual Environment	15	22.06
Home environment	7	10.29

With respect to learning environment-related reasons for cyberloafing, "virtual environment" was the most frequently cited code with 15 connotations (22.06%). In this regard, a male senior (P4) wrote "the freeness of the virtual environment", whereas a junior male (P52) and a female sophomore (P24) responded directly as "the virtual environment" when asked about the reasons for engagement with cyberloafing. On the other hand, the code "home environment" had 7 mentions (10.45%). To exemplify, when asked about the reasons behind cyberloafing a female freshman (P22) wrote "the comfort of the home environment", while another female freshman (P44) responded as "the unsuitability of the home environment to listen to the lecture".

Theme 5: Technology-related reasons for cyberloafing

The last theme that emerged from the data was technology-related reasons for cyberloafing. It includes the codes "online class recordings", "notifications", "devices", "bad internet connection", and "internet disconnection" as presented in Table 6.

Table 6. Technology-related reasons for cyberloafing

Codes	f	%
Online class recordings	3	4.41
Bad internet connection	2	2.94
Notifications	1	1.47

The most frequently connotated code on technology-related reasons for cyberloafing was "online class recording" with 4 mentions (4.41%). In this connection, whereas a female sophomore (P60) wrote "feature that enables us to watch it later", a female senior (P28) responded as "…because online classes can be re-watched". "Bad internet connection" was another code that emerged from the data, which also had 2 mentions (2.94%). On that note, whereas a male sophomore (P6) explicitly wrote "bad connection" as a reason for his cyberloafing, a male freshman (P33) wrote "disconnections related to the internet during classes and voice interruptions". Lastly, notifications was another code related to technology-driven reasons for cyberloafing with a single mention (1.47%). To exemplify, a female freshman (P16) typed "notifications distract my attention".

Student views on possible solutions to prevent cyberloafing during online classes

Lastly, analysis of student responses revealed three distinct themes on the possible solutions to prevent cyberloafing during online classes. These were named as instructor, student, and institution-based solutions.

The frequency distribution of the themes show that participants mainly offered solutions centred around the instructors, followed by themselves, and the institution.

Theme 1: Instructor-based solutions

This theme addressed solutions that can be undertaken by instructors to prevent cyberloafing during online classes. It was comprised of 12 codes that were "conducting a more interactive lesson", "making student open their cameras", "taking attendance", "giving breaks", "making course content more interesting", "non-monotonous lecturing", "avoiding presentation of long videos", "avoiding repetition", "enriching course-content", "establishing eye-contact with students", "improving online teaching skills", and "using music, videos, and visuals". The frequencies and percentages related to these codes are presented in Table 8.

Table 8. Instructor-based solutions to prevent cyberloafing

Codes	F	%
Conducting a more interactive lesson	25	36.76
Making student open their cameras	10	14.71
Taking attendance	8	11.76
Giving breaks	6	8.82
Making course content more interesting	4	5.88
Non-monotonous lecturing	2	2.94
Avoiding presentation of long videos	1	1.47
Avoiding repetition	1	1.47
Enriching course-content	1	1.47
Establishing eye-contact with students	1	1.47
Improving online teaching skills	1	1.47
Using music, videos, and visuals	1	1.47

Among instructor-based solutions 25 responses (36.76%) (e.g., P33) centred around "conducting a more interactive lesson". For instance, whereas a female sophomore (P40) stated "…student engagement with extracurricular activities can be prevented by asking questions to them", a female freshman (P44) stated that "instructors should ask questions or do activities that will ensure greater participation". Moreover, in ten responses (14.71%), participants (e.g., P15 and P40) explicitly stated that instructors should make students open their cameras during classes. The code "taking attendance" was also a high-frequency response with 8 mentions (11.76%). For example, a female freshman (P22) stated that "attendance taken during online classes… will focus students only on the lesson", whereas a female freshman wrote "counting students for attendance" (P43) as a possible solution to prevent cyberloafing during online classes. The next most frequent solution offered by the participants with 6 mentions (8.82%) was "giving breaks". To exemplify, whereas a female senior (P47) stated that "classes should be shorter with breaks just like in face-to-face education", a female sophomore (P55) wrote "students don't like long classes, there should be breaks". Another code related to teacher-based solutions to cyberloafing that emerged from the data was "making course content more interesting" with four mentions (5.88%). To illustrate, a female freshman (P2) stated "making the course-content more interesting than social media" as her solution to prevent cyberloafing during online classes whereas a female junior (P3) wrote "it cannot be prevented if the course is not interesting". The code "non-monotonous lecturing" was enunciated by two participants (2.94%). A female junior (P31), for example stated that "…not reading monotonously from slides… can make a difference". Moreover, "avoiding presentation of long videos" (P6), "avoiding repetition" (P28), "enriching course-

content" (P26), "establishing eye-contact with students" (P19), "improving online teaching skills" (P1), and "using music, videos, and visuals" (P61) were other teacher-based solutions stated by the participants.

Theme 2: Student-based solutions

This theme dealt with solutions to cyberloafing during online classes that centred around the students. The codes of this theme were "assuming responsibility for learning", "prioritizing the lesson", "creating a silent/non-distracting learning environment", "assuring stable internet connection at home", "keeping away from devices", and "sparing time for classes". The frequencies and percentages with respect to participant responses were given in Table 9.

Table 9. Student-based solutions to prevent cyberloafing

Codes	F	%
Assuming responsibility for learning	3	4.41
Prioritizing the lesson	1	2.94
Creating a silent/non-distracting learning environment	1	1.47
Assuring stable internet connection at home	1	1.47
Keeping away from devices	1	1.47
Sparing time for classes	1	1.47

As it can be seen in Table 8, "assuming responsibility for learning" was the response with the highest frequency with 3 mentions (4.41%) and was explicitly stated by three participants (e.g., P7). On the other hand, "prioritizing the lesson" was another code that emerged from the data. In this respect, a female junior (P51) stated "giving priority to the lesson" as a possible solution to cyberloafing during online courses. Moreover, a female sophomore (P20) stated that "a silent and non-disruptive environment like a classroom should be created" which was coded as "creating a silent/non-distracting learning environment". A male sophomore (P6) on the other hand wrote "better connection" and this response was coded as "assuring stable internet connection at home". The codes "keeping away from devices" (P8), and "sparing time for classes" (P51) were also among codes that were formed in line with explicit responses given by the participants.

Theme 3: Institution-based solutions

The last theme with respect to solutions to prevent cyberloafing during online classes was related to the actions the higher education institution can take. The codes related to this theme were "finding an audit program", "assuring stable internet connection at the institution", and "using a program that does not run in the background" as presented in Table 10.

Table 10. Institution-based solutions to prevent cyberloafing

Codes	F	%
Finding an audit program	1	1.47
Assuring stable internet connection at the institution	1	1.47
Using an online lecturing tool that does not run in the background	1	1.47

With respect to institution-based solutions, a female freshman (P43) stated that "if education is to continue online, a configuration can be found to check everyone's computers, extracurricular activities and etc". On the other hand, a male freshman (P32) wrote "the instructor should have a stable internet connection…" whereas a female senior (P53) stated "discovering a program that does not run in the background" as possible solutions to prevent students from cyberloafing during online classes. These

responses were coded as “finding an audit program”, “assuring stable internet connection at the institution”, and “using a program that does not run in the background” respectively.

4 | Discussion & Conclusion

Cyberloafing is a concept that has been gaining popularity in educational research in the past decade. Even though there was a sufficient effort in trying to identify the types of cyberloafing behaviours learners engaged with, the reasons of engagement with this type of behaviours and possible solutions to minimize or prevent these was under-researched. Moreover, no study was identified that sought to explore the reasons for and possible solutions to cyberloafing in online contexts. To that end, this qualitative study was conducted to fill this gap in the literature.

The results indicate that the participants engaged with various non-curricular online activities during course hours. These were online chatting, gaming, shopping social networking, off-topic research, off-topic reading, listening, watching, surfing, and drawing. These results are to a great extent in line with previous research in both face to face (e.g. Akbulut et al., 2016; Akgün, 2020; Dursun et al., 2018; Yılmaz et al., 2015) and online instructional settings (Lepp et al., 2019). Only online drawing appeared as a distinct type of cyberloafing behaviour. The results are supportive of Ainley, Hidi, & Berndorff’s (2002) conclusion that students can have individual interest in specific types of activities, which according to Palmer, Dixon, and Archer (2017) leads to engagement in those specific types of behaviour.

This study also reports why the participants cyberloaf during class hours during online instruction. In this respect, the emerging themes underlined instructors, students, course-content, the learning environment, peers, and technology as drives to cyberloaf. Thematic results are to some extent consistent with that of Varol and Yıldırım (2019) except for technology-related reasons which emerged as a unique theme. With respect to teacher-related reasons, the codes suggest instructors’ lack of Technological Pedagogical Content Knowledge (TPCK), which is defined as the synthesis of pedagogical, content, and technological knowledge (Mishra & Koehler, 2006), as the reason for their cyberloafing behaviours. According to Koehler and Mishra (2009), TPCK is the cornerstone of effective instructional practices with technology and can help to compensate for problems faced in this respect. Therefore, a well-developed TPCK for instructors can be considered as a must in online instructional settings to hinder deviant student behaviors like cyberloafing.

On the other hand, the results with respect to student-based reasons for cyberloafing are to a great extent in line with previous studies (e.g., Bağrıaçık-Yılmaz, 2017; Ergün & Altun, 2012; Şenel et al., 2019; Varol & Yıldırım, 2018; 2019). The results show that respondents attached greater importance to their personal problems and affairs, got or felt bored and could not or did not concentrate during online classes. Taken together these motives indicate a lack of situational interest (Hidi & Harackiewicz, 2000) towards online classes. As situational interest is central to self-regulation, task engagement, and persistence (Arnone, Small, Chauncey, & McKenna, 2011; Harackiewicz & Hulleman, 2010; Thoman, Smith, & Silvia, 2011) in educational contexts, the lack of it can promote cyberloafing behaviours. A seemingly unusual finding of the study was that cyberloafing was thought to improve focus during online classes. In this respect Lim and Chen (2012) offer that cyberloafing can indeed offer a break and allow for refocus of attention when one is bored and stressed. On the other hand, nonattendance of peers and peer pressure appeared as distinct student-related reasons for cyberloafing. With respect to these, negative social norms (Venkatesh, Morris, Davis, & Davis, 2003) regards contributing to the class discussion during online class sessions seem to have prompted students to cyberloaf.

Results with respect to course content related reasons were also in line with the study of Varol and Yıldırım (2019). The perception of content as beneficial and meaningful is significant in developing interest towards it (Linnenbrink-Garcia et al., 2010), which in turn is linked with engagement (Flowerday, Schraw, & Stevens, 2004) and task involvement (Durik & Harackiewicz, 2007), and self-regulation (Harackiewicz, Durik,

Barron, Linnenbrink-Garcia, & Tauer, 2008). The results with respect to course-content related reasons indicate that the perceived dullness and repetitiveness of course-content by the participants may have resulted in a lack of interest towards the online lessons and promoted cyberloafing behaviours.

The learning environment as a promoter of cyberloafing behaviour was evident in previous studies as well (e.g., Ergün & Altun, 2012, Varol & Yıldırım, 2019). However, as this study took place during online education during the Covid-19 pandemic with lockdowns in place, the environment-related reasons were the virtual and home environment as the participants had to pursue their education from their homes via online means. As argued by Dabbagh and Kitsantas (2004), online education environments pose a challenge to the self-regulation capacities of students and lead to engagement problems. Moreover, establishment of a quiet environment is a crucial aspect of online learning (Buck, 2016; Çakıroğlu, 2014) and because of the lockdown the home environment in which the participants pursued their education might have been overcrowded and distractive.

Technology-related reasons were also evident as reasons for participants' cyberloafing behaviours. Re-watching online recordings was found to have a positive effect on student performance (Palmer, Chu, & Persky, 2019), however, this study showed that the opportunity to re-watch online lectures from recordings acted as a promoter of cyberloafing behaviour. On the other hand, it is well-recognized that technical difficulties in online instruction can lead to reduced commitment (Jaggars, 2014). In this study, bad internet connection was another technology-related reason that emerged from the data. As Baytiyeh (2018) points out, a reliable internet connection is essential to ensure success in technology supported instruction. In the absence of a stable internet connection, students can get bored or distracted and engage with deviant behaviours like cyberloafing. Another source of cyberloafing in connection to technology was notifications, which was also evident as a reason for cyberloafing in Şenel et al.'s (2019) study. As Kushlev, Proulx, and Dunn (2016) report, notifications is a cause of inattentiveness, and as this study revealed, they can lead to cyberloafing.

Another aim of this study was to reveal participants' views on the possible ways to prevent cyberloafing during online instruction. To that end, the results showed that student responses centred around three stakeholders, which were instructors, students, and the institution. Among the teacher-based solutions unearthed in this study, conducting more interactive classes where students are not passive stakeholders in the learning process, giving breaks and non-monotonous lecturing were also revealed as possible student-stated solutions to cyberloafing in studies of Varol and Yıldırım (2018; 2019). On the other hand, making students open their cameras, taking attendance, and establishing eye-contact as instructor-based solutions relate to online classroom management strategies which was a theme evident in Varol and Yıldırım's studies (2018; 2019). Making course content more interesting, avoiding presentation of long videos and repetition, enriching course content, and using music, videos, and visuals, on the other hand, relate to more effective online content development, which according to (Mccombs 2015) is necessary to increase student engagement in online instruction.

On the other hand, the results with respect to student-based solutions indicate a need for self-regulation on part of the students to prevent cyberloafing. This is in line with Pellas's (2014) finding that student self-regulation and engagement in online learning environments are significantly correlated. Moreover, another student-based solution was ensuring a learning friendly environment at home. This is in line with Roddy et al.'s (2017) argument that user-friendly environments are crucial in online instruction to increase learner engagement. Ensuring a steady internet connection at home was another student-based solution to cyberloafing uttered by the participants, which is in line with Fabito, Trillanes, and Sarmiento's (2021) argument that continuous internet connectivity is a must for students to ensure complete student engagement during online instruction.

Last but not least, finding an audit program, assuring stable internet connection at the institution, and using an online lecturing tool that does not run in the background were the institution-based solutions to prevent cyberloafing mentioned by the participants. All these solutions relate to technological choices and investments made by the institution to conduct online instruction. This result is in line with the argument that establishing an efficient online learning experience that is positive and rewarding is the responsibility of the institution offering it (Pullan, 2011).

Practical Implications

By extending the literature on types of cyberloafing behaviors students engage with and by unearthing the reasons and possible solutions to cyberloafing during online instruction, this study makes an important contribution to the available literature on cyberloafing in educational settings which can still be considered as an under researched area. When and where students fail to self-regulate and engage with non-scholastic behaviors like cyberloafing during online classes adverse educational outcomes may become a reality. In such circumstances steps should be taken to ensure that educational goals are realized. Institutional competence in providing online synchronous and/or asynchronous education is vital in this respect. Higher education institutions that provide online modes of education should ensure that they have the necessary infrastructure to undertake it. Moreover, due to the swift advancement and changes in educational technologies they should provide continuous in-service training on online content development, teaching, and classroom management. Instructors should also be supported and encouraged to attend conferences to broaden their horizons on latest educational technologies. Furthermore, all teacher training programs should be revised to include more on technology integrated and supported modes of instruction to ensure technological competence in future instructors. Lastly, guidance regards self-management or elective courses on this issue can be offered to students in higher education institutions to ensure that that make most out of their educational experience.

Limitations and recommendations for future research

The data were collected from teacher trainees of the English language of a single higher education institution. Therefore, there is a need to conduct more studies in different educational settings with more participants to have a better understanding of cyberloafing behaviors, their causes, and possible solutions to these in online settings. Moreover, the inclusion of more or multiple stakeholders (i.e., instructors or administrators) in studies can also unearth valuable insights.

Statements of publication ethics

I declare that this research has no unethical problems that will limit the publication of the article.

Researcher' contribution rate

The study was conducted and reported by the corresponding author.

Conflict of interest

The author of this article declares that there is no conflict of interest in this study.

References

Adams, J. (2006). The part played by instructional media in distance education. *Studies in Media and Information Literacy Education*, *6*(2), 1-12.

Ainley, M., Hidi, S., & Berndorff, D. (2002). Interest, learning, and the psychological processes that mediate their relationship. *Journal of Educational Psychology*, *94*, 545–561.

Akbulut, Y., Dursun, O. O., Dönmez, O., & Şahin, Y. L. (2016). In search of a measure to investigate cyberloafing in educational settings. *Computers in Human Behavior, 55*, 616-625.

Akgün, F. (2012). Investigation of High School Students' Cyberloafing Behaviors in Classes. *TED Education & Science, 45*(201), 79-108. https://doi.org/10.15390/EB.2019.8419.

Alghamdi, A., Karpinski, A. C., Lepp, A., & Barkley, J. (2020). Online and face-to-face classroom multitasking and academic performance: Moderated mediation with self-efficacy for self-regulated learning and gender. *Computers in Human Behavior*, 102, 214–222. https://doi.org/10.1016/j.chb.2019.08.018

Arabacı, I. B. (2017). Investigation Faculty of Education Students' Cyberloafing Behaviors in Terms of Various Variables. *Turkish Online Journal of Educational Technology-TOJET, 16*(1), 72-82.

Arnone, M., Small, R., Chauncey, S., & McKenna, H. (2011). Curiosity, interest and engagement in technology-pervasive learning environments: A new research agenda. *Educational Technology Research and Development, 59*(2), 181–198. https://doi.org/10.1007/s11423-011-9190-9

Bağrıaçık-Yılmaz, A. (2017). Lisansüstü öğrencilerinin siber aylaklık düzeylerinin çesitli değiskenler açısından incelenmesi: karma bir çalışma [Investigation of cyberloafing levels of graduate students in terms of various variables: a mixed method study]. *Ahi Evran Üniversitesi Kırsehir Egitim Fakültesi Dergisi (KEFAD), 18*(2), 113-134.

Baturay, M. H., & Toker, S. (2015). An investigation of the impact of demographics on cyberloafing from an educational setting angle. *Computers in Human Behavior, 50*, 358-366.

Baytiyeh, H. (2018). Online learning during post-earthquake school closures. *Disaster Prevention and Management, 27*(2), 215-227. https://doi.org/10.1108/dpm-07-2017-0173

Bozanoğlu, D. (2004). Akademik güdülenme ölçeği: Geliştirilmesi, geçerliği ve güvenirliği. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 37, 83-98.

Braun, V., & Clarke, V. (2013). Successful qualitative research: A practical guide for beginners. Sage.

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise & Health, 11*(4), 589–597. https://doi.org/10.1080/2159676X.2019.1628806

Braun, V., Clarke, V., Boulton, E., Davey, L., & McEvoy, C. (2020). The online survey as a qualitative research tool. *International Journal of Social Research Methodology*. Advanced online publication. https://doi.org/10.1080/13645579.2020.1805550

Brubaker, A. T. (2006). *Faculty perceptions of the impact of student laptop use in a wireless internet environment on the classroom learning environment and teaching* (unpublished doctoral dissertation). School of Information and Library Science, University of North Carolina, Chapel Hill, North Carolina, USA.

Buck, S. (2016). In their own voices: Study habits of distance education students. *Journal of Library & Information Services in Distance Learning, 10*(3–4), 137–173. https://doi.org/10.1080/1533290X.2016.1206781.

Çakıroğlu, Ü. (2014). Analysing the effect of learning styles and study habits of distance learners on learning performances: A case of an introductory programming course. *The international review of research in Open and distributed Learning, 15*(4). https://doi.org/10.19173/irrodl.v15i4.1840

Charlier, S. D., Giumetti, G. W., Reeves, C. J., & Greco, L. M. (2017). Workplace cyberdeviance. In G. Hertel, D. L. Stone, R. D. Johnson, & J. Passmore (Eds.), *Wiley Blackwell handbooks in organizational psychology. The Wiley Blackwell handbook of the psychology of the Internet at work* (p. 131–156). Wiley-Blackwell. https://doi.org/10.1002/9781119256151.ch7

Creswell, J.W., & Creswell, J.D. (2018). *Research design: Qualitative, quantitative and mixed methods approaches* (5th ed.). Thousand Oaks: Sage.

Çok, R. (2018). *Üniversite öğrencilerinde çeşitli akademik değişkenlerin siber aylaklik davranişlarini yordama durumlarinin incelenmesi* [an investigation ofpredictive conditionsvarious academic variables on the university students'cyber slacking behaviors] (Master's thesis). İnönü University, Malatya, Turkey.

Çok, R., & Kutlu, M. (2018). Üniversite öğrencilerin ders esnasında ders dışı internet kullanım davranışları ile akademik güdülenme düzeylerinin çeşitli değişkenlere göre incelenmesi. *The Journal of International Lingual Social and Educational Sciences*, *4*(1), 1-21.

Dabbagh, N., & Kitsantas, A. (2004). Supporting Self-Regulation in Student-Centered Web-Based Learning Environments. *International Journal on E-Learning*, *3*(1), 40-47.

Durik, A., & Harackiewicz, J. (2007). Different strokes for different folks: How individual interest moderates effects of situational factors on task interest. *Journal of Educational Psychology*, *99*(3), 597-610.

Dursun, O. O., Dönmez, O., & Akbulut, Y. (2018). Predictors of Cyberloafing among Preservice Information Technology Teachers. *Contemporary Educational Technology*, *9*(1), 22-41.

Ergün, E., & Altun, A. (2012). Öğrenci gözüyle siber aylaklık ve nedenleri [The student's perspective of cyberloafing and ıts causes]. *Eğitim Teknolojisi: Kuram ve Uygulama*, *2*(1), 36–53.

Fabito, B. S., Trillanes, A. O., & Sarmiento, J. R. (2021). Barriers and challenges of computing students in an online learning environment: Insights from one private university in the Philippines. *International Journal of Computing Sciences Research*, *5*(1), 441-458. https://doi.org/10.25147/ijcsr.2017.001.1.51

Flowerday, T., Schraw, G., & Stevens, J. (2004). The role of reader choice and interest in reader engagement. *Journal of Experimental Education*, *72*(2), 93-114.

Gerow, J. E., Galluch, P. S., & Thatcher, J. B. (2010). To slack or not to slack: internet usage in the classroom. *Journal of Information Technology Theory and Application*, *11*(3), 5-24.

Gökçearslan, Ş, Mumcu, F. K., Haşlaman, T., & Çevik, Y. D. (2016). Modelling smartphone addiction: The role of smartphone usage, self-regulation, general self-efficacy and cyberloafing in university students. *Computers in Human Behavior*, *63*, 639-649. https://doi.org/10.1016/j.chb.2016.05.091

Greengard, S. (2000). The high cost of cyberslacking employees waste time Online. *Workforce*, *79*(12), 22-24.

Harackiewicz, J., Durik, A., Barron, K. Linnenbrink, E., & Tauer, J. (2008). The role of achievement goals in the development of interest: Reciprocal relations between achievement goals, interest, and performance. *Journal of Educational Psychology*, *100*(1), 105-122.

Harackiewicz, J. M., & Hulleman, C. S. (2010). The importance of interest: The role of achievement goals and task values in promoting the development of interest. *Social & Personality Psychology Compass*, *4*, 42-52. https://doi.org/10.1111/j.1751-9004.2009.00207.x

Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research*, *70*, 151–179.

Hsieh, H.-F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research*, *15*(9), 1277–1288. https://doi.org/10.1177/1049732305276687

Jaggars, S. S. (2014). Choosing between online and face-to-face courses: Community college student voices. *American Journal of Distance Education*, *28*(1), 27–38.

Kalaycı, E. (2010). *Üniversite öğrencilerinin siber aylaklık davranışları ile özdüzenleme stratejileri arasındaki ilişkinin incelenmesi* [The investigation of relationship between cyberloafing and self-regulated learning

strategies among undergraduate students] (unpublished doctoral dissertation). Hacettepe University, Ankara, Turkey.

Kaplan, M., & Çetinkaya, A. Ş. (2014). Sanal kaytarma ve Demografik Özellikler Açısından Farklılıklar: Otel İşletmelerinde Bir Araştırma [Meaningful Differences between Demographic Features and Cyberloafing: Case in Hotel Businesses]. *Anatolia: Turizm Araştırmaları Dergisi*, *25* (1), 26-34.

Keser, H., Kavuk, M., & Numanoglu, G. (2016). The relationship between Cyber-Loafing and internet addiction. *Cypriot Journal of Educational Science*, *11*(1), 37-42.

Knight, R.M. (2017). Academic Cyberloafing: *A Study of Perceptual and Behavioral Differences on In-Class Cyberloafing among Undergraduate Students* (unpublished master's thesis). East Carolina University, Greenville, North Carolina, USA.

Koay, K. (2018). Assessing Cyberloafing Behaviour among University Students: A Validation of the Cyberloafing Scale. *Pertanika Journal of Social Sciences & Humanities*, *26*(1), 409-424.

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? Contemporary Issues in Technology and Teacher Education, 9(1), 60-70.

Kurt, M. (2011). Siber Aylaklık Davranıslarının Karsılastırmalı Olarak _ Incelenmesi [Contrastive Study of Cyberloafing Behaviors]. In *5th International computer & instructional technologies symposium*, 22–24 September 2011, Fırat University, Elazığ- Turkey.

Kushlev, K., Proulx, J., & Dunn, E. W. (2016). "Silence Your Phones": Smartphone Notifications Increase Inattention and Hyperactivity Symptoms. *In Proceedings of the CHI Conference on Human Factors in Computing Systems*. ACM. 2016. pp. 1011-1020.

Lepp, A., Barkley, J. E., Karpinski, A. C., & Singh, S. (2019). College Students' Multitasking Behavior in Online versus Face-to-Face Courses. *SAGE Open*, *9*, 1-9. https://doi.org/10.1177/2158244018824505

Lim, V. K. (2002). The IT way of loafing on the job: Cyberloafing, neutralizing and organizational justice. *Journal of organizational behavior*, *23*(5), 675-694.

Lim, V. K., & Chen, D. J. (2012). Cyberloafing at the workplace: Gain or drain on work? *Behaviour and Information Technology*, *31*(4), 343-353. https://doi.org/10.1080/01449290903353054

Linnenbrink-Garcia, L., Durik, A. M., Conley, A. M., Barron, K. E., Tauer, J. M., Karabenick, S. A., et al. (2010). Measuring situational interest in academic domains. *Educational and Psychological Measurement*, *70*(4), 647–671. https://doi.org/10.1177/0013164409355699.

May, K., & Elder, A. (2018). Efficient, helpful, or distracting? A literature review of media multitasking in relation to academic performance. *International Journal of Educational Technology in Higher Education*, *15*(13), 1–17. https://doi.org/10.1186/s41239-018-0096-z

Mayer, R. E. (2005). Principles for managing essential processing in multimedia learning: Segmenting, pretraining, and modality principles. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 169–182). New York: Cambridge University Press.

McCombs, B. (2015). Learner-Centered Online Instruction. *New Directions for Teaching and Learning*, *144*, 57-71.

Mishra, P., & Koehler, M.J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teacher knowledge. *Teachers College Record*, *108*(6), 1017-1054.

Ophir, E., Nass, C., & Wagner, A. D. (2009). Cognitive control in media multitaskers. PNAS Proceedings of the National Academy of Sciences of the Unites States of America, 106(37), 15583-15587.

Palmer, S., Chu, Y., & Persky, A. M. (2019).Comparison of Rewatching Class Recordings versus Retrieval Practice as Post-Lecture Learning Strategies. *American Journal of Pharmaceutical Education*, *83*(9), 1958-1965. https://doi.org/10.5688/ajpe7217

Palmer, D. A., Dixon, J., & Archer, J. (2017). Using situational interest to enhance individual interest and science-related behaviours. *Research in Science Education*, *47*(4), 731–753. https://doi.org/10.1007/s11165-016-9526-x.

Pashler, H. (2000). Task switching and multitask performance (tutorial). In S. Monsell & J. Driver (Eds.), *Control of cognitive processes: Attention and performance XVIII* (pp. 277-307). Cambridge, MA: MIT Press.

Pellas, N. (2014). The influence of computer self-efficacy, metacognitive self-regulation and self-esteem on student engagement in online learning programs: Evidence from the virtual world of second life. *Computers in Human Behavior*, *35*, 157– 170. https://doi.org/10.1016/j.chb.2014.02.048

Polito, A. (1997). Cyberloafing can be curbed. *Workforce*, *76*(3), 18.

Pullan, M. (2011). Online support services for undergraduate millennial students. *Information Systems Education Journal*, *9*(1), 67-98.

Ravizza, S. M., Hambrick, D. Z., & Fenn, K. M. (2014). Non-academic internet use in the classroom is negatively related to classroom learning regardless of intellectual ability. *Computers & Education*, *78*, 109–114. https://doi.org/10.1016/j.compedu.2014.05.007

Roddy, C., Amiet, D. L., Chung, J., Holt, C., Shaw, L., McKenzie, S., Garivaldis, F., Lodge, J. M., & Mundy, M. E. (2017). Applying best practice online learning, teaching, and support to intensive online environments: An integrative review. *Frontiers in Education*, *2*(1), 1–10. https://doi.org/10.3389/feduc.2017.00059

Rodríguez-Gómez, D., Castro, D., & Meneses, J. (2018). Problematic uses of ICTs among young people in their personal and school life. *Comunicar*, *26*(56), 91–100. https://doi.org/10.3916/c56-2018-09

Sarıtepeci, M. (2019). Predictors of cyberloafing among high school students: unauthorized access to school network, metacognitive awareness, and smartphone addiction. *Education and Information Technologies*, *25*, 2201-2219.

Seçkin, Z., & Kerse, G., (2017). Üniversite Öğrencilerinin Sanal Kaytarma Davranışları ve Bu Davranışların Çeşitli Değişkenler Açısından İncelenmesi: Ampirik Bir Araştırma (Cyberloafing behaviors of university students and an examination of such behaviors in view of assorted variables: an empirical research). *Aksaray Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, *9*(1) 87-108

Şenel, S., Günaydın, S., Sarıtaş, M., & Çiğdem, H. (2019). Üniversite Öğrencilerinin Siber Aylaklık Seviyelerini Yordayan Faktörler [The Factors Predicting Cyberloafing Behaviors of Undergraduate Students]. *Kastamonu Eğitim Dergisi*, *27*(1), 95-105. https://doi.org/10.24106/kefdergi.2376

Skolnik, R., & Puzo, M. (2008). Utilization of laptop computers in the school of business classroom. *Academy of Educational Leadership Journal*, *12*(2), 1-10.

Sweller, J., Van Merriënboer, J. J. G., & Paas, F. (1998). Cognitive architecture and instructional design. *Educational Psychology Review*, *10*, 251–295.

Şumuer, E., Gezgin, D. M., & Yildirim, S. (2018). Üniversite Öğrencilerinin Ders Sırasında Öğretim Amacı Dışında Mobil Telefon Kullanımına Etki Eden Faktörlerin İncelenmesi. *Sakarya University Journal of Education*, *8*(4), 7-19. https://doi.org/10.19126/suje.378459

Taneja, A., Fiore, V., & Fischer, B. (2015). Cyberslacking in the classroom: potential for digital distraction in the new age. *Computers & Education*, *82*, 141–151.

Tanrıverdi, Ö., & Karaca, F. (2018) Investigating the relationships between adolescents' levels of cognitive absorption and cyberloafing activities according to demographic characteristics. *Addicta: The Turkish Journal on Addictions*, *5*(2), 285–315.

Terry, G., & Braun, V. (2017). Short but often sweet: The surprising potential of qualitative survey methods. In V. Braun, V. Clarke, & D. Gray (Eds.), *Collecting qualitative data: A practical guide to textual, media and virtual techniques* (pp. 15–44). Cambridge University Press

Thoman, D. B., Smith, J. L., & Silvia, P. (2011). The resource replenishment function of interest. *Social Psychological & Personality Science*, *2*, 592-599. https://doi.org/10.1177/1948550611402521

Varol, F., & Yıldırım, E. (2017). Siberaylaklik: öğretmen adayları ve mobil teknolojiler [Cyberloafing: teacher candidates and mobile technologies]. *Mersin University Journal of the Faculty of Education*, *13*(3), 1046-1057. https://doi.org/10.17860/mersinefd.321313.

Varol, F., & Yıldırım, E. (2018). An examination of cyberloafing behaviors in classrooms from students' perspectives. *Turkish Online Journal of Qualitative Inquiry*, *9*(1), 26-46.

Varol, F., & Yıldırım, E. (2019). Cyberloafing in higher education: Reasons and suggestions from students' perspectives. *Technology, Knowledge and Learning*, *24*(1), 129–142.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003). User acceptance of information technology: toward a unified view. *MIS Quarterly*, *27*(3), 425-478.

Welford, A. T. (1967). Single-channel operation in the brain. *Acta Psychologica*, *27*, 5–22. https:// https://doi.org/10.1016/0001-6918(67)90040-6

Wu, J., Mei, W., & Ugrin, J. C. (2018). Student cyberloafing in and out of the classroom in China and the relationship with student performance. *Cyberpsychology, Behavior and Social Networking*, *21*(3), 199–204.

Yaşar, S. (2013). *Universite ogrencilerinin denetim odagı ve bilgisayar laboratuvarlarına yonelik tutumlarinin siber aylaklik davranislarina etkisi* [the effects of students' locus of control and attitudes towards computer laboratory on their cyberloafing behaviour] (unpublished master's thesis). Hacettepe University, Ankara, Turkey.

Yaşar, S., & Yurdugül, H. (2013). The Investigation of Relation Between Cyberloafing Activities and Cyberloafing Behaviors in Higher Education. *Procedia-Social and Behavioral Sciences*, 83, 600-604.

Yılmaz, F. G. K., Yılmaz, R., Özturk, H. T., Sezer, B., & Karademir, T. (2015). Cyberloafing as a barrier to the successful integration of information and communication technologies into teaching and learning environments. *Computers in Human Behavior*, *45*, 290-298.

BUEFAD | 2021, Volume 10, Issue 3, 571-585
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.871566

An Analysis of Pre-Service Mathematics Teachers' Behavior on Mathematical Modeling Cycle

Zeynep ÇAKMAK GÜREL[a*], Ahmet IŞIK [b*]

a*Dr. Öğr. Üyesi, Faculty of Education, Erzincan Binali Yildirim University, Turkey (https://orcid.org/ 0000-0003-0913-3291)
zcakmak@erzincan.edu.tr

b* Prof. Dr. Ahmet IŞIK, Faculty of Education, Kırıkkale University, Turkey (https://orcid.org/ 0000-0002-1599-2570)

Research Article	Received: **06.02.2021**	Revised: **16.06.2021**	Accepted: **11.09.2021**

Abstract

The aim of the study is to determine the behavior on individual modeling cycle of pre-service teachers who participate in mathematical modeling learning environment and who do not. An action research method was employed in the study. The research participants consisted of 32 pre-service mathematics teachers, 17 of whom attended the learning environment while the rest did not. Two mathematical modeling tasks were used in the pre and post interview. In pre-interviews, pre-service teachers were interviewed individually, and the modelling routes of the pre-service teachers were closely monitored. At the end of the 11-week action plan, the post interview was made individually with the pre-service teachers. The recorded dialogues were analyzed during modeling cycles. It was determined that all pre-service teachers had a nonlinear cycle in the pre and post interviews. Pre-service teachers experienced in modeling repeated many steps back and forth. It was determined that they tried to revise the model when they reached a conclusion, so they had more complex modeling cycles. In addition, they mostly act in the world of mathematics. Pre-service teachers who are not experienced in modeling made a direct transition to real results without creating a mathematical model. It has been found that their areas of action are generally in the real world and they move less in the modeling cycle.

Keywords: Mathematical modeling, modelling cycle, modelling routes

Matematik Öğretmeni Adaylarının Matematiksel Modelleme Döngüsü Üzerindeki Davranışlarının İncelenmesi

Öz

Bu çalışmanın amacı, matematiksel modellemeyi öğrenme ortamına katılan ve katılmayan öğretmen adaylarının bireysel modelleme döngüleri üzerindeki davranışlarını belirlemektir. Çalışmada eylem araştırması yöntemi kullanılmıştır. Çalışma grubu, 17'si öğrenme ortamına katılan ve geri kalanı öğrenme ortamına katılmayan olmak üzere 32 matematik öğretmeni adayından oluşmaktadır. Ön ve son görüşmede iki adet modelleme durumu kullanılmıştır. Ön görüşmede öğretmen adayları ile bireysel olarak görüşme yapılmış ve öğretmen adaylarının modelleme rotaları yakından izlenmiştir. 11 haftalık eylem planı sonunda, son görüşmede yine öğretmen adaylarına bireysel olarak uygulanmıştır. Kaydedilen diyaloglar, modelleme döngüsü boyunca analiz edilmiştir. Tüm öğretmen adaylarının ön ve son görüşmede lineer olmayan modelleme döngüsüne sahip oldukları belirlenmiştir. Modellemeyi deneyimlemiş olan öğretmen adayları ileri geri birçok adımı tekrar etmişlerdir. Bir sonuca ulaştıklarında modeli revize etmeye çalıştıkları, bu yüzden de daha karmaşık modelleme döngülerine sahip oldukları belirlenmiştir. Ayrıca bu öğretmen adayları matematik dünyasında daha fazla hareket etmişlerdir. Modellemeyi deneyimlemeyen öğretmen adayları ise matematiksel model oluşturmadan gerçek sonuçlara doğrudan geçiş yapmışlardır. Hareket alanlarının genellikle gerçek dünyada olduğu ve modelleme döngüsünde daha az hareket ettikleri bulunmuştur.

Anahtar kelimeler: Matematiksel modelleme, modelleme döngüsü, modelleme rotası.

To cite this article in APA Style:

Cakmak Gürel, Z. & Işık, A. (2021). An Analysis of Pre-Service Mathematics Teachers' Behavior on Mathematical Modeling Cycle. Bartın University Journal of Faculty of Education, 10(3), 571-585. https://doi.org/10.1016/buefad.871566

1 | INTRODUCTION

Mathematical modelling represents a cyclic process between the real world and the mathematics world (Blum & Borromeo Ferri, 2009). Many researchers describe the mathematical modeling process as a cyclical process (Blum & Leiß, 2007; Greefrath & Vorhölter, 2016; Maaß, 2006; Schaap, Vos & Goedhart, 2011). Mathematical modeling is represented by a cyclic model that includes the real situation, the situation model (the mental representation of the situation), the real model, the mathematical model, the mathematical result and the real result stages (Blum & Leiß, 2007). There are different mathematical modeling cycles in the literature (Berry & Houston, 1995; Blum & Leiß, 2007; Borromeo Ferri, 2006). When modeling cycles are examined (Blum & Leiß, 2007; Borromeo-Ferri, 2006; Lesh & Doerr, 2003; Voskoglou, 2006), many cycles include real situation, mathematical model, mathematical result and real result stages but it has been observed that there are differences according to the situation model and the real model stages. Blum & Leiß (2007) has developed a detailed modeling cycle that includes all these stages (see Figure 1).

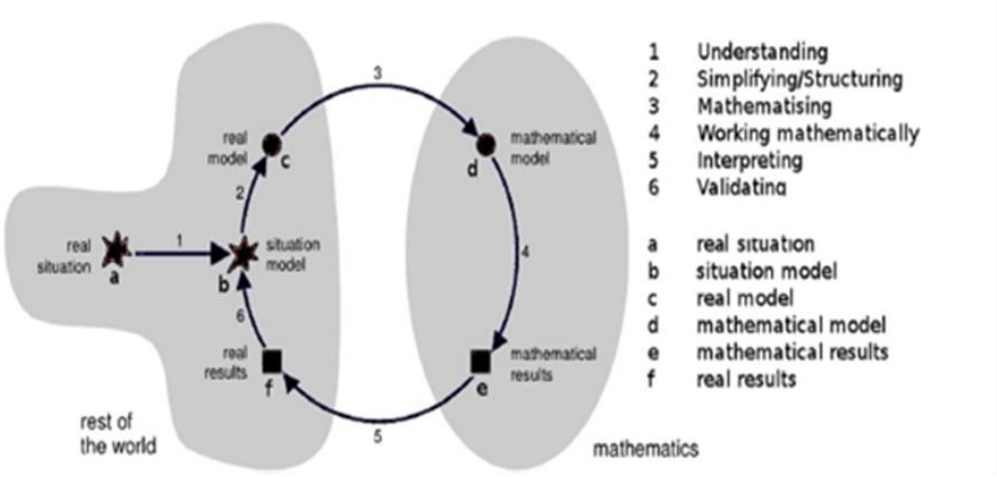


Figure 1. *Mathematical modeling cycle according to Blum & Leiß (2007).*

The mathematical modelling process demonstrated in Figure 1 is defined in six basic stages. These stages are the "Real Situation", "Situation Model", "Real Model", "Mathematical Model", "Mathematical Results" and "Real Results". When the studies on the mathematical modeling cycle are examined, it is revealed that students have problems at all stages of the mathematical modeling cycle (Biccard & Wessels, 2011; Galbraith & Stillman, 2006). In some studies (Blum & Borromeo Ferri 2009; Blum & Leiß, 2007; Borromeo-Ferri, 2010), especially in the transition from the real model to the mathematical model, some studies (Biccard & Wessels, 2011; Gatabi & Abdolahpour, 2013; Ji, 2012), it was determined that students have difficulties in testing the validity.

When the studies on the routes of the students in the modeling cycle are examined, it has been determined that individuals follow a unique path through the modeling process, rather than passing through each stage in sequence (Ärlebäck, 2009; Borromeo Ferri, 2006, 2007; Kehle & Lester, 2003). However, the reasons for their behavior have not yet been explained in detail (Czocher, 2016). Some of the contributing factors are the individual's prior real-world and scholastic experiences, dependence on the perceived purpose for model construction (Matsuzaki, 2011; Stillman, 2000; Thompson & Yoon, 2007) or the students' thinking styles (visual, analytical and harmonic thinking styles) (Blum & Borromeo Ferri, 2009; Borromeo Ferri, 2010; Borromeo Ferri, 2012). The reason why individuals' modeling processes are not linear is because it is a more complex process rather than a simple process like ideal behaviors expressed in modeling cycles (Haines & Crouch, 2010). In this process, individuals usually jump from one stage to the next, go back one step, or repeat the whole process repeatedly. Studies reveal that the modeling cycles of individuals are not linear and move back and forth in this cycle (Borromeo Ferri 2010; 2011; Doerr, 2007; Galbraith & Stillman,

2006). Specifically, Galbraith and Stillman (2001) found that students constantly go back to real-life situations and making assumptions at different stages of the modeling cycle. Similar results were determined in the study by Blum and Borromeo Ferri (2009), and it was observed that one of the students often switched between the real model and the mathematical model. Blum and Leiß (2007) explain this situation in two ways. The first is that reversals are made due to meta-cognitive activities in the verification or validity stages. The second is that students do not fully understand the real-life situation, cannot construct the real model, cannot simplify and structure the given real situation, and thus must return even if it moves in the cycle. Blum and Leiß (2007) also describe modeling processes in which no returns are made. In his study with ninth grade students, he determined that none of the students tried to develop their own solutions and that the students completed the process when they reached any result. This shows that students complete the process when they reach a mathematical result without creating a model.

In the literature about modeling cycles of students, it was seen that the behaviors of students on the modeling cycle were defined as case study (For example, Blum & Borromeo Ferri, 2009; Borromeo Ferri, 2007). In this study, it was aimed to investigate the effect of experience in modeling on individual modeling cycles. It is important to determine changes in individual modeling cycles because of participation in the mathematical modeling learning environment. In this respect, it is thought that the study will contribute to the limited literature on describing behaviors in the mathematical modeling cycle.

The aim of the study is to determine the individual modeling routes of pre-service teachers who participate in mathematical modeling learning environment and who do not. The sub-problems for this purpose are as follows:

1. Which stages of the modeling cycle do the pre-service teachers, who participate in the learning environment and not participate, adequately perform in the pre and post interview?
2. What are the differences and similarities between the behaviors of the pre-service teachers who participate in the learning environment and who do not participate in the modeling cycle in the pre and post interview?

2 | Method

Action research is used in this study. Action research is seen as a systematic process used to solve educational problems, improve educational practices and improve education quality (Carr & Kemmis, 2003; Tomal, 2010). This research design is practice-oriented research rather than research aimed at defining a problem (Elliott, 1991). In action research, while the problem is determined in qualitative ways at the beginning; at the end of the research, data collection is carried out in qualitative ways to understand whether the action plan has been successful and whether there is a difference in the knowledge and skills of the students. In this study, pre-service teachers were interviewed individually before the action plan and their knowledge and skill levels on mathematical modeling were revealed. Then, an action plan was developed and an environment for learning mathematical modeling was planned. In this learning environment, pre-service teachers were provided to work with groups, to be exposed to modeling problems for a long time, and to gain theoretical knowledge about modeling. In addition, evaluation of the solutions of pre-service teachers' weekly modeling activities and the next week's modeling activity was planned by the teacher and the expert. At the end of the 11-week action plan, the last interview was made individually with the pre-service teachers. Mathematical modeling problem was used as pre and post interview (see Appendix 1).

THE STUDY GROUP

The study was conducted with the fourth-grade students of elementary mathematics education undergraduate program. The research was conducted with 17 pre-service teachers participating in the mathematical modeling learning environment and 15 pre-service teachers who did not participate in the learning environment. During their education, they take theoretical and practical courses in the department.

They take theoretical courses such as algebra, statistics, analytical geometry, analysis, general physics, applied mathematics teaching, measurement and evaluation, material design, and problem-solving. These pre-service teachers did not take any courses directly related to mathematical modelling. Since action research involves a long-term practice, it is important that individuals feel willing to participate in the study (Tomal, 2010). In this context, participation and non-participation in the mathematical modeling learning environment is left to the preference of pre-service teachers. Pre-service teachers were informed about this study and were encouraged to participate in the learning environment every week.

Pre-service teachers participating in the learning environment were coded as K1, K2, ..., K17, while those who did not attend were coded as KM1, KM2, ..., KM15.

DATA COLLECTION

In the study, pre and post interviews were made individually to the pre-service teachers who participated in the learning environment and did not. Modeling problems given in the pre and post interviews are presented in Appendix 1. The research process is summarized in Table 1.

Table 1. Research process

Pre-service teachers not participating in the learning environment	Pre-service teachers participating in the learning environment	Time
Pre interviews (Individually)	Pre interviews (Individually)	1 week
	General information about mathematical modeling	1 week (3 lesson hours)
	Participation in mathematical modeling learning environment	10 weeks (30 lesson hours)
Post interviews (Individually)	Post interviews (Individually)	1 week

Pre-service teachers who did not participate in the learning environment were asked to individually solve the modeling problem given in the pre and post interview. Pre-service teachers who participate in the learning environment were made informative meeting about modeling and modeling activities were carried out with the group for 10 weeks. The problems that exist in the literature such as the big foot problem, the baseboard problem and the traffic intersection problem are used in the study. The action plan is organized as follows: in the first two weeks, activity based on the whole modeling cycle was applied. These activities are suitable for a holistic approach. It has been determined by the expert and the practitioner that the pre-service teachers mostly have problems in creating and solving models. Then, modeling activities for the stages of creating and solving models were applied for four weeks. After it was decided that they had reached a sufficient level, activity based on the whole modeling cycle was applied. Since it was determined that there were problems in the validation phase, the next activity was prepared according to this stage. After this problem, activity based on the whole modeling cycle was applied, and it was determined that there was a problem in creating the real model. The next activity was prepared according to this stage. The process was completed by applying the last activity based on the whole modeling cycle.

The pre-service teachers were asked to individually solve the modeling problem given in the pre and post interviews. To determine whether the change or development in the modeling cycles of the pre-service teachers participating in the learning environment was caused by the applied modeling problem, data were collected from the pre-service teachers who did not participate in the learning environment. The modeling level of pre-service teachers was determined in the pre-interview. Accordingly, it was understood that all pre-service teachers' prior knowledge about modeling was similar. In addition, the fact that the individual modeling routes of the pre-service teachers who did not participate in the learning environment were similar showed that the development was not caused by the modeling problem in the post interview.

The researcher did not direct the participants and it was determined their development and competencies without any intervention during pre and post interview.

Data Analysis

Pre and post interviews of the pre-service teachers were videotaped and working papers were collected. In the study, it was determined to which modeling stage all pre-service teachers progressed correctly. The definitions and indicators of the levels of the mathematical modeling cycle developed by Ji (2012) and adapted to this study are given in Table 2.

Table 2. Levels of the Mathematical Modeling Cycle

Stage	Definition	Indicator
0	Cannot make any connection between real world and math world	Blank or unrelated answers are valued in this category.
1	Understands the real-world situation, forms a mental representation of the situation, but fails to realize the ability to construct, simplify, make assumptions, and predict.	Draws the representation of the given situation, expresses it in words or talks about past experiences, but was unable to construct the real model.
2	Simplifies the real situation, finds the real model, and realizes its relevance to mathematics, but cannot construct the mathematical model or transfer it to the world of mathematics	The individual makes assumptions about the modeling situation, simplifies the situation, determines the variables, and makes predictions about these variables. But he could not mathematize.
3	Creates the mathematical model and turns it into a mathematical problem but cannot solve the model.	Sets up the mathematical model and creates a mathematical problem. But he could not solve the mathematical problem.
4	Solves the mathematical model and gets the mathematical results, but cannot interpret the real world	Solves the mathematical problem and gets mathematical results. But he could not make the transition to real results.
5	It interprets mathematical results to the real world but cannot test their validity.	Can interpret mathematical results and take real-world results, but cannot test their validity
6	It tests the validity of the real results and adapts the model if they are not suitable.	It tests the real-world accuracy and validity of its real results.

Through the coding presented in Table 2, it was determined to what stage all teacher candidates progressed correctly. Sufficient, partially sufficient and inadequate performance sub-dimensions for each stage were created. For example, if the participant determines all the variables that affect the situation in the second stage and can make predictions about these variables, he/she has shown a sufficient performance in the second stage. However, if he/she determines some of the variables that affect the situation and makes only predictions about them or if he/she cannot determine only the variables and make predictions, he/she has partially performed enough in the second stage. If the participant could not determine the variables that directly affect the situation, it was evaluated in the category of inadequate performance. It has been observed that if he/she has never achieved these competencies, he/she cannot make the transition to this stage. In this

case, the participant was evaluated in the first stage, which is a sub-stage. it is determined that he has passed to the second stage if he has achieved partially sufficient or sufficient performance.

In addition, the mathematical modeling cycles of pre-service teachers were analysed according to the modeling cycle given in Figure 1. The forward and backward movements of the pre-service teachers in the modeling cycle were determined. Students' individual modeling processes are shown through arrows on the modeling cycle and numbered as 1A, 2B, 3C, 4D, 5E, 6F. While the numbers in the form of 1,2, 3... express the order between the stages; A: the mental representation of the situation, B: the real model, C: the mathematical model, D: the mathematical result, E: the real result, F: the transition to the verification stage. Regardless of the correctly progress of the pre-service teachers in the process, it was determined they switched from which stage to which stage by means of arrows. For example, if a pre-service teacher who created the real model, expressed the real results intuitively and completed the process without obtaining the mathematical model and its results, the individual modeling cycle is shown by an arrow drawn directly from the real model to the real results.

Research ethics

Exempt from research ethics.

3 | Findings

Table 3 shows the findings related to the first sub-problem that is "Which stages of the modeling cycle do pre-service teachers who participate in the learning environment and not participate in the pre and post interviews adequately?"

Table 3. Pre and post interview findings of pre-service teachers who participated in the learning environment of mathematical modeling and who did not.

	Code	Pre-service teachers participating in the learning environment	*f*	%	Pre-service teachers not participating in the learning environment	*f*	%
Pre-interview (Filling up Problem)	Stage 0	K3, K4	2	12	KM2,	1	7
	Stage 1	K6, K13	2	12	KM11, KM13	2	13
	Stage 2	K1, K2, K5, K7, K8, K9, K10, K11, K12, K14, K15, K16, K17	13	76	KM1, KM3, KM4, KM5, KM6, KM7, KM8, KM9, KM10, KM12, KM14, KM15	12	80
	Stage 3	-	-			-	-
	Stage 4	-	-			-	-
	Stage 5	-	-			-	-
	Stage 6	-	-			-	-
Post-interview (Bus Stop Problem)	Stage 0	-	-	-	KM3, KM7, KM12	3	20
	Stage 1	-	-	-	KM2, KM11	2	13
	Stage 2	K1, K3, K5, K9, K11, K15, K17	7	41	KM1, KM4, KM5, KM6, KM8, KM9, KM10, KM13, KM14, KM15	10	67
	Stage 3	K12, K6	2	12		-	
	Stage 4		-	-		-	
	Stage 5	K2, K4, K7, K8, K10, K13, K14, K16	8	47		-	
	Stage 6	-	-	-		-	

According to the findings obtained from the pre-interview, it was determined that 76% of the 17 pre-service teachers who participated in the learning environment, 80% of the 15 pre-service teachers who did not participate in the learning environment were able to progress to the stage of creating the real model but could not create the mathematical model. According to the findings obtained from the last interview, it was determined that all teacher candidates participating in the learning environment progressed at least to the stage of constructing the real model. Most of the pre-service teachers (12% + 47% = 59%) have also completed the mathematical model stage. 47% of the pre-service teachers reached both mathematical and real results. It was determined that 67% of the pre-service teachers who did not participate in the learning

environment were able to progress to the stage of the real model in the mathematical modeling cycle, but none of them could switch from the real model to the mathematical model.

Figure 2 shows the findings related to the second sub-problem. In addition, individual modeling cycles were given to reveal the behaviors of pre-service teachers in the modeling cycle. While the pre-service teachers participating in the learning environment were described as experienced in mathematical modeling in their last interviews, the pre-interviews of the pre-service teachers participating in the learning environment and the pre and post interviews of those who did not were classified as inexperienced in mathematical modeling.

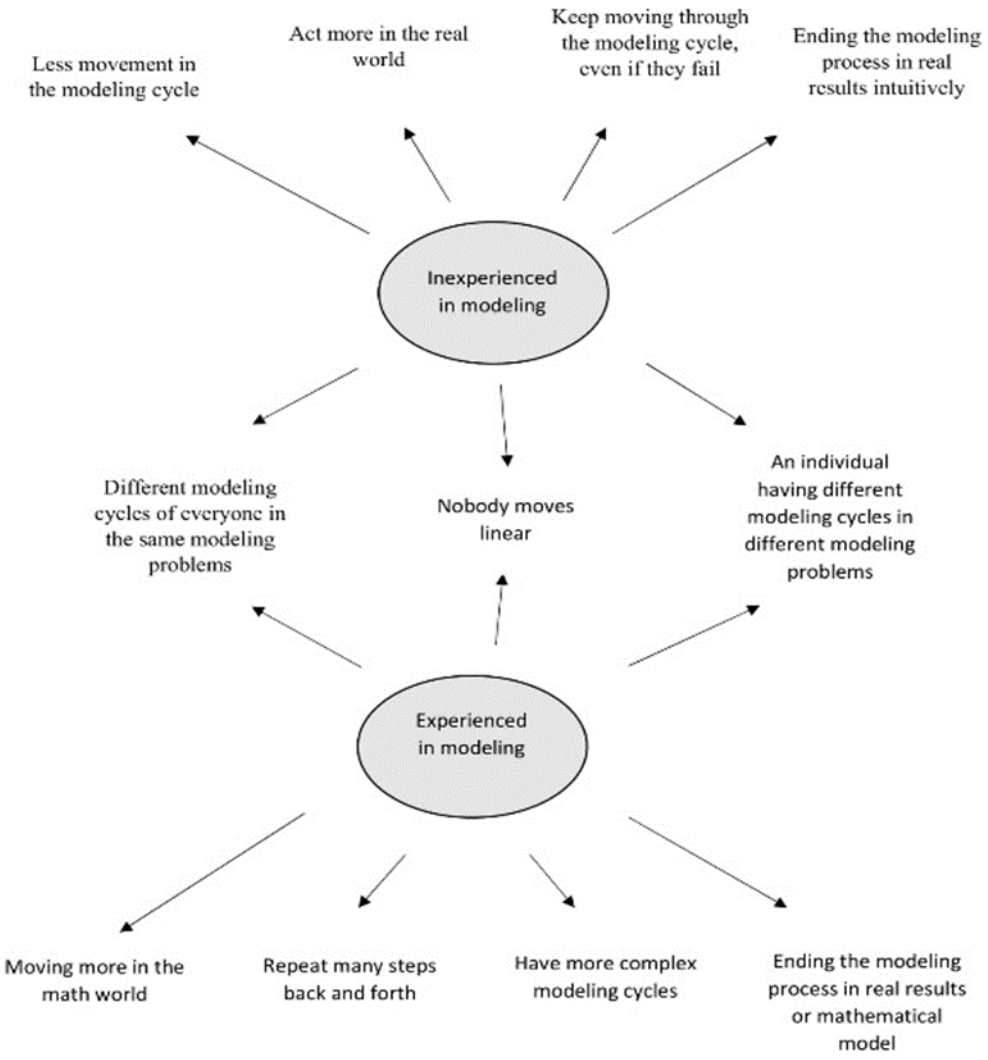


Figure 2. *Similarities and differences in modeling cycles of pre-service teachers who are experienced and inexperienced in mathematical modeling*

When the behaviors in the modeling cycle were examined, it was determined that all pre-service teachers had a nonlinear cycle in the pre and post interviews, each teacher candidate had different modeling cycles in different modeling problems, and each teacher candidate's modeling cycles were different from each other in the same modeling problem. As an example of this situation, the modeling cycles of K10 participating in the learning environment and KM13, which does not participate in the learning environment, belonging to the pre and post interview are presented in Figure 3.

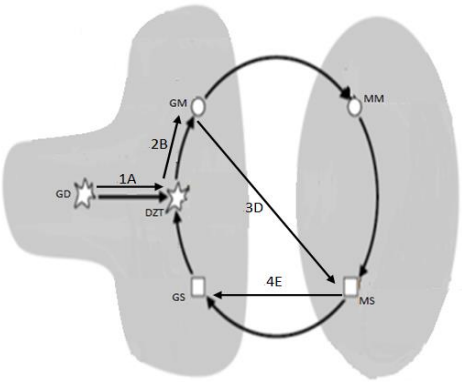


Figure 3a. *K10's individual modeling process for pre-interview.*

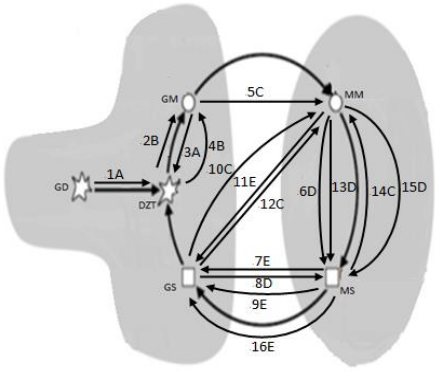


Figure 3b. *K10's individual modeling process for post-interview.*

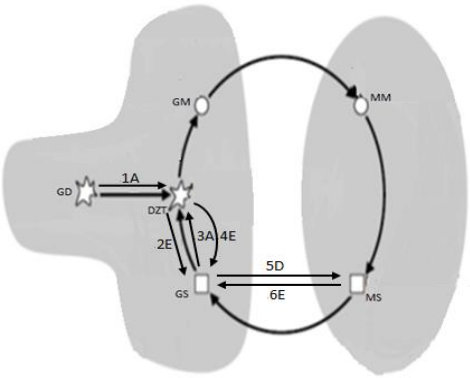


Figure 3c. *KM13's individual modeling process for pre-interview.*

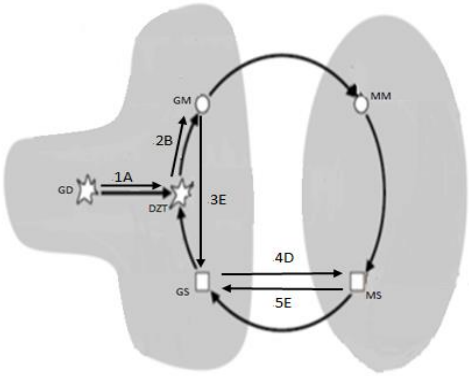
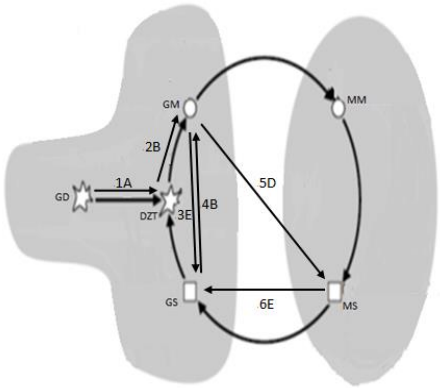


Figure 3d. *KM13's individual modeling process for post-interview.*

When the findings of pre-service teachers experienced in modeling are examined, it was determined that they repeated many steps back and forth in the post interview. When they reached a conclusion, they tried to revise the model, so they had more complex modeling cycles compared to the pre-interview. In addition, it has been observed that they mostly act in the world of mathematics. Even if they express real results, they complete their process in the modeling cycle either at the real results or at the mathematical model stage. As an example of this situation, the modeling cycle of K14 participating in the learning environment of pre and post interview is given in Figure 4.



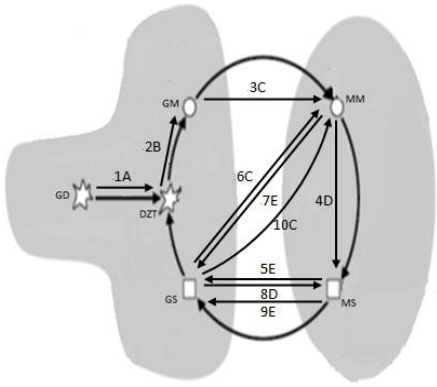


Figure 4a. K14's individual modeling process for pre-interview.

Figure 4b. K14's individual modeling process for post-interview.

Worksheet of K14's pre and post interviews are given in figures 5 and 6.

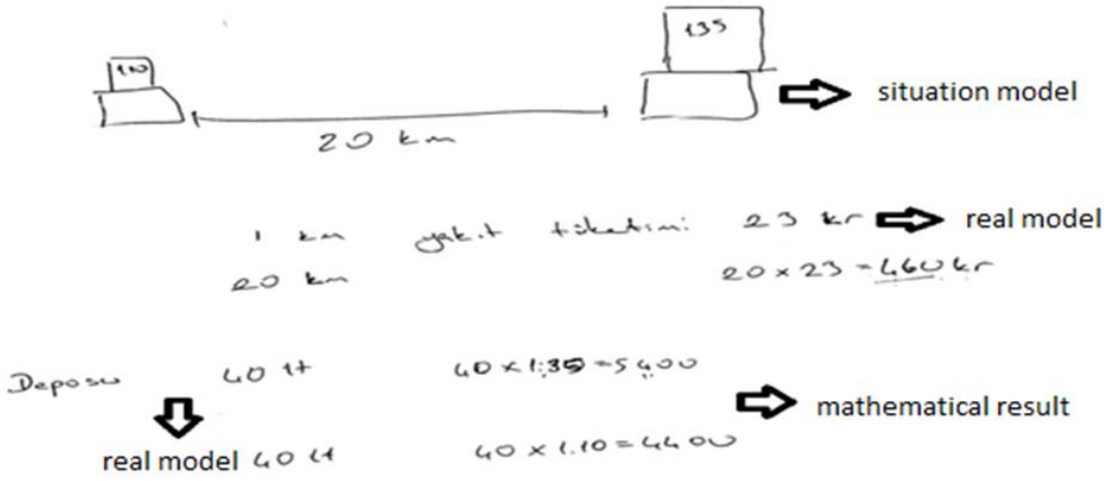


Figure 5. *Worksheet for K14's pre-interview*

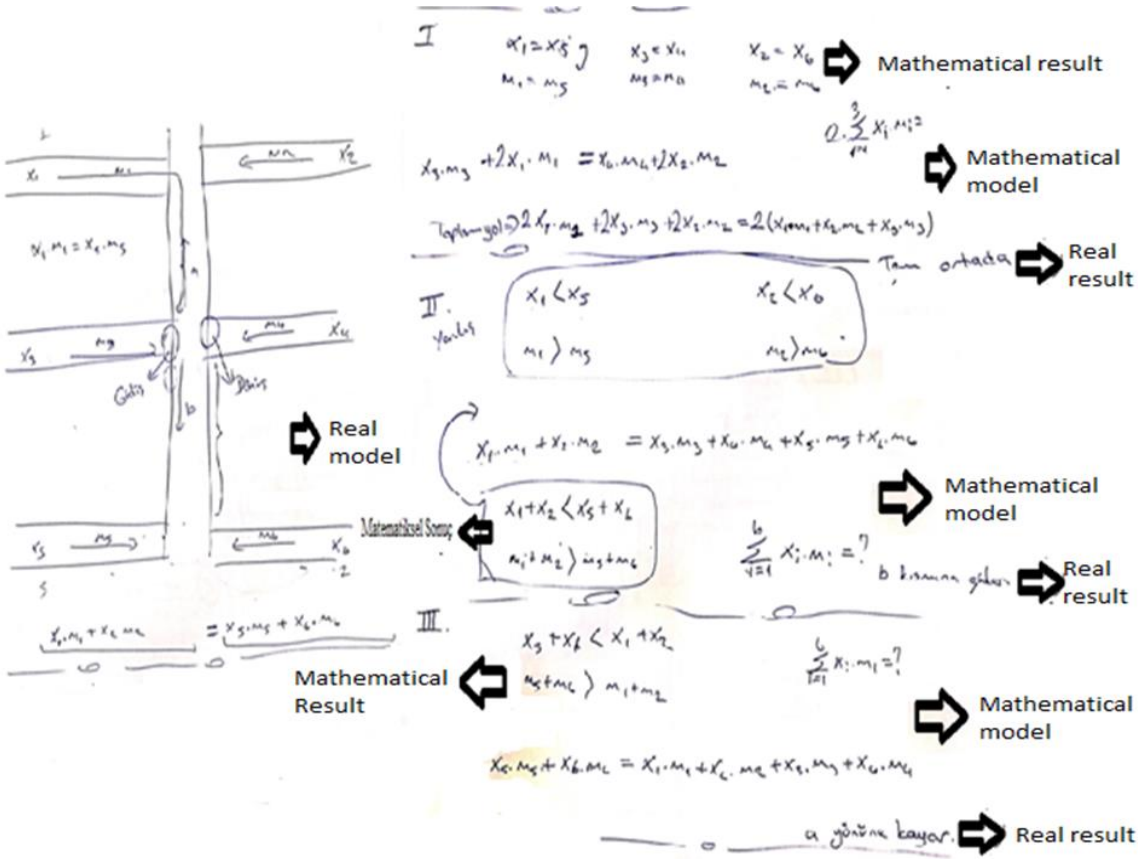


Figure 6. *Worksheet for K14's post-interview*

When the findings of pre-service teachers who are not experienced in modeling are examined, it was determined that they made a direct transition to mathematical results based on any assumptions or guesses

without establishing a mathematical model. It has been observed that when they reach a conclusion, they end the process and thus move less in the modeling cycle. It has been found that areas of action are generally in the real world. In addition, it was determined that even if the pre-service teachers failed in understanding the problem and constructing the real model, they continued to act in the process and completed the modeling process intuitively with the real results they reached. As an example of this situation, the modeling cycle of KM2, which does not participate in the learning environment, belonging to the pre and post meeting is presented in Figure 7.

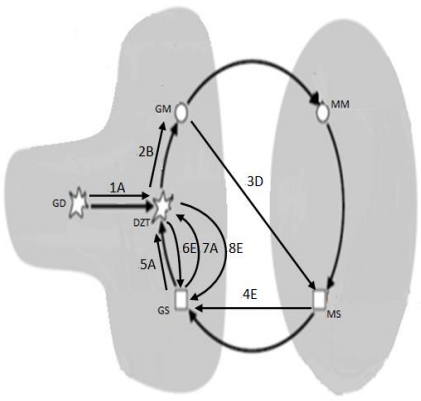


Figure 7a. *KM2's individual modeling process for pre-interview.*

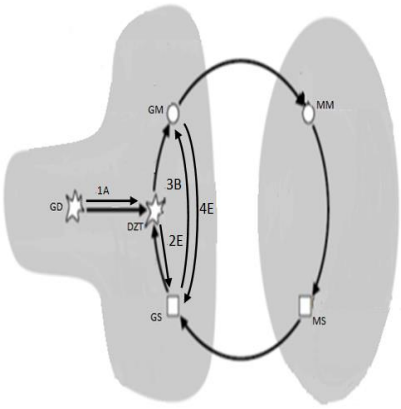


Figure 7b. *KM2's individual modeling process for post-interview.*

Worksheet of KM2's pre and post interviews are given in figures 8 and 9.

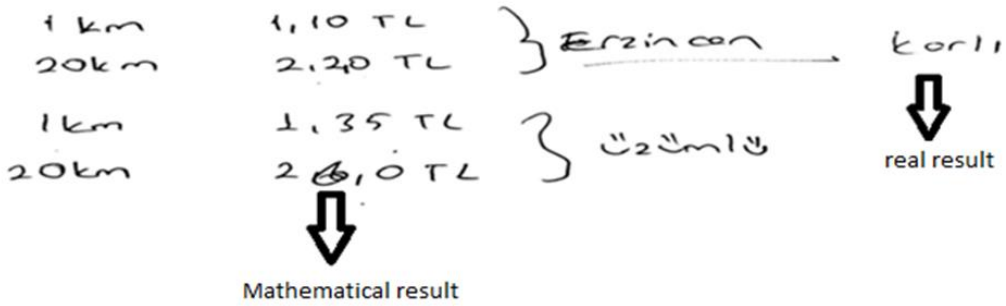


Figure 8. *Worksheet for KM2's pre-interview*

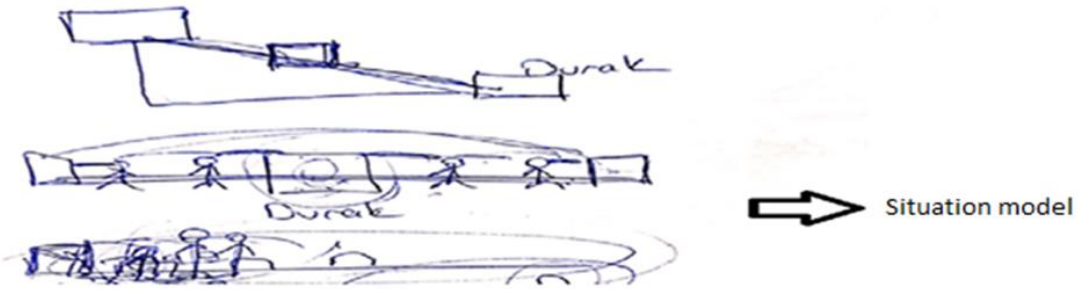


Figure 9. *Worksheet for KM2's post-interview*

4 | Discussion & Conclusion

The aim of the study is to determine the individual modeling routes of pre-service teachers who participate in mathematical modeling learning environment and who do not.

While most of the pre-service teachers who participated in the learning environment reached the real model stage in the pre-interview, it was determined that almost half of them were able to progress until the real results stage in the post interview. Similar results with this study were determined by Ji (2012) and Gatabi and Abdolahpour (2013). It was determined that pre-service teachers who did not participate in the learning environment could only come to the real model stage in both pre and post interviews. This result shows that the development in the modeling cycles of pre-service teachers participating in the learning environment is not random or caused by the given modeling situation. Similarly, studies (Biccard & Wessels, 2011; Galbraith & Stillman, 2006; Gatabi & Abdolahpour, 2013) show that students who are not experienced in mathematical modeling experience problems at all stages of the mathematical modeling process. Especially, Blum and Borromeo Ferri (2009), Blum and Leiß (2007), Borromeo Ferri (2010) and Frejd and Ärlebäck (2011) also identified the problems that occurred during the transition to the mathematical model. Also, Biccard and Wessels, (2011) Gatabi and Abdolahpour (2013) and Ji (2012) determine that students have difficulties in testing the validity of the real result as this study.

When the behaviors of pre-service teachers in the modeling cycle are examined; It has been determined that all pre-service teachers act nonlinear in the modeling cycle. Studies (Borromeo-Ferri 2010; Borromeo-Ferri, 2011; Doerr, 2007; Galbraith & Stillman, 2006; Peter-Koop, 2004) show that students' modeling cycles are not linear. In the study, it was revealed that pre-service teachers have different modeling cycles and solution processes in different modeling situations and that modeling cycles are different from each other individually.

It has also been determined by Ärlebäck (2009) and Czocher (2016) that everyone follows a unique path in the modeling cycle. The reason for this difference was based on the thinking styles of students by Blum and Borromeo Ferri (2009), while Matsuzaki (2011), Stillman, (2000), and Thompson and Yoon, (2007) attributed the differences in individuals' real life and mathematical experiences.

It has been determined that those experienced in mathematical modeling move more back and forth by repeating many steps, move further away from the ideal modeling cycle and have more complex modeling cycles. Borromeo Ferri (2010) explains this situation depending on the thinking styles of the students, and it is revealed that students with analytical thinking structure move more back and forth in the modeling cycle. In this study, this result is explained by participation in the learning environment of mathematical modeling. It was stated by Blum and Leiß (2007) that students who were successful in the mathematical modeling process returned to check the solution or to make critical reflections on the solution of the problem, as they also continued meta-cognitive activities during this process. It was observed that the experienced pre-service teachers in the modeling process mostly moved in the world of mathematics and completed the process in the modeling cycle at the mathematical model stage even if they expressed real results. This is thought to be due to simplifying the mathematical model and revising the mathematical model. Pre-service teachers can also return to the mathematical model stage to show their mathematical model with a different representation.

In this study, it was determined that the pre-service teachers who were not experienced in the modeling process mostly act in the real world. It was determined that these pre-service teachers tended to express real results and they completed their modeling cycles at the stage of real results by interpreting either the mental

representation of the situation or the real model intuitively. In addition, they move less in the modeling cycle than those experienced in the modeling cycle. It has been determined that although they move less, they go back and forth between some stages several times in the modeling cycle but complete the process unsuccessfully. Although they failed in the modeling process, they continued to move in the cycle, as stated by Blum and Leiß (2007) that "students should return even if they move through the cycle because they do not fully understand the real-life situation, cannot construct the real model, cannot simplify and structure the given real situation." Blum and Borromeo Ferri (2009) explained the reasons for the return of students who fail in modeling as the students do not fully understand the real-life situation, cannot construct the real model, simplify and construct the given real situation, and thus they must return even if they progress in the cycle. Borromeo Ferri (2010), on the other hand, explains this result with their thinking styles, and states that students with visual thinking style first talk about the real-life situation, have difficulty in transitioning to the mathematical model, perform the ideal modeling cycle more linearly, and cannot complete the mathematical modeling process successfully. In this study, it was observed that pre-service teachers who were not experienced in modeling, regardless of their thinking style, displayed a similar behavior. Pre-service teachers without mathematical modeling experience are not sufficient to complete the stages in the modeling cycle. That is why they cannot move forward in the modeling cycle. They want to end the process immediately. Therefore, it is thought that pre-service teachers without mathematical modeling experience cannot engage in more complex behaviors.

As a result, it was determined that pre-service teachers participating in mathematical modeling learning environment have more successful modeling cycles. It has been determined that the developed learning environment has a positive change on the mathematical model phase. Accordingly, it has also improved the interpretation skills of pre-service teachers. Taking mathematical modeling education causes changes, developments and differences in the modeling cycles. To develop modeling competence, it is recommended to create environments for learning mathematical modeling.

ACKNOWLEDGMENTS

This research article was formed based on the first author's Ph.D. Dissertation.

STATEMENT OF PUBLICATION ETHICS

The authors of the study declare that the research has not any ethical problem and the research and publication ethics were considered in the study.

Researchers' contribution rate

The contribution rate of researchers is equal.

Conflict of interest

There is no conflict of interest in this study.

References

Ärlebäck, J. B. (2009). On the use of realistic Fermi problems for introducing mathematical modelling in school. The Montana Mathematics Enthusiast, 6(3), 331–364.

Berry, J. S., & Houstan, S. K. (1995). Mathematical modelling. London: Edward Arnold.

Biccard, P., & Wessels D. C. J. (2011). Documenting the development of modelling competencies of grade 7 mathematics students. In G. Kaiser, W. Blum, R. B. Ferri & G. Stillman (Eds.), Trends in teaching and learning of mathematical modelling (pp. 375-383). New York: Springer. doi: 10.1007/978-94-007-0910-2_37

Blum, W., & Borromeo Ferri, R. (2009). Mathematical modelling: Can it be taught and learnt? Journal of Mathematical Modelling and Application, 1(1) 45-58.

Blum, W., & Leiß, D. (2007). How do students and teachers deal with modelling problems. In C. Haines, P. Galbraith, W. Blum, & S. Khan (Eds.), Mathematical modeling: Education, engineering, and economics (pp. 222–231). Chichester: Horwood.

Borromeo Ferri, R. (2006). Theoretical and empirical differentiations of phases in the modelling process. ZDM International Journal on Mathematics Education, 38(2), 86–95.

Borromeo Ferri, R. (2007). Modelling problems from a cognitive perspective. In C. Haines, P. Galbraith, W. Blum, & S. Khan (Eds.), Mathematical modeling: Education, engineering, and economics (pp. 260–270). Cambridge, UK: Woodhead Publishing Limited.

Borromeo Ferri, R., (2010). On the influence of mathematical thinking styles on learners'modeling behavior. Journal für Mathematik-Didaktik, 31, 99-118. doi: 10.1007/s13138-010-0009-8

Borromeo Ferri, R. (2011). Effective mathematical modelling without blockages-a commentary. In G. Kaiser, W. Blum, R. Borromeo Ferri & G. Stillman (Eds.), Trends in teaching and learning of mathematical modelling (pp. 181-185). New York: Springer.

Borromeo Ferri, R. (2012, July). Mathematical thinking styles and their influence on teaching and learning mathematics. Paper presented at the meeting of the 12. International Congress on Mathematical Education. Korea: Seoul.

Carr, W., & Kemmis, S. (2003). Becoming critical: education, knowledge and action research. New York: RoutledgeFarmer, Taylor & Francis.

Czocher, J. A. (2016) Introducing modeling transition diagrams as a tool to connect mathematical modeling to mathematical thinking. Mathematical Thinking and Learning, 18(2), 77-106, doi: 10.1080/10986065.2016.1148530.

Doerr, H. M. (2007). What knowledge do teachers need for teaching mathematics through applications and modeling? In W. Blum, P.L. Galbraith, H. W. Henn, & M. Niss (Eds.), Modeling and Applications in Mathematics Education (ICMI 14) (pp. 69–78). New York: Springer.

Elliott, J. (1991). Action research for educational change. Philadelphia: Open University Press.

Frejd, P., & Ärlebäck, J. B. (2011). First results from a study investigating Swedish upper secondary students'mathematical modelling competencies. In G. Kaiser, W. Blum, R. Borromeo Ferri & G. Stillman (Eds.), Trends in teaching and learning of mathematical modelling (pp. 407–416). Springer: New York.

Galbraith, P. L., & Stillman, G. (2001). Assumptions and context: Pursuing their role in modeling activity. In J. F. Matos, W. Blum, K. Houston & S. P. Carreira (Eds.), Modeling and mathematics education: ICTMA9 applications in science and technology (pp. 300–310). Chichester: Horwood.

Galbraith, P., & Stillman, G. (2006). A framework for identifying student blockages during transitions in the modelling process. Zentralblatt für Didaktik der Mathematik-ZDM. 38(2), 143-162. doi: 10.1007/BF02655886.

Gatabi, A. R., & Abdolahpour, K. (2013). Investigating students'modeling competency through grade, gender, and location. In B. Ubuz, C. Haser & M. A. Mariotti (Eds.), Proceedings of the 8th congress of the european society for research in mathematics education CERME 8 (pp. 1070-1077). Turkey: Middle East Technical University.

Greefrath, G., & Vorhölter, K. (2016). Teaching and learning mathematical modelling: approaches and developments from German speaking countries. ICME-13 Topical Surveys, 1-42, Switzerland: Springer International Publishing. doi: 10.1007/978-3-319-45004-9_1.

Haines, C. R., & Crouch, R. (2010). Remarks on a modeling cycle and interpreting behaviours. In R. Lesh, P. Galbraith, C., R. Haines & A. Hurford (Eds.), Modelig students'mathematical modeling competencies (ICTMA 13) (pp. 145-154). New York: Springer.

Ji, X. (2012, July). A quasi-experimental study of high school students'mathematics modelling competence. Paper presented at the meeting of the 12. International Congress on Mathematical Education. Korea: Seoul.

Kehle, P.E., & Lester F. K. (2003). A semiotic look at modelling behavior. In R. Lesh & H. M. Doerr (Ed.), Beyond constructivism: models and modelling perspectives on mathematics problem solving, learning and teaching (pp. 97-125). Mahwah N. J.:Lawrance Erlbaum Associates Publishers.

Lesh, R., & Doerr, H. M. (2003). Foundations of a models and modelling perspective on mathematics teaching, learning and problem solving. In R. Lesh & H. M. Doerr (Eds.), Beyond constructivism: models and modelling perspectives on mathematics problem solving, learning and teaching (pp. 3-33). Mahwah N. J.:Lawrance Erlbaum Associates Publishers.

Maaß, K. (2006). What are modelling competencies? Zentralblatt Für Didactik Der Mathematic, 38(2), 113-142. doi: 10.1007/BF02655885

Matsuzaki, A. (2011). Using response analysis mapping to display modellers'mathematical modelling progress. In G. Kaiser, W. Blum, R. Borromeo Ferri & G. Stillman (Eds.), Trends in teaching and learning of mathematical modelling (ICTMA 14) (pp. 499-508). New York: Springer.

Peter Koop, A. (2004). Fermi problems in primary mathematics classrooms: pupils'ınteractive modelling processes. In I. Putt, R. Farragher & M. McLean (Eds.), Mathematics education for the Third Millenium: Towards 2010, Proceedings of the 27th Annual Conference of the Mathematics Education Research Group of Australasia (pp. 454-461). Townsville, Queensland: Merga.

Schaap, S., Vos, P., & Goedhart, M. (2011). Students overcoming blockages while building a mathematical model: Exploring a framework. In G. Kaiser, W. Blum, R. Borromeo Ferri & G. Stillman (Eds.), Trends in teaching and learning of mathematical modelling (ICTMA 14) (pp. 137-146). New York: Springer.

Stillman, G. (2000). Impact of prior knowledge of task context on approaches to applications tasks. The Journal of Mathematical Behavior, 19(3), 333–361. doi:10.1016/S0732-3123(00)00049-3

Swetz, F. and Hartzler, J. S. (1991). Mathematical modeling in the secondary school curriculum: A resource guide of classroom exercises. Reston, VA: NCTM.

Thompson, M., & Yoon, C. (2007). Why build a mathematical model? A taxonomy of situations that create the need for a model to be developed. In D. K. Lyn, & D. English (Ed.), Handbook of international research in mathematics education (pp. 193–200). Mahwah, NJ: Routledge.

Tomal, D. R. (2010). Action research for education (2. Ed.). Lanham, MD: Rowman and Littlefield Education.

Voskoglou, M. G. (2006). The use of mathematical modelling as a tool for learning Mathematical. Quaderni di Ricerca in Didattica, 16, 53-60.

Appendix 1.

Pre-interview

"Filling up"

Mrs. Ela lives in Üzümlü, 20 km away from the border of Erzincan in Turkey. To fill up her X she drives to Erzincan where immediately behind the border there is a petrol station. There you must pay 11.0 TL for one liter of petrol whereas in Üzümlü you have to pay 13.5 TL. Is it worthwhile for Mrs. Ela to drive to Erzincan? Give reasons for your answer (Blum & Borromeo Ferri, 2009).

Post-interview

"Bus stop"

When we consider a school bus, there is a need to decide a place of the school-bus shelter for a group of students living along a road. Determine where the shelter should be located so that the total distance the students must walk is the minimum amount (Swetz & Hartzler, 1991)

BUEFAD | 2021, Volume 10, Issue 3, 586-597
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.959543

Effective School Research in Turkey: Content Analysis of Articles (2000-2020)

Osman Titrek[a], Mustafa Delioğlan[b*], & Neslihan İpekli[c]

a Prof. Dr., Sakarya University, (0000-00001-8176-4958), otitrek@sakarya.edu.tr

b*Graduate Student, Sakarya University, (0000-0001-5933-5436), mustafa.delioglan@ogr.sakarya.edu.tr

c Graduate Student, Sakarya University, (0000-0002-8117-6416), neslihan.ipekli@ogr.sakarya.edu.tr

Research Article	Received: **29.06.2021**	Revised: **02.09.2021**	Accepted: **05.09.2021**

Abstract

In this study, it was aimed to reveal the descriptive characteristics, methodical dimensions and general trends of the research articles on Effective School in Turkey published between 2000-2020. These studies have been systematically evaluated through content analysis. For this purpose, 23 articles scanned with the keyword 'effective school' and 'school effectiveness' were examined in the Journal Park and Google academic databases published between 2000 and 2020. The article classification form developed by Sözbilir, Kutu and Yaşar (2012) was adapted and used for effective school research to examine the articles. According to SPSS Statitics 23 program the data obtained from the studies examined by content analysis were analyzed using percentage and frequency values. In these studies, it was observed that (I) the concept of an effective school is most often associated with the leadership styles of school administrators, (II) quantitative research method was often used, (III) survey was preferred as data collection tool, (IV)random sampling method was widely used and (V)teachers were chosen most as sample.

Keywords: Education, Effective School, School Effectiveness

Türkiye'de Etkili Okul Araştırmaları: 2000-2020 Dönemi Makalelerin İçerik Analizi

Öz

Bu araştırmada 2000-2020 yılları arasında yayınlanmış Türkiye adresli etkili okul üzerine yapılan araştırma makalelerinin tanımlayıcı özelliklerini, yöntemsel boyutlarını ve genel eğilimlerini ortaya çıkarmak amaçlanmıştır. Bu amaçla 2000 ile 2020 yılları arasında yayımlanmış Dergi Park ve Google Akademik veri tabanlarında "etkili okul" ve "okul etkililiği" anahtar kelimesi ile taranan 23 makale incelenmiştir. İncelenen bu araştırmalar içerik analizi yöntemiyle sistematik bir biçimde değerlendirilmiştir. Makaleleri incelemek için Sözbilir, Kutu ve Yaşar (2012) tarafından geliştirilen makale sınıflama formu etkili okul araştırmaları için uyarlanarak kullanılmıştır. İçerik analizi ile incelenen çalışmalardan elde edilen veriler SPSS Statistics 23 programıyla yüzde ve frekans değerleri kullanılarak çözümlenmiştir. İncelenen araştırmalarda (I) etkili okul kavramının en çok okul yöneticisinin liderlik stilleri ile ilişkilendirildiği, (II) araştırmalarda nicel araştırma yönteminin sıklıkla kullanıldığı, (III) veri toplama aracı olarak anket tercih edildiği, (IV) tesadüfi örnekleme yönteminin yaygın olarak kullanıldığı ve (V) örneklem olarak en çok öğretmenlerin seçildiği görülmüştür.

Anahtar kelimeler: Eğitim, Etkili Okul, Okul Etkililiği

1 | Introduction

A school, which society identifies with the concept of an educational nest, is a social and open system (Titrek, 2020) in which students acquire complex and more abstract knowledge, skills and behaviors, as well as literacy and other simple skills, in accordance with the goals and principles of the educational system (Balcı,

2010). Schools, which are a social system, are not only institutions with administrative and educational goals in which educational activities are carried out. Schools also have social, economic and political responsibilities (Bursalıoğlu, 2010).

A school administrator wants to improve the quality of education in his or her school and make a difference. This difference is created by increasing the quality of education. Studies to increase the quality of education have revealed the concept of effective school (Helvacı & Aydoğan, 2011). As a result of research conducted on schools that make a difference, succeed, and schools that lag behind them and are less successful, common findings have been identified, showing what needs to be done in order to increase productivity and success in schools (Çubukçu & Girmen, 2006).

Studies on the effective school gained importance towards the mid-1960s (Yılmaz K. , 2015). How does the school affect students with these studies? What are the effects of school on students in their interaction with the external environment? What are the variables in the school's impact on students? Is the school or the environment more effective in the lives of students? By looking for answers to such questions, the concept of effective school and the effect of school on students has gained importance.

Due to the fact that schools that are part of the macro system have a multifaceted, complex structure and constantly interact with the environment, it is difficult to conceptualize the concept of an effective school with precise lines in the literature. Those who work on effective school have the idea that effective school is a multifaceted concept (Arslan, Satıcı, & Kuru, 2007).

Despite the difficulty of defining an effective school, as in all social sciences, studies have been conducted to make a definition of the concept of an effective school that meets comprehensive, theoretical frameworks. According to Özdemir (2019), an effective school is defined as a school in which cognitive, affective, psycho-motor, social and aesthetic development of students is supported in the most appropriate way and an optimal learning environment is created. Başaran (2000), on the other hand, has defined an effective school as a school that accomplishes its organizational, managerial and educational goals at the planned level. Although there are different definitions for an effective school in the literature, many researchers note that the leadership of school principals plays an important role in creating effective schools (Balcı, 2000; Brookover, 1979; Good and Brophy, 1986; Lezotte, 1989; Mackenzia, 1983; Şişman, 2011).

Another dominant view in effective school understanding is that schools create differences in student achievement (Çubukçu & Girmen, 2006). In order for students to succeed in an effective school, appropriate physical environments should be prepared, all human and material resources of the school should be used effectively. An effective school allows the student to develop from a cognitive aspects as well as from an affective, physical, and artistic aspects. Being an effective school does not mean having too many resources, an effective school aims to achieve the best results with the resources it has. In effective school understanding, teaching and performance improvement are seen as the most important task of the school (Özdemir, 2019).

Although effective school is a multidimensional concept, researchers have come to a consensus on some common features (Helvaci & Aydogan, 2011). Edmonds (1979) states that influential schools have five characteristics:

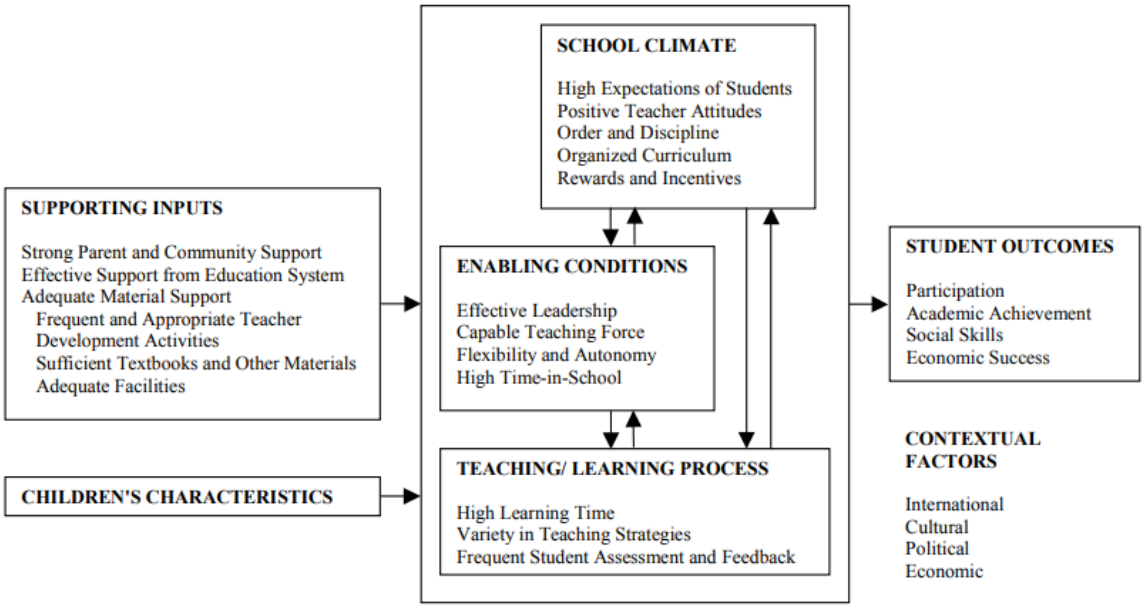
- Effective schools should clearly set out their goals related to education,
- Effective schools should conduct systematic evaluation in special and general dimensions,
- In effective schools, there is an expectation that all students can learn well,
- Effective school has a safe climate that encourages teachers and learning,
- Effective schools have principled educators.

Research on the effectiveness of schools has often found that effective schools have the following characteristics (Özdemir, 2000; Karip & Köksal, 1996; as cited in Çubukçu& Girmen, 2006):

- Effective schools have clearly stated missions.
- Administrators of effective schools are a strong teaching leader.
- All stakeholders of effective schools, especially student teacher parents, have high expectations.
- In effective schools, student success is constantly monitored and evaluated.
- Effective schools have a school climate in which discipline problems are reduced and an appropriate learning environment is created.
- In effective schools, parents and the environment give all kinds of support to the school, school-family cooperation has developed.
- It is important to acquire basic skills in effective schools.

Henneveld (1994) explains the theoretical framework of effective school in five basic dimensions: "school inputs, school climate, facilities provided, learning-teaching process and results" in the model in which he developed it, and with the features listed under these dimensions. The interdimensional relations are shown in the table below.

Figure 1. Model Determining School Effectiveness Factors



Source: Henneveld, (1994)

In Figure 1, the theoretical framework of Henneveld's school effectiveness model shows the connection of 16 factors divided into 4 main groups that directly affect student outcomes. According to the model, the level of strength of each factor contributes positively to school effectiveness. The higher the level of strength among these 4 main groups, the higher the quality of student output increases in direct proportion (Arslan, Satıcı, & Kuru, 2007). Similar to Henneveld, Şenol (1996) stated that there are many factors affecting school effectiveness and explained the factors affecting school effectiveness as the principal and his assistants, teachers, students, parents, school climate and culture, educational programs, environment, physical structure of the school, and educational technology.

In his research, Zigarelli (1996) identified six key characteristics that reveal an effective school, each of which was tested on student success (Helvacı & Aydoğan, 2011). These are: "qualified teacher, teacher participation and satisfaction, leadership characteristic and communication of the school administrator, strong school culture, positive relationships of the school administration, high family participation".

Qualified teacher: In effective schools, one of the most important characteristics of a qualified teacher is that the teacher develops himself. The teacher must keep up with the changing and developing era, develop himself/herself through activities such as in-service training and personal development courses. His/her experience in teaching life also has an impact on the quality of the teacher. The preparation of the teacher before the lesson, the power of expression in the lesson process, the efficient use of time in the lesson process and the different teaching methods and techniques that he/she uses reveal the quality of the teacher.

Teacher participation and satisfaction: In effective schools, decisions are made democratically. In any decision taken within the school, it is expected that teachers, who are one of the most important elements of the school should be consulted.

Leadership characteristic and communication of the school administrator: In an effective school, the administrator has an important place. The leadership characteristic displayed by the school administrator is the most important step to be taken in creating an effective school. Many researchers agree that the school administrator has a very important place in designing, managing and maintaining an effective school (Helvacı & Aydoğan, 2011). Effective school research indicates that active participation in the classroom, where school administrators must necessarily have leadership characteristics, will create better schools.

Strong school culture: Effective school research shows that schools with a good organizational climate and a strong school culture are more successful. It is emphasized that there should be a positive atmosphere suitable for learning in an effective school. As the interactions, experiences and sharing of school employees increase, school provides an environment for the formation of a culture specific to that school over time.

Positive relationships of the school administration: The positive relationships established by the school administrator with students and teachers as a leader increase the performance of students and teachers and contribute to the school culture.

High family participation: Family participation in school increases student success. It has been emphasized that voluntary activities by families also play a role in increasing student success.

Schools are seen as the most effective factor in increasing student academic success. A school is as effective as its performance (Polatcan & Cansoy, 2018). As a result, as effective school research shows, if the school does not have a unique vision, if it does not have a school administrator as a teaching leader, if it cannot meet the expectations of society, if it cannot offer a suitable learning environment for students, if it cannot develop the academic, sporting and artistic skills of students, we cannot say that this school is an effective school. In order to qualify a school as an effective school, that school must have all these characteristics.

Effective school research has started in Turkey since the 90s. These research gained momentum in Turkey after the 2000s (Polatcan & Cansoy, 2018).

Although effective school research is widely conducted in Turkey, no research has been found on the current state of the concept of an effective school and the concepts to which it is associated. Because of this, it is important to identify the different characteristics of effective school research published in Turkey and to determine the concepts to which the concept of effective school is associated.

In this context, this research aims to reveal the descriptive characteristics, methodical dimensions, and general trends of the effective school research in Turkey published between 2000-2020. Answers to the following questions were sought within the scope of this study:

1. Effective school research has been widely published in which journals?
2. How is the distribution of effective school research by year?
3. In effective school research, the concept of effective school has been used in relation to what concepts?
4. What data collection tools have been widely used in effective school research and how are they distributed by research methods?
5. What are the research methods commonly used in effective school research?
6. What are the sampling methods commonly used in effective school research?

7. What are the sampling levels used in effective school research?

2 | METHOD

METHOD OF THE STUDY

This study, which examined effective school research published in various journals in Turkey, was conducted based on content analysis. Şimşek and Yıldırım (2011) explained content analysis as combining similar data using specific themes and concepts and organizing and interpreting them in a way that readers can understand. As a result of searching with the keywords "effective school" and "school effectiveness" in the Dergi Park and Google Scholars, the sample of the study was determined as 23 studies conducted in Turkey between 2000-2020.

DATA COLLECTION TOOL

In this study, the article classification form developed by Sözbilir, Kutu and Yaşar (2012) was adapted and used for effective school research. Article classification form consists of 6 parts: article masthead, type of article, subject of article, method of article, data collection tools and sampling.

ANALYSIS OF DATA

In this study, content analysis technique was used to evaluate the data obtained. During the analysis and interpretation of effective school articles published in Turkey between 2000-2020, attention was paid to the stages of coding, category development, ensuring validity and reliability, calculating frequencies and interpreting. At the naming and category development stage of content analysis; each of the articles has been carefully examined and classified under categories such as the article masthead, the concepts it is associated with, its method, data collection tools, sampling, and data analysis methods. First, the name of the article, its authors, the Journal in which it was published, and the year in which it was published were entered as data. Later, the concept and method in which the article is associated with the concept of effective school were identified, the type of data collection tool used in the article, the methods used in analyzing the data were identified. The SPSS Statistics 23 Data Analysis Program was used to analyze the data obtained. The data obtained were analyzed using percentage and frequency values. As for the data obtained, their frequency and percentage rates were calculated to correspond to the answer to each research question, and the data obtained was tabulated.

RESEARCH ETHICS

The data collection phase of this study were approved ethically in accordance with the decision taken at the meeting of Sakarya University Social and Human Sciences Ethics Committee dated 02.06.2021 and numbered 2021/60.

3 | FINDINGS

The collected data was analyzed considering research questions. The results obtained from the analysis are presented below.

Table1. Journals Featuring Influential School Research

Journal	f	%

International Journal of Educational Sciences	1	4,3
Erzincan University Journal of Educational Sciences	1	4,3
Journal of Field Education Research	1	4,3
Journal of Education and Science	1	4,3
Gaziantep University Journal of Social Sciences	1	4,3
Bartın University Journal of Faculty of Education	2	8,7
International Journal of Social Research	1	4,3
Erciyes University Journal of Science and Literature	1	4,3
Journal of Social Sciences	1	4,3
Gaziantep University Journal of Educational Sciences	1	4,3
Journal of Academic History and Thought	1	4,3
Journal of the Faculty of Education of Uludağ University	1	4,3
Bolu Abant Baysal University Journal Of Education	1	4,3
Uşak University Journal Of Social Sciences	1	4,3
Mediterranean Journal of Educational Research	1	4,3
Kastamonu Education Journal	1	4,3
International Journal Of Social Sciences	1	4,3
Turkish Science Research Foundation Journal	1	4,3
Cumhuriyet University Journal of Faculty of Education	1	4,3
Mersin University Journal of Faculty of Education	1	4,3
Erzincan University Journal of Faculty of Education	1	4,3
Journal of Theoretical Education	1	4,3
Total	23	100,0

Table 1 shows that 23 articles examined for research have been published in 22 different journals. 2 of the articles examined for the research were published in the Bartın University Journal of Faculty of Education while the others were published in various journals.

Table 2. Distribution of Effective School Research by Year

Years	f	%
2003	1	4,3
2006	3	13,0
2009	1	4,3
2010	1	4,3
2011	1	4,3
2012	1	4,3
2013	1	4,3
2014	1	4,3
2015	1	4,3
2016	5	21,7
2017	3	13,0
2018	1	4,3
2019	1	4,3
2020	2	8,7
Total	23	100

In Table 2, it is seen that effective school studies have been studied every year in Turkey, especially since 2009. Studies have intensified in 2016. In 2016, 5 studies were conducted on effective school. 3 studies were conducted in 2006 and 2017.

Table 3.Concepts Associated with the Effective School Concept

Concepts Associated With	f	%
Personality traits and focus of control	1	4,3
School culture	3	13,0
School development	2	8,7
Job satisfaction	1	4,3
Leadership styles	7	30,4
School-environment-family cooperation	2	8,7
Decision-making	1	4,3
Meeting teachers ' expectations	1	4,3
Professional affiliation	1	4,3
Professional performance	1	4,3
Executive self-sufficiency	1	4,3
School climate	1	4,3
Effective school indicators	1	4,3
Total	23	100,0

In Table 3, it is seen that 30.4% of the concept of effective school is associated with leadership styles. When the studies are examined, it is seen that 13% of the effective school concept is associated with school culture, 8.7% with school development, and 8.7% with school-environment-family cooperation.

Table 4. Methods and Data Collection Tools Used in Effective School Research

Data Collection Tool	Method			
	Quantitative		Qualitative	
	f	%	f	%
Survey	19	100	0	0
Open-Ended Question	0	0	3	75
Structured Interview Form	0	0	1	25
Total	19	100	4	100

In Table 4, it is seen that effective school studies are mainly quantitative studies (f=19). In all quantitative studies, surveys were used as a data collection tool. In 75% of qualitative studies, the open-ended question method was used as a data collection tool, while in 25%, the structured interview form was used as a data collection tool.

Table 5. Quantitative Research Methods Used in Effective School Research

	Quantitative		Total
	Descriptive Survey Method	Correlational Survey Method	
N	11	8	19
%	57,9	42,1	100

In Table 5, it is seen that 57.9% of quantitative research on effective school used descriptive survey method and 42.1% used the correlational survey method.

Table 6. Qualitative Research Methods Used in Effective School Research

	Qualitative		Total
	Case Study	Case Study Survey Model	
N	3	1	4
%	75	25	100

Table 6 showed that 75% of the qualitative research used in effective school research used a case study, and 25% used a case study survey model.

Table 7. Sampling Method Used in Effective School Research

Sampling Method	*N*	*%*
Random sampling,	8	34,8
Simple random sampling	4	17,4
Simple random sampling	2	8,7
Stratified sampling	1	4,3
Simple random sampling	4	17,4
Unbiased sampling	1	4,3
Simple random sampling	1	4,3
Proportional sampling	1	4,3
Proportional sampling	1	4,3
Total	23	100,0

In Table 7, the most commonly used sampling method in effective school research is random sampling with 34.8%. In addition, simple random sampling are commonly used sampling methods with 17.4%.

Table 8. Sampling Levels Used in Effective School Research

Sampling Levels	Research Method				Total	
	Quantitative		Qualitative			
	f	%	f	%	f	%
Teacher	11	47,8	1	4,3	12	52,2
School administrator	1	4,3	1	4,3	2	8,7
Teacher and school administrator	6	26,1	0	0	6	26,1
Teacher, school administrator and student	0	0	1	4,3	1	4,3
Instructor	0	0	1	4,3	1	4,3
Teacher and student	1	4,3	0	0	1	4,3
Total	19	82,6	4	17,4	23	100

Table 8 shows the sampling level used in effective school studies and its distribution by research methods. In 52% of effective school-related research, only teachers were selected as a sample. 47.8% of the studies in which teachers were selected as samples were conducted by quantitative research method and 4.3% by qualitative research method. According to this study, the proportion of studies in which teachers and school administrators were selected together as samples was 26.1%. In the articles examined within the scope of this research, instructors were not selected as samples in the studies conducted by quantitative research method.

4 | Discussion & Conclusion

In this study, 23 articles conducted in Turkey between 2000-2020 were examined as a result of a search conducted in the Journal Park and Google Scholar with the keyword "effective school" and "school effectiveness". These articles were examined in terms of year of publication, journal, concept associated with effective school concept, research methods, data collection tools, sampling method and sampling levels.

As a result of the content analysis of the journals in which the studies were published, it was determined that 23 articles were published in 22 different journals. The first studies about effective school had began in the middle 1960s at the USA. According to Polatcan and Cansoy (20018), effective school research has gained momentum in our country since the 2000s. When the published articles are examined, it is seen that the studies have intensified since 2016. No intensive work is seen in the early 2000s.

Zigarelli (1996) explained the characteristics of an effective school: qualified teacher, teacher participation and satisfaction, leadership characteristics and communication of a school administrator, strong school culture, positive relationships of school management, and high family participation. In the study, the concepts associated with the concept of effective school seem to be parallel to these characteristics, which Zigarelli (1996) explains. When content analysis of concepts associated with effective schools is performed, it is observed that the relationship between the concept of an effective school and issues such as decision process (Çelikten,2003), school development (Arslan, Satıcı and Kuru, 2006), characteristics of secondary education institutions to be effective schools (Çubukçu and Girmen, 2006), school culture (Ayık and Ada, 2009), leadership styles of school principals (Gökçe and Kahraman, 2010; Yörük and Şahin, 2012; Arslantaş and Özkan, 2014; Cerit and Yıldırım, 2017; Ermeydan and Can, 2020), school-environment-family relationship (Çalışkan and Güçlü, 2013), personality traits of school principals (Yıldırım and Ada, 2015), effective school indicators (Uğurlu and Demir, 2016), school leadership behaviors (Abdurrezak and Uğurlu, 2016), school development (Altun and Bebek, 2016), school climate (Şenel and Buluç, 2016), school culture (Akan, 2016), professional performance (Akan, 2016), job satisfaction (Yıldırım, Akan and Yalçın, 2017), self-sufficiency of administrator (Işık, 2017), school-environment-family collaboration (Ergin, Kaplan and Korkmaz 2018), professional affiliation (Güler, Çıkrıkçı and Akçay, 2019) is examined.

It is observed that the majority (82,6) of the methods used in the studies were performed by quantitative research methods based on positive paradigm, and the proportion of qualitative studies was 17.6. In quantitative research, survey studies were conducted to determine the relationship between the concept of an effective school and the concepts associated with an effective school, as well as the current level of effectiveness of schools. This supports the view of effective school research that behavioral and perceptual processes are measured by surveys and scales, rather than by direct observation in classrooms, as noted by Good and Brophy (1986). In quantitative research, the school effectiveness survey created by Hoy and Ferguson(1985) and adapted to Turkish culture and the school effectiveness survey prepared by Fat (2011) are used. In qualitative research, case study and case study survey model research methods were used, in which school manager and teacher opinions were included, mostly for questions prepared by researchers on the concept of an effective school. A mixed-method study was not found in the study. It is thought that it would be better to conduct qualitative or mixed-method studies on an effective school, which is a concept

that outweighs the qualitative aspect, in terms of detailing the subject. In addition, direct observation and transmission of observations in schools that can qualify as effective schools will be useful in terms of revealing all the dimensions of an effective school.

In the study, it is seen that researchers mainly used random sampling (34,8) and simple random sampling (17,4) methods in the field of sampling selection.

As a sample of research, the opinions of teachers, school administrators, or teachers and school administrators together are often included. On the other hand, a limited number of studies have included the opinions of teachers. In order to develop the concept of an effective school and achieve success in practice, it is necessary to focus on the opinions of teachers.

Statements of publication ethics

The ethics committee approval for present research was given by Sakarya University Social and Humanities Ethics Committee with the issue number E-61923333-050.99-33810 and authors declare that the principals of research and publication ethics were followed. In addition, the article classification form developed by, Sözbilir, Kutu and Yaşar (2012) was used by obtaining the necessary permissions from the researchers in order to conduct content analysis of the articles.

Conflict of interest

The authors declare that there is no conflict of interest.

References

Abdurrezzak, S., ve Uğurlu C., T. (2016). Okul liderliği davranış ve uygulamalarının okul etkililiğini sağlamadaki rolüne ilişkin öğretmen algılarının incelenmesi. [Examination of teacher perceptions regarding the role of school leadership behaviors and practices in ensuring school effectiveness] *Cumhuriyet Üniversitesi Sosyal Bilimler Dergisi*, 40(1), 2016-242.

Akan, D. (2016). Effective school evaluation in primary schools from the dimension of parents. *Journal of Education and Training Studies,* 5(1), 134-140.

Altun, T. ve Bebek, G. (2016). Öğretim elemanlarının okul geliştirme ve etkili okul paradigmalarının temel bileşenleri hakkındaki görüşlerinin incelenmesi. [Examining the views of the instructors on the basic components of school improvement and effective school paradigms] *Alan Eğitimi Araştırmaları Dergisi*, 2(2), 96- 107.

Arslan, H., Satıcı, A., & Kuru, M. (2007). Resmi ve Özel İlköğretim Okullarının Kültür ve Etkililik Düzeylerinin Karşılaştırılması. [Comparison of Culture and Effectiveness Levels of Public and Private Primary Schools.] *Kuram ve Uygulamada Eğitim Yönetimi* , Sayı 51, ss: 371-394.

Arslantaş, H., İ., ve Özkan, M. (2014). Öğretmen ve yönetici gözüyle etkili okulda yönetici özelliklerinin belirlenmesi. [Determining the characteristics of the administrator in an effective school from the perspective of teachers and administrators] *The Journal of Academic Social Science Studies*, 26, 181-193.

Ayık, A. ve Ada, Ş. (2009). İlköğretim okullarında oluşturulan okul kültürü ile okulların etkililiği arasındaki ilişki. [The relationship between the school culture created in primary schools and the effectiveness of schools] *Gaziantep Üniversitesi Sosyal Bilimler Dergisi*, 8(2), 429-446.

Balcı, A. (2010). Açıklamalı eğitim yönetimi terimleri sözlüğü (2.Baskı). [Annotated glossary of educational administration terms] *Ankara: Pegem Akademi*.

Balcı, A. (2014). Etkili Okul ve Okul Geliştirme Kuram,[Effective School and School Development Theory]Uygulama ve Araştırma (7.baskı*). Ankara: Pegem Akademi.*

Başaran, İ.E, (2000).Eğitim Yönetimi Nitelikli Okul. [Educational Management Qualified School] 4. Baskı, *Feryal Matbaası, Ankara.*

Brookover, W. (1979). School socıal systems and student achıevement (School can make difference), *New York: Praeger Publishers.*

Bursalıoğlu, Z. (2010). Okul yönetiminde yeni yapı ve davranış [New structure and behavior in school management] (15.basım). *Ankara: Pegem Akademi.*

Cerit, Y., ve Yıldırım, B. (2017). İlkokul müdürlerinin etkili liderlik davranışları ile okul etkililiği arasındaki ilişki. [The relationship between effective leadership behaviors of primary school principals and school effectiveness.] *Bartın Üniversitesi Eğitim Fakültesi Dergisi*, 6(3), 902-914.

Çelikten, M. (2001). Etkili okullarda karar süreci.[Decision process in effective schools.] *Erciyes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi,* 11(2), 263-274.

Çalışkan, M., S., ve Güçlü, M. (2014). Etkili okul-çevre ilişkisinde ailenin katkısına ilişkin okul yöneticilerinin görüşleri. [School administrators' views on the contribution of the family in the effective school-environment relationship.] *Journal of International Social Research*, 7(34), 750-759.

Çubukçu, Z., & Girmen, P. (2006). Ortaöğretim Kurumlarının Etkili Okul Özelliklerine Sahip Olma Düzeyleri. [Levels of Secondary Education Institutions to Have Effective School Characteristics.] *Sosyal Bilimler Dergisi,* Sayı:16.

Edmonds, R. (1979). Effective School For the Urban Poor. *Educational Leadership*, 15-24.

Good, T.L. and Brophy, J.E. (1986), School Effects. In M.C. Wittrock (Ed.),*Handbook of Resarch on Teaching*, 3.Ed., New York: Macmillian

Gökçe, F. ve Kahraman, P. B. (2010). Etkili okulun bileşenleri: Bursa ili örneği. [Components of an effective school: The case of Bursa province.] *Uludağ Üniversitesi Eğitim Fakültesi Dergisi,* 23(1), 173-206.

Helvacı, M. A., & Aydoğan, İ. (2011). Etkili Okul ve Etkili Okul Müdürüne İlişkin Öğretmen Görüşleri. . [Teachers' Views on Effective School and Effective School Principal.] *Uşak Üniversitesi Sosyal Bilimler Dergisi*, 4/2, 42-61

Hoy, W., K. ve Ferguson, J. (1985). A Theoretical framework and exploration of organizational effectiveness of schools. *Educational Administration Quarterly*, 21, 117-134.

Işık, A., N., ve Gümüş, E. (2016). Yönetici öz-yeterliği ve okul etkililiği arasindaki ilişkinin incelenmesi. . [Examining the relationship between administrator self-efficacy and school effectiveness.] *Kastamonu Eğitim Dergisi*, 25(1), 419-434

Lezotte, L. W. (1989), School improvement based on the effective schools resarch, *International Journal of Educational Reasarch*,13, 815-824.

Mackenzia, D. E.(1983). Resarch of school ımprovement: an appraisal of some recent trends. *Educational Resarcher*, 12(4), 5-16

Özdemir, S. (2019). Eğitimde Örgütsel Yenileşme [Organizational Innovation in Education] (Geliştirilmiş 7. Baskı). *Ankara: Pegem Akademi.*

Şenel, T., ve Buluç, B. (2016). İlkokullarda okul iklimi ile okul etkililiği arasındaki ilişki. [The relationship between school climate and school effectiveness in primary schools] *TÜBAV Bilim Dergisi*, 9(4), 1-12.

Şimşek, H. & Yıldırım, A. (2011). Sosyal Bilimlerde Nitel Araştırma Yöntemleri. [Qualitative research methods in the social sciences.]*Ankara: Seçkin Yayıncılık. 10.Baskı*

Şişman, M. (1996). Etkili okul yönetimi. Şişman, M. (1996).[Effective school management.] *Yayınlanmamış Araştırma Raporu,* Eskişehir

Şişman, M. (2011). Eğitimde mükemmellik arayışı etkili okullar. [The pursuit of excellence in education is effective schools.] *Ankara: Pegem Akademi*.

Titrek, O. (2020, 12 26). https://www.youtube.com/watch?v=ag2yr89yW5E adresinden alındı.

Uğurlu, C., T. ve Demir, A. (2016). Etkili okullar için kim ne yapmalı? [Who should do what for effective schools?] *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 12(1), 53-75.

Yılmaz, K. (2015). Öğretmenlerin örgütsel farkındalık ve örgütsel güven algıları ile okulların örgütsel etkililik düzeyleri. [Organizational awareness and organizational trust perceptions of teachers and organizational effectiveness levels of schools. Intellectual.] Aydın.

Yörük, S., ve Şahin, B. (2012). Cultural leadership roles of school principals in high schools as effective schools. *Journal of Theoretical Educational Science*, 5(3), 352-368.

Zigarelli, M. A. (1996). An Empirical Test of Conclusions From Effective Schools *Journal of Educational Research*. Vol. 90, No. 2, s. 103-111.

BUEFAD | 2021, Volume 10, Issue 3, 598-612
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.652394

Self-Compassion's Correlation with Attachment for Middle School Adolescents

Ezgi SUMBAS[a*] & Nilgün ÖZTÜRK[b]

a*İnönü University, (0000-0001-5450-6400), ezgi.sumbas@inonu.edu.tr

b İnönü University, (0000-0003-2593-9076), nilgun.ozturk@inonu.edu.tr

Research Article | Received: 26.11.2019 | Revised: 11.08.2021 | Accepted: 13.08.2021

Abstract

The present study was conducted to investigate the correlation between self-compassion and attachment in adolescents. The data were collected by the authors and the students were informed about the study before proceeding to the data collection stage. In the study, the Self-Compassion Scale (Short Form) was used to measure the self-compassion levels of the students, and the Relationships Questionnaire (Adolescent Form) was used to determine the attachment styles of the students. The study group included 355 students attending 6th, 7th and 8th grades in public secondary schools in Turkey. Descriptive statistics, t-test, analysis of variance and simple linear correlation analysis were used in data analysis. The study findings demonstrated that there were low, negative and significant correlations between self-compassion levels of the students and their obsessive attachment and fearful attachment levels. Findings also demonstrated that there was no significant difference between self-compassion levels of the students based on gender, however there was a significant difference based on the age variable.

Keywords: Self-compassion, attachment, adolescence.

Ortaokul Öğrencilerinde Öz-Şefkat İle Bağlanma Arasındaki İlişkinin İncelenmesi

Öz

Bu araştırma, ergenlerde öz-şefkat ile bağlanma arasındaki ilişkiyi incelemek amacıyla yapılmıştır. Veriler, araştırmacı tarafından toplanmış ve verilerin toplanmasına geçmeden önce öğrencilere çalışma ile ilgili bilgilendirme yapılmıştır. Araştırmada, öğrencilerin öz-şefkat düzeylerini ölçmek amacıyla Öz-Şefkat Ölçeği Kısa Formu, öğrencilerin bağlanma tarzlarını belirlemek amacıyla İlişki Ölçekleri Anketi- Ergen Formu kullanılmıştır. Araştırmanın çalışma grubunu Türkiye'de yer alan bir il merkezine bağlı devlet ortaokullarının 6., 7. ve 8. sınıflarında öğrenim gören 355 öğrenci oluşturmaktadır. Verilerin analizinde betimsel istatistikler, t testi, varyans analizi ve basit doğrusal korelasyon analizi kullanılmıştır. Çalışmanın sonucunda öğrencilerin öz-şefkat düzeyleri ile saplantılı bağlanma ve korkulu bağlanmaları arasında düşük düzeyde, negatif ve anlamlı ilişkilerin olduğu belirlenmiştir. Araştırmadan elde edilen diğer bir bulgu ise cinsiyete göre öğrencilerin öz-şefkat düzeyleri arasında anlamlı bir farklılık görülmezken yaş değişkenine göre anlamlı bir farklılık olduğu görülmektedir. Elde edilen bulgular alanyazın ışığında tartışılmış ve önerilerde bulunulmuştur. Bu çalışmada ergenlerde kendine şefkat düzeyleri ile bağlanma arasındaki ilişki araştırılmıştır.

Anahtar kelimeler: Öz-şefkat, bağlanma, ergenlik.

To cite this article in APA Style:

Sumbas, E. & Öztürk, N. (2021). Self-compassion's correlation with attachment for middle school adolescents. *Bartın University Journal of Faculty of Education, 10*(3), 598-612. https://doi.org/10.1016/buefad.652394

1 | Introduction

Compassion with its different forms have been one of the most important concepts in eastern spiritual traditions (e.g., Islam, Christianity, Buddhism) (Tanhan, 2019). Lazarus (1991) described the concept of compassion as the emotion that motivates the desire to help a suffering individual. Self-compassion, on the other hand, represents a bridge between Eastern and Western thought, which includes the Buddhist concept of awareness (Tirch, 2010). While compassion is generally conceptualized as exhibiting compassion for others in the West, Buddhist tradition emphasizes that it is necessary for the individual to feel compassion for one's self as well as the others (Neff, 2003b). According to Neff (2003a), self-compassion refers to an attitude that involves approaching one's self with warmth and understanding in difficult times and accepting that making mistakes is part of being human. Also this is same in Islam (Tanhan, 2019). In short, self-compassion is that the self-care of the suffering individual and directing compassion to one's self.

Neff (2003a) argued that the structure of self-compassion consists of three basic interrelated components that develop one another. These components include self-kindness, common human experience and mindfulness. Self-kindness, the first component of self-compassion, is emotionally gentle, attentive, compassionate and understanding approach of the individual towards herself or himself during pain and trouble due to personal flaws and failure instead of cruel criticism. Self-compassion therefore offers the individual the opportunity to understand in a critical way his failure, inadequacy and suffering. Thus, self-compassion allows the individual to understand failures, inadequacies and pain without a critical approach. The second component, common human experience reflects the acceptance of personal pain, failures and inadequacies from the perspective of common human experience and that problems in life are a part of the common human experience and do not apply only to certain individuals. Instead of focusing on one's individual self, self-compassion involves accepting that all individuals could fail, make mistakes, and everybody has flaws in their experiences in life. Therefore, instead of isolation and avoidance of others when things go wrong, the sense of self-compassion could make it easier to communicate and deal with other individuals in times of failure or difficulty. The third component, mindfulness requires a balanced perspective on the individual's situation. In other words, it means being able to face painful thoughts and emotions without exaggeration, drama or self-pity. These components interact to form a compassionate mind frame when individual faces personal mistakes, perceives inadequacies, or experiences various difficulties in life (Neff & Lamb, 2009; Neff & McGehee, 2010). Thus, self-compassion works as an effective emotional regulation strategy, leading to more positive emotions such as compassion and attachment by neutralizing negative emotional patterns (Neff, Hsieh & Dejitterat, 2005).

Self-compassion increases the emotions of security and interconnection and decreases the emotions threat and isolation, leading to emotional balance, as well as supporting the psychology of the individual against negative emotional situations (Neff & Tirch, 2013). Self-compassion, for example, provides higher empathy (Neff & Pommier, 2013) and cognitive flexibility (Martin, Staggers & Anderson, 2011). Therefore, it is considered that self-compassionate individuals tend to be more open-minded and therefore more capable of altering their reactions (Neff & Tirch, 2013). Furthermore, the literature, which has grown dramatically during the last decade, demonstrated that self-compassion leads to several psychological benefits (Neff & Tirch, 2013). The studies showed that self-compassion is associated with psychological well-being and it was considered a potentially important protective factor that promotes emotional flexibility (Tanhan, 2020). While self-compassionate individuals react less to negative events, it was reported that they experience higher life satisfaction when compared to non-compassionate individuals (Allen & Leary, 2010; Bluth & Blanton, 2015; Tel & Sarı, 2016).

Previous studies reported that high level of self-compassion related with happiness (Hollis-Walker & Colosimo, 2011), more realistic self-assessments (Neff, Rude & Kirkpatrick, 2007), high psychological resilience levels (Yağbasanlar, 2018), better romantic relations (Baker & McNulty, 2011; Neff & Beretvas, 2013), more self-reliance (Breines & Chen, 2012; Neely, Schallert, Mohammed, Roberts & Chen, 2009), being able to suppress unwanted thoughts and emotions (Neff, 2003a).

Also previous studies reported that high level of self-compassion related with acceptance of important emotions (Neff, Kirkpatrick & Rude, 2007) and it was associated with anxious attachment and perceived social support from family and friends (Bayar, 2016). Self-compassion also could be important in psychotherapy (Kuyken et al., 2010; Shapiro, Astin, Bishop & Cordova, 2005). Assessment of previous study findings as a whole demonstrated that self-compassion had several physical and psychological benefits and was associated with several psychological well-being indices.

It could be argued that self-compassion is a variable that positively affects psychological health (Neff, 2003a). Therefore, it was considered important to investigate the factors that would contribute to the development of self-compassion, which positively affects the individual's life. Certain authors claimed that the attachment theory and early care experiences may provide a useful framework for understanding the origins of self-compassion (Gilbert, 2009; Gilbert & Procter, 2006). According to Bowlby (1979), attachment is the bond of love between the baby and the mother (or caregiver) that develops during the initial years of life. Bowlby argued that the attachment system was not only related to infants but also active and effective "from cradle to the grave" (Bowlby, 1979). Thus, the attachment pattern that begins to develop in infancy continues to improve as the mother and father continues to fulfill the needs of the child consistently (Erikson, 1969; Grossmann, Grossmann, Kindler & Zimmerman, 2008). Presence of a consistent caregiver (physical intimacy), quality of care, infant's traits, and familial conditions, including the parent's internal working models, are among the factors that affect attachment security (Berk, 2013). The continuous support and care of the caregiver supports the development of a sense of safety and attachment in the child. Such care develops the sense that the child and others' internal working models are reliable and worthy of love and care (Collins, Guichard, Ford & Feeney, 2004). The close and supportive relationship that the individuals with safe attachment style (low anxiety and low avoidance) experience with their mothers or caregivers is considered to facilitate the emotions of intimacy and comfort during the time when the infant is in distress. Sensitive and susceptible parenting facilitates the development of a secure attachment style and consequently self-relaxation, leading to the development of self-compassion (Irons, Gilbert, Baldwin, Baccus & Palmer, 2006). According to Neff and McGehee (2010), a consistently attentive and supportive mother may increase the feeling of compassion in the child. Similarly, Gilbert and Procter (2006) mentioned that growing up in a sensitive and susceptible parenting environment would allow the individual to relate with herself or himself in compassionate and stressful conditions and reveal the individual's ability to relieve the stress. However, inadequate or inconsistent parenting of the caregiver may prevent the development of a sense of secure attachment due to the development of the emotions of anxiety or avoidance in the child (Mikulincer & Shaver, 2007). Gilbert and Procter (2006) indicated that growing up with inconsistent, cold or rejecting parents may lead to inadequate development of the relaxation system and development of self-criticism rather than self-compassion. Similarly, Pietromonaco and Feldman Barrett (2000) reported that a negative perspective may develop in individuals who experienced high levels of attachment anxiety due to inconsistent parenting during childhood. Thus, the fact that individuals who grew up in dysfunctional families and with mothers who lacked self-compassion and exhibited insecure attachment patterns shows low levels of self-compassionate when they compared to individuals that grew up in healthy families (Wei, Liao, Ku & Shaffer, 2011). So, it's suggested that family experiences could play a significant role in the development of self-compassion (Neff, 2003a).

The transfer of the attachment to parents or caregiver to other close relatives is based on the attachment theory (Bowlby, 1973). Secure attachment to caregivers could provide a safe basis for promotion of social

interaction with peers (Sroufe & Waters, 1977). The attachment that is rooted in early care period changes during adolescence. Steinberg and Silverberg (1986) argued two differences in the relationship between attachment to parents and attachment to peers. The first difference was the fact that an adolescent's orientation from parents to peers was considered as an indicator of autonomy. In this perspective, parental attachment and peer attachment are inversely proportional. On the other hand, Berndt (1979) argued that the social impact of the family and peers on the individual constituted an independent social environment. In this perspective, attachment to the parents may be independent of attachment to peers. Which of these social worlds would be more important would depend on the self-assessment of the adolescent. Thus, based on the characteristics of adolescence, individuals in this period are expected to acquire independence from their families and their attachment patterns are oriented towards their peers (Allen & Manning, 2007; Hazan & Zeifman, 1994). Receiving adequate responses from others (i.e., care and compassion) during a need for care and compassion from his / her social relationships would enforces the individual's perspective, while the opposite occurs during a need for care and compassion (i.e., rejection, neglect, or humiliation), this would prevent the individual's perspective (Gilbert, 2009). When the efforts to receive compassion are constantly obstructed by others, one may fail to recognize his or her need for care and compassion (in other words, being compassionate), because these individuals do not have emotional memories of being loved and appeased (Gilbert & Irons 2005).

While the initial experiences of seeking care and compassion occur during childhood (Pepping et al., 2015), it was considered that certain aspects of parenting during childhood may be associated with the development of self-compassion in adolescents and young adults (Neff & McGeehee, 2010). However, the literature review revealed that the studies on self-compassion were mostly conducted on adults or college students and the studies conducted on children and adolescents were quite limited (Bluth & Blanton, 2015; MacBeth & Gumley, 2012; Tanhan, 2020). However, adolescence is a stormy period where both physical and psychological problems (restless, apprehensive, choosy, reactive, explosive, quickly upset, speculative) and rapid changes occur (Yörükoğlu, 2000). Difficulties experienced in this developmental process, coupled with social pressures and academic and parental expectations, may increase psychological and emotional disorders among adolescents (Kessler, Avenevoli & Merikangas, 2001). Thus, it was considered important to investigate the psychological resources that could help the adolescent to cope with difficulties during this stormy period. According to Collins (1997), self-compassion may be highly associated with adolescence. The self-acceptance and kindness required by self-compassion could lead to reduced levels of harsh and cruel criticism and judgment when adolescents encounter situations they do not like or dislike. Furthermore, the skill of the adolescent to share his / her experiences in common human experience could provide a sense of interpersonal connection that could help young individuals cope with their fear of social rejection. In addition, self-compassion helps prevent repetitive pessimistic thoughts and emotions that could lead to psychological dysfunctions in adolescents (Nolen-Hoeksema, 1991). It is seen that there is a lack of literature on self-compassion, which is considered to be one of the important psychological resources, in the sample of adolescents. Based on this, it is thought that the findings obtained from this study conducted with a sample of adolescents will contribute to the literature.

In this context, the aim of the present study was to investigate the correlation between self-compassion and attachment styles that were considered to be among the factors that could contribute to the development of self-compassion in adolescents and to determine whether there were significant differences between self-compassion levels of the students based on gender and age variables.

2 | Method

Research Design

The present study aimed to investigate the correlation between self-compassion and attachment styles of students attending the middle school in province in east of Turkey. Thus, relational screening model was preferred as the research model. Relational screening method aims to determine the presence or degree of covariance between two or more variables (Karasar, 2008).

Sample

The study sample included 6th, 7th and 8th grade students attending the middle school province in east of Turkey during the 2018-2019 academic year spring semester. One hundred and ninety-eight students were female (55.8%) and 157 were male (44.2%) and the total sample size was 355. The mean sample age was $\overline{X}$ = 12.76 and the age range was between 12 and 14. The mean ages of female and male students were Ss = 12.78 and Ss = 12.75, respectively. 37.7% (n = 134) of the study group were 6th grades, 38.3% (n = 136) were 7th grades and 23.9% (n = 85) were 8th grades. Convenience sampling method (Fraenkel, Wallen & Hyun, 2012) was used to determine the study sample.

Data Collection Instruments

Relationships Questionnaire – Adolescent Form (RQ): It was developed by Bartholomew and Horowitz (1991). The scale was adapted to Turkish by Sümer and Güngör (1999). Relationships Questionnaire includes 17 items. It aims to measure four attachment styles (secure, dismissing avoidant, fearful avoidant, and preoccupied). The scale is a 7-point Likert type. These points were indicated by 1: It does not describe me at all, 4: It partially describes me, 7: It completely describes me. Attachment scale includes four sub-dimensions: secure attachment (sample item: I can easily establish emotional affinity with others), fearful attachment (sample item: Being close to others bothers me), dismissing attachment (sample item: It is important for me to feel independent), and preoccupied attachment (sample item: I want to establish full emotional affinity with others).

In validity and reliability studies conducted by Sümer and Güngör (1999) on the Turkish sample, it was determined that the Relationships Questionnaire included four factors: security, dismissing, fearful, and preoccupied. Furthermore, it was determined that reliability coefficients were calculated between .54 and .61 in all dimensions (Sumer & Gungor, 1999). Reliability coefficients were calculated between .58 and .75 in this study.

Self-Compassion Scale – Short Form (SCS-SF): Psychometric properties of the Turkish language version of the Self-Compassion Scale - Short Form were analyzed by Yılmaz and Sarı (2018) on adolescents. In order to investigate the psychometric properties of the scale, construct validity, criterion validity, internal consistency coefficient and test-retest reliability were addressed. The internal consistency coefficient of the scale was calculated as .75. The scale includes 11 items (sample item: I try to consider my failures as a natural part of being human). It is a 5-point Likert type scale (1: Never, 2: Rarely, 3: Sometimes, 4: Frequently and 5: Always). A high total score in the scale indicates a high self-compassion level (Yılmaz & Sarı, 2018). Reliability coefficients were calculated .80 in this study.

Data Analysis

After obtaining the approval from the relevant institutions for the study, the teachers were informed, and the classrooms were visited, and the information on the aim of the research and how to respond to the scales were provided to the students before the implementation. The scales were provided as a set to the students who volunteered to participate in the study and the process took an average of 25 minutes. The scales were organized primarily based on the control items and 89 surveys with inconsistent responses were excluded from the dataset. Then, the responses were entered into the statistics software and 4 surveys with outliers

were excluded based on descriptive statistics. Similar box diagram, QQ histography (Kalaycı, 2008), mean, median and modes, lower than 1 skewness and kurtosis coefficients and Kolmogorov-Smirnov or Shapiro-Wilk tests (Can, 2014) are utilized to determine normality. When the sample size is greater than 50, Büyüköztürk (2005) suggested the use of Kolmogorov-Smirnov test. However, there is controversy in the literature about the effectiveness of this test (Can, 2014). Thus, normal distribution was tested with the Q-Q histography, the similarity of the median, mean and mode values, and the skewness and kurtosis coefficients. It was determined that the data distribution was normal based on the above-mentioned criteria. Pre-analysis processes demonstrated that the dataset included 355 students. Descriptive statistics, t test, analysis of variance and simple linear correlation analysis were conducted in the analysis of the study data. SPSS 21 software was used in data analysis and the level of significance was accepted as .05.

3 | FINDINGS

The collected data was analyzed considering research questions. The results obtained from the analysis are presented below.

In this section, findings and interpretations obtained with the analysis of the correlation between self-compassion and attachment levels of adolescents are presented.

Descriptive Statistics

Frequency (f) and percentage (%) distributions of personal information obtained from the middle school students are presented in Table 1.

Table 1. Descriptive Analysis Findings

Variables		f	%
1. Gender	Female	198	55,8
	Male	157	44,2
2. Age	12	134	37,7
	13	136	38,3
	14	85	23,9
	TOTAL	355	100

As seen in Table 1, 55.8% of the participating students were female and 44.2% of the students were male and 37.7% of the participating students were 12 years old, 38.8% of the students were 13 years old, and 23.9% of the students were 14 years old.

Findings on Self-Compassion Based on Certain Variables

This section includes findings on the correlation between self-compassion and attachment styles based on gender and age.

Correlation analysis was conducted to determine whether there was a relationship between middle school students' self-compassion levels and their attachment style. The analysis findings are presented in Table 2.

Table 2. Correlation Between Self-Compassion and Attachment Styles

		Secure Attachment	Dismissing Attachment	Preoccupied Attachment	Fearful Attachment
Self-Compassion	r	.067	-.075	-.204*	-.121*

p< 0.05*

As seen in Table 2, there were low and negative correlations between self-compassion and preoccupied attachment (r = -0.204, p <0.05) and fearful attachment (r = -0.121, p <0.05)." to "As seen in Table 2, there were *significantly* negative and correlations between self-compassion and preoccupied attachment (r = -0.204, p <0.05) and fearful attachment (r = -0.121, p <0.05).

The results of the t-test conducted to determine whether the self-compassion levels of the students differed based on gender are presented in Table 3.

Table 3. Self-Compassion t-test Findings Based on Gender Variable

Self-Compassion		n	$\overline{X}$	SS	Sd	t	p
Gender	Female	198	34.6869	7.95884	.56561	-1.710	.088
	Male	157	36.0828	7.21995	.57621		

p< 0.05*

As seen in Table 3, the mean self-compassion score for female students was $\overline{X}$= 34.68 (Ss = 7.96) and the mean self-compassion score for male students was $\overline{X}$ = 36.08 (Ss = 7.22). Independent groups t-test conducted to determine whether there was a significant difference between the self-compassion scores based on the gender of the students demonstrated that the difference between the arithmetic mean scores of the groups was not statistically significant (t = -1,710; p> 0.05). This finding showed that the self-compassion levels of the students were not affected by gender.

The findings of the one-way analysis of variance (ANOVA) conducted to determine whether there was a difference between self-compassion levels of the students based on age are presented in Table 4.

Table 4. One-Way Analysis of Variance (ANOVA) Findings on Self-Compassion Based on Age Variable

			n	$\overline{X}$	ss	Sd	F	p	Significant Difference
Self-Compassion	Age	12	134	36.9104	7.53784	.65117	5.150	.006*	1-2 1-3
		13	136	34.6471	7.35505	.63069			
		14	85	33.8235	7.96596	.86403			

p< 0.05*

As seen in Table 4, the mean self-compassion score for 12-year-old students was 36.91, (SD = 7.53), the mean self-compassion score for 13-year-old students was 34.91 (SD = 7.35), and the mean self-compassion score for 14 year-old students was 33.82 (SD = 7.96). The findings of one-way analysis of variance (ANOVA) conducted to determine whether there was a significant difference between the arithmetic mean self-compassion scores based on the age variable demonstrated that the difference between the arithmetic means based on age was statistically significant [F (3-355) = 5.150, p < .05]. Tukey Test was conducted to determine the significant differences between the groups and it was determined that there was a difference between 12 and 13 year old students and 12 and 14 year old students. As age increased, the level of self-compassion decreased. This finding indicated that age variable affected the self-compassion level of adolescents

4 | Discussion & Conclusion

In the present study, the correlation between self-compassion levels and attachment (secure, fearful, dismissive, preoccupied) was investigated in adolescents. The study findings demonstrated that there were

low and negative correlations between self-compassion and preoccupied attachment and fearful attachment and there was no correlation between self-compassion and secure attachment and dismissive attachment. Thus, it could be suggested that as self-compassion level increases, preoccupied and fearful attachment levels decrease in adolescents. Another finding of the present study revealed that there was no significant difference between the self-compassion levels of the students based on the gender variable, however there was a significant difference based on the age variable.

The first finding of the study was the correlations between attachment styles and self-compassion. According to this finding, there were negative correlations between self-compassion and preoccupied and fearful attachment styles, however there was no correlation between self-compassion and secure attachment and dismissive attachment. Similar to the findings of the present study, previous studies reported that there were correlations between self-compassion and preoccupied and fearful attachment. In a study conducted by Neff and McGehee (2010) with adolescents and young adults, a negative correlation between self-compassion and fearful and preoccupied attachment was determined, while no correlation was found between self-compassion and dismissive attachment. Similarly, in a study conducted by Neff and Beretvas (2013), negative correlations were determined between self-compassion levels of young adults and fearful and preoccupied attachment, and no correlation was observed between self-compassion and dismissive attachment. In general, studies conducted with adolescents reported no correlation between self-compassion and dismissive attachment, while negative correlations were reported between self-compassion and preoccupied and fearful attachment, which are insecure attachment styles (Bayar, 2016; Irons, Gilbert, Baldwin, Baccus, & Palmer, 2006; Pepping, Davis, O'Donovan & Pal, 2015; Gilbert & Irons, 2009).

The study findings also demonstrated that there was no correlation between secure attachment and self-compassion. Although the attachment relationships of adolescents shift towards peers, it could be considered that the attachment pattern established with friends is not as effective as the attachment pattern established with parents (DuBois, Burk-Braxton, Tevendale, Lockerd & Moran, 2002; Peter & Gazelle, 2017). Furthermore, it could not be argued that the correlation between attachment and self-compassion was fully clarified; although attachment patterns do not vary significantly with age, it is possible for an insecurely attached individual to develop secure attachment patterns later in life (Mikulincer & Shaver, 2003). Bowlby (2012) also states that the attachment patterns do not change over time but some traumatic events can change this. In other words, a negative relationship between secure attachment and self-compassion or no correlation could be expected.

The study findings also demonstrated that self-compassion did not differ based on the gender variable. Similar to the present study findings, previous studies in the literature reported that self-compassion did not differ based on gender are. Muris, Meesters, Pierik and Kock (2016) and Neff and McGehee (2010) determined that there was no significant difference in self-compassion levels of the students of different gender. It was observed that similar findings were obtained in studies conducted with college students (Baykal, Usta, Memur & Şirin, 2018; Dilmaç, Deniz & Deniz, 2009; İkiz & Totan, 2012; Iskender, 2009; Kıcalı, 2015; Öveç, 2007 Yang, 2016).

In a study conducted with adults, Soysa and Wilcomb (2015) found that the negative dimension of self-compassion (self-judgment, isolation and over-identification) did not vary by gender. Similarly, other studies conducted with adults obtained the same finding (Neff et al.,, 2007; Neff & Pommier, 2013). In a study where self-compassion levels in the United States, Thailand, Taiwan were compared, Neff, Pisitsungkagarn and Hsieh (2008) determined that the self-compassion levels of Thai and Taiwanese participants did not differ based on the gender variable, however American females had lower self-compassion levels when compared to males. This gender difference was explained by the tendency of females to act more considerate when compared to males. A similar finding was reported by Yarnell, Stafford, Neff, Reilly, Knox, and Mullarkey (2015) in their meta-analysis, which revealed a low but significant difference in self-compassion levels

between males and females. The finding that females had a lower level of self-compassion when compared to males was explained by the fact that women tend to be more self-critical.

In certain studies in the literature, it was reported that men generally had higher self-compassion when compared to women (Bluth & Blanton, 2015; Neff, 2003a; Neff & Beretvas, 2013; Neff, Hseih & Dejitthirat, 2005). Adolescence, which includes the middle school age, is a transition period where rapid physical and psychological, cognitive, moral and personality developments and changes and also certain difficulties in adapting to these changes are experienced (Yörükoğlu, 2000). Neff (2003b) and Neff and McGehee (2010) reported that self-compassion decreased during adolescence. In adolescence, it was emphasized that adolescents could relentless towards themselves. The increase in self-criticism and the attitude of adolescents to be more idealistic in this period are the main reasons for this behavior (Neff, 2003b). Therefore, the fact that self-criticism is self-directed during adolescence and similar developments and changes are experienced in both genders during this period explain the fact that the self-compassion levels of girls and boys do not differ.

The present study also determined that self-compassion levels differed based on the age variable. Self-compassion level decreased as the age increased between the ages of 12 and 14. Similar to the present study findings, there are studies in the literature, which reported that self-compassion levels differed based on age. Bluth, Campo, Futch, and Gaylord (2017) reported that older girls had lower self-compassion levels when compared to younger girls in a study conducted with 765 adolescents between the 7th and 12th grades. Similarly, Bluth and Blanton (2015), in a study conducted with 90 adolescents between 6th and 12th grades in a private middle school and public high school in South America, reported that self-compassion levels differed among high school and middle school students based on age. While self-compassion levels of males were similar at all ages, self-compassion levels of older female adolescents (over 14) were the lowest. In another study conducted by Neff and Vonk (2009) with a sample of 18-83 years old individuals in Denmark, it was reported that there was a positive but low correlation between self-compassion and age (r =, 24, p <.001), however compassion levels could increase in later years in life. Similarly, Homan (2016) and Wren et al. (2012) stated that there was a correlation between age and self-compassion and that self-compassion may increase later in life. Przezdziecki, Sherman, Baillie, Taylor, Foley and Stalgis - Bilinski (2013) found a positive correlation between self-compassion and age in a study conducted with 279 participants diagnosed with breast cancer over the age of 18. In a study by Peker (2017), it was concluded that self-compassion levels of those aged between 18 and 30 were significantly lower when compared to those aged between 31 and 40 and 41 and 53. Thus, the studies that investigated the correlation between self-compassion and age in the literature reported that self-compassion level increased with age and adolescence was a developmental period where the self-compassion level was the lowest. The development continues in pre-adolescence, which includes the ages of 9-12 (Wiltz, 2005), however it was observed that psychological and emotional development is different in mid-adolescence that includes the ages of 13 and 14 (Bee & Boyd, 2009). In the present study, it was considered that the different psychological and emotional development of 12 years old pre-adolescents was effective in differentiating the self-compassion levels of the 12-year-old students when compared to 13 and 14-year-old students. Also, it is stated in the literature that there is a negative relationship between self-compassion and perfectionism during adolescence (Alaloğlu, 2020; Barnett & Sharp, 2016; Neff, 2003b). The effort to achieve perfection and the efforts to be perfect (Bayram, 2019), which is a characteristic of adolescence, explain the decrease in the level of self-compassion in adolescents.

In conclusion, it was observed that there were differences between the self-compassion levels of middle school students based on the attachment and age variables. Certain recommendations could be presented based on the study findings. First, considering that attachment (fearful and preoccupied) is a factor that affects the development of self-compassion in adolescents, educational institutions and non-governmental organizations could collaborate and conduct joint studies. It could be suggested that the foundation of communities that would include expecting couples in the society and organization of training courses for

these communities on the factors that affect attachment could be effective. Secondly, based on the finding that the level of self-compassion decreases with age, it is suggested that psycho-education studies and group guidance studies that will improve the self-compassion levels of adolescents should be carried out by psychological counselors working in school guidance services. It is seen in literature studies that self-compassion is a feature that can be changed both in adults (Albertson, Neff, & Dill-Shackleford, 2015; Kelly & Carter, 2015; Smeets, Neff, Alberts, & Peters, 2014) and adolescents (Galla 2016). Future studies could be conducted on potential variables that could affect the development of self-compassion in adolescence due to the limited number of self-compassion studies in adolescence, the presence of protective (Muris & Petrocchi, 2017) and well-being improvement (Hope, Koestner & Milyavskaya, 2014; Gunnell, Mosewich, McEwen, Eklund & Crocker, 2017) effects of self-compassion. Future researchers can utilize a quite new and innovative method called Online Photovoice (Tanhan, 2020; Tanhan & Strack, 2020; Tanhan ve di**ğ**., 2021) to understand self-compassion and attachment, especially secure attachment and dismissive attachment.

Similar to any study, the present study has certain limitations. Since the study group included adolescents between the ages of 12 and 14, the findings can only be generalized to students in this age group. The second limitation of the study is the fact that the majority of the students in the sample came from low socio-economic and low parental education level families (57.7% of mothers and 34.6% of the fathers were primary school graduates). Thus, these findings are considered to limit generalizability to adolescent population with different demographics. Thus, further studies could be conducted with a larger sample of adolescents with different demographics. Furthermore, future long-term studies could be conducted to understand the changes in adolescence in more detail, to determine the other variables effective on self-compassion between pre-adolescence and late adolescence, in order to fill the present gap in the literature on the development of self-compassion.

Although thepresent study had certain limitations, it was observed that the study had several important aspects. First, considering the limited literature on self-compassion in adolescents, the study contributed to the comprehension of the differences between adolescent self-compassion based on age and gender. Furthermore, it was considered that the inclusion of control items in data collection instruments to exclude the participants who did not respond carefully to the questionnaire improved the validity of the study findings.

Statements of publication ethics

Conflict of interest

The authors declare that there is no conflict of interest.

References

Alaloğlu, G. (2020). *Mükemmeliyetçilik, kendini sabotaj, öz-şefkat ve psikolojik iyi oluş arasındaki ilişkilerin incelenmesi.* Yüksek Lisans Tezi, Maltepe Üniversitesi, İstanbul.

Allen, A. B., & Leary, M. R. 2010. Self-compassion, stress, and coping. *Social and Personality Psychology Compass*, *4(*2), 107–118.doi/pdf/10.1111/j.1751-9004.2009.00246.x

Allen, J. P., & Manning, N. (2007). From safety to affect regulation: Attachment from the vantage point of adolescence. *New directions for child and adolescent development*, (117), 23-39. doi: 10.1002/cd.192

Albertson, E. R., Neff, K. D., & Dill-Shackleford, K. E. (2015). Self-compassion and body dissatisfaction in women: A randomized controlled trial of a brief meditation intervention. *Mindfulness*, *6*(3), 444-454.doi: 10.1007/s12671-014-0277-3

Baer, R. A. (2010). Self-compassion as a mechanism of change in mindfulness- and acceptance-based treatments. In R. A. Baer (Eds.), *Assessing mindfulness and acceptance processes in clients: Illuminating the theory and practice of change* (pp. 135–153). Oakland, CA: New Harbinger Publications.

Baker, L. R., & McNulty, J. K. (2011). Self-compassion and relationship maintenance: The moderating roles of conscientiousness and gender. *Journal of Personality and Social Psychology*, *100*(5), 853-873.doi: 10.1037/a0021884

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: a test of a four-category model. *Journal of personality and social psychology*, *61*(2), 226-244.https://pdfs.semanticscholar.org/6b60/00ae9911fa9f9ec6345048b5a20501bdcedf.pdf

Barnett, M. D. & Sharp, K. J. (2016). Maladaptive perfectionism, body image dissatisfaction, and disordered eating behaviors among U.S. college women: The mediating role of self-compassion. *Personality and Individual Differences, 99,* 225-234. doi: 10.1016/j.paid.2016.05.004

Bayar, Ö. (2016). *Üniversite öğrencilerinde öz-şefkatin yordayıcıları olarak bağlanma tarzı ve algılanan sosyal destek*. Yüksek Lisans Tezi, Hacettepe Üniversitesi. Ankara.

Baykal, N. B., Usta, T. K., Memur, H. N. K., & Şirin, A. (2018). Üniversite öğrencilerinin öz-anlayışlarının, bağlanma stilleri ve ilişki durumları bakımından incelenmesi. *Kastamonu Eğitim Dergisi*, *27*(3), 1023-1032. doi: 10.24106/kefdergi.252

Bayram, S. B. (2019). Ergenlerin mükemmeliyetçilik özellikleri ve akademik alanda arzuların ertelenmesi ile akademik stres arasındaki ilişkinin incelenmesi. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi, 1*(35),41-55.https://dergipark.org.tr/en/download/article-file/808956.

Bee, H. L. & Boyd, D. R (2009). (Gündüz, O. Çev.). *Çocuk gelişim psikolojisi*. Kaknüs yayınları.

Berk, E. L. (2013). *Bebekler ve çocuklar- doğum öncesinden orta çocukluğa* (Işıkoğlu, E. Çev.). Nobel Yayınları.

Berndt, T. J. (1979). Developmental changes inconformity to peers and parents. *Developmental Psychology, 15*(6), 608-618. doi:10.1037/0012-1649.15.6.608

Bluth, K., & Blanton, P. W. (2015). The influence of self-compassion on emotional well-being among early and older adolescent males and females. *The Journal of Positive Psychology*, *10*(3), 219-230. doi.org/10.1080/17439760.2014.936967

Bluth, K., Campo, R. A., Futch, W. S., & Gaylord, S. A. (2017). Age and gender differences in the associations of self-compassion and emotional well-being in a large adolescent sample. *Journal of Youth and Adolescence*, *46*(4), 840-853.doi: 10.1007/s10964-016-0567-2

Breines, J. G., & Chen, S. (2012). Self-compassion increases self-improvement motivation. *Personality and Social Psychology Bulletin*, *38*(9), 1133-1143.doi.org/10.1177%2F0146167212445599

Bowlby, J. (1973). Attachment and Loss: VoL 2. Separation: Anxiety and Anger. Basic Books, New York.

Bowlby, J. (1979). The Bowlby-Ainsworth attachment theory. *Behavioral and Brain Sciences*, *2*(4), 637-638. doi.org/10.1017/S0140525X00064955

Bowlby, J. (2012). *Bağlanma* (Güneri, S. Çev.). İstanbul: Pinhan Yayınları.

Büyüköztürk, Ş. (2005). *Veri analizi el kitabı.* Ankara: Pegem Akademi Yayınları.

Can, A. (2014). *SPSS ile bilimsel araştırma sürecinde nicel veri analizi.* Ankara: Pegem Akademi Yayınları.

Collins, W. A. (1997). Relationships and development during adolescence: Interpersonal adaptation to individual change. *Personal Relationships*, 4, 1–14. doi/pdf/10.1111/j.1475-6811.1997.tb00126.x

Collins, N. L., Guichard, A. C., Ford, M. B., & Feeney, B. C. (2004). Working models of attachment: New developments and emerging themes. In W. S. Rholes & J. A. Simpson (Eds.), Adult attachment: Theory, research, and clinical implication (pp. 196 –239). New York: Guilford Press.

DuBois, D., Burk-Braxton, C., Swenson, L., Tevendale, H., Lockerd, E., & Moran, B. (2002). Getting by with a little help from self and others: Self-esteem and social support as resources during early adolescence. *Developmental Psychology*, 38, 822–839. http://dx.doi.org/10.1037/ 0012-1649.38.5.822

Dilmaç, B., Deniz, M., & Deniz, M. E. (2009). Üniversite öğrencilerinin öz-anlayışıları ile değer tercihlerinin incelenmesi. *Değerler Eğitimi Dergisi*, *7*(18), 9-24. https://dergipark.org.tr/en/download/article-file/302492

Erikson, E. H. (1968). *Identity: Youth and crisis*. New York: Norton.

Fraenkel, J. R., Wallen, N. E. & Hyun, H. H. (2012). *How to design and evaluate researchin education* (8. st ed). New York: McGraw Hill.

Galla, B. M. (2016). Within-person changes in mindfulness and self-compassion predict enhanced emotional well-being in healthy, but stressed adolescents. *Journal of Adolescence*, *49*, 204-217 doi.org/10.1016/j.adolescence.2016.03.016

Gilbert, P., & Irons, C. (2005). Focused therapies and compassionate mind training for shame and self-attacking. In P. Gilbert (Eds.). *Compassion: Conceptualisations, research and use in psychotherapy*, (pp. 263-325). London: Routledge

Gilbert, P., & Irons, C. (2009). Shame, self-criticism, and self-compassion in adolescence. *Adolescent emotional development and the emergence of depressive disorders*, *1*, 195-214.https://pdfs.semanticscholar.org/ceb6/66daddb6d9d0bd65fe92724c83fb6617564d.pdf

Gilbert, P. & Procter, S. (2006). Compassionate mind training for people with high shame and self-criticism: Overview and pilot study of a group therapy approach. *Clinical Psychology & Psychotherapy*, 13, 353–379.

Gilbert, P. (2009). Introducing compassion-focused therapy. *Advances in Psychiatric Treatment*, *15*(3), 199-208.. doi: 10.1192/apt.bp.107.005264

Grossmann, K., Grossmann, K. E., Kindler, H., & Zimmermann, P. (2008). A wider view of attachment and exploration: The influence of mothers and fathers on the development of psychological security from infancy to young adulthood. In J. Cassidy & P. R. Shaver (Eds.)*, Handbook of attachment: Theory, research, and clinical applications*, (pp.220-235). The Guilford Press.

Gunnell, K. E., Mosewich, A. D., McEwen, C. E., Eklund, R. C., & Crocker, P. R. (2017). Don't be so hard on yourself! Changes in self-compassion during the first year of university are associated with changes in well-being. *Personality and Individual Differences*, *107*, 43-48. doi.org/10.1016/j.paid.2016.11.032

Hazan, C., & Zeifman, D. (1994). Sex and the psychological tether. In K. Bartholomew & D. Perlman (Eds.), *Advances in personal relationships, Vol. 5. Attachment processes in adulthood* (pp. 151-178). London, England: Jessica Kingsley Publishers.

Hollis-Walker, L., & Colosimo, K. (2011). Mindfulness, self-compassion, and happiness in non-meditators: A theoretical and empirical examination. *Personality and Individual differences*, *50*(2), 222-227.doi.org/10.1016/j.paid.2010.09.033

Homan, K. J. (2016). Self-compassion and psychological well-being in older adults. *Journal of Adult Development*, *23*(2), 111-119.doi: 10.1007/s10804-016-9227-8

Hope, N., Koestner, R., & Milyavskaya, M. (2014). The role of self-compassion in goal pursuit and well-being among university freshmen. *Self and identity*, *13*(5), 579-593.doi.org/10.1080/15298868.2014.889032

Iskender, M. (2009). The relationship between self-compassion, self-efficacy, and control belief about learning in Turkish university students. *Social Behavior and Personality: an international journal*, *37*(5), 711-720.doi: 10.2224/sbp.2009.37.5.711

Irons, C., Gilbert, P., Baldwin, M. W., Baccus, J. R., & Palmer, M. (2006). Parental recall, attachment relating and self-attacking/self-reassurance: Their relationship with depression*. British Journal of Clinical Psychology, 45*, 297–308. doi.org/10.1348/014466505X68230

İkiz, E., & Totan, T., (2012). Üniversite öğrencilerinde öz-duyarlılık ve duygusal zekanın İncelenmesi. *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 14*(1), 51-71. https://dergipark.org.tr/en/download/article-file/53289

Kalaycı, Ş. (2008). *SPSS uygulamalı çok değişkenli istatistik teknikleri.* Ankara: Asil Yayınları.

Karasar, N. (2008). *Bilimsel araştırma yöntemi: kavramlar-ilkeler-teknikler*. Nobel Yayın Dağıtım.

Kelly, A. C., & Carter, J. C. (2015). Self-compassion training for binge eating disorder: A pilot randomized controlled trial. *Psychology and psychotherapy: Theory, research and practice*, *88*(3), 285-303. doi.org/10.1111/papt.12044

Kessler, R. C., Avenevoli, S., & Merikangas, K. R. (2001). Mood disorders in children and adolescents: An epidemiologic perspective. *Biological Psychiatry*, *49*(12), 1002-1014. doi.org/10.1016/S0006-3223(01)01129-5

Kıcalı, Ü. Ö. (2015). *Öz-şefkat ve tekrarlayıcı düşünmenin olumsuz duygulanım ve depresyon ile ilişkilerinin incelenmesi*. Yayınlanmamış yüksek lisans tezi, Maltepe Üniversitesi, İstanbul.

Kuyken, W., Watkins, E., Holden, E., White, K., Taylor, R. S., Byford, S., ... & Dalgleish, T. (2010). How does mindfulness-based cognitive therapy work? *Behavior Research and Therapy, 48*, 1105-1112. /doi.org/10.1016/j.brat.2010.08.003

Lazarus, R. S. (1991). *Emotion and adaptation*. Oxford University Press, Oxford.

MacBeth, A., & Gumley, A. (2012). Exploring compassion: A meta-analysis of the association between self-compassion and psychopathology. *Clinical psychology review*, *32*(6), 545-552. doi.org/10.1016/j.cpr.2012.06.003

Martin, M. M., Staggers, S. M., & Anderson, C. M. (2011). The relationships between cognitive flexibility with dogmatism, intellectual flexibility, preference for consistency, and self-compassion. *Communication Research Reports*, *28*(3), 275-280. doi.org/10.1080/08824096.2011.587555

Mikulincer, M., & Shaver, P. R. (2003). The attachment behavioral system in adulthood: Activation, psychodynamics and interpersonal processes. In M. P. Zanna (Eds.), *Advancer in experimantal social psychology* (pp. 53-152). New York, NY: Academic Press.

Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change*. Guilford Press.

Muris, P., Meesters, C., Pierik, A., & Kock, B. (2016). Good for the self: Self-compassion and other self-related constructs in relation to symptoms of anxiety and depression in non-clinical youths. *Journal of Child and Family Studies*, *25*(2), 607–617.doi:10.1007/s10826-015-0235-2

Muris, P., & Petrocchi, N. (2017). Protection or vulnerability? A meta-analysis of the relations between the positive and negative components of self-compassion and psychopathology. *Clinical Psychology & Psychotherapy*, *24*(2), 373-383.doi: 10.1002/cpp.2005

Sümer, N., & Güngör, D. (1999). Yetişkin bağlanma stilleri ölçeklerinin Türk örneklemi üzerinde psikometrik değerlendirmesi ve kültürlerarası bir karşılaştırma. *Türk Psikoloji Dergisi, 14 (43)*, 71-106. http://www.nebisumer.com/wp-content/uploads/2016/01/Sumer-Gungor_baglanma_TPD1999_14_71-106.pdf

Neff, K. D. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, *2*(2), 85-101.doi.org/10.1080/15298860309032

Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and İdentity*, *2*(3), 223-250. doi.org/10.1080/15298860309027

Neff, K. D., Hsieh, Y. P., & Dejitterat, K. (2005). Self-compassion, achievement goals, and coping with academic failure. *Self and İdentity*, *4*(3), 263-287.doi.org/10.1080/13576500444000317

Neff, K. D., Rude, S. S., & Kirkpatrick, K. L. (2007). An examination of self-compassion in relation to positive psychological functioning and personality traits. *Journal of Research in Personality*, *41*(4), 908-916. doi.org/10.1016/j.jrp.2006.08.002

Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality*, *41*(1), 139-154. doi.org/10.1016/j.jrp.2006.03.004

Neff, K. D., Pisitsungkagarn, K., & Hsieh, Y. P. (2008). Self-compassion and self-construal in the United States, Thailand, and Taiwan. *Journal of Cross-Cultural Psychology*, *39*(3), 267-285. doi/pdf/10.1177/0022022108314544

Neff, K. D., & Lamb, L. M. (2009). Self-compassion. In K. D. Neff. (Eds.). *Handbook of İndividual Differences in Social Behavior*, (pp. 561-573). Milano, Italy: Hachette UK Company.

Neff, K. D., & Vonk, R. (2009). Self-compassion versus global self-esteem: Two different ways of relating to oneself. *Journal of Personality*, 77, 23-50. doi/pdf/10.1111/j.1467-6494.2008.00537.x

Neff, K. D., & McGehee, P. (2010). Self-compassion and psychological resilience among adolescents and young adults. *Self and Identity, 9,* 225–240. doi.org/10.1080/15298860902979307

Neff, K. D., & Beretvas, S. N. (2013). The role of self-compassion in romantic relationships. *Self and Identity*, *12*(1), 78-98. doi.org/10.1080/15298868.2011.639548

Neff, K. D., & Pommier, E. (2013). The relationship between self-compassion and other-focused concern among college undergraduates, community adults, and practicing meditators. *Self and Identity*, *12*(2), 160-176.. doi.org/10.1080/15298868.2011.649546

Neff, K. D., & Tirch, D. (2013). Self-compassion and ACT. In. T. B. Kashdan,. & J. Ciarrochi (Eds.), *Mindfulness, acceptance, and positive psychology: The seven foundations of well-being,* (pp.78-106), Context Press/New Harbinger Publications, Oakland.

Neely, M. E., Schallert, D. L., Mohammed, S. S., Roberts, R. M., & Chen, Y. J. (2009). Self-kindness when facing stress: The role of self-compassion, goal regulation, and support in college students' well-being. *Motivation and Emotion, 33,* 88-97. doi.org/10.1007/s11031-008-9119-8

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of abnormal psychology*, *100*(4), 569-582. doi.org/10.1037//0021-843x.100.4.569

Peker, E. (2017). *Çocukluk çağı travmaları, yetişkinlik döneminde bağlanma biçimi ve öz anlayış arasındaki ilişkilerin incelenmesi*. Yüksek Lisans Tezi. İstanbul Arel Üniversitesi. İstanbul.

Peter, D., & Gazelle, H. (2017). Anxious Solitude and Self‐Compassion and Self‐Criticism Trajectories in Early Adolescence: Attachment Security as a Moderator. *Child Development*, *88*(6), 1834-1848. doi/pdfdirect/10.1111/cdev.12926

Pietromonaco, P. R., & Feldman Barrett, L. (2000). Attachment theory as an organizing framework: A view from different levels of analysis. *Review of General Psychology*, *4*(2), 107-110. doi.org/10.1037%2F1089-2680.4.2.107

Przezdziecki, A., Sherman, K. A., Baillie, A., Taylor, A., Foley, E., & Stalgis‐Bilinski, K. (2013). My changed body: Breast cancer, body image, distress and self‐compassion. *Psycho‐oncology*, *22*(8), 1872-1879. doi.org/10.1002/pon.3230

Shapiro, S. L., Astin, J. A., Bishop, S. R., & Cordova, M. (2005). Mindfulness-based stress reduction for health care professionals: Results from a randomized trial. *International Journal of Stress Management,* 12, 164-176. doi: 10.1037/1072-5245.12.2.164

Smeets, E., Neff, K., Alberts, H., & Peters, M. (2014). Meeting suffering with kindness: Effects of a brief self‐compassion intervention for female college students. *Journal of Clinical Psychology*, *70*(9), 794-807.doi/pdf/10.1002/jclp.22076

Sroufe, L. A., & Waters, E. (1977). Attachment as an organizational construct. *Child Development*, 1184-1199. https://www.jstor.org/stable/pdf/1128475.pdf

Steinberg, L., & Silverberg, S. B. (1986). The vicissitudes of autonomy in early adolescence. Child Development, 57, 841-851. https://www.jstor.org/stable/pdf/1130361.pdf

Soysa, C. K., & Wilcomb, C. J. (2015). Mindfulness, self-compassion, self-efficacy, and gender as predictors of depression, anxiety, stress, and well-being. *Mindfulness*, *6*(2), 217-226. doi 10.1007/s12671-013-0247-1

Tanhan, A. (2019). Acceptance and commitment therapy with ecological systems theory: Addressing Muslim mental health issues and wellbeing. *Journal of Positive Psychology and Wellbeing, 3*(2), 197-219. https://doi.org/10.47602/jpsp.v3i2.172

Tanhan, A. (2020). COVID-19 Sürecinde Online Seslifoto (OSF) Yöntemiyle Biyopsikososyal Manevi ve Ekonomik Meseleleri ve Genel İyi Oluş Düzeyini Ele Almak: OSF'nin Türkçeye Uyarlanması. *Electronic Turkish Studies*, *15*(4). https://dx.doi.org/10.7827/TurkishStudies.44451

Tanhan, A., & Strack, R. W. (2020). Online photovoice to explore and advocate for Muslim biopsychosocial spiritual wellbeing and issues: Ecological systems theory and ally development. *Current Psychology*, *39*(6), 2010-2025. http://dx.doi.org/10.1007/s12144-020-00692-6

. Tanhan, A., Arslan, G., Yavuz, K. F., Young, J. S., Çiçek, İ., Akkurt, M. N., Ulus, İ. Ç., Görünmek, E. T., Demir, R., Kürker, F., Çelik, C., Akça, M. Ş., Ünverdi, B., Ertürk, H., & Allen, K. (2021). A constructive understanding of mental health facilitators and barriers through Online Photovoice (OPV) during COVID-19. ESAM Ekonomik ve Sosyal Araştırmalar Dergisi, 2(2). Advance Online Publication. https://doi.org/10.13140/RG.2.2.15257.13921

Tirch, D. D. (2010). Mindfulness as a context for the cultivation of compassion. *International Journal of Cognitive Therapy*, *3*(2), 113-123.doi: 10.1521/ijct.2010.3.2.113

Tel, F. D., & Sarı, T. (2016). Üniversite öğrencilerinde öz duyarlılık ve yaşam doyumu. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 16* (1), 292-304. doi: 10.17240/aibuefd.2016.16.1-5000182922

Yağbasanlar, O. (2018). *Üniversite öğrencilerinin psikolojik dayanıklılıkları ile dini yönelimleri ve öz-şefkatleri arasındaki ilişkilerin incelenmesi*. Yüksek Lisans Tezi, Gazi Üniversitesi, Ankara.

Yang, X. (2016). Self-compassion, relationship harmony, versus self-enhancement: Different ways of relating to well-being in Hong Kong Chinese. *Personality and Individual Differences*, *89*, 24-27. doi.org/10.1016/j.paid.2015.09.006

Yarnell, L. M., Stafford, R. E., Neff, K. D., Reilly, E. D., Knox, M. C., & Mullarkey, M. (2015). Meta-analysis of gender differences in self-compassion. *Self and Identity*, *14*(5), 499-520. doi.org/10.1080/15298868.2015.1029966

Yıldırım, M., & Sarı, T. (2018). Öz-şefkat ölçeği kısa formu'nun türkçe uyarlaması: Geçerlik ve güvenirlik çalışması. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, *18*(4), 2502-2517. https://doi.org/10.17240/aibuefd.2018.18.41844-452171

Yörükoğlu, A (2000*). Gençlik çağı*, Özgür Yayınları: İstanbul.

Wei, M., Liao, K. Y. H., Ku, T. Y., & Shaffer, P. A. (2011). Attachment, self-compassion, empathy, and subjective well-being among college students and community adults. *Journal of Personality*, *79*(1), 191-221. doi/pdf/10.1111/j.1467-6494.2010.00677.x

Wiltz, J. M. A. (2005). *İdentifying factors associated with friendship in individuals with mental retardation*. (Unpublished doctoral dissertation). Ohio State University, Ohio.https://etd.ohiolink.edu/apexprod/rws_etd/send_file/send?accession=osu1122928929&disposition=inline

Wren, A. A., Somers, T. J., Wright, M. A., Goetz, M. C., Leary, M. R., Fras, A. M., ... & Keefe, F. J. (2012). Self-compassion in patients with persistent musculoskeletal pain: relationship of self-compassion to adjustment to persistent pain. *Journal of pain and symptom management*, *43*(4), 759-770. doi.org/10.1016/j.jpainsymman.2011.04.014

BUEFAD | 2021, Volume 10, Issue 3, 613-625
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.767783

Ideal Science Teacher From Perspective of Gifted Students: Phenomenologicial Study

Münevver SUBAŞI ÇOLAK[a*]

a* Hatay Mustafa Kemal University, (0000-0001-6777-6995) *munevversubasi@gmail.com

Research Article	Received: **10.07.2020**	Revised: **28.06.2021**	Accepted: **19.07.2021**

Abstract

The aim of this study was to determine the characteristics of an ideal science teacher, from the perspective of gifted secondary school students. For this purpose, phenomenological method from the qualitative research methods was used in the study. Thirty-five gifted secondary school students studying at a science and art center in the Mediterranean region of Turkey have been selected as the participants of the study. In the study conducted on a voluntary basis, the data was collected using a semi-structured interview form. The data obtained from the study was analyzed using content analysis, which is one of the qualitative data analysis methods. Frequency values were used to analyze the data and direct citations were included. As a result of the analysis of the data, gifted students emphasized in general, the personal and educational dimensions of an ideal science teacher. While an ideal science teacher is expected to be fair, humorous and entertaining on a personal level, it was emphasized that he/she should be wise and creative on a professional level. In the educational dimension, the science teachers who address the students by their names and treat them sincerely and in the learning and teaching dimension, the type of teachers who are fun, experimental, and the ones that can create a more enjoyable environment in the classroom emerge as the ideal science teachers.

Keywords: Gifted, ideal teacher, science.

Özel Yetenekli Bireylerin Bakış Açısıyla İdeal Fen Bilimleri Öğretmeni: Fenomonolojik Çalışma

Öz

Bu araştırmada amaç özel yetenekli ortaokul öğrencilerinin bakış açısıyla ideal bir fen bilimleri öğretmeninin özelliklerini belirlemektir. Bu amaç doğrultusunda çalışmada nitel araştırma yöntemlerinden fenomonolojik desen kullanılmıştır. Çalışmanın katılımcılarını Akdeniz bölgesinde bir Bilim ve Sanat Merkezinde eğitim gören otuz beş özel yetenekli ortaokul öğrencisi oluşturmaktadır. Katılımcıların gönüllülük esasına dayalı olarak yer aldığı çalışmada veriler yarı yapılandırılmış görüşme formu yardımıyla toplanmıştır. Çalışmadan elde edilen veriler nitel veri çözümleme yöntemlerinden olan içerik analizi yardımıyla çözümlenmiştir. Verilerin çözümlenmesinde frekans değerleri kullanılmış ve doğrudan alıntılara yer verilmiştir. Verilerin analizi sonucunda; özel yetenekli öğrenciler ideal bir fen bilimleri öğretmeninin genel olarak kişisel ve eğitsel boyutlarına vurgu yapmışlardır. Kişisel boyutta ideal bir fen bilimleri öğretmeninin adil, esprili ve eğlenceli olması beklenirken; mesleki gelişim boyutunda bilgili ve yaratıcı olması gerektiği vurgulanmıştır. Eğitsel boyutta öğrenciye yaklaşımında ismen hitap edilmesi ve samimi davranması istenirken, öğrenme ve öğretme sürecinde eğlenceli olma, deneyler yaptırma ve oyunlar yardımıyla ders işlemesi ideal bir fen bilimleri öğretmeninden beklenilen özellikler olarak ortaya konmuştur.

Anahtar kelimeler: Özel yetenekli, idea öğretmen, fen bilimleri.

To cite this article in APA Style:

Subaşı, M. (2021). Ideal science teacher from perspective of gifted students: phenomenologicial study. *Bartın University Journal of Faculty of Education, 10*(3), 613-625. https://doi.org/10.1016/buefad.767783

1 | INTRODUCTION

Considering the principle of equal opportunity in education, just like children with disabilites, children with visual or hearing impairments, gifted students too want to become aware of their potential and improve themselves (Hızlı, 2014). The cornerstone of the transformation of gifted children into individuals who are beneficial to the society is education (Darga, 2010). One of the most decisive factors in student success in the educational process is the quality of the teacher (Education Monitoring Report, 2017). No matter the difficulties faced by the students in the classroom or the abilities they have, teachers should try to integrate them into society as confident and self-sufficient individuals (Robinson et al., 2014).

Teachers who can work with gifted students should be better equipped compared to other teachers (Mills, 2003). Teachers involved in the education of the gifted students, who are different from their peers in many aspects, should be able to meet the needs of gifted students and provide them with an education in line with their needs. In order to achieve this, the teacher needs to know their characteristics and needs. Differentiated education programs are needed to bring out the potential of these students whose educational needs and requirements are different, in order to provide them with equal opportunities in education. The individual development of these students through differentiated education programs is important (Lassig, 2003; Manning, 2006). In order for teachers and students to receive education in line with their needs, they should receive adequate training on the differentiation of teaching. Teachers who are not adequately educated are incapable of meeting the needs of their students (Copenhaver & McIntrye, 1992; Hansen & Fedhusen, 1990; Westberg & Daoust, 2003). Self-improving teachers have more satisfactory results in turning their students' into successful individuals (Robinson et al., 2014). Teachers of gifted students who are preparing for professional life recognize students' needs and try to meet these needs and provide more opportunities for student success (Hansen & Feldhusen, 1994). Cheung and Phillipson (2008) stated that there are statistically significant differences in the competence and characteristics between the experienced and non-experienced teachers in the education of gifted students. In addition, the teachers' awareness of the deficiencies and faults of the current system for the gifted, will help them to propose solutions to the problems (Gökdere & Çepni, 2003).

Teachers of gifted children should present diversity in terms of character and qualifications (Dağlıoğlu, 2010). The teachers of gifted students should care for their cognitive, social and emotional differences and work around these differences and should have the required skillset to help the students to develop these aspects of theirs (Delisle, 2006; Devis & Rimm, 2004; Londvogt, 2001; Miligram & Hang, 2009; Ziv & Sarango, 2011). Bishop (1968), Drews (1972), Gallager, Aschner, and Jenne (1967), Baldwin (1977), and Lindsay (1980) stated in their research that teachers should be democratic, guiding, process-oriented, innovative, and attach importance to experiences (cited in Dağlıoğlu, 2010). In addition, teachers should be more confident and experienced regarding these students who are highly motivated and even sometimes know more than the teachers (Parke, 1992). In addition, an ideal teacher is expected to be open-minded, empathetic, tolerant, loving his/her occupation, students and teaching, and attentive to his/her students (Feldhusen, 1997; Friedman & Krongold, 1993; Raichel & Arnon, 2005). Mills (2003) stated in his study that the cognitive and personal characteristics of an effective teacher play an important role in this process. He stated that teachers who want to work effectively with gifted students should be objective, prefer to work with abstract concepts and themes, be open-minded and flexible and they should be capable of logical analysis. In his work with teachers, Woods (2004) stated that an ideal teacher should be more flexible and more cohesive, open-minded and approachable, with a broader experience and diverse and wide-ranging interests. When the relevant literature is summarized, it can be seen that experts usually emphasized the cognitive and personal characteristics of teachers working with the gifted students. It has been stated that teachers should be understanding, open-minded, flexible, guiding, and they should love both teaching and learning for themselves.

It can be surmised from the relevant literature that the expectations of gifted students from an ideal teacher usually vary. Abel and Karnes (1994) stated that in their work with gifted students living in rural areas with low socioeconomic opportunities, students usually emphasized social and personal characteristics in an ideal teacher. Vialle (1994), who conducted similar studies in Australia, stated that students only emphasized personal characteristics of the teacher and in which they are expected to be understanding and helpful. Tischler and Vialle (2009) demonstrated that gifted students look for appropriate personality traits in an effective teacher with active and diverse pedagogical approaches and positive intellectual qualities. Miligram (1979), who worked with fourth and sixth grades in Israel, stated that students only focus on intellectual features. Another study by Miligram (2000) showed that gifted children also want their teachers to have features such as creativity, positive personal and social behavior, the use of rich and complex materials, and regular classroom management. It was also revealed in a study by Cross and Coleman (1992) that students wanted their teachers to be quicker, more creative and more action oriented in science class. They also stated that they received less emotional support from their teachers and wanted to be treated the same way other students were treated. Hativa (2003) stated that teachers should be capable of finding ways to best explain the subject to the students, have up-to-date information about their field of teaching, and have a wide knowledge of materials and methods that they can use during teaching. In addition, gifted students described their teachers as "teachers of the future" and emphasized that these teachers should be open to change and innovation and should effectively use multimedia, in order to achieve this (Ziv & Sarangon, 2011). For gifted students, a good teacher should be good in terms of personality, character and teaching skills. He/She should be able to develop a personal teacher and student relationship (Devis & Rimm, 2004; Khalil & Accariye, 2016; Leikin, 2001). We can surmise from the relevant literature that the characteristics that the ideal teacher should have for gifted students vary. While some students emphasized the cognitive aspect of teachers, some emphasized the importance of their personal characteristics. However, in general, it was emphasized that an ideal teacher should be intellectual, creative, have a broad knowledge of methods, open to innovations, and possess positive personality traits.

In conclusion, teachers who work with gifted students need to teach these children how to think (not what to think), how to communicate, how to develop their concept of self, how to solve problems, how to work independently, how to use big data and how to acquire special working skills (Duneland Schools, 1986). In summary, given the relevant literature, we can see that there are many different studies on what characteristics should be found in teachers working with gifted students and what these students expect from their teachers. Considering the studies conducted in both Western and non-Western countries, it can be said that the expectations of students in general differ according to the characteristics of the societies in which they live. In this study, gifted secondary school students who are in an exam-oriented and competitive education system were studied. The aim of the study is to reveal (from the perspective of these students);

a) What gifted students think of about an ideal science teacher

b) What qualifications teachers should have in order to perform an effective education in the classroom

In accordance with this purpose, it was aimed to determine the personal and professional development of an ideal science teachers of gifted students, their approach to themselves and their expectations throughout an effective education and training period. In addition, it was intended to take remedial actions for these identified situations in the future and to be able to give an effective science lessons.

2 | METHOD

RESEARCH DESIGN

Phenomenological method from the qualitative research methods was used in the study. Phenomenology which seeks to identify facts rather than generalizations (Creswell, 2013) allows us to investigate and make sense of concepts such as events, experiences, perceptions and orientations (Yıldırım & Şimşek, 2005). The

goal is to understand the basic structure and essence of intensely intricate human experiences (Merriam, 2013).

PARTICIPANTS

Thirty-five gifted secondary school students studying at a science and art center in the Mediterranean region of Turkey have been selected as the participants of the study. Convenience sampling method was used to reach gifted students who were educated in different schools but attended the Science and Art Center in their free time. Thus, the researcher selected the individuals who would participate in the study from people who were close and easy to access. This way, the study was conducted rapidly and more practically (Yıldırım & Şimşek, 2005). All secondary school students attending the science and arts center were informed about the study; however, data was collected only from students who wanted to participate voluntarily in the study. The characteristics of the student participating in the study are given below:

Table 1. Frequencies of The Characteristics of The Participants

Grade	Frequency (f)	Gender	Frequency (f)	School type	Frequency (f)
5th Grade	10	Female	17	Public	21
6th Grade	11	Male	18	Private	14
7th Grade	9				
8th Grade	5				

DATA COLLECTION TOOLS

For the data collection process, a semi-structured interview form created by the researchers was used. In the first part of the form, there is a personal information form with demographic information to reveal participant characteristics; in the second part, there are four open-ended questions to help reveal participants' thoughts on the subject. During the preparation of the questions in the interview form, both the relevant literature and the "General Qualifications of the Teaching Profession" determined by the Ministry of National Education were taken into account. A pilot study was conducted before the final version of the interview form created. The first open-ended question of the interview was "What kind of features would you like an ideal science teacher to have?" In the pilot study, "What kind of features would you like an ideal science teacher to have?" was asked as an open ended question. But, given the responses from students, it was found that this was a very general question and not enough data was collected from the answers. It has been observed that students focus only on personality traits or cognitive characteristics and give very short answers. In line with the pilot interview and expert opinions received (one associate professor, two doctoral faculty members, one science teacher), in order to elaborate the question form, the number of questions were increased to four and the interview form was finalized.

1.What kind of personality should an ideal science teacher have?

2. How should an ideal science teacher approach to students?

3. How should an ideal science teacher handle the course?

4. What should be the ideal knowledge of an ideal science teacher about the course?

DATA COLLECTION

In the actual data collection process of the study, first of all, students were informed about it, then, only the students who volunteered were included in the study. The timing of the interview was decided according to the wishes of the students. Interviews were held with each student, which lasted between 6 to 10 minutes.

In order to prevent data loss, the interviews were recorded with an audio recorder after the permission of the participants were obtained. The interviews were conducted in a quiet and calm environment in order to prevent the students from being distracted. The questions were asked based on the order in the interview form. In order to elaborate the answers of the students, probes were sometimes used, and participant confirmation was also used to prevent data loss. The researcher was careful not to ask directing questions during the data collection process and not to affect the responses of the participants. The researcher rapidly transcribed the data obtained and corrected it by immediately identifying and correcting the failures.

DATA ANALYSIS

Descriptive statistics and content analysis were used to organize and summarize the obtained data. In the study, the overall outcome was described using frequency (f) and percentage (%) values in the analysis of the data obtained to determine the demographic characteristics of the students and the characteristics of the ideal science teachers. In order to combine similar data around specific concepts and themes and to present them in a language that the reader can understand, the students' answers to the questions contained in the interview form were subjected to content analysis. By examining the data in detail, first the codes, then similar codes were put together and combined to create themes. At the beginning of this process, two researchers worked independently of each concurrently. Similarities and differences in the code list created by the two researchers were compared and the percentage of coding was found to be 78%. This percentage must be at least 70% for it to be reliable (Patton, 2014). After calculating the reliable encoding percentage, the researcher conducted the data analysis alone. In the process of creating codes and categories, the relevant literature and the General Qualifications of the Teaching Profession updated by The Ministry of Education in 2017 were taken into consideration (Ministry of Education, 2017, p.8-11). In the coding process performed within a general framework, both the conceptual framework was used, and the researcher studied the data and produced new codes (Yıldırım & Şimşek, 2005). Themes were created by combining similar codes. General Qualifications of the Teaching Profession consist of 3 qualification areas and 11 sub-qualifications related to these qualifications. Main qualifications consist of "professional knowledge", "professional skills", "attitudes and values", while 11 sub-qualifications are educational knowledge and regulatory knowledge, planning, being able to create learning environments, being able to manage the learning/teaching process, being able to monitor and evaluate development, being able to monitor and evaluate learning, approach, national, spiritual and universal values and the development of communication and cooperation skills and personal and professional values (Ministry of Education, 2017, p.8-11).

VALIDITY AND RELIABILITY

Reliability and validity in qualitative research is considered to be different from the quantitative study. There are number of strategies that qualitative researchers can be used to increase credibility of findings: credibility, dependability, confirmability and transferability (Creswell, 2013; Merriam, 2013). In order to ensure credibility of the study, expert opinion was obtained on the scope of the study, voice recorder was used to prevent data loss and participant confirmation was ensured. Detailed information about data collection process, data analysis and sampling is provided to ensure transferability. For consistency, the obtained data was confirmed with a different researcher; the obtained data was presented with direct citations and adhered to the pre-formed conceptual framework (Relevant literature ve General Qualifications of the Teaching Profession updated by The Ministry of Education in 2017). In order to ensure objective confirmability , the researcher informed the participants at the beginning of the process about the purpose of the study and how it will be done and how the data will be evaluated.

3 | FINDINGS

The characteristics required in an ideal science teacher according to gifted students are categorized by taking into account a) three qualification factors of Ministry of Education and 11 sub-qualifications related to

them, b) conceptual framework. The codes that make up the categories are presented, along with the percentage, frequency values, supported by direct citations.

PERSONAL AND PROFESSIONAL VALUES

This category was created with the help of answers obtained from the first question of the semi-structured interview form (What kind of features would you like an ideal science teacher to have?). The category of personal and professional values is examined in two sub-themes: Personal qualifications and professional values.

Table 2. Views On Personal Characteristics

Personal Qualities	Frequency (f)	Personal Qualities	Frequency (f)
Fair	21	Friendly	5
Humorous	14	Disciplined	5
Entertaining	13	Motivating	4
Sincere	6	Smart	3
Understanding	6	Honest	3
Mild-mannered	6	Polite	3
Patient	6	Good-humored	2

As table 2 indicates, students have very different expectations from their science teachers in terms of personal characteristics. As a result of students' responses, 15 different codes were created. The most repeated of these codes is the desire for the teacher to be fair then humorous and entertaining, while the least repetitive code is the desire or the teacher to be good-humored.

The most repeated code by students is fairness. As an example to this, S35 says: *"The teacher should treat every student equally and should be fair. He/She shouldn't accuse a student unfairly and protect another. When this happens, guilty ones can never learn what is right, as he/she is constantly justified."* Similarly, S12 says: *"I think the most important thing is fairness. Some students make a lot of mistakes, but they are always overlooked, while the teacher si ruthless to others." S26*, who emphasized friendly and sincere traits in a teacher says: *"I think a science teacher should first be motivating, friendly and sincere. If the teacher does not possess these qualities, I don't want to listen to the lesson at all."* Similarly, S1 says, *"Teachers should be friendly and understanding. The more good-humored he/she is, the better. This way, we can feel comfortable around him/her"*. S7, who emphasizes a mild-mannered and patient teacher says: *"He/She should not be angry or yell at us. If that happens, the student can't focus on the lesson and learn." Similarly, S6 says: "He/She shouldn't yell all the time, should be calm. I wouldn't want to have an angry teacher. When someone speaks, teachers should not start yelling right away, but listen first and answer if there is something to be answered."* As for being entertaining and respectful, S22 says, *"He/She should be an entertaining and knowledgeable teacher who respects everyone's decisions."*

Regarding the professional development aspect, students want their teachers to be knowledgeable. As for how knowledgeable they want them to be, there are three different codes: good, very good and adequate. In addition, they want the teachers to be open to different ideas, to be creative and to constantly improve themselves.

Table 3. Professional Development

Professional Development	Frequency (f)
Knowledgeable	21
Continuous Self-Improvement	18

Creative	2

As shown in Table 3, three different codes have been created for students' expectations of science teachers in terms of professional development. Of the generated codes, the most emphasis is on knowledgable (21), while the least is on creative (2). Some student opinions regarding the generated codes are conveyed directly with citations.

Regarding the most repeated code which is "knowledgeable", S5 says *"Teacher should be wise so that he/she can answer every question of students"*, while S15 says *"He/She should be highly knowledgeable. This way, he/she can explain the lesson better and give us more descriptive information from everyday life so that we can understand it better."*. Similarly, S33 says *"It is more than enough if he/she is well-versed in science at the secondary school level, to answer all our questions."* S26, who wants teachers to constantly improve themselves says, *"He/She should talk to us about science. For example, if there is an upcoming important scientific event, he/she should ask if we know about it. He/She should inform us about that event and discuss it with us."* Similarly, S18 says *"He/She should be an expert. He/She should be able to answer all our questions. He/She should also keep an eye on scientific developments and talk to us in the classroom about these topics."* S35, *who emphasizes the creativity of teachers says, "He/She should be creative because science is not about memorizing text-books. He/She should be able to comment on matters that are open to interpretation."*

STUDENT RECOGNITION

With the help of answers from the second question of the semi-structured interview form (how should an ideal science teacher approach students?), students in this theme have focused on caring, attention and consideration to the needs in general.

Table 4. Student recognition

Student recognition	Frequency (f)
Addressing by Name	20
Being Sincere	16
Considering Individual Differences	5
Responding to Needs	3
Sweet Talk	3
Helpful	1
Impartial	1

As shown in Table 4, eight different codes have been created for students' expectations of science teachers in terms of their approach and communication. Of the generated codes, the most emphasis is on addressing by name (20), while the least is on being helpful and impartial (1). Some student opinions regarding the generated codes are conveyed directly with citations

At the point of addressing by name, which is the most repeated code, S23 says *"It sounds more sincere when I am addressed by my name and it is better. A science teacher once called me lady, and I didn't understand if she was addressing me or not."* Similarly, S19 says *"By name, definitely. My teacher once addressed me as "that", it wasn't very nice. Because people can be sensitive and fragile about this."* S32, who stated that individual differences should be considered, says: *"I think individual differences should be taken into account. My science teacher used to be mad at me for asking questions in class before he knew that I was a student of the Science And Art Center. He would think that I was asking stupid questions and interrupting the course. But after he found out about my condition, he became more understanding. We've got it resolved now, but I think it's very important."* S17 says, *"He/She should*

treat the students nicely. He should have the ability to observe the students and recognize them." On the other hand, in terms of responding to needs, S29 says *"He/She should take into account the interests and needs of all students. In a course that does not meet hes/her interests and needs, the student's productivity decreases and the course become boring."* S8, *who wants the teacher to be sincere says, "I want my teacher to be sincere and helpful. We should be able to go to him/her and talk freely whenever we have a problem so that he/she can help us"*. Similarly, S21 says *"He/She should be sincere but not too much. In the end, it is a teacher - student relationship, there has to be a limit to intimacy."* S3, who wants his/her teacher to have a sweet talk says, *"He/She should have a sweet talk and should be sincere. Occasional jokes are OK, but he/she should know how to keep it in under control."*

LEARNING AND TEACHING PROCESS

In relation to the learning and teaching process, the students generally focused on the function of the course. Students consider a teacher who handles the course in an entertaining way, who uses different methods, and generally handles the course with practical activities, as an ideal science teacher. In addition, treating students equally and ensuring dominance in classroom are considered characteristics that should be found in an ideal science teacher.

Table 5. Learning and Teaching Process

Learning - Teaching Process	Frequency (f)	Learning - Teaching Process	Frequency (f)
Entertaining	20	Ensuring memorability	5
Experimenting	15	Using Materials	3
Playing games	13	Classroom Management	2
Treating Equally	10	Smooth language	2

As shown in Table 5, eight different codes have been created for students' expectations of science teachers during the course process. The most emphasized of the generated codes are entertaining courses (20), while the least are class management and smooth language use (1). Some student opinions regarding the generated codes are conveyed directly with citations.

S34, who stated that courses should be fun says *"lessons should be fun, but of course, they should not be interrupted with too much fun"* S7 says, *"I think classes should be enjoyable. The teacher should explain the topic first, let us write down the important parts. With lots of examples. Then we can play games about the subject."* S11, who wants the courses to be hands-on and memorable, taught together with games says *"The teacher should explain the lesson in a fun and memorable way. He/She can reinforce the subject matter by providing examples from everyday life. Then maybe an experiment can be done, if no experiments are available, maybe we can play some games."* Similarly, S8 says, *"I think the teacher should make classes enjoyable by doing different things. Maybe make the lesson more memorable by letting us play games."* S9 also gives some examples for the games that he/she is talking about. *"It could be coding." It's easier and more memorable to live and experience and learn. We can also do experiments."* S31, who gives examples for the practice says *"The lessons should be more hands on. Let's say, the topic is the refraction of light. We can have some experiments about this topic. If the subject allows for experiments, we should definitely have them. The teacher should use various methods and techniques and materials."* S27, who wants teachers to treat everyone equally during the lectures says, *"The lectures should be comprehensible for everyone in the class. Teacher should not only be interested in those who attend the course, but rather should try to engage everyone. He/She should act fairly and equally to all the students in the class, regardless of the student being good or not. All students should be equal for the teacher."* Emphasizing the teacher's classroom management,

S33 said, *"Teacher's classroom management should be adequate. But this is more about the student than the teacher. If all students are agreeable and smart, the teacher can be more comfortable."*

4 | Discussion & Conclusion

The purpose of this research is to a) reveal what the gifted students think of an ideal science teacher, b) find out what characteristics science teachers must have in order to carry out an effective education in the classroom, from the perspective of those students. Based on the data obtained for this purpose, the expectations of gifted students from an ideal science teacher are generally similar to those expected from an ideal teacher of any other subject. The analysis of the data obtained revealed that the students focused in general, on the personal and educational dimensions of an ideal teacher. Students' emphasis on these dimensions is consistent with many past studies that suggest that an ideal teacher should have two important characteristics, such as professional knowledge and personality traits (Arnon & Reichel, 2007; Devis & Rimm, 2004; Khalil & Accariye, 2016; Leikin, 2001; Mills, 2003; Woods, 2004). In addition, when the findings obtained from the students are examined within the framework of the general qualifications updated by the Ministry of Education in 2017, it is clear that the characteristics of the ideal science teacher expressed by the students are in harmony with the characteristics determined in the dimensions of "Personal and Professional Values – Professional Development", "Student Recognition" and "Learning and Teaching Process" determined by The Ministry of Education. In addition, students have concentrated on some personality traits that are not included in the general qualifications organized by the Ministry of education, but which they think should be in the ideal science teacher. Because while the students discussed the personality traits they seek in detail in the study, Ministry of Education used rather more general expressions. For example, Ministry of Education focused only on empathy and tolerance when it comes to the aspect of approaching the student. The literature supports the outcome of our study suggesting that students concentrate on the personality traits in the ideal teacher (Abel & Karnes, 1994; Tischker & Vialle, 2009; Vialle, 1994). The personality traits sought after are seen as the most important characteristic to be found in an ideal science teacher for gifted students.

Given the personal characteristics that an ideal science teacher should have, students were generally more focused on the teacher being fair (60%), smart (40%), and entertaining (37%). The emphasis on fairness in personal characteristics can be explained by the improved sense of justice among gifted children. These children are different from their peers emotionally and socially as well as in the cognitive field. They are susceptible to any inequality in the classroom environment. The findings are consistent with the findings of Cross and Coleman (1992). Cross and Coleman (1992) also stated that gifted students do not want to be treated differently from other students. The expectation from an ideal teacher to be witty and funny can be explained by the strong sense of humor of gifted children. Friedman and Krongold (1993), Raichel and Arnon (2005) similarly emphasized that an ideal teacher should develop a sense of empathy, be tolerant, love his/her work, students and teaching, and be attentive to his/her students. These personality traits that students demand from their teachers can be explained by the fact that their social and emotional needs have not been met by their teachers before.

In the professional development dimension, the emphasis was made on knowledgeable, continuously improving and creative teacher characteristics. Here, the primary emphasis was made to the teacher's own education (Copenhaver & McIntrye, 1992; Hansen & Fedhusen, 1990; Westberg & Daoust, 2003) and his/her response to the needs of students through this education that he/she received. Because in general, students want their teachers not to ignore their questions but answer each and every one of them. The finding suggesting that students do not want their questions being ignored by the teachers is parallel with what Çelikdelen (2010) has found. In his work, Çelikdelen (2010) emphasized that students complain the most about teachers dodging their questions. It is very important to improve oneself in the teaching profession. Self-improving teachers can achieve more positive results in bringing success to their students (Robinson et al., 2014) and advance their work in this direction, recognizing student needs (Hansen &

Feldhusen, 1994). The importance of a creative science teacher has also been emphasized by many studies. In his study, Milligram (2000) achieved a similar result, stating that students demand creative teachers. It supports the findings obtained in other studies. Ziv and Sarangon (2011) have demonstrated that teachers should be open to innovation and changes, while Hativa (2003) stated that teachers should follow up-to-date information in their respective fields. While Bishop (1968), Drews (1972), Gallager, Aschner and Jenne (1967), Baldwin (1977) and Lindsay (1980) focused on the innovative and experience-minded teacher (Cited in Dağlıoğlu, 2010); studies that emphasize direct creativity are also available (Cross & Coleman, 1992; Ziv & Sorongon, 2001). In light of these findings, which are supported by literature, we can say that an ideal science teacher, from the gifted students perspective, should constantly improve him/herself, use creative activities in his/her courses and be sensitive to students' needs.

The second dimension created in the light of the findings of the research is "Student Recognition". The most number of answers obtained under this dimension was "being addressed by name" (58%) and "sincerity" (46%). Especially being addressed by name is of particular importance for students. Because they emphasized that people can be sensitive and fragile at this point. This result can be explained by the fact that the students are emotionally sensitive and have strong feelings towards sincerity (Clark, 2002; Cited in, Levent, 2013). The emphasis on individual differences is consistent with the work of Hansen and Feldhusen (1994), which demonstrated the demand of gifted children for the creation of a learning environment by their teachers, taking into account the student needs. Likewise, many studies emphasized the importance of individual teacher-student relationship, by supporting the relevant finding (Devis & Rimm, 2004; Khalil & Accariye, 2016; Leikin, 2001). Dağlıoğlu (2010) stated that gifted students should have different qualifications. Likewise, Cheung and Phillipson (2008) stated that teachers of gifted students should have different competencies in order to adequately guide them. In addition, the necessity for teachers of these students with different needs, to be able to realize and meet these needs, is supported by other studies (Delisle, 2006; Devis &Rimm, 2004; Londvogt, 2001; Miligram & Hang, 2009; Ziv & Sarangon, 2011). A perceived ideal science teacher is seen as someone who is close, warm and friendly towards the students. This can be explained by the fact that these students, who are different from their peers, want to be taken seriously as human beings and individuals.

As for the final dimension, the "learning and teaching process", students have stated that they want the lectures to be practical and entertaining. In addition, material usage and classroom management are aspects added to this dimension. At this point, the students' desire to be involved in the process reveals also their desire for the teacher to be their guide. Parke (1992) stated that science teachers should be more guiding. Milligram (2000) and Hativa (2003) also stated that gifted children want their teachers to use rich and complex materials and have good classroom management skills. Cross and Coleman (1992), in their study, found that students wanted more action-oriented activities. Ziv and Sarangon (2011) also emphasized the need for teachers of the gifted to use multimedia effectively. The desire for more application-based and material-based training in the lectures can be explained by the rather high academic ego and internal motivation of gifted students.

In light of all the findings obtained, an ideal science teacher for gifted students a) should have a close and sincere communication with his/her students, b) treat all students equally and fairly, c) continuously improve him/herself and d) explain their courses in an entertaining and practical manner. Teachers who will work with these students are expected to be better equipped with knowledge, skills and qualifications compared to other teachers (Chan, 2001). Unfortunately, there is no clear system in our country regarding the choice of teachers who will work with the gifted students (Gökdere & Çepni, 2003; Gökdere & Çepni, 2004). The science teachers are limited to the special courses they receive during their undergraduate studies and the in-service training seminars they receive during their teaching days (Gökdere & Çepni, 2004). Nevertheless, what is expected of teachers is to train these students to meet their needs, taking into account their abilities. This will also help to identify perceptions of the gifted students regarding the learning environment by identifying students' perceptions of an ideal teacher (Kanevsky & Keighley, 2003). Identifying the

perceptions of these students, who spend most of their time at school and have an innate interest in science, is important both in terms of regulating the learning environment and in order to take the necessary measures in terms of the teachers' approach to these students and the realization of their potential.

This study is limited a Science and Art Center and 35 students studying at this center and the interview questions in the semi-structured interview form used for the data collection process. Data was collected by interviewing 35 students. Recommendations that can be given in line with the answers of gifted students are: a) trainings to help develop communication skills in order to develop a healthy communication; b) In order to be an effective guide in the classroom environment, teachers can participate in trainings and in-house seminars on effective strategies, methods and techniques that will enable them to be able to respond to the educational needs of gifted students. The same study can also be made using quantitative research methods with a larger sample. Thus, generalizations can be made based on sampling through the findings obtained from the study.

Statements of publication ethics

I declare that the research has no unethical problems and I observe research and publication ethics.

Conflict of interest

The author proclaimed that there was no conflict interest in the publication and authorship of the article.

References

Abel, T., & Karnes, F. A. (1994). Teacher preferences among the lower socioeconomic rural and suburban advantaged gifted students. *Roeper Review*, *17*(1), 52-53. https://doi.org/10.1080/02783199409553619.

Chan, D. W. (2001). Characteristics and competencies of teachers of gifted learners: The Hong Kong teacher perspective. *Roeper Review*, *23*(4), 197-202. https://doi.org/10.1080/02783190109554098.

Cheung, H. Y., & Phillipson, S. N. (2008). Teachers of gifted students in hong kong: competencies and characteristics. *Asia-Pacific Education Researcher*, *17*(2).Retrieved from https://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=0&sid=3178b3dd-57e2-43f1-a056-b68386c7fc10%40sdc-v-sessmgr03.

Copenhaver, R. W., & Mc Intyre, D. J. (1992). Teachers' perception of gifted students. *Roeper Review*, *14*(3), 151-153. https://doi.org/10.1080/02783199209553411

Creswell, J.W. (2013). *Nitel araştırma yöntemleri: Beş yaklaşıma göre nitel araştırma ve araştırma deseni [Oualitative inquiry & research design choosing among five approaches]* (Translation from 3rd edition).(Translation Editors: M. Bütün ve S.B.Demir). Siyasal Publishing.

Cross, T. L., & Coleman, L. J. (1992). Gifted high school students' advice to science teachers. *Gifted Child Today (GCT)*, *15*(5), 25-26. Retrieved from https://eric.ed.gov/?id=EJ454496.

Çelikdelen, Hatice (2010). *Bilim sanat merkezlerinde bilim birimlerinden destek alan üstün yetenekli öğrencilerin kendi okullarında fen ve teknoloji dersinde karsılaştıkları güçlüklerin değerlendirilmesi* [*The evaluation of the difficulties of talented students who face during the science and technology lessons in their own schools, are enrolled in science and art centers].* Master Thesis, Selçuk University, Konya, Turkey.

Darga, H. (2010). *Brigance K&1 Screen II ile ilköğretim 1. sınıfta saptanan üstün yetenekli çocuklara ve sınıf arkadaşlarına uygulanan zenginleştirme programının çoklu zekâ alanlarındaki performans düzeylerini arttırmaya etkisi [The effect of enrichment programme applied to gifted/highly superior intelligent children and their classmates determined from primary education 1st class level via Brigance K&I Screen II, on improving their performance levels in multiple intelligence field],* Doctorate Dissertation, Gazi University, Ankara, Turkey.

Dağlıoğlu, H. E. (2010). Üstün yetenekli çocukların eğitiminde öğretmen yeterlikleri ve özellikleri [Proficiency and characteristics of teachers ın the education of gifted children]. *Journal of Ministery of Education*, *40*(186), 72-84. Retrieved from https://dergipark.org.tr/en/download/article-file/442757.

Davis, G. A., & Rimm, S. B. (2004). *Education of the gifted and talented.* Pearson Education Press.

Delisle, J. (2006). *Parenting gifted kids: tips for raising happy and successful children*. Prufrock Press.

Duneland Schools (1986). *Gifted education handbook*. Chesterton. Indiana. Retrieved from https://www.npsk12.com/cms/lib011/VA02208074/Centricity/Domain/717/Handbook-of-Gifted-Servicesv2.pdf

Eğitim İzleme Raporu 2016-2017 [Education Monitoring Report]. (2017).

https://dspace.ceid.org.tr/xmlui/bitstream/handle/1/418/ekutuphane3.5.2.3.11.pdf?sequence=1&isAllowed=y

Friedman, Y. & Krongold, N. (1993). *Interaction between teachers and students: the student's perspective*. Jerusalem: Szold Institute. (In Hebrew)

Gökdere, M., & Çepnı, S. (2003). Üstün yetenekli ögrencilerin fen ögretmenlerinin egitimine yönelik bir model önerisi [A model proposal for gifted students' science teacher education]. *The Turkish Online Journal of Educational Technology*, *2*(3). Retrieved from http://tojet.net/articles/v2i3/2318.pdf

Gökdere, M., & Çepni, S. (2004). Üstün yetenekli öğrencilerin fen öğretmenlerinin hizmet içi ihtiyaçlarının değerlendirilmesine yönelik bir çalışma bilim sanat merkezi örneklemi [A study on the assessment of the ın-service needs of the science teachers of gifted students: a case for science art center]. *Gazi University Journal of Gazi Educational Faculty*, *24*(2). Retrieved from http://www.gefad.gazi.edu.tr/en/download/article-file/77314Hansen, J. B., & Feldhusen, J. F. (1990). Off campus training of teachers of the gifted: A program model. *Gifted İnternational*, *6*(1), 54-62. https://doi.org/10.1080/07387849.1990.11674849.

Hansen, J. B., & Feldhusen, J. F. (1994). Comparison of trained and untrained teachers of gifted students. *Gifted Child Quarterly*, *38*(3), 115-121. https://doi.org/10.1177%2F001698629403800304.

Hativa, N. (2003). *Teaching processes in class*. Tel Aviv: Academic Publishers for the Promotion of Teaching Staff. (In Hebrew)

Hızlı, E. (2014). Examining of gifted and talented education: Israeli education. *Journal of Gifted Education Research*, *2*(2), 52-62. Retrieved from https://www.academia.edu/download/35985024/ISRAILDE_USTUN_ZEKALILAR_EGITIMI.pdf

Khalil, M., & Accariya, Z. (2016). Identifying "good" teachers for gifted students. *Creative Education*, *7*(3), 407-418. http://dx.doi.org/10.4236/ce.2016.73040

Kanevsky, L., & Keighley, T. (2003). To produce or not to produce? Understanding boredom and the honor in underachievement. *Roeper Review*, *26*(1), 20-28. https://doi.org/10.1080/02783190309554235

Landvogt, J. (2001). Affecting eternity: Teaching for talent development. *Roeper Review*, *23*(4), 190-196. https://doi.org/10.1080/02783190109554097

Lassig, C. J. (2003). Gifted and talented education reforms: Effects on teachers' attitudes. In *1st Annual International Conference on Cognition, Language, and Special Education Research: Reimagining Practice: Researching Change* (pp. 141-152). Retrieved from https://eprints.qut.edu.au/14299/1/14299.pdf

Leikin, R. (2011). Teaching the mathematically gifted: featuring a teacher. *Canadian Journal of Science, Mathematics and Technology Education*, *11*, 78-89. https://doi.org/10.1080/14926156.2011.548902

Levent, F. (2013). *Üstün yetenekli çocukları anlamak: Üstün yetenekli çocuklar sarmalında aile, eğitim sistemi ve toplum [Understanding gifted children: family, education system and society in a spiral of gifted children].* Nobel Publishing.

Manning, S. (2006). Recognizing gifted students: A practical guide for teachers. *Kappa delta Pi record*, *42*(2), 64-68. https://doi.org/10.1080/00228958.2006.10516435

MEB (2017). *Öğretmenlik mesleği genel yeterlilikleri [Generic Competences of Teaching Profession].*

https://oygm.meb.gov.tr/www/ogretmenlik-meslegi-genel-yeterlikleri/icerik/486

Merriam, S. B. (2013). *Nitel araştırma: Desen ve uygulama için bir rehber [Oualitative research a guide to design and implementation]*(Translation from 3rd edition, Translation Edıtor: S. Turan). Nobel Publishing.

Milgram, R. M. (1979). Perception of teacher behavior in gifted and nongifted children. *Journal of Educational Psychology*, *71*(1), 125. https://psycnet.apa.org/doi/10.1037/0022-0663.71.1.125

Milgram, R. M. (2000). Identifying and enhancing talent ın ısrael: A high national priority. *Roeper Review*. https://doi.org/10.1080/02783190009554012

Milgram, R., & Hong, E. (2009). *Talent loss in mathematics: causes and solutions.* In R. Leikin, A. Berman, and B. Koichu (Eds.), Creativity in Mathematics and the Education of Gifted Students (pp. 149-163). Sense Publishers https://doi.org/10.1163/9789087909352_011

Mills, C. J. (2003). Characteristics of effective teachers of gifted students: Teacher background and personality styles of students. *Gifted Child Quarterly*, *47*(4), 272-281. https://doi.org/10.1177%2F001698620304700404.

Parke, Beverly, N. (1992). *"Challenging gifted students in the regular classroom."* (ERIC Digest #E513). ERIC Clearinghouse on Handicapped and Gifted Children Reston, Va. ED352774. Retrieved from https://eric.ed.gov/?id=ED352774

Robinson, A., Shore, B.M & Enersen, D.L. (2014). *Üstün zekalılar eğitiminde en iyi uygulamalar: kanıt temelli bir kılavuz [Best practices in gifted education/ An evidence-based guide].* (Translation Editors: Ü. Ogurlu, F.Kaya). Nobel Publishing.

Tischler, K., & Vialle, W. J. (2009). Gifted students' perceptions of the characteristics of effective teachers.115-124. University of Wollongong Research Online, Faculty of Education – Papers https://ro.uow.edu.au/edupapers?utm_source=ro.uow.edu.au%2Fedupapers%2F732&utm_medium =PDF&utm_campaign=PDFCoverPages Westberg, K. L., & Daoust, M. E. (2003). The results of the replication of the classroom practices survey replication in two states. *The National Research Center on the Gifted and Talented Newsletter*, *3*(8). Retrieved from https://nrcgt.uconn.edu/newsletters/fall032/#

Ziv, Y., & Sorongon, A. (2011). Social information processing in preschool children: relations to sociodemographic risk and problem behavior. *Journal of Experimental Child Psychology*, 109, 412-429. https://doi.org/10.1016/j.jecp.2011.02.009

Vialle, W., & Quigley, S. (2002). Does the teacher of the gifted need to be gifted? *Gifted and Talented International*, *17* (2), 85-90. https://doi.org/10.1080/15332276.2002.11672992.

Woods, J. W. (2004). *The characteristics of successful and effective teachers of the gifted*. Doctorate Dissertation,The University of Tennessee, Knoxville, USA. Retrieved from https://trace.tennessee.edu/utk_graddiss/4578/

Yıldırım, A., & Şimşek, H. (2005). *Sosyal bilimlerde nitel araştırma yöntemleri [Qualitative research methods in the social sciences].* (5th edition). Seçkin Publishing.

BUEFAD | 2021, Volume 10, Issue 3, 626-638
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.849351

The Relationships Between Students' Epistemological Beliefs and Conceptions of Learning in Different Science Domains

Serkan KAPUCU[a*]

a* Ağrı İbrahim Çeçen University, (0000-0002-4027-4466) * serkankapucu@yahoo.com

Research Article	Received: **29.12.2020**	Revised: **27.08.2021**	Accepted: **02.09.2021**

Abstract

This study aims to investigate the relationships between 9th grade students' epistemological beliefs and conceptions of learning in different science domains (physics, chemistry, biology). A total of 462 students (male=247, female=215) participated in the study. Data were collected with the help of the questionnaires that measure students' epistemological beliefs and conceptions of learning. Pearson correlation analysis was performed to determine the relationships between students' epistemological beliefs and conceptions of learning in different science domains. The results revealed that there were positive and moderate relationships between students' epistemological beliefs in "justification" and "development" dimensions and their higher-level conceptions of learning. However, these beliefs were weakly correlated or not correlated to the students' lower-level conceptions of learning. Similarly, students' epistemological beliefs in "source" and "certainty" dimensions were weakly associated or not associated with their conceptions of learning.

Keywords: Conceptions of learning, epistemological beliefs, science domains

Öğrencilerin Epistemolojik İnançları ile Farklı Fen Disiplinlerine Yönelik Öğrenme Anlayışları Arasındaki İlişkiler

Öz

Bu çalışmanın amacı 9. sınıf lise öğrencilerinin epistemolojik inançları ve farklı fen disiplinlerine (fizik, kimya, biyoloji) yönelik öğrenme anlayışları arasındaki ilişkileri incelemektir. 462 (erkek=247, kız=215) öğrenci çalışmaya katılmıştır. Veriler öğrencilerin epistemolojik inançlarını ve öğrenme anlayışlarını ölçen anketler yardımı ile toplanmıştır. Öğrencilerin epistemolojik inançları ve farklı fen disiplinlerine yönelik öğrenme anlayışları arasındaki ilişkiyi ölçmek için Pearson korelasyon analizi yapılmıştır. Araştırma sonuçları öğrencilerin epistemolojik inançlarından "bilginin doğrulanması" ve "bilginin gelişmesi" ve üst-düzey öğrenme anlayışları arasında pozitif ve orta düzeyde bir ilişki olduğunu ortaya koymuştur. Ancak, bu inançlar öğrencilerin alt-düzey öğrenme anlayışları ile zayıf bir şekilde ilişki göstermişlerdir ya da ilişkisizdir. Benzer bir şekilde, öğrencilerin epistemolojik inançlarından "bilginin kaynağı" ve "bilginin kesinliği", öğrenme anlayışları ile zayıf bir ilişki göstermiştir ya da ilişkisizdir.

Anahtar kelimeler: Öğrenme anlayışları, epistemolojik inançlar, fen disiplinleri

To cite this article in APA Style:

Kapucu, S. (2021). The relationships between students' epistemological beliefs and conceptions of learning in different science domains. *Bartın University Journal of Faculty of Education, 10*(3), 626-638. https://doi.org/10.1016/buefad.849351

1 | Introduction

Epistemological beliefs and conceptions of learning are important physiological constructs that influence the learning process (Hofer & Pintrich, 1997). Epistemological beliefs are core beliefs and it is difficult to change them. They are closely related to the peripheral beliefs (i.e. beliefs about learning and teaching) (Bahçivan, 2017; Brownlee et al., 2001). Bahçivan (2017) states that epistemological beliefs can influence how the learner and the teacher perceive learning. There can also be significant relationships between epistemological beliefs and conceptions of learning (Liang & Tsai, 2010). Moreover, epistemological beliefs and conceptions of learning can be domain-specific – that is, students can have different beliefs and conceptions about every domain (Tsai, 2004). Epistemological beliefs concern with the beliefs about nature of knowledge and knowing (Hofer & Pintrich, 1997). Conceptions of learning can be considered as interpretations and beliefs about learning (Vermunt & Vermetten, 2004).

Epistemological beliefs can be classified under the four main categories: "certainty of knowledge", "simplicity of knowledge", "source of knowledge", and "justification for knowing" (Hofer & Pintrich, 1997). In the light of this view, Conley et al. (2004) classified epistemological beliefs as follows: (1) "source", (2) "certainty", (3) "development", (4) "justification" in their study. The first dimension "source" is related to the beliefs about knowledge that is transferred from the authority. Secondly, "certainty" refers to beliefs about right answers. Thirdly, "development" includes the beliefs about changing and developing aspects of scientific knowledge. Finally, "justification" is related to the role of experiments in science and how individuals confirm knowledge (Conley et al., 2004).

In the 2000s, many studies were conducted to investigate the students' conceptions of learning, in particular for science domain. In his phenomenological study, Tsai (2004) categorized conceptions of learning science under seven dimensions. Then, Lee et al. (2008) developed a questionnaire that measures students' such conceptions and found six dimensions. In another study (Tsai et al., 2011), these dimensions were also grouped under two main themes as lower-level conceptions of learning science and higher-level conceptions of learning science. While the lower-level ones concern with the memorizing the scientific facts, formulas etc., getting high scores in science exams, taking science tests, and practicing calculations and problem solving, the higher-level ones include attaining knowledge about natural phenomena, applying the knowledge to unknown situations, and understanding scientific knowledge (Tsai et al., 2011). From the dimensions of lower-level conceptions of learning science, "memorizing" refers to memorization of definitions, formulas and laws in science learning; "testing" is related to solving questions based on more remembering in science learning; "calculate and practice" concerns with the calculations and problem solving practices in science learning. In contrast, from the dimensions of higher-level conceptions of learning science, "increase of knowledge" is related to increase in learning scientific knowledge in science; "applying" concerns with learning science by learning by doing; "understanding and seeing in a new way" refers to learning science meaningfully and having a new perspective about science learning (Lee et al., 2008).

There are some studies that examined the relationships between epistemological beliefs and conceptions of learning. Chan (2007, 2011) found that there was a positive and significant relationship between teacher candidates' epistemological belief in "learning effort/process" dimension and their conceptions of learning in all dimensions. Similarly, Otting et al. (2010) determined positive and significant relationships between teacher candidates' epistemological beliefs in "learning effort/process" dimension and their constructivist learning and teaching conceptions. Mardiha and Alibakhshi (2020) have also recently found teachers' epistemological beliefs were highly related to their conceptions of learning and teaching. Khalid et al (2021) also determined positive and significant relationships between prospective teachers' epistemological beliefs and conceptions of learning. However, these studies are not domain specific and only focused on the relationships between pre-service teachers' epistemological beliefs and conceptions of learning.

In addition, there are some other studies that explored the relationships between epistemological beliefs and domain-specific conceptions of learning. Liang and Tsai (2010) examined the relationships between

university students' epistemological beliefs and conceptions of learning science. While they found positive and significant relationships between students' epistemological beliefs in "development" and "justification" dimensions and their higher-level conceptions of learning science in "increase of knowledge" "applying" and "understanding and seeing in a new way" dimensions, they determined negative and significant relationships between students' epistemological beliefs in "source" and "certainty" dimensions and their lower-level conceptions of learning science in "memorizing", "testing" and "calculate and practice" dimensions. Ho and Liang (2015) also achieved similar results by examining high schools students' conceptions of learning science. In contrast, Adıbelli Şahin et al. (2016) determined positive and significant relationships between pre-service teachers' epistemological beliefs in "omniscient authority", "certain knowledge", "innate ability" and "quick learning" dimensions and their lower-level conceptions of learning science in "memorizing", "calculate and practice" "testing" dimensions. Moreover, they could not find any significant relationships between pre-service teachers' epistemological beliefs and higher-level conceptions of learning science in "increase of knowledge" and "applying" dimensions. Sadi and Dağyar (2015) studied with high school students and also could not find any significant relationships between many dimensions of epistemological beliefs and conceptions of learning biology. They could only find significant and positive relationships between the students' epistemological beliefs in "source/certainty", "development" and "justification" dimensions and their lower-level conceptions of learning biology in "preparing for exam" dimension. There were also positive and significant relationships between the students' epistemological belief in "development" dimension and higher-level conceptions of learning biology in "applying" dimension, and negative and significant relationships between their epistemological belief in "source/certainty" dimension and lower-level conceptions of learning biology in "calculate and practice" dimension (Sadi & Dağyar, 2015). However, Shen et al. (2018) found negative and significant relationships between the students' epistemological belief in "uncertainty" and lower-level conceptions of learning biology in "memorizing", "testing" and "calculate and practice" dimensions. This epistemological belief was also positively and significantly related to students' higher-level conceptions of learning biology in "increase of knowledge and understanding" and "seeing in a new way" dimensions. Similarly, students' epistemological belief in "justification" dimension was negatively and significantly correlated with their lower-level conceptions of learning biology in "testing" and "calculate and practice" dimensions and positively and significantly correlated with their higher-level conceptions of learning biology in "applying", "increase of knowledge and understanding" and "seeing in a new way" dimensions (Shen et al., 2018).

Many of the studies that investigated the relationships between students' epistemological beliefs and conceptions of learning are not domain-specific or they are only related to science-domain. Tsai (2004) suggests researchers to focus on domain-specific conceptions of learning due to such domains' specific features. Therefore, studying on conceptions of learning in different domains and their relationships with epistemological beliefs can help researchers to make more robust inferences about these relationships. In fact, students' conceptions of learning in different science domains can differ from each other (Sadi, 2015). Hence, their relationships with epistemological beliefs may also be different from each other. Furthermore, determination of these relationships considering domain-specific features can offer some clues about how to design students' learning environments. For example, positive developments of students' epistemological beliefs in different learning environments (e.g., argumentation, inquiry, cooperative) can also imply positive developments in their conceptions of learning.

As also discussed before, different science domains can have different features. For example, physics subjects can include more calculations and formulas (Bozkurt & Sarıkoç, 2008), and biology subjects can include more memorization of scientific facts or events (Joy et al., 2017). Therefore, students' epistemological beliefs can differently correlate with their conceptions of learning in different science domains. For example, while students' epistemological beliefs may positively correlate with their conceptions of learning biology, they may negatively correlate with their conceptions of learning physics. In addition, the sizes of relationships can differ from each other for each domain. Hence, determination of the relationships

between the students' epistemological beliefs and conceptions of learning may also help researchers to better understand the nature of domain-specific science subjects.

The aim of the study and research questions

The aim of this study is to investigate the relationships between 9th grade students' epistemological beliefs and conceptions of learning in different science domains (physics, chemistry, biology). Hence, the following research questions are prepared;

- What are the relationships between 9th grade students' epistemological beliefs and conceptions of learning physics?
- What are the relationships between 9th grade students' epistemological beliefs and conceptions of learning chemistry?
- What are the relationships between 9th grade students' epistemological beliefs and conceptions of learning biology?

2 | Method

The correlation design of quantitative research method was used in the study. The relationships among two or more variables are investigated without any interventions in this research type (Fraenkel et al., 2012). As the relationships between the students' epistemological beliefs and conceptions of learning in different science domains were investigated in this study, this design was chosen. The data obtained were also collected with the help of the questionnaires administered to the students.

Sample

The 9th grade students (male=247, female=215) from one of the cities of the eastern region of Turkey participated in the study. All 9th grade students in the city center comprised target population. Students were selected by using purposive sampling method. This sampling method can allow researchers to reach information-rich cases (Büyüköztürk et al., 2013). Students from four high schools that can represent general profile of the students in the city center were selected. These schools have similar standards in terms of physical facilities and achievement level. This information was obtained by asking experienced teachers and school managers in the city center. In addition, the 9th grade students were chosen because they took basic and common courses. Therefore, students having different perceptions or views about science learning participated in the study.

Data collection

In data collection, two questionnaires were used. The first one Epistemological Belief Questionnaire (EBQ) was designed to identify students' scientific epistemological beliefs by Conley et al. (2004) and first adapted into Turkish by Özkan (2008). In this adapted version it includes three dimensions (Özkan, 2008). However, Bahcivan (2014) found four dimensions for the EBQ similar to original one by also studying with a Turkish sample. This questionnaire is in the form of a Likert-type scale (strongly disagree [1] → strongly agree [5]) and consists of four dimensions: (1) "source", (2) "certainty", (3) "development", (4) "justification" (Bahcivan, 2014; Conley et al., 2004). The Cronbach's alpha coefficients of the EBQ for every dimension were found by implementing it two times. These values after its two implementations were as follows: 0.81, 0.65, 0.57, 0.78 (first one); 0.82, 0.76, 0.66, 0.79 (second one), respectively. The correlation coefficients between every same dimension after its two applications were determined and these were ranged from r = 0.44 to 0.76. Confirmatory factor analysis for the construct validity of the EBQ was also run and some fit indices were examined. It was claimed to find acceptable fit indices as RMSEA = 0.038, CFI = 0.900 and NNFI = 0.89 and RMR = 0.062 (Conley et al., 2004).

Another questionnaire which is Conceptions of Learning Science Questionnaire (COLS) used in the study was developed to identify students' conceptions of learning science by Lee et al. (2008) and adapted into Turkish by Bahçivan and Kapucu (2014). The COLS consists of six dimensions: (1) "memorizing", (2) "testing", (3) "calculate and practice", (4) "increase of knowledge", (5) "applying" and (6) "understanding and seeing in a new way" and is in the form of Likert-type scale (strongly disagree [1] → strongly agree [5]) (Lee et al., 2008). The first three dimensions concern with lower-level conceptions of learning science, and the last three dimensions are related to higher-level conceptions of learning science (Tsai et al., 2011). The Cronbach's alpha coefficients of the COLS's each dimension were found as 0.85, 0.91, 0.89, 0.90, 0.84 and 0.91, respectively. The overall alpha was found to be 0.91. The confirmatory factor analysis results also showed reasonable fit with the values: RMSEA=0.060, GFI=0.82, NFI=0.95, NNFI=0.97, CFI=0.97 (Lee et al., 2008). In this study, all the items in the COLS were reorganized by considering physics, chemistry and biology domains without changing the meanings of items for the study. Students were also required to mark one of the choices considering the science domains separately.

Data analysis

Before running the correlation analysis, whether the data in each dimension of the questionnaires is normally distributed was tested. However, the items in the "source" and "certainty" dimensions in the EBQ were reverse coded. Therefore, higher scores mean more positive beliefs. Moreover, reliability and validity of the questionnaires were tested.

For the normality, skewness and kurtosis values of all dimensions were calculated. The values between -1.96 and +1.96 are necessary for the skewness and kurtosis (Can, 2013). In this study, all the values were in these ranges. In Table 1, these values are presented.

Table 1. Normality assumptions

	Dimensions	N	Skewness	Kurtosis
Epistemological Beliefs	S	462	0.097	-1.103
	C	462	-0.105	-0.890
	D	462	-1.005	0.722
	J	462	-1.362	1.628
Conceptions of learning physics	M	462	0.813	0.118
	T	462	0.547	-0.620
	CP	462	-0.332	-0.949
	IK	462	-1.050	0.776
	A	462	-0.958	0.748
	US	462	-1.228	0.894
Conceptions of learning chemistry	M	462	0.686	-0.179
	T	462	0.669	-0.426
	CP	462	-0.278	-1.021
	IK	462	-0.988	0.464
	A	462	-1.143	1.219
	US	462	-1.338	1.360
Conceptions of learning biology	M	462	0.317	1.352
	T	462	0.478	0.397
	CP	462	0.087	-0.152
	IK	462	-1.042	1.004
	A	462	-0.925	0.827
	US	462	-1.062	0.545

Note: The abbreviations used to define dimensions: Source (S); Certainty (C); Development (D); Justification (J); Memorizing (M); Testing (T); Calculate and practice (CP); Increase of knowledge (IK); Applying (A); Understanding and seeing in a new way (US)

As shown in Table 1, skewness and kurtosis values are acceptable. While the skewness values vary between -1.362 and 0.813, the kurtosis values vary between -1.103 and 1.628.

The construct validities of the instruments were tested by running confirmatory factor analysis in the AMOS program (version 21). AMOS outputs were presented in the Appendix. In this analysis, some fit indices (GFI, CFI, TLI, CMIN/df and RMSEA) were calculated. The values for GFI, CFI and TLI above 0.90 (Byrne, 2010), the values for RMSEA between 0 and 0.08, and the values for CMIN/df between 0 and 3 (Schermelleh-Engel et al., 2003) can be acceptable in the factor analysis. Firstly, this analysis was performed on students' responses in the EBQ. GFI, CFI, TLI, CMIN/df and RMSEA values were respectively found as 0.921, 0.929, 0.920, 1.874 and 0.044. GFI, CFI and TLI values were above 0.90. CMIN/df value was between 0 and 3, and RMSEA value was below 0.08 for the EBQ.

Confirmatory factor analyses were also performed for the questionnaires used to determine students' conceptions of learning in different science domains. GFI, CFI, TLI, CMIN/df and RMSEA values were respectively found as 0.900, 0.922, 0.912, 1.928 and 0.045 for conceptions of learning physics; 0.911, 0.911, 0.901, 1.740 and 0.040 for conceptions of learning chemistry; 0.923, 0.945, 0.939, 1.405 and 0.030 for conceptions of learning biology. GFI, CFI and TLI values were above 0.90. CMIN/df values were between 0 and 3, and RMSEA values were below 0.08 in these measurements.

The Cronbach's alpha coefficients were also examined in reliability analysis. The overall alphas and dimensions of each questionnaire were calculated. The Cronbach's alpha coefficients of the dimensions of the EBQ "source", "certainty", "development" and "justification" were respectively found as 0.759, 0.790, 0.795 and 0.825. Its overall alpha was also found as 0.865.

In addition, the overall Cronbach's alpha coefficients of conceptions of learning in different science domains and the alphas for each dimension were determined. These Cronbach's alpha coefficients are presented in Table 2.

Table 2. The Cronbach's alpha coefficients of conceptions of learning in different science domains

Conceptions of learning	Physics (α)		Chemistry (α)		Biology (α)	
M	0.733		0.649		0.696	
T	0.798		0.740		0.697	
CP	0.790	0.834	0.748	0.798	0.585	0.768
IK	0.828		0.752		0.783	
A	0.741		0.671		0.699	
US	0.854		0.832		0.842	

As shown in Table 2, the overall Cronbach's alpha coefficients of conceptions of learning in different science domains are as follows: 0.834, 0.798 and 0.768. The Cronbach's alpha coefficients of the dimensions vary between 0.585 and 0.854.

Finally, correlation analysis was performed on SPSS program (version 22) by considering Pearson's correlation coefficient. In this analysis the relationships between epistemological beliefs and conceptions of learning in different science domains were separately investigated. When the results obtained from the correlation analysis were interpreted, Cohen's (1988) suggestions about the size of correlation coefficients were taken into consideration. According the Cohen (1988), the values for correlation coefficients (r) between ±0.10 – ±0.29; ±0.30 – ±0.49; ±0.50 – ±1.0 respectively imply weak, moderate and strong associations.

3 | FINDINGS

In this section the results obtained from correlation analysis were presented. Firstly, the relationships between students' epistemological beliefs and conceptions of learning physics were determined. In Table 3, these relationships are shown.

Table 3. The relationships between students' epistemological beliefs and conceptions of learning physics

			Conceptions of learning physics					
			M	T	CP	IK	A	US
Epistemological beliefs	S	r	-0.061	-0.026	-0.020	0.140**	0.067	0.081
		p	0.188	0.580	0.668	0.003	0.148	0.080
		N	462	462	462	462	462	462
	C	r	0.034	0.073	0.134**	0.124**	0.053	0.035
		p	0.470	0.116	0.004	0.007	0.257	0.451
		N	462	462	462	462	462	462
	D	r	-0.102*	-0.065	0.122*	0.364**	0.356**	0.328**
		p	0.029	0.166	0.009	0.000	0.000	0.000
		N	462	462	462	462	462	462
	J	r	-0.016	0.000	0.281**	0.389**	0.330**	0.396**
		p	0.728	0.994	0.000	0.000	0.000	0.000
		N	462	462	462	462	462	462

**$p<0.01$; *$p<0.05$

As shown in Table 3, there are significant relationships among some dimensions of epistemological beliefs and conceptions of learning physics. There are positive and weak correlations between "source" and "increase of knowledge" (r=0.140, $p<0.01$); "certainty" and "calculate and practice" (r=0.134, $p<0.01$); "certainty" and "increase of knowledge" (r=0.124, $p<0.01$). In addition, there are negative and weak correlation between "development" and "memorizing" (r=-0.102, $p<0.05$); positive and weak correlation between "development" and "calculate and practice" (r=0.122, $p<0.05$); positive and moderate correlation between "development" and "increase of knowledge" (r=0.364, $p<0.01$); positive and moderate correlation between "development" and "applying" (r=0.356, $p<0.01$) and positive and moderate correlation between "development" and "understanding and seeing in a new way" (r=0.328, $p<0.01$). Finally, "justification" positively and weakly correlates with "calculate and practice" (r=0.281, $p<0.01$); positively and moderately correlates with "increase of knowledge" (r=0.389, $p<0.01$); positively and moderately correlates with "applying" (r=0.330, $p<0.01$); and positively and moderately correlates with "understanding and seeing in a new way" (r=0.396, $p<0.01$).

The relationships between students' epistemological beliefs and conceptions of learning chemistry were also investigated. In Table 4, these relationships are shown.

Table 4. The relationships between students' epistemological beliefs and conceptions of learning chemistry

			Conceptions of learning chemistry					
			M	T	CP	IK	A	US
Epistemological beliefs	S	r	0.004	-0.012	-0.069	0.056	0.053	0.045
		p	0.939	0.791	0.141	0.232	0.254	0.339
		N	462	462	462	462	462	462
	C	r	0.118*	0.112*	0.091	0.043	-0.023	-0.027
		p	0.011	0.016	0.051	0.356	0.622	0.565
		N	462	462	462	462	462	462
	D	r	-0.068	-0.043	0.099*	0.286**	0.274**	0.265**
		p	0.147	0.356	0.034	0.000	0.000	0.000
		N	462	462	462	462	462	462
	J	r	-0.049	0.017	0.229**	0.319**	0.254**	0.343**

	p	0.289	0.708	0.000	0.000	0.000	0.000
	N	462	462	462	462	462	462

$^{**}p<0.01$; $^{*}p<0.05$

As shown in Table 4, "certainty" positively and weakly correlates with "memorizing" (r=0.118, $p<0.05$) and "testing" (r=0.112, $p<0.05$). In addition, "development" positively and weakly correlates with "calculate and practice" (r=0.099, p<0.05); "increase of knowledge" (r=0.286, $p<0.01$); "applying" (r=0.274, $p<0.01$); and "understanding and seeing in a new way" (r=0.265, $p<0.01$). Finally, there are positive and weak correlation between "justification" and "calculate and practice" (r=0.229, $p<0.01$); positive and moderate correlation between "justification" and "increase of knowledge" (r=0.319, $p<0.01$); positive and weak correlation between "justification" and "applying" (r=0.254, $p<0.01$), and positive and moderate correlation between "justification" and "understanding and seeing in a new way" (r=0.343, $p<0.01$).

Lastly, the relationships between students' epistemological beliefs and conceptions of learning biology were examined. These relationships are shown in Table 5.

Table 5. The relationships between students' epistemological beliefs and conceptions of learning biology

			Conceptions of learning biology					
			M	T	CP	IK	A	US
Epistemological beliefs	S	r	0.006	0.017	-0.061	0.147**	0.074	0.148**
		p	0.894	0.713	0.189	0.001	0.111	0.001
		N	462	462	462	462	462	462
	C	r	0.025	0.105*	0.079	0.147**	0.055	0.120**
		p	0.597	0.024	0.089	0.002	0.238	0.010
		N	462	462	462	462	462	462
	D	r	0.021	0.016	0.010	0.328**	0.316**	0.314**
		p	0.647	0.730	0.838	0.000	0.000	0.000
		N	462	462	462	462	462	462
	J	r	0.013	0.057	0.148**	0.339**	0.296**	0.356**
		p	0.778	0.225	0.001	0.000	0.000	0.000
		N	462	462	462	462	462	462

$^{**}p<0.01$; $^{*}p<0.05$

As shown in Table 5, there are significant relationships among some dimensions of epistemological beliefs and conceptions of learning biology. "Source" is positively and weakly correlated with "increase of knowledge" (r=0.147, $p<0.01$) and "understanding and seeing in a new way" (r=0.148, $p<0.01$). Similarly, "certainty" is positively and weakly correlated with "testing" (r=0.105, $p<0.05$); "increase of knowledge" (r=0.147, $p<0.01$) and "understanding and seeing in a new way" (r=0.120, $p<0.01$). There are also positive and moderate correlations between "development" and "increase of knowledge" (r=0.328, $p<0.01$); "development" and "applying" (r=0.316, $p<0.01$); "development" and "understanding and seeing in a new way" (r=0.314, $p<0.01$). Finally, "justification" is positively and weakly correlated with "calculate and practice" (r=0148, $p<0.01$); positively and moderately correlated with "increase of knowledge" (r=0.339, $p<0.01$); positively and weakly correlated with "applying" (r=0.296, $p<0.01$); and positively and moderately correlated with "understanding and seeing in a new way" (r=0.356, $p<0.01$).

4 | Discussion & Conclusion

The results of this study showed that there were positive relationships between students' epistemological beliefs and higher-level conceptions of learning in different science domains (physics, chemistry, biology). Students' epistemological beliefs in "development" and "justification" dimensions were positively and

significantly correlated with their higher-level conceptions of learning in "increase of knowledge", "applying" and "understanding and seeing in a new way" dimensions. The results of some studies (Ho & Liang, 2015; Liang & Tsai, 2010; Shen et al., 2018) support these findings. For instance, Liang and Tsai (2010) found positive and significant relationships between students' epistemological beliefs in "development" and "justification" dimensions and their higher-level conceptions of learning science. Similarly, Shen et al. (2018) found that students' epistemological belief in "justification" dimension was positively and significantly correlated with their higher-level conceptions of learning biology. Furthermore, according to the results of this study, increase in the students' epistemological beliefs in "development" and "justification" dimensions may imply increase in their higher-level conceptions of learning in different science domains. In other words, increase in students' positive beliefs about changing and developing aspect of science, the change in scientists' views on their ideas over time and the role of experiments in science may imply the increase in their higher-level conceptions of learning in different science domains. These higher-level conceptions of learning can be as follows: acquiring new knowledge about natural phenomena, applying to newly acquired knowledge to unknown situations, and making learning meaningful and relating it to daily life by having a new perspective (Lee et al., 2008). In this regard, students' higher-level conceptions of learning in different science domains can develop with the developments in their epistemological beliefs in "development" and "justification" dimensions. Maybe, the opposite situation can also be valid. Therefore, the possible learning activities that may cause the development of such psychological constructs can contribute to development of both constructs. Lee and Hannafin (2016) discussed that student-centered learning methods can positively influence the development of epistemological beliefs and conceptions of learning. Hence, teachers are advised to use student-centered learning methods in their classrooms to improve both students' epistemological beliefs and higher-level conceptions of learning in different science domains.

Another important result in this study was that the sizes of correlation coefficients between epistemological beliefs and conceptions of learning in different science domains were different from each other. For example, sizes of correlation coefficients between epistemological beliefs in "development" and "justification" dimensions and the higher-level conceptions of learning physics were higher than the sizes of correlation coefficients between these epistemological beliefs and other conceptions of learning in the science domains which are chemistry and biology. This can be interpreted that there can be differences in the relationships between epistemological beliefs and domain-specific conceptions of learning. In fact, students' perceptions about different science domains can differentiate from each other. For example, Joy et al. (2017) indicated that biology subjects can include more memorization. Hence, researchers should try to identify students' domain-specific conceptions of learning instead of investigating conceptions of learning in general as also suggested by Tsai (2004).

In addition, there were weak or no relationships between students' epistemological beliefs in "source" and "certainty" dimensions and their higher-level conceptions of learning in different science domains. Similarly, Sadi and Dağyar (2015) determined weak or no relationships between many epistemological beliefs and conceptions of learning biology that student have. On the contrary, some researchers (Ho & Liang, 2015; Liang & Tsai, 2010) explored positive and moderate relationships between students' epistemological beliefs and higher-level conceptions of learning science. When the claims of Tsai (2004) are also considered, there should be significant and positive relationships between sophisticated epistemological beliefs and higher-level conceptions of learning. The ideas of Brownlee et al. (2001) on these relationships also support this claim. Ho and Liang (2015) viewed epistemological beliefs as students' opinions about nature of knowledge and conceptions of learning as their views about learning. They determined positive and moderate relationships between students' epistemological beliefs and higher-level conceptions of learning science. However, in this study such relationships could not be found. The reason for this can be attributed to fact that the participants in this study may not have more positive epistemological beliefs in the dimensions "source" and "certainty". As discussed before, the use of learning activities that based on more student learning approaches in the lessons can contribute more desirable relationships between students' epistemological beliefs and conceptions of learning in different science domains.

The results of this study also showed that there were weak or no relationships between students' epistemological beliefs and lower-level conceptions of learning in "memorizing", "testing" and "calculate and practice" dimensions in different science domains. This result is also in line with the results obtained by Sadi and Dağyar (2015). However, Ho and Liang (2015) determined negative and moderate relationships between students' epistemological beliefs and lower-level conceptions of learning science. Liang and Tsai (2010) also achieved similar results. Shen et al. (2018) also found that there were significant and negative relationships between many epistemological beliefs and lower-level conceptions of learning biology. These contradictory results can be arisen from two reasons. The first one can be that students may not have more sophisticated epistemological beliefs. The second one can be that students' lower-level conceptions of learning in different science domains can be high.

As a conclusion, this study showed there can be some different relationships between students' core epistemological beliefs and different conceptions of learning. Instead of studying conceptions of learning in general, researchers should focus on domain-specific conceptions further. In addition, considering that the students' epistemological beliefs vary across different disciplines (Lonka et al., 2021), domain specific epistemological beliefs should also be determined and their relationships with conceptions of learning can be investigated. Hence, the relationships between students' domain-specific epistemological beliefs and conceptions of learning can be better understood.

Statements of publication ethics

Ethics committee approval was received from Ağrı İbrahim Çeçen University. (Approval Date: September 8, 2020, No: 119)

Conflict of interest

The author confirms that there is no conflict of interest.

References

Adıbelli Şahin, E., Deniz, H., & Topçu, M. S. (2016). Predicting Turkish preservice elementary teachers' orientations to teaching science with epistemological beliefs, learning conceptions, and learning approaches in science. *International Journal of Environmental and Science Education*, *11*(5), 515-534.

Bahcivan, E. (2014). Examining relationships among Turkish pre-service science teachers' conceptions of teaching and learning, scientific epistemological beliefs and science teaching efficacy beliefs. *Journal of Baltic Science Education*, *13*(6), 870-882.

Bahçivan, E. (2017). Eğitim bilimlerinde epistemoloji araştırmaları: düne, bugüne ve gelecek perspektiflere eleştirel bakış [Epistemological research in educational sciences: critical investigation of past, present and future perspectives]. *Mersin Üniversitesi Eğitim Fakültesi Dergisi* [*Mersin University Journal of the Faculty of Education*], *13*(2), 760-772.

Bahçivan, E., & Kapucu, S. (2014). Adaptation of conceptions of learning science questionnaire into Turkish and science teacher candidates' conceptions of learning science. *European Journal of Science and Mathematics Education*, *2*(2), 106-118.

Bozkurt, E., & Sarıkoç, A. (2008). Fizik eğitiminde sanal laboratuar, geleneksel laboratuarın yerini tutabilir mi? [Can the virtual laboratory replace the traditional laboratory in physics education?] *Selçuk Üniversitesi Ahmet Keleşoğlu Eğitim Fakültesi Dergisi* [*Selçuk University Journal of Ahmet Keleşoğlu Education*], *25*, 89-100.

Brownlee, J. M., Boulton-Lewis, G. M., & Purdie, N. M. (2001). Core beliefs about knowing and peripheral beliefs about learning: Developing an holistic conceptualisation of epistemological beliefs. *Australian Journal of Educational and Developmental Psychology*, *2*, 1-16.

Büyüköztürk, **Ş**., Kılıç Çakmak, E., Akgün, Ö., Karadeniz, **Ş**., & Demirel, F. (2013). *Bilimsel araştırma yöntemleri [Scientific research methods]*. Ankara: Pegem Yayınları [Pegem Publications]

Byrne, B. M. (2010). *Structural equation modeling with AMOS: basic concepts, applications, and programming (multivariate applications series)*. New York: Taylor & Francis Group.

Can, A. (2013). *SPSS ile bilimsel araştırma sürecinde nicel veri analizi*. [*Quantitative data analysis with SPSS in scientific research*] Ankara: Pegem Yayınları [Pegem Publications]

Chan, K. W. (2007). Hong Kong teacher education students' epistemological beliefs and their relations with conceptions of learning and learning strategies. *The Asia-Pacific Education Researcher*, *16*(2), 199-214.

Chan, K. W. (2011). Preservice teacher education students' epistemological beliefs and conceptions about learning. *Instructional Science*, *39*(1), 87-108.

Cohen, J. W. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Conley, A. M., Pintrich, P. R., Vekiri, I., & Harrison, D. (2004). Changes in epistemological beliefs in elementary science students. *Contemporary Educational Psychology*, *29*(2), 186-204.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education (Vol. 8)*. New York: McGraw-Hill.

Ho, H. N. J., & Liang, J. C. (2015). The relationships among scientific epistemic beliefs, conceptions of learning science, and motivation of learning science: a study of Taiwan high school students. *International Journal of Science Education*, *37*(16), 2688-2707.

Hofer, B. K., & Pintrich, P. R. (1997). The development of epistemological theories: Beliefs about knowledge and knowing and their relation to learning. *Review of Educational Research*, *67*(1), 88-140.

Joy, W. M., Dinah, S. C., Opara, M. F. C., & Momanyi, L. O. (2017). Fostering students' learning in the 21st century: Effect of inquiry-based learning on students' achievement of science process skills in biology subject. *African Journal of Education, Science and Technology*, *4*(2), 137-145.

Khalid, M., Hashmi, A., & Javed, Z. (2021). Relationship between prospective teachers' epistemological beliefs and their conceptions about teaching and learning. *Ilkogretim Online*, *20*(4), 1681-1689.

Lee, E., & Hannafin, M. J. (2016). A design framework for enhancing engagement in student-centered learning: own it, learn it, and share it. *Educational Technology Research and Development*, *64*(4), 707-734.

Lee, M. H., Johanson, R. E., & Tsai, C. C. (2008). Exploring Taiwanese high school students' conceptions of and approaches to learning science through a structural equation modeling analysis. *Science Education*, *92*(2), 191-220.

Liang, J. C., & Tsai, C. C. (2010). Relational analysis of college science-major students' epistemological beliefs toward science and conceptions of learning science. *International Journal of Science Education*, *32*(17), 2273-2289.

Lonka, K., Ketonen, E., & Vermunt, J. D. (2021). University students' epistemic profiles, conceptions of learning, and academic performance. *Higher Education*, *81*(4), 775-793.

Mardiha, S. M., & Alibakhshi, G. (2020). Teachers' personal espistemological beliefs and their conceptions of teaching and learning: A correlational study. *Cogent Education*, *7*(1), 1763230.

Otting, H., Zwaal, W., Tempelaar, D., & Gijselaers, W. (2010). The structural relationship between students' epistemological beliefs and conceptions of teaching and learning. *Studies in Higher Education*, *35*(7), 741-760.

Özkan, **Ş**. (2008). *Modeling elementary students' science achievement: The interrelationships among epistemological beliefs, learning approaches, and self-regulated learning strategies*. [Doctoral Dissertation. Middle East Technical University]. Council of Higher Education, Thesis Center. https://tez.yok.gov.tr/UlusalTezMerkezi/giris.jsp

Sadi, Ö. (2015). The analysis of high school students' conceptions of learning in different domains. *International Journal of Environmental and Science Education*, *10*(6), 813-827.

Sadi, Ö., & Da**ğ**yar, M. (2015). High school students' epistemological beliefs, conceptions of learning, and self-efficacy for learning biology: a study of their structural models. *Eurasia Journal of Mathematics, Science and Technology Education*, *11*(5), 1061-1079.

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, *8*(2), 23-74.

Shen, K. M., Li, T. L., & Lee, M. H. (2018). Learning biology as 'Increase ones' knowledge and understanding': studying Taiwanese high school students' learning strategies in relation to their epistemic views and conceptions of learning in biology. *International Journal of Science Education*, *40*(17), 2137-2157.

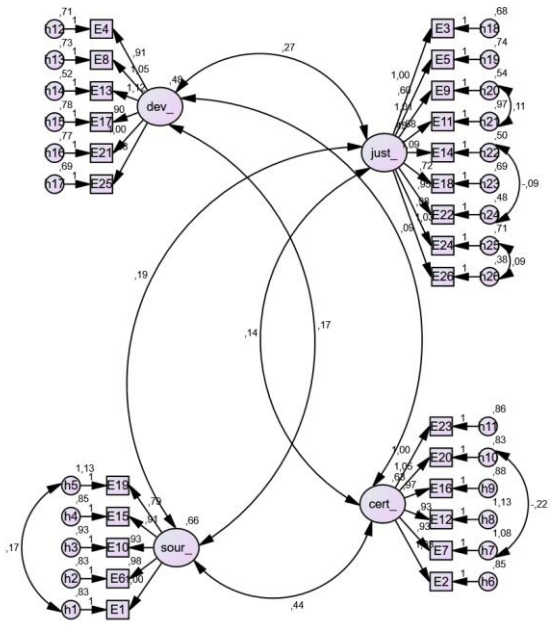
Tsai, C. C. (2004). Conceptions of learning science among high school students in Taiwan: A phenomenographic analysis. *International Journal of Science Education*, *26*(14), 1733-1750.

Tsai, C. C., Ho, H. N. J., Liang, J. C., & Lin, H. M. (2011). Scientific epistemic beliefs, conceptions of learning science and self-efficacy of learning science among high school students. *Learning and Instruction*, *21*(6), 757-769.

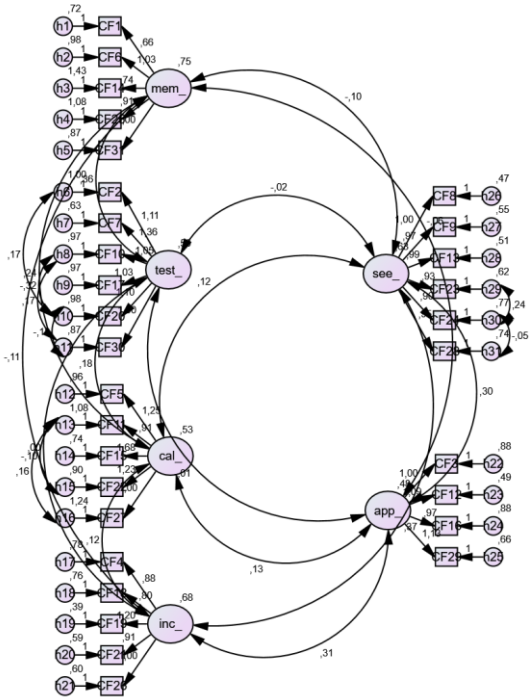
Vermunt, J. D, & Vermetten, Y. J. (2004). Patterns in student learning: Relationships between learning strategies, conceptions of learning, and learning orientations. *Educational Psychology Review*, *16*(4), 359-384.

Appendix: Confirmatory Factor Analyses Diagrams

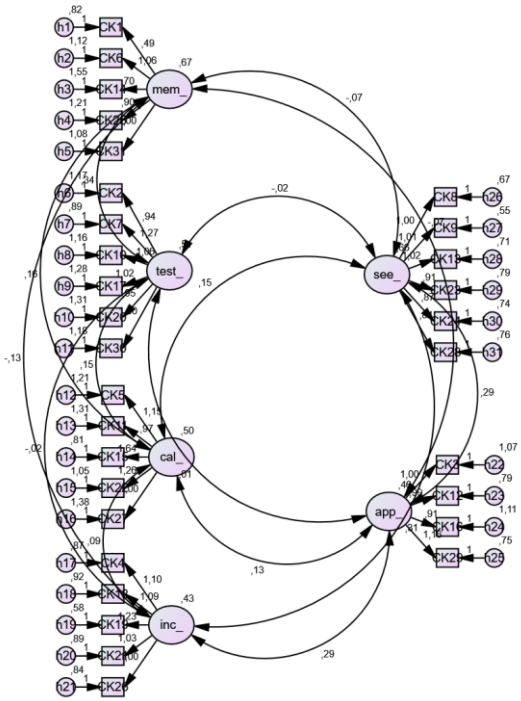
Epistemological Beliefs



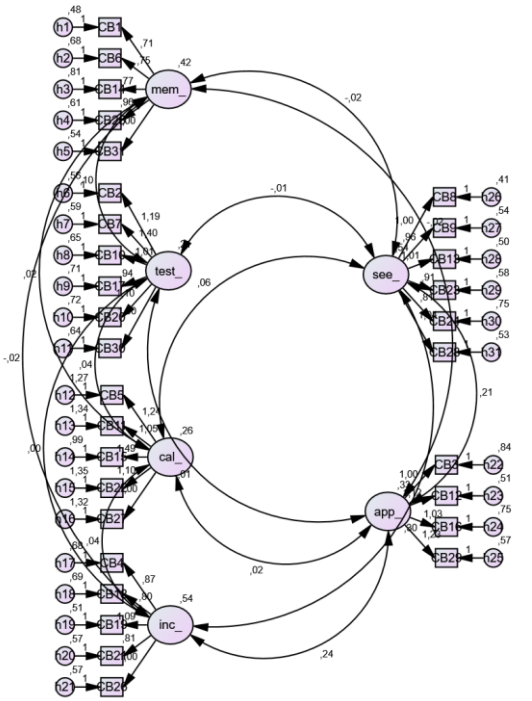
Conceptions of Learning Physics



Conceptions of Learning Chemistry



Conceptions of Learning Biology



BUEFAD | 2021, Volume 10, Issue 3, 639-651
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.887520

Correctional Education in Turkey: A Historical Overview from Past to Present and Evaluation of Current Practices

Gülden AKIN[a*]

[a*] Assoc. Prof. Dr., Ankara University (https://orcid.org/0000-0002-7875-5898), akingulden@gmail.com

Research Article | Received: 26.02.2021 | Revised: 17.15.2021 | Accepted: 06.08.2021

Abstract

Prison education is covered within the scope of adult education for the reasons such as content, program, and target group. Incarcerated people, on the other hand, are one of the disadvantaged groups among adult learners that have been increasingly studied in recent years. The present research aims to analyze the current correctional education in Turkey with reference to practices in the past and to discuss the challenges in the implementation process through descriptive analysis. According to the results of the paper, the number of inmates who participate in the first and second-degree courses is fewer than the total population of illiterate prisoners and literate prisoners who have no primary school diploma. Moreover, the study reveals that it is an exemplary activity that the prisoners acquire a profession with vocational training while they are employed within the correctional settings. However, they have difficulty finding jobs after they are released. In addition, according to the findings of the study, prisoners are generally satisfied with the religious education activities going on inside the prisons. Nevertheless, there is a need to regulate the prison population in Turkey in order to make the inmates equally benefit from the educational, cultural, and recreational activities. Finally, it is significant to disseminate technology-enriched education programs to eliminate the challenges that arise in the implementation of educational activities particularly after the COVID-19 pandemic.

Keywords: Incarcerated adults, correctional education, Turkey, practice, literacy education, vocational training

Türkiye'deki Hapishane Eğitimi Uygulamaları: Geçmişten Günümüze Tarihsel Bir Bakış ve Güncel Uygulamaların Değerlendirilmesi

Öz

İçerik, program ve hedef kitle gibi nedenlerle cezaevi eğitimi yetişkin eğitimi faaliyetleri kapsamında değerlendirilmektedir. Öte yandan, yetişkin öğrenen evreni içinde dezavantajlı topluluklardan biri olarak kabul edilen mahkûmlar ise, üzerinde giderek daha fazla araştırma yapılan bir grup olarak dikkat çekmektedir. Bu araştırma, Türkiye'deki hapishane eğitiminin geçmişten günümüze süregelen uygulamalarını analiz etmeyi ve hâlihazırdaki uygulama süreçlerinde karşılaşılan zorluklarını betimsel analiz yoluyla tartışmayı amaçlamaktadır. Araştırmanın sonuçlarına göre, birinci ve ikinci derece okuma yazma kurslarına katılan mahpus sayısı, hapishanelerde ikame etmekte olan ve okuma yazma bilmeyen veya okuma yazma bilip ilkokul diploması olmayan toplam mahpus sayına göre daha azdır. Ayrıca, mahpusların cezaevinde hem mesleki eğitim faaliyetlerine katılıp hem de sigortalı olarak çalıştırılmaları tüm dünya için örnek bir faaliyettir. Ancak, bu mahkûmlar tahliye edildikten sonra iş bulmakta zorluk yaşamaktadır. Öte yandan, hapishane içinde devam eden dini eğitim faaliyetlerinden mahkûmların genel olarak memnun olduğu bulgusuna ulaşılmıştır. Ancak, mahkûmların eğitim, kültür ve kaliteli boş zaman geçirme etkinliklerinden eşit şekilde yararlanabilmeleri için Türkiye'deki cezaevlerinin popülasyonunun iyileştirilmesine ihtiyaç vardır. Son olarak, özellikle COVID-19 salgınından sonra eğitim faaliyetlerinin uygulanmasında ortaya çıkan sorunların ortadan kaldırılması için teknoloji ile zenginleştirilmiş eğitim programlarının yaygınlaştırılması önemlidir.

Anahtar kelimeler: Yetişkin mahkûmlar, hapishane eğitimi, Türkiye, uygulamalar, okuma-yazma eğitimi, mesleki eğitim

To cite this article in APA Style:

Akın, G. (2021). Correctional education in Turkey: A historical overview from past to present and evaluation of current practices. *Bartın University Journal of Faculty of Education, 10*(3), 639-651. https://doi.org/10.1016/buefad.887520

1 | Introduction

In order to analyze the concept of imprisonment and prison training activities in Turkey, it is needed to go back the Ottoman Empire Period. The first imprisonment in the Ottoman Empire was Germiyanoğlu Yakup Bey's incarceration by the fourth Ottoman Emperor, Yıldırım Bayezid, for political reasons in the early 1390s (Özçelik, 2011). Apart from a few such political events, imprisonment was not a common practice in the Ottoman Empire owing to the fact that Islamic (or ecclesiastics) law was applied in jurisdiction system. According to Islamic law, tortures on the criminals' body (such as execution, cutting arms or/and legs, crucifixion, castration) and property penalties (such as fine, seizure of some of the assets of criminals in regard to the crime committed) were performed (Doğan, 2015). However, the most common penalties imposed on criminals during this period were rowing penalty, fettering and confinement in a fortress (Adak, 2006; Öztürk, 2005). In the Ottoman Empire, the judges, who were called "Kadı", generally chose to rehabilitate the prisoners by employing them for the purposes of supporting their families, providing their own livelihood and helping them forget the difficulties of imprisonment (Öztürk, 2014). In the Ottoman Empire, as Islam was at the center of life and the entire education system was shaped around the mosques, religious and worldly education was carried out together, and worldly side of education was based on acquiring a profession (Akyüz, 1993). Therefore, it is not surprising that vocational training was also practiced in prisons as a form of correctional education spontaneously (Oral & Atamer, 2005). These practices continued until the first Criminal Code in Ottoman Empire enacted in 1858 during the Abdulhamid Period. This law was a part of the Westernization moves that emerged as a result of the pressure exerted by European countries especially for the protection of minorities across the country. For the coming decades, the most prominent development was a project emerged in 1911 titled as the 'Prison Improvement Project', it was envisaged that prisoners would spend time and rehabilitate not only with vocational training but also with arts, music and different educational activities. However, the government could not allocate funds for these activities since it did not have enough budget (Gönen, 2005). The project would not have inured anyhow since Ottoman Empire went to the Balkan Wars and First World War.

Correctional Education in Turkey

A number of revolutions were started with the proclamation of The Republic of Turkey in 1923. In this regard, one of the first reforms was the transfer of prison administration from the Ministry of Internal Affairs to the Ministry of Justice in 1929. As the next step in 1930, in the Law on the Administration of Prisons and Detention Houses; it was stated that "workshops" would be built inside the prisons. Thus, the prisoners, who were forced to work in different sites and under heavy conditions, started to work with daily insurance in the workshops built within the penal institutions. By building the workshops inside the correctional institutions, prisoners were also granted to acquire a profession and get their working insurance (Demirbaş, 2005). Even if the workshops opened in prisons, the report of the inspection conducted across the country in 1931 revealed that the living conditions in prisons were far below the standards (Gölcüklü, 1966). Therefore, it is not possible to talk about a programmed educational activity in prisons at the time.

A new code, which was connected with the Belgian Penal Execution Code of 1902, was issued in 1941. Thus, rather than making a penal code from scratch, the law of another country was adapted (General Directorate of Prisons and Detention Houses [GDP& DH], Chronology of Prisons in Turkey, 2019). Formal regulation of educational activities in prisons was in the August 1941 issue of the Official Gazette for the first time in history. A "training service" and the allocation of teachers was declared. According to the regulation, teachers were responsible for literacy and numeracy courses and the devotional growth of inmates. Besides, it was regulated to found new ateliers in correctional institutions and assign new workshop managers who were in charge of the vocational trainings and laboring of prisoners. Furthermore, teachers and managers were held responsible for the prisoners who were in prison for more than 3 years and were still illiterate or who didn't learn any craftworks enough to make their own living after released from the prison respectively. In addition, reports were requested on prisoners' progress in their education or craftworks and on their

learning difficulties. Moreover, in order to determine whether all educational activities reached their goals or not, written and oral exams were held by a commission under the administration of the prison warden every June. One of the articles in the law was that the well-behaving prisoners who officially proved that they were highly educated could help teachers in all these educational processes. In addition to basic education courses, seminars and conferences were planned to conduct in order to improve the spirit of patriotism of inmates and a copy of each conference was kept for future (The Official Gazette, 1941).

Although the Ministry of Justice requested the appointment of preachers in prisons from the Presidency of Religious Affairs in 1959, this request did not materialize due to the low number of preachers across the country (Özdemir, 2002). It was in 1974 that preachers started to be employed in penal institutions to improve the spirituality of prisoners. With the military coup in 1980, thousands of people were imprisoned and the military government started to rule the country. During this period, not only religion courses, but also general cultural courses such as Literature, History, Citizenship, Sociology, Psychology, Music, and Art were also made compulsory for prisoners (The Official Gazette, 1983). The aim was to provide primary, secondary, and high school graduation courses for prisoners and to help adaptation for their re-entry to the society. However, all of these compulsory courses except for Religious Culture and Morality, were abolished in 1991. The employment of preachers in prisons continued for the purposes of increasing the spiritual lives of prisoners, conducting one-to-one interviews like a spiritual support psychologist and helping to practice religious knowledge in daily life (Özdemir, 2002).

The Latest Correctional Education Code in Progress

In Turkey, all training activities are carried out centrally and single-handedly by the "Training and Correctional Department" which operates under Turkish General Directorate of Prisons and Detention Houses, Ministry of Justice. This department is divided into several offices such as adult correctional education, juvenile correctional education, office for vulnerable groups, educational strategies, procedures of courses and examinations, social and spiritual activities office. These offices decide all trainings, educational and correctional activities. The Ministry of Justice issued the latest circular titled as "Educational and Correctional Procedures of Juvenile and Adult Convicts and Detainees" on 27th July, 2007. On the basis of Article 42 of the Turkish Constitution (as *"No one can be deprived of education and training"*), the following two articles were briefly included in the education principles section (GDP&DH, Educational and Correctional Procedures of Juvenile and Adult Convicts and Detainees, 2007):

1. The necessity and benefit of education and correctional activities for the physical and spiritual development of convicts and detainees have been recognized worldwide. These activities are the most effective means of correction, as well as the best system of living that fits the discipline and order required by the regime of the institution.

2. The expected outcomes of educational activities are as follows: To ensure that convicts and detainees adopt the right behavior, attitudes and habits, to gain moral values that will prevent them from committing crime again, to facilitate their re-entry to the society after their release and to make them patient, resilient and cool-headed against external events and provocations.

As stated by Turkish General Directorate of Prisons and Detention Houses (GDP&DH, Education Service Activities, 2020) data, educational opportunities and activities are literacy courses, distance learning tests, application of national tests, religious education, vocational trainings and social, cultural and sports activities inside the prisons. As in formal school education system, correctional practices are carried out within annual syllabus and are divided into semesters. In the last week of the current semester, program of the next academic year is announced to all authorities. One copy is hung on the notice boards as all prisoners should see. However, not all prisoners are welcomed to all educational activities. Who can attend, under what conditions and the rules to be followed during the trainings are announced to the prisoners on notice boards. On the official website of the General Directorate of Prisons and Detention Houses (GDP& DH, Education

Service Activities, 2020), it is claimed that the penal institutions work as schools, education centers, rehabilitation and recruiting centers. Whether these goals are achieved or not is analyzed below.

2 | METHOD

The present paper is a qualitative study which points the correctional education practices in Turkey with references to past and analyze the challenges during their application processes. Furthermore, possible solutions to some of the problems are presented as well. Document analysis was used to collect data by analyzing records and documents such as official reports, books, articles and statistics. As Bowen (2009) stated, these documents can be in printed or electronic forms. Therefore, document analysis technique includes scanning, finding resources, and reading, taking notes, inferring, developing and evaluating empirical data (Corbin & Strauss, 2008). The author of this paper searched resources such as signed proceedings, minutes, decrees, statistics, books, articles, etc. which are about prison education from past to present in Turkey. Descriptive analysis method was used during data processing and presentation. Descriptive analysis is an approach in which the collected data is summarized and interpreted according to research questions or predefined themes (Yıldırım & Şimşek, 2016). All things considered, due to the limited international research on prison and correctional adult education in Turkey, this study will add to the body of knowledge both on national and international correctional education.

LIMITATION OF THE STUDY

In this present study, educational activities in adult correctional institutions were examined and researched. Juvenile delinquency and education of juvenile offenders is a different field of study. Therefore, there is no data or findings available on juvenile penitentiary settings and educational procedures within these institutions.

THE TARGET GROUP OF CORRECTIONAL EDUCATION IN TURKEY

As of December 2019, there were officially 281605 prisoners in 355 Turkish correctional institutions across the country (TurkStat, 2020). Since November 2019, the impact of the COVID-19 in correctional institutions has been inevitable and unpreventable (Kinner, Young, Snow, Southalan, Lopez-Acuña, Ferreira-Borges, & O'Moore, 2020; Saloner, Parish, Ward, DiLaura, & Dolovich, 2020; Williams, Ahalt, Cloud, Augustine, Rorvig, Sears, & Walter, 2020). Although various recommendations have been made to prevent the spread of the virus, most of them didn't work out and the prison population has been reduced with indemnity acts by governments. Even though the exact number is unknown, Turkey released the highest proportion of prisoners in Europe with the number of more than 110000 (Council of Europe, 2020).

Table 1. Educational Status of Incarcerated People between the Years of 2015-2019

Educational Status	2015	2016	2017	2018	2019
Illiterate	1455	1579	2048	1820	2027
Literate but not graduated from a school	11217	13012	11998	11774	10514
Primary school	38619	43854	41755	43875	41843
Primary Education	50205	57979	78162	98140	55152
Junior high school and vocational school at junior high school level	18560	22289	24961	36880	84925
High school and vocational school at high school level	36623	40026	45508	57857	63940
Higher education	6396	8098	9857	13914	20653
Unknown	5651	424	1941	2629	2551
Total	168726	187730	215761	266889	281605

TurkStat, Prison Statistics, 2020

In order to get a better picture of the educational levels of target group in correctional settings, Table 1 is included with the most current official data of incarcerated people. It seems that there is an increase in the number of all prisoners, except for those with 'literate' status. Especially among high school and higher school graduates, this increase is quite high compared to other categories.

Table 2. Prison Population by Gender and Nationality between the Years of 2015 and 2019

	2015	2016	2017	2018	2019
Male	1707544	192354	222444	254426	280114
Female	6508	8373	9896	10416	11432
Turkish	173440	196285	225994	256264	281544
Foreigner	3822	4442	6346	8578	10002

TurkStat, Prison Statistics, 2020

Table 2 contains data which shows the number of prisoners in terms of gender and nationality. It seems that the increase in the rate of all prisoners in the 5 years, from 2015 to 2019, is reflected in the number of female prisoners and foreign prisoners. It may be possible that the increase in the refugee population in recent years in Turkey has affected the prison population of the foreigners as well.

Research ethics

Since the data in the present paper is reached from the database which is available to all researchers at both national and international levels, it does not require an ethics committee approval report.

3 | Findings: Educational& Correctional Practices

First& Second Level Literacy& Numeracy Courses

In the Circular of "Educational and Correctional Procedures of Juvenile and Adult Convicts and Detainees" (GDP& DH, Educational and Correctional Procedures of Juvenile and Adult Convicts and Detainees, 2007), it is emphasized that for the prisoners under the age of 65, it is compulsory to provide 1st level literacy course for illiterate prisoners and 2nd level literacy course for prisoners who have no primary school diploma. Although at least 10 participants is a prerequisite for opening other courses, it is considered sufficient to have only 1 prisoner participant for the 1st level literacy course and 5 for the second level. According to the latest official data, the number of prisoners attending 1st and 2nd level courses was 10 762 in 2016 (GDP& DH, Annual Activity Report, 2017). Compared to the official data at the end of 2016 in Table 1, this number shows that 4298 of illiterate or literate prisoners without any diplomas didn't or couldn't attend these compulsory courses. In the document of "Education in Prison" by the Council of Europe (1990) it was stated that "*Basic Education and literacy work are prioritized and all prisoners are given, wherever possible, equal access to education.*"(p.1). Thus, reaching all those who need basic education is a priority. It seems that the prisoners who need to attend the first and second-degree literacy courses couldn't enroll in these courses and it can be perceived a challenge in practice in Turkish correctional institutions. It is significant to find different alternatives to increase prisoners' participation. For instance, in a study conducted in New Zealand, literacy courses were organized for prisoners via virtual reality and it was concluded that prisoners' participation increased (McLauchlan& Farley, 2019). In another example, instead of traditional basic prison education practices, social literacy programs were implemented and it was observed that adult prisoners participated more in such new implementations (Ioannidou, Kiourti, & Christofidou, 2019).

Moreover, according to 2019 data, the total number of teachers working in prisons is 619 (GDP& DH, Staff Status, 2020). Thus, on average, there is 1 teacher for every 20 prisoners who are illiterate or non-graduates of primary school. Although it is known that the majority of teachers are employed for primary school level courses, there is no official information on teachers' branches. The first and second degree literacy education is implemented under the agreement with the Ministry of National Education (MoNE). The

materials and educational programs are supported by MoNE and even when the correctional institutions do not have enough number of teachers, MoNE also provides teachers. The first degree literacy courses are 90 hours in total whereas the second degree courses are 180 hours. Those who are successful in the exams which are held at the end of each stage are certificated, by doing this, they are given opportunity to go on to the next level of education. There are a few studies on whether prisoners are satisfied with the educational practices provided in prisons. For instance, in Şen's (2016) research, it was revealed that the prisoners who attended the literacy courses perceived prisons as the educational institution. However, in their study, Balaban and Özen (2015) concluded that prisoners found the educational practices inadequate.

On the other hand, according to Institute for Crimes and Justice Policy Research (2016) data, 2.2% of the population in Turkish prisons are foreign prisoners. However; as reported by Directorate General of Migration Management, Ministry of Interior (2021), the number of refugees in Turkey has a population of 3 650 496 (%4.39 of the total population) and as it was illustrated in Table 2, it means that the number of foreign prisoners should be expected higher in the following years, but there seems no current or future official program or plan for literacy or language teaching courses for this target group.

Open Schools& Universities

Distance-open secondary school practices are carried out for those who have successfully completed their 2nd level literacy education in prisons, or who have completed primary education but have not been able to continue or complete their secondary education. Moreover, open high school opportunity is available for those who have a secondary school or equivalent diploma and those who have not completed high school education (GDP& DH, Educational and Correctional Procedures of Juvenile and Adult Convicts and Detainees, 2007). According to the Annual Activity Report of GDP& DH (2017), the number of prisoners benefiting from open secondary school was 6643 and prisoners attending open high school was 20058. However, there is no data on whether these prisoners consistently continued their education and / or how many of them graduated successfully.

In accordance with the protocol signed between the Ministry of Justice and Anadolu University Open Education Faculty, prisoners who get enough points in the national university entrance exam become entitled to register to the previously listed departments with “the distance education model”. These are vocational schools such as Occupational Health and Safety, Accounting and Tax Practices, Medical Documentation and Secretariat; or bachelor degrees such as Sociology, Economics, Business Administration, Finance, and History. In 2016, the number of prisoners benefiting from the activities of open university was 6567 (GDP& DH, Annual Activity Report, 2017).

Relatives of prisoners are responsible for registration procedures for open education. In the cases of unavailability of relatives, the prison directorate undertake the procedures of registration (GDP& DH, Educational and Correctional Procedures of Juvenile and Adult Convicts and Detainees, 2007). Because all the school books from primary to high school are distributed free of charge by government, free books are distributed after registration in open secondary and high school. However, prisoner students purchase their own books for each academic semester in the open university process.

Apart from religious education and literacy courses, correctional institutions in Turkey do not have any educational activities inside. It seems a challenge in the implementation process since in many countries, including the United States, which has the world's largest prison population, post-secondary or college education is provided within prisons (Castro, Hunter, Hardison, & Johnson-Ojeda, 2018; Davis& Tolbert, 2019; Strait& Eaton, 2017). According to the results of a meta-analysis study conducted by Ellison, Szifris, Horan and Fox (2017), which was on 28 research papers, prison education had a positive effect on lowering the recidivism rates among incarcerated people. In other words, there is an inverse correlation between the increase of prison education within the correctional settings and the rate of recidivism after inmates re-enter the society.

Religious Education

In Turkey, although the regulations of 1943 emphasized the importance of religious education for prisoners, after 1981, Religious Culture and Morality course was introduced and a curriculum consisting of 74 modules was applied along with culture lessons such as Turkish and History (Çınar, 2016). Following the protocols established with the Presidency of Religious Affairs, it was decided to assign preachers to the prisons and pay them for each course over 12 hours. With another protocol signed in 2011, it was aimed to go beyond guiding prisoners to perform their religious practices and helping them to re-enter the society by offering moral development and guidance through religion (Altıntaş, 2019). Therefore, one of the most important branches of correctional activities has become religious education. In this respect, it was determined to give lectures and religious conversations twice a week, to conduct conferences on religion and moral integrity at least once a month, and to teach "Quran in Arabic Alphabet" (Çınar, 2016).

Table 3. The First Week Subject Sample of the Religious Culture and Morality Course Applied within the Prisons

Days	Subjects
Monday	The concept of religion and the main religions in the world
Tuesday	General information about religions
Wednesday	Muslims and Ahlul Bayt
Thursday	Principles of faith

The Directorate of Religious Affairs, *Penal Institutions Religious Services Directory*, 2012:136

The courses whose sample subjects are listed in Table 3 are held as six lesson hours of 40 minutes each. Prison preachers are responsible for the courses that are conducted in the cells within the prisons. As of December 2019, the number of prison preachers was 2790 (Directorate of Religious Affairs, Strategy Development Directorate, 2020). There are many national and international studies on whether spiritual services and practices of preachers in prisons have any effect on the correction of inmates. For instance, according to the results of Dağcı's research study (2020), which was based on 40 papers conducted between 1987 and 2018 in Turkey, religious services in prisons increase the feelings of regret among incarcerated people and have positive effects on their attitudes. Likewise, the international studies conducted by Vasylenko (2020), Baker and Reyes (2020), Talik and Skowroński (2018) reveal that religious education in prisons has positive outcomes for both prisoners and their families and the community they re-enter.

Sports Activities

Sports activities are recreation activities carried out in prisons, and it is the prison teachers' and deputy wards' responsibility to conduct them (GDP&DH, Educational and Correctional Procedures of Juvenile and Adult Convicts and Detainees Education Circular, 2007). In order to carry out sports activities more regularly, a protocol has been signed with the Ministry of Sports and it is undertaken that, if necessary, both professional and material supplies such as trainers and sports equipment would be provided. However, in The Grand National Assembly Human Rights Commission Report (2019), it was stated that since the prisons were far above the capacity, the recreation activities were carried out sequentially, and prisoners were divided into groups of 10. Thus, the frequency of prisoners' participation in sports activities is low. However, international studies show that prisoners' participation in sports activities in the prison settings provides benefits such as coping with stress and feeling good (Buckaloo, Krug, & Nelson, 2009; De Vita, Donini, & Iovino, 2019; Gallant, Sherry, & Nicholson, 2015). In addition, exercising has mentally positive effect on prisoners (Meek& Lewis, 2014), as it is good for their physical health (Vaiciulis, Kavaliauskas, & Radisauskas, 2011). Likewise, The results of the national study conducted by Üney and Erim (2019) in Turkey, revealed that there was a

statistically significant and positive difference among prisoners doing exercise in terms of physical, verbal and indirect aggression variables compared to those who did not do any sports.

Workshops, Vocational& Technical Trainings

According to the data of The Grand National Assembly Parliamentary Human Rights Commission, (2018) Turkey has 297 workshops in the correctional facilities. There are 172 different vocations such as production of cotton goods, leather, furniture, decorative items, and husbandry.

Table 4. The Number of Prisoners Working in the Workshops within the Prisons between the Years of 2018 and 2020

	2018	2019	2020
Number of Prisoners	59150	60767	53818

General Directorate of Prisons and Detention Houses, Workshops Activity Report, 2021: 24

Table 4 illustrates that the number of prisoners working in the prison workshops decreased by 11.44% in 2020 compared to 2019. The condition is an effect of the COVID-19 pandemic. As stated in GDP& DH Workshops Activity Report (2021), workshops operate like a large state-owned enterprise with a revenue of 2.5 billion Turkish Liras (around 410 million US dollars). Pursuant to Article 29/1 of the Law on the Execution of Criminal and Security Measures No. 5275, prisoners are obliged to work in workshops if they do not have any health problems. Depending on their experience, prisoners are paid between 14 TL (around 2 USD) to 17.5 TL per day. However, according to the results of the studies in the field in Turkey it seems that prisoners who participate in production while they are in prisons have a much lower chance of being employed and have difficulties being employed outside compared to other people after they re-enter the society (Engin, 2012; Koçak & Altun, 2010; Saruç, 2018; Savaş & Eryalçın, 2020). The results of the study conducted with the national data in the USA have similarities to those in Turkey. Accordingly, the unemployment rate of former prisoners in the US is quite high compared to the unemployment rate in the general population across the country (Couloute & Kopf, 2018). In another study conducted in Kenya, it was concluded that the rate of recidivism is high (around %60) and it was underlined that there was not enough data to show whether vocational training in prisons is effective on prisoners (Mbatha, Kerre, Ferej, & Kitainge, 2019).

After the Covid-19 Pandemic

Following the COVID-19 virus, which started to spread all over the world towards the end of 2019, various measures were taken in prisons all over the world. Due to overcapacity in prisons in 59% of the world countries (Institute for Crime and Justice Policy Research, 2020), with alternatives such as amnesties, early and temporary release, the prison population has been reduced. In this context, Turkey (%35), Cyprus (%16), and Slovenia (%16) were the top three countries with the most prisoner-release rate in Europe (Council of Europe, 2020). Despite the relief in prison population, it was stated that there were disruptions in educational activities in correctional institutions in Turkey (Civil Society in the Penal System Association, 2021; Esen, 2020). This situation is not unique to Turkey and disruptions in prison education has been experienced in other countries as well (Craggs- Mersinoglu, 2020; Stanistreet, 2020). The solution to this problem seems to be digitalization and distance education (Craggs- Mersinoglu, 2020).

On the other hand, vocational training programs in Turkish prisons have contributed to the fight against the COVID-19 across the country. After the COVID-19 pandemic, there have been some changes in working plans in prison ateliers and workshops in Turkey. Accordingly, the focus was on the production of goods such as masks, overalls, surgical gowns, disinfectants and cologne that are included in the fight against the COVID-19. These products were distributed in places where needed throughout the country, especially in health institutions (GDP&DH, Announcements, 2020).

4 | Discussion, Conclusion & Recommendations

According to the European Prison Education Association (2017), prison education is "*formal, informal and non-formal education provided for all persons who are under the supervision of the judiciary, whether sentenced or awaiting trial, and whether serving a sentence in prison or in the community*."(p.1). Therefore, even though individuals are deprived of their liberty, their right to access education continues. Prison education in Turkey is protected by laws as well considering the constitutional rights of education of all citizens, including the incarcerated people (GDP& DH, Educational and Correctional Procedures of Juvenile and Adult Convicts and Detainees, 2007).

Correctional education in Turkey is carried out single-handedly from a center and the ongoing practices can be grouped under six subheadings. These are literacy courses, distance learning tests (at secondary, high school and university levels), application of national tests inside the prisons (such as national university entrance test, higher education test etc.), religion education (cooperation with the Presidency of Religious Affairs), vocational and technical trainings, social, cultural and sports activities (GDP& DH, Education Service Activities, 2020).

According to the results of the study, the number of inmates who attend the first and second degree literacy courses is low compared to the total number of prisoners who are illiterate or literate without any diplomas. There are variety of practices such as using virtual reality (McLauchlan & Farley, 2019) or social literacy (Ioannidou, Kiourti, & Christofidou, 2019) in correctional institutions of different countries around the world in order to increase and encourage the participation of inmates in the first and second degree literacy courses. Different methods can be tried in Turkish correctional settings as well in order to increase the curiosity, self-perception and inner motivation of incarcerated adults.

Inside the Turkish prisons, there are no ongoing educational activities or practices other than literacy and religious courses. However, it has been revealed that giving high school and college courses inside prisons reduces the rate of recidivism (Ellison et al, 2017). It is likely that such an application may be an alternative to reduce the recidivism rate in Turkey as well. Moreover, sports activities are among important recreation activities for adults to spend quality time. Therefore, it is important to encourage sports activities among prisoners as well since doing sports has a positive effect on incarcerated people emotionally, mentally, and physically (Buckaloo, Krug, & Nelson, 2009; De Vita, Donini, & Iovino, 2019; Gallant, Sherry, & Nicholson, 2015; Meek& Lewis, 2014; Üney& Erim, 2019; Vaiciulis, Kavaliauskas, & Radisauskas, 2011).

It is not a common practice to set up workshops or ateliers inside prison and employ prisoners with their daily insurance coverage as in workplaces outside the prisons. Therefore, workshops and ateliers in Turkish prisons stand out as an example with their capacity and product quality. However, after prisoners are released, they have difficulties in finding jobs in areas where they pursue the professions they acquired in prison settings (Engin, 2012; Koçak & Altun, 2010; Saruç, 2018; Savaş & Eryalçın, 2020). Thus, the recruitment of former prisoners can be supported through different projects or support programs.

Especially after the COVID-19, creating alternatives to traditional face-to-face education practices has become a necessity in formal, informal and non-formal learning environments (UNESCO Institute for Lifelong Learning, 2020). Undoubtedly, one of these educational settings is prisons. Notably, improving the correctional institutions with technological innovations and expanding prisoners' right to access information can help to overcome the challenges in practice.

Statements of publication ethics

I hereby declare that the present research has no unethical problem and I observe research and publication ethics.

Researchers' contribution rate

This paper was prepared by one author.

CONFLICT OF INTEREST

This study has no conflict of interest.

REFERENCES

Adak, U. (2006). *XIX. yüzyılın sonları XX. yüzyılın başlarında Aydın vilayetindeki hapishaneler [Prisons in the province of Aydın in the late 19th century and early 20th century]*. (Unpublished Master's Dissertation), Social Sciences Institute, Ege University.

Altıntaş, M. A. (2019). A qualitative research on spiritual guidance and religious services in prisons (Kayseri case). *Diyanet İlmi Dergisi*, 55. (81-119).

Akyüz, Y. (1993). *Türk Eğitim Tarihi [History of Turkish Education]*. Kültür Kolej Publications, 2.

Baker, D., & Reyes, P. B. (2020). Religious educators are the future. *Religious Education* https://doi.org/10.1080/00344087.2020.1706422

Balaban, Ö.,& Özen, S . (2015). Ceza infaz kurumlarındaki tutuklu ve hükümlülerin eğitim faaliyetlerine ilişkin algıları: T tipi kapalı ceza infaz kurumu örneği. [Perception of imprisoned and convicts in penal institutions on training activities: T type closed prison case]. *Çalışma İlişkileri Dergisi*, 6 (1), 37-52. https://dergipark.org.tr/tr/pub/cider/issue/29532/316980

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40.

Buckaloo, B. J., Krug, K. S., Nelson, K. B. (2009). Exercise and the low-security inmate: Changes in depression, stress, and anxiety. *The Prison Journal*, 89, 328-343.

Castro, E. L., Hunter, R. K., Hardison, T., & Johnson-Ojeda, V. (2018). The landscape of postsecondary education in prison and the influence of Second Chance Pell: An analysis of transferability, credit-bearing status, and accreditation. *The Prison Journal*, 98(4), 405-426.

Civil Society in the Penal System Association. (2021). *Complaints about coronavirus (COVID-19) from prisons. [Hapishanelerden gelen koronavirüs (COVID-19) kaynaklı şikayetler].* http://cisst.org.tr/raporlar/hapishanelerden-gelen-koronavirus-covid-19-kaynakli-sikayetler-15-30-aralik/

Craggs-Mersinoglu, Y. (2020). *Locked-up and locked-down: how prison education has fared during Covid-19*. https://feweek.co.uk/2020/07/06/locked-up-and-locked-down-how-prison-education-has-fared-during-covid-19/

Corbin, J., & Strauss, A. (2008). Strategies for qualitative data analysis. *Basics of Qualitative Research. Techniques and Procedures for Developing Grounded Theory*, *3*.

Couloute, L., & Kopf, D. (2018). Out of prison & out of work: Unemployment among formerly incarcerated people. *Prison Policy Initiative*. https://www.prisonpolicy.org/reports/outofwork.htm

Çınar, F. (2016). Religious education in prisons. *Hitit University Journal of Divinity Faculty*, 15(29), 131-149.

Dağcı, A. (2020). Suç işlemiş bireylere yönelik manevi ve dini hizmetlerle ilişkili araştırmalar üzerine bir inceleme. *Türk Manevi Danışmanlık ve Rehberlik Dergisi*, (1), 61-95

Davis, L. M., & Tolbert, M. A. (2019). *Evaluation of North Carolina's pathways from prison to postsecondary education program*. RAND.

Demirbaş, T. (2005). Hürriyeti bağlayıcı cezaların ve cezaevlerinin evrimi. [Evolution of liberty-bound penalties and prisons]. In E.G. Naskali& H.O. Altun (Eds.), *Hapishane kitabı* (pp.3-40). Bookstore Publications.

De Vita, T., Donini, L., & Iovino, S. (2019). Re-education treatment and physical activities in prison. *Sport Science*, 12(1), 69-72.

Doğan, M. (2015). *Canımı alsalar da kurtulsam dedirten Osmanlı'nın 19 işkence yöntemi [Worse than death 19 different torture method in Ottoman Empire]*. https://listelist.com/osmanli-iskenceleri-2/

Ellison, M., Szifris, K., Horan, R., & Fox, C. (2017). A rapid evidence assessment of the effectiveness of prison education in reducing recidivism and increasing employment. *Probation Journal*, 64(2), 108-128.

Engin, E. M. (2012). Suçu önleyici tedbirler bağlamında ceza infaz kurumlarında çalışma ve eski hükümlü istihdamı. [Working in penal institutions and employment of former prisoners in the context of anti-crime measures]. *Çalışma İlişkileri Dergisi*, 3(2), 24-35.

Esen, D. (2020). *Don't prisoners have a right to education? [Mahkûmların eğitim hakkı yok mu?]* https://www.birgun.net/haber/mahkumlarin-egitim-hakki-yok-mu-316834

European Prison Education Association. (2017). *Full constitution*. Vienna, November 2017. https://www.epea.org/wp-content/uploads/EPEA-Constitution-Vienna-2017.pdf

Gallant, D., Sherry, E., Nicholson, M. (2015). Recreation or rehabilitation? Managing sport for development programs with prison populations. *Sport Management Review*, 18(1), 45-56.

General Directorate of Prisons and Detention Houses (GDP& DH), the Ministry of Justice. (2020). *Correctional ınstitutions in the Covid-19 pandemic process. [Kovid-19 pandemi sürecinde ceza infaz kurumları]. Announcements*. https://cte.adalet.gov.tr/Home/SayfaDetay/ceza-infaz-kurumlarinda-kovid-19-pandemi-surecine-dair-kamuoyu-aciklamasi17062020045113

General Directorate of Prisons and Detention Houses (GDP& DH), Detention Houses Workshops Institution, the Ministry of Justice (2021). *İşyurtları faaliyet raporu [Workhops activity report] 2020*. https://iydb.adalet.gov.tr/Resimler/BilgiBankasi/28220211839332020%20FAAL%C4%B0YET%20RAPORU.pdf

General Directorate of Prisons and Detention Houses (GDP& DH), the Ministry of Justice (2020). *Eğitim servisi faaliyetleri [Education service activities].* http://www.cte.adalet.gov.tr/ Home/SayfaDetay/egitim-servisi-faaliyetleri

General Directorate of Prisons and Detention Houses (GDP& DH), the Ministry of Justice. (2007). *Genç ve yetişkin hükümlü ve tutukluların eğitim ve iyileştirilme işlemleri ve diğer hükümler [Educational and correctional procedures of juvenile and adult convicts and detainees]. Genelge no: 46/1.* http://www.cte.adalet.gov.tr/Resimler/Dokuman/198201911532446_1.pdf

General Directorate of Prisons and Detention Houses (GDP& DH), the Ministry of Justice. (2020). *Personel durumu [Staff status]*. http://www.cte.adalet.gov.tr/Home/SayfaDetay/personel-durumu

General Directorate of Prisons and Detention Houses (GDP& DH), the Ministry of Justice. The Department for Foreign Affairs. (2017). *The year of 2016 unit annual activity report. Report no. 2017/1.* https://cte.adalet.gov.tr/Resimler/Dokuman/20820191410332016_faliyet_raporu.pdf

General Directorate of Prisons and Detention Houses (GDP& DH), the Ministry of Justice. (2019). *Türkiye ceza infaz kurumları kronolojisi [Chronology of prisons in Turkey] (1850-2005).* http://www.cte.adalet.gov.tr/Home/SayfaDetay/turkiye-ceza-infaz-kurumlari-kronolojisi-1850-2005

Gölcüklü, F. (1966). Türk ceza sistemi: hürriyeti bağlayıcı cezalar. [Turkish penal system: penalties for liberty]. *Ankara Üniversitesi Siyasal Bilgiler Fakültesi.*

Gönen, Y.S. (2005). Osmanlı İmparatorluğunda hapishaneleri iyileştirme girişimi, 1917 yılı [An attempt to improve prisons in the Ottoman Empire, the year of 1917]. In E.G. Naskali& H.O. Altun (Eds.), *Hapishane kitabı* (pp.173-183). Bookstore Publications.

Ioannidou, E., Kiourti, E., & Christofidou, C. (2019). Literacy education in prison: developing a social literacy programme in the prison school of Cyprus. *Research Papers in Education*, 34(5), 597-620.

Institute for Crime and Justice Policy Research. (2016). *Turkey foreign prisoners. World prison brief.* https://www.prisonstudies.org/country/turkey

Institute for Crime and Justice Policy Research. (2020). *World prison brief online database.* https://www.prisonstudies.org/highest-to-lowest/occupancylevel?field_region_taxonomy_tid=All

Kinner, S. A., Young, J. T., Snow, K., Southalan, L., Lopez-Acuña, D., Ferreira-Borges, C., & O'Moore, É. (2020). Prisons and custodial settings are part of a comprehensive response to COVID-19. *The Lancet Public Health*, 5(4), e188-e189.

Koçak, O., & Altun, S. (2010). Ceza infaz kurumundaki mesleki eğitim faaliyetlerinin hükümlü istihdamına katkıları. [Contribution of vocational training activities in the penal institution to the employment of former prisoners]. *Çalışma İlişkileri Dergisi*, 1(1), 95-117.

Mbatha, C. M., Kerre, B. W., Ferej, A., & Kitainge, K. M. (2019). How effective is vocational education and training for rehabilitation in Kenyan prisons? A study protocol. *American Journal of Educational Research*, 7(10), 677-693.

McLauchlan, J., & Farley, H. (2019). Fast cars and fast learning: using virtual reality to learn literacy and numeracy in prison. *Journal For Virtual Worlds Research*, 12(3).

Meek, R., & Lewis, G. (2014). Promoting well-being and desistance through sport and physical activity: The opportunities and barriers experienced by women in English prisons. *Women & Criminal Justice*, 24, 151-172.

Oral, G., & Atamer, A. (2005). Cezaevlerinde rehabilitasyon programları. [Rehabilitation programs in prisons]. In E.G. Naskali& H.O. Altun (Eds.), *Hapishane kitabı* (pp.335- 345). Bookstore Publications.

Özçelik, M. (2011). Mütareke döneminde Osmanlı hapishanelerinin durumu [The status of Ottoman prisons during the armistice]. *Cumhuriyet Tarihi Araştırmaları Dergisi*, 7, 16-39.

Özdemir, Ş. (2002). Türkiye'de cezaevlerinde din eğitimi uygulamasının geçirdiği aşamalar. [The stages of religious education in prisons in Turkey]. *Dinbilimleri Akademik Araştırma Dergisi*, 2(3), 65-78.

Öztürk, N. (2005). Osmanlılarda hapis olayları (1300-1512) [Prison incidents in Ottomans (1300-1512)]. In E.G. Naskali& H.O. Altun (Eds.), *Hapishane kitabı* (pp.101-129). Bookstore Publications.

Öztürk, S. (2014). *XIX. yüzyıl Osmanlı ceza sisteminde dönüşüm: Zindandan hapishaneye geçiş [XIX century transformation in the Ottoman criminal system: Transition from dungeon to prison].* (Unpublished Master's Dissertation), Adnan Menderes University.

Saloner, B., Parish, K., Ward, J. A., DiLaura, G., & Dolovich, S. (2020). COVID-19 cases and deaths in federal and state prisons. *Jama*, 324(6), 602-603.

Saruç, S. (2018*). Kadının suç serüveni. Kadın hükümlüler: Cezaevi öncesi, cezaevi süreci ve tahliye sonrası [Crime adventure of woman. Women convicts: Pre-prison, prison process and post-evacuation].* Nisan Kitabevi, 122.

Stanistreet, P. (2020). *COVID-19: Challenges and opportunities in prison education*. https://thelifelonglearningblog.uil.unesco.org/2020/10/13/covid-19-challenges-and-opportunities-in-prison-education/

Strait, A., & Eaton, S. (2017). *Post-secondary education for people in prison*. Sillerman Center for the Advancement of Philanthropy.

Şen, Ş. (2016). *Ceza infaz kurumlarında verilen eğitim faaliyetlerinin yaşam boyu öğrenme açısından değerlendirilmesi: Zonguldak ili örneği. [Evaluation of educational activities given in penal institutions in terms of lifelong learning: Example of Zonguldak province].* Master's thesis, Bartın Üniversitesi, Eğitim Bilimleri Enstitüsü.

Talik, E., & Skowroński, B. (2018). The sense of quality of life and religious strategies of coping with stress in prison inmates. *Journal of Religion and Health*, 57(3), 915-937.

The Directorate General of Migration Management, Ministry of Interior (2021). *Yıllara göre geçici koruma kapsamındaki Suriyeliler*. https://www.goc.gov.tr/gecici-koruma5638

The Directorate of Religious Affairs, General Directorate of Religious Services. (2012). *Penal institutions religious services directory*. https://dinhizmetleri.diyanet.gov.tr/Documents/Ceza%20%C4%B0nfaz%20Kurumlar%C4%B1%20Din%20Hizmetleri%20Rehberi.pdf

The Directorate of Religious Affairs, Strategy Development Directorate. (2020). *Statistics. Number of personnel according to statistical regional units classification and staff (mufti's office).* https://stratejigelistirme.diyanet.gov.tr/sayfa/57/istatistikler

The Grand National Assembly of Turkey, Human Rights Commission, Human Rights Investigation Commission Journal. (2019). *Second meeting. Period 27, legislative year 3, November 14, 2019.*

https://www.tbmm.gov.tr/develop/owa/komisyon_tutanaklari.goruntule?pTutanakId=2338

The Grand National Assembly of Turkey, Human Rights Commission, Human Rights Investigation Commission Journal. (2018). *Second meeting. Period 27, legislative year 2, November 14, 2018.* https://www.tbmm.gov.tr/develop/owa/komisyon_tutanaklari.goruntule?pTutanakId=2216

The Official Gazette [Resmi Gazete]. (1983). *Ceza infaz kurumları ile tutukevleri kütüphane ve kitaplık yönetmeliği.* https://www.tbmm.gov.tr/komisyon/insanhaklari/belge/um_cezakutuphane.pdf

The Official Gazette [Resmi Gazete]. (1941). *16 Ağustos 1941 tarihli 4888 sayılı, 16328 no'lu kararname. Ceza ve Tevkif Evleri Nizamnamesi.* https://www.resmigazete.gov.tr/arsiv/4888.pdf

TurkStat. (2020). *Prison statistics, 2019. [Ceza infaz kurumu istatistikleri, 2019].* https://tuikweb.tuik.gov.tr/PreHaberBultenleri.do?id=33625

UNESCO Institute for Lifelong Learning (UIL). (2020). *How cities are utilizing the power of non-formal and informal learning to respond to the COVID-19 crisis.* https://www.voced.edu.au/content/ngv:88094

Üney, R., & Erim, B. R. (2019). The effects of regular physical exercise on violent behavior, coping with stress and self-confidence in male prisoners of a closed prison. *Anatolian Journal of Psychiatry*, 20(6).

Vaiciulis, V., Kavaliauskas, S., Radisauskas, R. (2011). Inmates' physical activity as part of the health ecology. *Central European Journal of Medicine*, 6, 679-684.

Vasylenko, O. V. (2020). The impact of religious education on prisoners. *International Journal of Education and Science*. Vol. 3, No. 2, 2020

Williams, B., Ahalt, C., Cloud, D., Augustine, D., Rorvig, L., Sears, D., & Walter, L. C. (2020). Correctional facilities in the shadow of COVID-19: Unique challenges and proposed solutions. *Health Aff*, 10.

Yıldırım, A., & Şimşek, H. (2016). *Sosyal bilimlerde nitel araştırma yöntemleri [Qualitative research methods in the social sciences].* 10th edition, Seçkin Publishing, 243.

BUEFAD | 2021, Volume 10, Issue 3, 652-662
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.938201

Freshman Students' Motivated Behavior Indicators in EAP Courses

İlknur KAZAZ[a*]

a* Karadeniz Technical University, (0000-0002-4051-3412) * ilknurkazaz@ktu.edu.tr

Research Article	Received: **17.05.2021**	Revised: **12.09.2021**	Accepted: **12.09.2021**

Abstract

Attendance, L2 motivation, and language learning achievement indicators were pursued in an EAP course at a Civil Engineering Department for freshman students. Quantitative methodology via motivated behavior scale, first midterm grades and attendance was employed. The survey instrument was translated into Turkish, and both translation and back translation procedures were conducted to ensure the content validity of the instruments. The study was conducted at a state university in the North of Turkey, with 45 participants. These participants were 1st year students between the ages of 18 and 22. All of the participants -at the time of data collection- were A1 level students, as measured according to descriptors proposed in the Common European Framework of Reference for Languages (Council of Europe, 2001). The quantitative data were analyzed through SPSS Statistics. Parametric tests were employed as the data showed a normal distribution. Both descriptive statistics and inferential analysis including Independent Samples T-test, One-way ANOVA, Pearson Correlation were applied and conclusions were drawn. The results demonstrated that the freshman learners in the educational context had medium level L2 learning motivation. Female students were a little more successful in their language achievement compared to male students. While motivation had a big impact on language learning achievement and was central in the interplay between the variables, absence had no effect at all. The higher was the motivation, the higher were the grades. This study concludes that achievement is stimulated by motivation.

Keywords: L2 motivation, language learning achievement, EAP

Birinci Sınıf Öğrencilerinin Akademik Amaçlı İngilizce Derslerinde Motive Davranış Göstergeleri

Öz

Devam, L2 motivasyonu ve dil öğrenme başarı göstergeleri, İnşaat Mühendisliği Bölümünde birinci sınıf öğrencilerine yönelik bir akademik amaçlı İngilizce dersinde takip edildi. Motivasyonlu davranış ölçeği, birinci ara sınav notları ve devam için nicel metodoloji kullanılmıştır. Anket aracı Türkçeye çevrildi ve araçların içerik geçerliliğini sağlamak için hem çeviri hem de geri çeviri işlemleri yapıldı. Çalışma, 45 katılımcı ile Türkiye'nin Kuzeyindeki bir devlet üniversitesinde gerçekleştirildi. Bu katılımcılar, 18-22 yaşları arasındaki 1. sınıf öğrencileriydi. Tüm katılımcılar - veri toplama sırasında - Ortak Avrupa Dil Referans Çerçevesi'nde (Avrupa Konseyi, 2001) önerilen tanımlayıcılara göre ölçülen A1 düzeyinde öğrencilerdi. Nicel veriler SPSS ile analiz edildi. Veriler normal dağılım gösterdiğinden parametrik testler kullanıldı. Bağımsız Örnekler T-testi, Tek Yönlü ANOVA, Pearson Korelasyonunu içeren hem tanımlayıcı istatistikler hem de çıkarımsal analizler uygulanmış ve sonuça varılmıştır. Sonuçlar, eğitim bağlamında birinci sınıf öğrencilerinin orta düzeyde L2 öğrenme motivasyonuna sahip olduğunu göstermiştir. Kız öğrenciler, erkek öğrencilere göre dil başarılarında biraz daha başarılı olmuştur. Motivasyon, dil öğrenme başarısı üzerinde büyük bir etkiye sahipken ve değişkenler arasındaki etkileşimin merkezinde yer alırken, devamsızlığın hiçbir etkisi olmamıştır. Motivasyon ne kadar yüksekse, notlar da o kadar yüksek olmuştur. Bu çalışma, başarının motivasyon tarafından teşvik edildiği sonucuna varmaktadır.

Anahtar kelimeler: dil öğrenme motivasyonu, dil öğrenme başarısı, akademik amaçlı ingilizce

To cite this article in APA Style:

Kazaz, İ.(2021). Freshman students' motivated behavior indicators in eap courses. *Bartın University Journal of Faculty of Education, 10*(3), 652-662. https://doi.org/10.1016/buefad.938201

1 | Introduction

Several studies have investigated the relationship between attendance and grades or motivation and grades. In the scant quantitative literature that surround educational issues of attendance and achievement, the results are mixed. Many studies were conducted which support the positive relationship between L2 motivation and achievement (Dörnyei et al., 2015; Skehan & Dörnyei, 2003; Engin, 2009). In Dörnyei and Ryan (2015) study it was seen that motivation gave the learners an initial drive at the beginning of learning process and sustained this energy and power later on. Weak motivation is therefore a reason for failure. Lamdin (1996) relied on aggregate data to show that student attendance had a positive and significant relationship with academic performance. Silvestri (2003) did a correlation study between the number of absences and course grades and found a weak negative correlation with students who missed a few courses and strong negative correlation with students who missed four or more courses. The relationship between language learning achievement and L2 motivation has also gained a lot of attention over the last decade. Al-Shehri (2009), in one of his seminal studies, investigated the interaction of visual learning style, vision, ideal L2 self and motivated learning behavior in 200 Saudi EFL learners. He hypothesized that learners with visual preferences were better at creating a vivid vision of their ideal L2 self than the learners with less visual capabilities. The results of the study have proven his hypothesis and revealed strong relationship among visual learning style, creation of a vivid vision of the ideal L2 self and motivated learning behavior. Dörnyei and Chan (2013) also made an investigation on 172 eight-grader learners of English and Mandarin in Hong Kong. The results suggested a positive correlation between future L2 self-guides, vision, visual and auditory styles, motivated behavior and L2 achievement. The last study performed by Kim and Kim (2014) included 2682 Korean EFL students and justified the relation among perceptual styles, future self-guides, imagery, motivated behavior and achievement. This study confirmed that there was a positive relation between visual and auditory learning styles and L2 motivation except kinesthetic learning. Visual learning had the most significant effect on language learning success, while ideal L2 self and L2 motivation were the intervening variables. When the relationship between imagery, ideal L2 self, L2 motivation, and visual and auditory learning styles are considered some researchers have also suggested that that the brain area which is responsible for creating imagery is similar to the visual area (Kosslyn, Cacioppo, and Davidson, 2002; Modell, 2003). Therefore learners with visual preferences may be more successful in creating and visualizing their ideal L2 self.

Research questions

1. What's is the participants' level of motivation?
2. Is there a relationship between participants' gender and level of achievement?
3. How does motivation and absence from the lessons effect language learning achievement?
4. To what extent is motivation related to achievement?

2 | Method

Method section may include research design, the study group or participants of the study, data collection tools, data analysis. This section involves the methodological procedures followed in this study. It starts with a theoretical framework section on quantitative studies, especially survey studies. Then, the study will be depicted in details. The setting where the data were collected will be described, an elaborate section on the participants will be presented, and the instruments used in the study will be reported. Next, they will be followed by a detailed section on data collection procedures and finally data analysis procedures will be covered.

Research Design

In this study, quantitative research design has been adopted. Muijs (2004) states that contrary to the qualitative research, quantitative design uses numbers to explain the phenomenon under investigation. Quantitative perspective is based on realism or positivism which describes reality as standing "out there" independent from the individual people (2004, p. 4). Therefore, the researcher should have an etic perspective not an emic one and view the issue as an outsider in order not to ruin its nature and should use appropriate instruments serving that purpose. Muijs further (2004) suggests that "a well-designed quantitative study will allow us not just to look at what happens, but to provide an explanation of why it happens as well. The key lies in your research design and what variables you collect." (p. 10).

Depending on the statements above, it can be easily argued that quantitative design is very practical in many areas and can find correct answers to research questions as long as it is well-designed.

Survey Studies

In this study, the researcher has adopted a survey research. Creswell (2014) emphasizes the numeric and highly generalizable nature of survey studies since they can describe and explain many topics such as ideas or attitudes of the participants. They are painless to conduct with large numbers of randomly assigned participants as well. Many researchers in the area has underlined that motivation is not a construct that can be ensured via observation (Dörnyei, 2005). Dörnyei et al. (2016) emphasize its unstable nature since it displays continuous ebbs and flows; with a wide range of circumstances and events having the potential to substantially impact their motivation in varying positive and negative ways. That's why it has to be assessed out of a scale. They are also much more effective in terms of time and money in reaching the large sample. Another advantage of questionnaires is the use of standardized questions which hinder the misinterpretations by the researchers.

Study

This study aims to investigate the interaction among motivated behavior, attendance and L2 academic achievement of freshman level language learners in Turkish context. Although these subjects have been formerly studied in some countries, the absence of research in the Turkish EFL context has been the very reason for starting out this research. It is evident that these variables are highly context-bound and can be easily affected by the infrastructure of the country. So, a distinctive relations network is expected to come to the fore.

Setting

The study was conducted at a state university Civil Engineering Department. The students take compulsory English course at their first academic year in two terms entitled as YDB 1001 and YDB 1002. The aim of this course is to teach English for general purposes and develop grammatical literacy in one-year intensive education. The students have 3 hours of contact-hour per week. Classes are between 13:00 and 16:00 on Fridays. The language curriculum applied is based on Focus on Form (FonF) which is an approach to language education in which learners are made aware of the grammatical form of language features. *Live English Grammar* graded series grammar book Beginners level from MM Publications is used for one academic year long. Throughout the semester, the students have one midterm and one final exam as assessment tools.

Participants

The participants from Civil Engineering Department consisted of 45 adult learners of English as a foreign language. Among them, 32 students are males and 13 students are female. All of the participants have gone through very similar English instruction until university, following the Ministry of Education's primary, secondary and high school curricula. They started learning English in elementary school from the 4th grade onward and still continue learning. They are A1 level according to CEFR. The participants' ages ranged from 18 to 22. At the end of the language instruction they get this year their level will be B1, and when they get a minimum of 50 out of 100 as a composite score of the term, they will pass the course.

Instrumentation

For the current study, data were collected using a 18-item survey instrument in Likert Scale Format. (see Appendix B). To measure the motivated behavior and effort of the learners, a questionnaire from Al-Shehri (2009), which was developed with cooperation of Al-Shehri and Dörnyei was used. The Cronbach's alpha value of this motivated behavior scale was reported by Al-Shehri (2009) to be $\alpha = .89$. It is clear that the instrument has a high level of reliability, and therefore has been used by the researchers many times (e.g., Kim & Kim, 2011; Kim, 2012; Kim & Ma, 2013).

For the motivated behaviour scale of that 18-item instrument, a 5 point Likert scale ranging from "never" to "all the time" was used. Academic achievement score (Midterm Grades) in the English course was the second most significant variable of this study and it referred to how much attainment learners got to reach the objectives of their English courses in the first half of the school term. It was a 20 item and 100 points multiple choice test measuring the grammar topics until 9th week (see appendix A for the test and answer key). L2 academic achievement of the respondents from Civil Engineering department was assessed based on the answer key. The third instrument used in this study is the attendance of the students. The students had 27 hours English course (9 weeks) until the midterm; three hours per week. The students were asked to sign up the role-call when they attended the courses. The absence of the students were calculated out of those attendance lists.

Translation and Back-translation Procedures

Considering the low proficiency levels of the participants, the instrument used needed to be translated into Turkish. A translated version of the motivated behavior scale was taken from the Master's thesis of a colleague (Demir, 2016). As stated in the thesis, to make sure there was no meaning difference or loss between the original and translated versions of the questionnaires, translation and back-translation procedures were performed and during that process some professional English majors were asked to assist. First, the researcher translated the instruments into Turkish and then asked five M.A or PhD level colleagues to grade the consistency between the original and translated versions of the instruments. She also asked for feedback from these colleagues regarding how problematic statements would be translated more clearly. Then, she made some corrections based on the reactions of her colleagues and she asked for another colleague with the same qualifications stated above to translate the Turkish version back to English. After creating a back-translated English version of the instruments, two native speakers of English were asked to rate the synonymy between the original and back-translated questionnaires, and 95.2% synonymy between them was achieved.

Data collection

In both classes, the researcher was available during the survey application; so that would have an opportunity to clarify the points that may be confusing to the respondents and observe the situation under which the respondents fill in the questionnaire. Finally, achievement scores and attendance of the participants were obtained from the other colleague at the end of the academic term.

Data Analysis

Rationale for the Use of Parametric Tests

To determine whether parametric or non-parametric tests would be more appropriate to analyze the available data, a test of normality was conducted, administering Kolmogorov-Smirnov test and Shapiro-Wilk, Histogram and Q-Q plot.

According to the Kolmogorov-Smirnov test, abscence variable in the study had values which were statistically significant ($p < .05$), specifying that these tests produced a non-normal distribution. Furthermore, Shapiro-Wilk test also revealed that tests were not normally distributed ($p < .05$) as they had statistically significant scores. Review of the Kolmogorov-Smirnova (KS = .215, df = 45, p = .000) and Shapiro-Wilk (SW = .875, df = 45, p = .000) tests showed violation of normal distribution The results can be viewed in Table 1.

Table 1. Test of Normality

	Sig	df	Men	Trimmed Mean	Std. Deviation	Md	Std. Error
Kolmogorov-Smirnova	.000	45	3.80	3.72	2.74	3.00	.409
Shapiro-Wilk	.000						

An overview of the QQ Plot results (Figure 1) indicates that the data in this study had a normal distribution. Figure 1 shows a nearly perfect straight line of scores suggesting that the data of absence seems to be normally distributed.

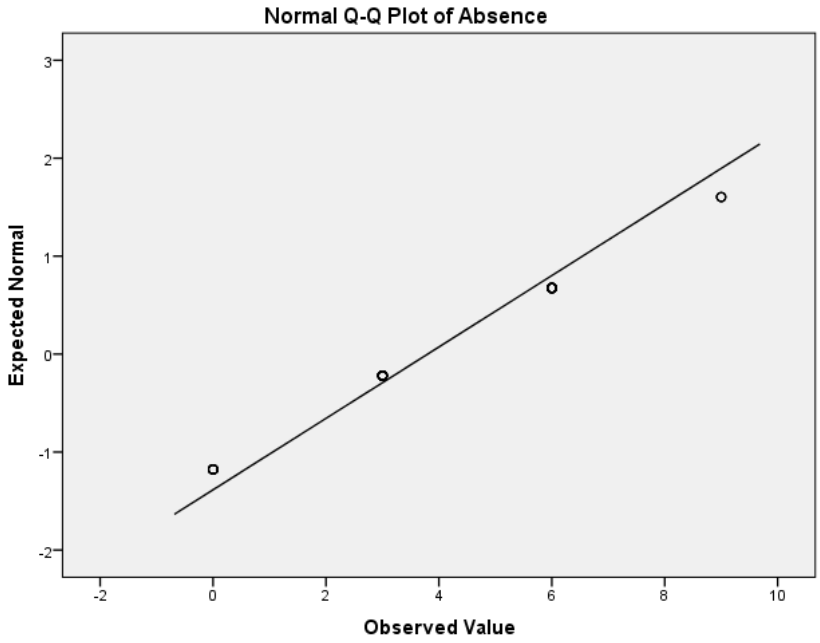


Figure 1. Normal probability plots of absence test

Since the current research study had a small sample group, there was a need to examine these figures with Histogram as well to be sure of the distribution.

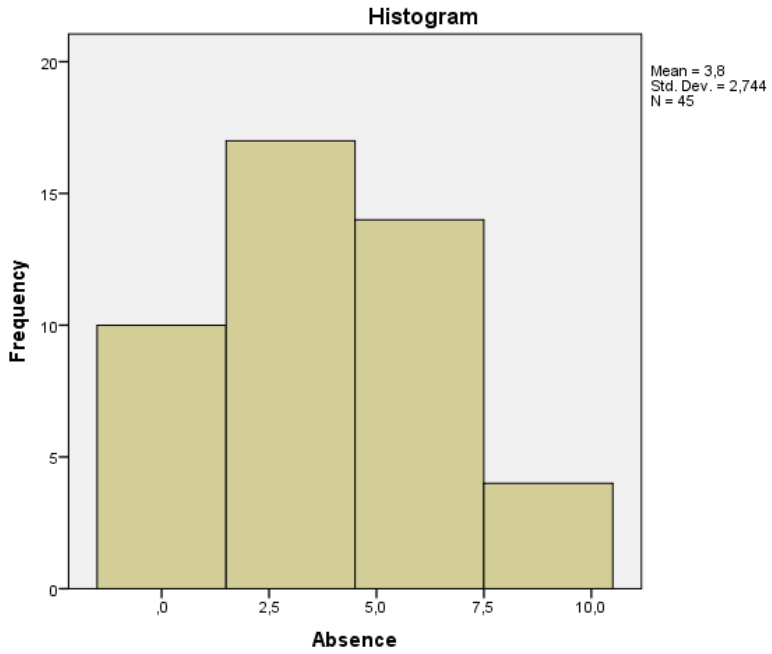


Figure 2. Histogram of absence test

The initial investigation of the analysis appeared to show a non-normally distributed data. However, Pallant (2010) states that this is a commonly observed situation and the real form of the distribution can be viewed in histograms or normal probability plots (Q-Q plots). She also suggests that "If you have the 'right' sort of data, it is always better to use a parametric technique if you can." (p. 213). Although the Kolmogorov-Smirnov and Shapiro-Wilk tests revealed numerical results of non-normal distribution, the visuals of normality tests (Q-Q plots and Histogram) displayed normal distribution with reasonably straight lines. Therefore, the researcher preferred to use parametric tests rather than non-parametric ones based on the normal probability plots presented in the figures above.

3.2. Tests Employed

Data was analyzed quantitatively, and both descriptive and inferential statistical procedures were applied using SPSS Statistics 20.0. Both the normal distribution of the data and the interval level scaling of it comply with the assumptions of parametric techniques (Pallant, 2010), and therefore parametric tests were preferred in this study. For the first research question, descriptive statistics was applied and mean values of motivated behavior scale was calculated. The second research question regarding gender effect on achievement was analyzed via Independent Samples T-test. The third research question was analyzed via one-way ANOVA. One-way ANOVA is used to compare the mean values of the same group on more than two different situations (Pallant, 2010). That research question was concerned with the impact of motivation on absence and language learning achievement. For the fourth research question, Pearson product-moment correlation coefficient which "…is used when you want to explore the strength of the relationship between two continuous variables." (Pallant, 2010, p. 103) was performed. The relationship among the variables of L2 motivation, and L2 learning achievement was explored through that analysis model.

RESEARCH ETHICS

Before starting the data collection process, the researcher applied for the permission of the Civil Engineering Department Administration. She visited both classes within the knowledge of the school administration and the teacher of the courses, and first, she briefly informed the students about this study. They were told that this questionnaire would be used only for the purposes of that research study, it would not be shared by any other people or institutions and it would not have any negative effect on their grades. After making sure that

the learners were comfortable with participating and confirmed their participation, the researcher conducted the questionnaires.

3 | FINDINGS

In this section, the researcher will present the results of the analyses following the order of the research questions. Firstly, the research questions will be restated. Then, the findings for each research question will be presented describing the statistics regarding each question. Lastly, the chapter will be concluded with a summary section.

Participants' levels of motivation

Research question 1: What is the participants' level of motivation?

Descriptive statistics showed that the participants appeared to have a medium level of motivation with the mean value (mean = 2.87, SD = .87) indicating that they are reasonably enough motivated.

Table 2. Descriptive Statistics: Level of L2 Motivation

	N	Men	Std. Dev.	Md	Min	Max
Motivated Behavior	45	2.87	.87	2.83	1.00	5.00

Relationship between Gender and L2 achievement

Research question 2: Is there a relationship between participants' gender and language learning achievement?

An independent-samples t-test was performed to compare language learning achievement of males and females. There was a significant difference in scores for males (M = 67.50, SD = 17.46) and females (M = 73.08, SD = 13.31); t(45) = -1.033, p = .307 (two tailed) with moderate (d = 0.35) effect size (Cohen, 1988).

Table 3. Gender difference in language learning achievement

	Gender	N	Men	SD	Mean Difference	t value	df	Sig.
Midterm Grade	Male	32	67.50	17.46	-5.577	1.033	43	.307
	Female	13	73.08	13.31				

Impact of motivation and attendance on language learning achievement

Research question 3: How does motivation and absence from the lessons effect the language learning achievement?

To see the impact of motivation and attendance on language learning achievement and see whether they are significantly different from each other, one-way ANOVA was employed. As seen in Table 4 One-way

ANOVA revealed no significant difference and between absence and language achievement attribution (F(13, 44)=.726, p=.725)

Table 4. Analysis of Variance on absence attribution according to the language learning achievement

Absence	Sum of Sq.	df	Mean Square	F	Sig
Between Group	77.235	13	5.948	.726	.725
Within Groups	253.87	31	8.190		
Total	331.20	44			

As seen in Table 5 One-way ANOVA revealed a significant difference between motivation and language achievement attribution (F(13, 44)=2.283, p=.030).

Table 5. Analysis of Variance on motivation attribution according to the language learning achievement

Motivation	Sum of Sq.	df	Mean Square	F	Sig
Between Group	16.40	14	1.262	2.283	.030
Within Groups	17.13		.553		
Total	33.53				

Based on the guidelines offered by Cohen (1988), the results of this study present a large effect size, partial eta squared = .48 (>.14) in motivation and achievement relationship.

The relationship between the variables motivation and achievement

Research question 4: Is motivation related to language learning achievement?

Table 6. Pearson Product-Moment Correlations Between Motivation and Achievement

	Achievement	Motivation
1. Achievement	1	
2. Motivation	.523	1

A Pearson product-moment correlation coefficient was computed to assess the relationship between language learning achievement and motivation. As the results in Table 6 show the variables investigated in this study were correlated strongly and statistically significant. Having explored the correlations between L2 learning achievement and the other independent variable motivated behavior, it can be clearly said that there was a positive and statistically significant correlation between language learning achievement and L2 motivation ($r = .523$, $p < .01$).

4 | Discussion & Conclusion

Level of Motivation

The L2 motivation of the participants which have been revealed to be at medium level is considerably in line with the previous research studies. In line with the situation in Turkey, Engin (2009) indicates that the majority of the learners in the Turkish context have both instrumental motivations to learn L2, such as finding a well-paid and high status job together with integrative orientation such as communicating with native speakers, listening to Anglophone music or understanding Anglophone films. He argues that the enthusiasm of these learners to achieve L2 learning couples with the effort to reach their individual goals. Hence, there is a positive relationship between integrative motivation and L2 achievement. The results of this study is similar to Engin's (2009) study. Considering that the participants of this particular study were freshman level learners, it is quite reasonable that L2 learning is a substantial and indispensable part of their life especially as a requisite for their future profession. They will have to use English when they a lot throughout their career. Since they have completed the transformations of the adolescence and created their selves as mature individuals, they are at a developmental stage to make much more stable and realistic decisions about themselves and create their own wishes (Carlson, 1965). Therefore, it may be suggested that ages and developmental levels of the learners may have affected their high ideal L2 self. The findings also ascertained that motivation level of the participants' which is reasonably high is likely to have been affected by the norms of Turkish culture and educational context. In Turkey L2 learning is seen as an obligation in order to have a good academic career or job, a satisfactory salary, and a privileged status in the society. Therefore, it can be asserted that the adult learners in the country are quite aware of these obligations and needs, and language learning holds a substantial place in their life.

Gender Effect on Language Achievement

From the biological viewpoint, females and males differ from each other in terms of cognitive ability and learning style. These differences derive mainly from physiological differences, such as differences in the development of brain, and higher-level cortical functions. Males and females don't have similar patterns of lateralization, males are more left-hemisphere dominant compared to females (Banich, 1997, p. 306-312.) Although gender differences follow essentially stereotypical patterns on achievement tests in which boys typically score higher on math and science, females have the advantage on school grades regardless of the material (Voyer & Voyer, 2014). School marks reflect learning in the larger social context of the classroom and require effort and persistence over long periods of time, whereas standardized tests assess basic or specialized academic abilities and aptitudes at one point in time without social influences. Most studies show that, on average, girls do better in school than boys. The theorists of Second Language Acquisition assert that female learners demonstrate superiority in their second language learning process (Boyle, 1987; Ehrlich, 2001). Girls get higher grades and complete school at a higher rate compared to boys (Jacob, 2002). The findings of this study is therefore congruent with the literature in terms of gender effect.

Effect of Motivation on Language Learning Achievement

Many studies were conducted so far supporting the positive relationship between L2 motivation and language learning achievement (e.g. Dörnyei & Kubanyiova, 2014; Dörnyei and Ryan, 2015; Skehan & Dörnyei, 2003), and the current study also adds to that already considerable amount of literature with the same conclusion. This study revealed that L2 motivation and language learning achievement are largely related to each other and L2 motivation is a very strong predictor of language learning achievement. Concerning these findings, Dörnyei and Ryan (2015) suggest that L2 motivation gives the learner the initial impetus to start the learning behavior as well as the power to sustain the effort until accomplishing the final goal of learning. Huitt (2001) suggests that the importance and necessity of language should be demonstrated to learners to help them improve their motivation in case of inadequate intrinsic motivation.

Suggestions for Further Research

As the number of the participants increase, the reliability and generalizability of the study increases. So, the aforementioned study could be replicated with a larger sample size. In order to gain a more in-depth understanding, other constructs could be added.

Summary of the Study

This study was performed to examine the relationships among attendance, L2 motivation and language learning achievement of freshman level EFL learners at a state university. Besides revealing the interactions among these concepts, it also targeted finding out the predictors of L2 learning achievement and L2 motivation. Bryman (2012, p. 35) defines quantitative research as a strategy that emphasizes quantification in the collection and analysis of data and denotes amounting something, which in this study is amounting motivation level and L2 relationship. The results obtained could help the L2 educators to plan and structure their classes with more awareness of the issues investigated in this study. These investigations were also attempted to shed light on the advancements in the foreign language education field in Turkish context by providing new information that would be helpful and effective for L2 instructors, curriculum and material developers, and teacher trainers.

This research study was conducted in a quantitative design using scales as data collection tools. It was carried out with 45 freshman level EFL learners at a state university. Motivated Behavior and Effort Scale by Al-Shehri (2009) was used as an instrument of this study. 5 point Likert scale was used. Language learning achievement of the participants was measured using the composite scores of the term, and data was analyzed via SPSS Statistics V24.

Main findings of the study are presented below:

1. The participants had reasonably high level of motivation.
2. They were mainly present in the classes, therefore absence didn't have any impact on language learning achievement.
3. Female students scored higher compare to male students.
4. Motivation was a significant predictor of success in the participants' language learning.

Statements of publication ethics

You may specify the details of your approval of ethics committee here (date, document number etc.).

Researchers' contribution rate

Please specify the contribution rate of each article in the manuscript.

Conflict of interest

Please specify if this study has any conflict of interest.

References

Al-Shehri, A. S. (2009). Motivation and vision: the relation between the ideal L2 self, imagination and visual style. In Z. Dörnyei & E. Ushioda (Eds.), *Motivation, language identity and the L2 self* (pp. 164-171). MPG Books Ltd.

Banich MT. 1997. Breakdown of executive function and goal-directed behavior. In M.T. Banich (Eds.), *Neuropsychology: the neural bases of mental function* (pp. 369-390). Houghton Mifflin Company

Boyle JP. 1987. Sex differences in listening vocabulary. *Language Learning,* 37(2), 273-284.

Bryman, A. (2012). *Social research methods* (4th ed.) Oxford University Press.

Carlson, R. (1965). Stability and change in the adolescent's self-image. *Child Development, 36,* 659–666.

Council of Europe. (2001). *Common European framework of reference for languages: learning, teaching, assessment*. Cambridge University Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Earlbaum Associates.

Creswell, J. (2014). W. (2009). *Research design: qualitative, quantitative, and mixed methods approaches.* Sage Publications Ltd.

Demir, A. (2016). *The relationship between foreign language learners' future second language (L2) self-guides, language learning motivation and achievement.* A Master's Thesis

Demir-Ayaz, A., & Erten, İ.H. (2017). The relationship between EFL learners' future L2 self-guides, vision and language learning motivation. In Şehnaz Şahinkarakas and Jülide İnözü (Eds), The role of the self in language learning (pp. 7-24). Cambridge Scholars Publishing.

Dörnyei, Z., & Chan, L. (2013). Motivation and vision: an analysis of future L2 self-images, sensory styles, and imagery capacity across two target languages. *Language Learning, 63*(3), 437-462.

Dörnyei, Z., Henry, A., & Muir, C. (2015). Motivational currents in language learning: Frameworks for focused interventions. Routledge.

Dörnyei, Z., & Kubanyiova, M. (2014). *Motivating learners, motivating teachers: Building vision in the language classroom*. Cambridge University Press.

Dörnyei, Z., & Ryan,S.(2015). *The psychology of the language learner revisited.* Routledge.

Ehrlich S. 2001. *Representing rape: language and sexual consent*. Routledge.

Engin, A. O. (2009). Second language learning success and motivation. *Social Behavior and Personality 37*(8), 1035–1042.

Griffiths, C., & Özgür, B. (2013). Second language motivation. *Procedia – Social and Behavioral Sciences*, 70, 1109–1114.

Huitt, W. (2001). Motivation to learn: an overview. *Educational Psychology Interactive.* Valdosta State University. Retrieved http://chiron.valdosta.edu/whuitt/col/motivation/motivate.html

Jacob, B. A. (2002). Where the boys aren't: Non-cognitive Skills, returns to school and the gender gap in higher education. *Economics of Education Review*, 21, 589–598.

Kim, K.-J. (2012). The structural relationship between demotivational factors and English achievement for high school students. *English Language & Literature Teaching*, 18(4), 71-92.

Kim, Y., & Ma, J.-H. (2013). What makes Korean high school students demotivated in learning English? English21, 26(3), 297-318.

Kim, T. Y., & Kim, Y. K. (2014). A structural model for perceptual learning styles, the ideal L2 self, motivated behavior, and English proficiency. *System,46,* 14-27.

Kosslyn, S. M., Cacioppo, J. T., Davidson, R. J., Hugdahl, K., Lovallo, W. R., Spiegel, D. & Rose, R. (2002). Bridging psychology and biology: The analysis of individuals in groups. *American Psychologist, 57*(5), 341-351.

Lamdin, D. J. (1996). Evidence of student attendance as an independent variable in education production functions. *Journal of Educational Research,* 89, 155–162.

Modell, A. H. (*2003*). *Imagination and the Meaningful Brain*. MIT Press.

Muijs, D. (2004). *Doing quantitative research in education with SPSS.* Sage Publications Ltd.

Pallant, J. (2010). *A step by step guide to data analysis using the SPSS program. SPSS survival manual 4th ed.* Allen and Unwin Books.

Silvestri, L 2003 The effect of attendance on undergraduate methods course grades, *Education*, 123(3), 483-486.

Voyer, D., & Voyer, S. D. (2014). Gender differences in scholastic achievement: a meta-analysis. *Psychological Bulletin,* 140, 1174-1204.

BUEFAD | 2021, Volume 10, Issue 3, 663-680
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.983795

The Development of the Self-Efficacy Form for School Administrators' Use of Information and Communication Technologies in Education

Uğur Ferhat ERMİŞ[a*] & Demet Hatice SOMUNCUOĞLU ÖZERBAŞ[b]

a Amasya University, (0000-0003-4862-3592), uf.ermis@amasya.edu.tr

b*Gazi University, (0000-0002-2050-1182), demets@gazi.edu.tr

Research Article	Received: **17.08.2021**	Revised: **14.09.2021**	Accepted: **23.09.2021**

Abstract

The purpose of this study was to develop an up-to-date, valid and reliable instrument to measure school administrators' self-efficacy for the use of information and communication technologies in education. To achieve this, we formed a pool of items based on the technology standards for education leaders issued by ISTE in 2018. The items in the pool were examined by field experts and then some items were revised. Further, we have added some new items. We recruited a total of 162 school administrators for exploratory factor analysis, whereas a total of 167 participants took part in the confirmatory factor analysis. Based on the exploratory and confirmatory factor analyses, we have developed the Self-Efficacy for Use of Information and Communication Technologies in Education - School Administrator Form, which includes such scales as "Equity and Citizenship Advocate (7 items", "Visionary Planner (4 items)", "Empowering Leader (5 items)", "Systems Designer (5 items)" and "Connected Learner (8 items)". We performed the Cronbach's Alpha internal consistency coefficients, item discrimination indexes in the lower and upper groups and the item total correlations to reliability levels of the scales. We have concluded that the instruments are valid and reliable data collections tools.

Keywords: Information and communication technologies, self-efficacy, technology standards in education, school administrators.

Okul Yöneticilerinin Eğitimde Bilgi ve İletişim Teknolojileri Kullanımına Yönelik Öz-Yeterlik Formunun Geliştirilmesi

Öz

Bu araştırmanın amacı okul yöneticilerinin eğitimde bilgi ve iletişim teknolojileri öz yeterliklerini belirlemeye yönelik güncel, geçerli ve güvenilir bir ölçme aracı geliştirmektir. Öncelikle, ISTE'nin 2018 yılında eğitim liderleri için belirlemiş olduğu standartlarda yer alan başlıklar baz alınarak madde havuzu oluşturulmuştur. Maddeler alan uzmanlarının görüşlerine sunulmuş ve uzmanların dönütleri doğrultusunda bazı maddeler revize edilmiş ve madde havuzuna yeni maddeler eklenmiştir. Açımlayıcı Faktör Analizi için 162 , Doğrulayıcı Faktör Analizi ve güvenilirlik analizleri için 167 okul yöneticisinden veri toplanmıştır. Açımlayıcı ve Doğrulayıcı Faktör Analizleri sonunda "Eşitliği ve Vatandaşlığı Koruma (7 madde)", "Vizyoner Planlayıcı (4 madde) ", "Güçlendirici Lider (5 madde)", "Sistem Tasarımcısı (5 madde)" ve "Bağlantılı Öğrenen (8 madde)" ölçeklerinden Eğitimde Bilgi ve İletişim Teknolojileri Kullanımı Öz Yeterlikleri - Okul Yöneticisi Formu'nun son haline ulaşıldı. Formda yer alan ölçeklerin güvenilirlik düzeylerini belirlemek amacıyla Cronbach's Alpha iç tutarlılık katsayısı, alt ve üst gruplardaki madde ayırt edicilik indeksleri ve madde toplam korelasyonu analizleri gerçekleştirildi. Analizlerden elde edilen bulgular formda yer alan ölçeklerin geçerli ve güvenilir olduklarını gösterdi.

Anahtar kelimeler: Bilgi ve iletişim teknolojileri, öz yeterlik, eğitimde teknoloji standartları, okul yöneticileri .

1 | Introduction

Technological developments have led to considerable changes and transformations in almost every sphere of the society. Technology first affects individuals and then transforms virtually all fields in which people are central. Today's young individuals, considered as digital natives by Prensky (2001), have different learning and thinking styles when compared with those older ones (Bilgiç, Duman, & Seferoğlu, 2011; Lei,

2009; Prensky, 2004). Digital natives are comfortable with high level of technology use, are able to adapt themselves when encountering a new technology, spend much time using technological devices, can use multiple devices at once, have frequent interactions in the digital world, and do detailed searches for topics in which they are interested (Günther, 2007; Helsper & Eynon, 2010; Muchsini & Siswandari, 2018; Prensky, 2001). Developments in technology and transformations in learning styles have led to changes in instructional methods and techniques and curriculums. For the effectiveness of technology use to boost learning quality, such stakeholders as students, teachers, and school administrators must have the necessary skills for technology use in education.

One of the most important tasks of a school principal is to guide the future vision of the school organization and to manage human resources as well as other resources to achieve it (Çelik, 2000; Turan, 2002). The changes and transformations in education are achieved based on the visions and abilities of school administrators. Technology use has deeply penetrate into in almost every sphere of education. Accordingly, school administrators are expected to lead the use of technology in managerial and instructional processes (Afshari, Bakar, Luan, Samah, & Fooi, 2009). One of the roles of school administrators who are the pioneers of innovations and transformation is the role of technology leadership (Anderson & Dexter, 2005). The deficiencies in technological leadership skills of school administrators decelerate technology integration in schools, whereas those with higher levels of technological leadership skills accelerate the use of technology in education (Flanagan & Jacobsen, 2003; Hacıfazlıoğlu, Karadeniz, & Dalgıç, 2011)

The role of technology leadership is a school administrator role that encompasses planning and implementing the activities related to technology use (Hamzah, Juraime, & Mansor, 2016). Technology leadership roles of school administrators are of utmost importance for teachers and students to keep up with the latest developments in teaching and learning. In the absence of technology leadership in schools, all types of teaching and learning activities may be in jeopardy (Anderson & Dexter, 2005).

Past studies revealing the positive effect of technology use in education have highlighted the necessity of determining the standards of technology use in education and defining the competencies in technology-related skills by stakeholders in education. For this purpose, researchers in educational sciences (Anderson & Dexter, 2005; Kearsley, 1994) and international organizations (ISTE, 2002, 2009, 2018) have carried out studies on the standards and the competencies for teachers and school administrators to teach and to lead in the digital age.

International Society for Technology in Education (ISTE) is a nonprofit organization that serves educators and school administrators in the use of information and computer technologies (ICT) in education. ISTE has been established to promote innovations in learning processes in the United States of America and to encourage the use of technology for the problems arising in education. Not only does ISTE determine technology standards for school administrators and teacher, but it also has technology standards for students, coaches, and computer science educators. This is important for a comprehensive technology integration (Şişman Eren & Kurt, 2011).

The first focus of ISTE on the educational technology standards for administrators dates back to 2002. The International Society for Technology in Education adopted standards for school administrators in six dimensions with a total of thirty-one performance indicators such as “Leadership and Vision”, “Learning and Teaching”, “Productivity and Professional Practice”, “Support, Management, and Operations”, “Assessment and Evaluation”, and “Social, Legal, and Ethical Issues” (ISTE, 2002). ISTE set the standards for school administrators’ technology competence, entitled “National Educational Technology Standards (NETS•A) and Performance Indicators for Administrators” in 2009 and determined the subdimensions as “Visionary Leadership”, “Digital-Age Learning Culture”, “Excellence in Professional Practice”, “Systematic Improvement” and “Digital Citizenship” (ISTE, 2009). ISTE, on the other hand, updated the technology standards for school administrators in 2018. The updated version of the technology standards, entitled “ISTE Standards for

Education Leaders", has five subdimensions such as "Equity and Citizenship Advocate", "Visionary Planner", "Empowering Leader", "Systems Designer" and "Connected Learner" (ISTE, 2018). It is seen that several performance indicators such as enabling students to have equal technological opportunities, collaborating with stakeholders to develop a strategy for technology integration and using technology for professional development have been added to the standards issued in 2018.

Previous literature has revealed that there have been several attempts to develop scales for school administrators' technology competences (Banoğlu, 2012; Cantürk, 2016; Hacıfazlıoğlu et al., 2011) and all of them were based on the ISTE Standards issued in 2002 and 2009. Further, the scales developed by Banoğlu (2012), Cantürk (2016) and Hacıfazlıoğlu et al., (2011) were employed in the studies on focusing on school administrators' technology competences (Akın-Mart & Tulunay-Ateş, 2021; Beytekin, 2014; Bülbül & Çuhadar, 2012; Çalık, Çoban, & Özdemir, 2019; Doğan, 2018; Görgülü, Küçükali, & Şükrü, 2013; Kör, Erbay, & Engin, 2016; Sisman Eren & Kurt, 2011; Ünal, Uzun, & Karataş, 2015; Yahşi, 2020; Yıldız, Tüysüz & Öztürk, 2021; Yorulmaz & Can, 2016). Considering the fact that technological developments have been accelerating at an unprecedented pace and new ones have been continuously taking place in the world, it can be noted that there needs an up-to-date scale for technology standards for school administrators. This present study is expected to fill this void by developing information and technology self-efficacy form for school administrators which draws on the ISTE Standards issued in 2018.

2 | METHOD

STUDY GROUP

We recruited two different study groups to carry out exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) for the developed instruments. We recruited school administrators working in public schools affiliated to the Ministry of National Education and located in the province of Amasya. We collected the data during the 2020-2021 academic year. We used Google Forms to obtain data as schools were closed due to the COVID-19 pandemic. A total of 162 school administrators responded in the first group in which EFA was performed, while there were 167 participants in the second group in which CFA was performed. Table 1 presents the information on demographic variables.

Table 1. Information on Demographic Variables of Participants

		First Study Group (EFA)		Second Study Group (CFA)	
		N	%	N	%
Gender	Female	18	11,1	17	10,2
	Male	144	88,9	150	89,8
	Total	162	100	167	100
Professional Experience	0-5 years	4	2,5	4	2,4
	6-10 years	7	4,3	16	9,6
	11-15 years	27	16,7	25	15,0
	16 years or more	124	76,5	122	73,1
	Total	162	100	4	2,4
Educational Level	Bachelor	114	70,4	139	83,2
	Postgraduate	47	29,0	27	16,2
	Doctorate	1	0,6	1	0,6
	Total	162	100	167	100
School Type	Nursery School	3	1,9	9	5,4
	Primary School	47	29,0	55	32,9

	Secondary School	50	30,9	49	29,3
	Vocational High School	47	29,0	40	24,0
	General High School	15	9,3	14	8,4
	Total	162	100	167	100

When the demographic characteristics of the participants in the first study group (EFA) are examined, it is seen that the majority of them are male (88,9%), those with 16 years or more of experience (76,5%) and those with undergraduate education (70,4%). 30,9% of them work in secondary school.

As shown in Table 1, 89,8% of second study group (CFA) are male. 73.1% of them have 16 years or more experience. In addition, 83.2% of the participants in the second study group received undergraduate education and 32,9% of them work in primary school.

Data Collection Instruments

In the standards published for educational leaders in 2018, ISTE has classified the competencies that education leaders should have under five main headings. In the current study, five scales were separately developed for these five main topics in order to determine the information and communication technologies self-efficacy of school administrators in education. Validity and reliability studies were separately carried out for each scale. The Self-Efficacy for the Use of Information and Communication Technologies in Education - School Administrator Form consists of these five scales.

The Self-Efficacy for the Use of Information and Communication Technologies in Education - School Administrator Form

This form consists of separate scales including “Equity and Citizenship Advocate”, “Visionary Planner”, “Empowering Leader”, “Systems Designer” and “Connected Learner”, which are the subdimensions of the ISTE Standards for Education Leaders issued in 2018. For each scale, we followed the scale development steps by DeVellis (2016). First, we identified the competencies we intended to measure and generated an item pool based on the related literature and the standards issued by ISTE (2018). There was an item pool including a total of thirty-three items (11 items in the Equity and Citizenship Advocate Scale, 4 items the Visionary Planner Scale, 5 items in the Empowering Leader Scale, 5 items in the Systems Designer Scale and 8 items in the Connected Learner Scale). Scales are structured as a 5-point Likert type scale.

The items were examined by six field experts. Based on the comments of the field experts, some items were revised. Further, we have added two items to the Equity and Citizenship Advocate Scale and one item to the Connected Learner scale. In the end, the Self-Efficacy for the Use of Information and Communication Technologies in Education - School Administrator Form had 36 items. Three school administrators were asked to examine the scale and the concepts which were difficult to understand were revised. Further, some explanations were added to the expressions considered to be difficult to understand for administrators.

In order to carry out validity and reliability studies, data were collected from 162 school administrators at the EFA stage and 167 at the CFA stage. Finally, the results of the analyzes performed for validity and reliability are reported.

Data Analysis

Before the analysis, the collected data were examined in terms of identifying and removing responses from participants who did not answer thoughtfully or who are straight liners. Accordingly, we removed 11 cases out of 173 while conducting the EFA, and 15 cases out of 182 during the CFA. To test whether the data were suitable for factor analysis, we conducted the Kaiser-Meyer-Olkin (KMO) test and Bartlett’s test of sphericity (Bryman & Cramer, 1999). To investigate the factorial structure of the Self-Efficacy for the Use of ICT in Education - School Administrator Form, we conducted exploratory factor analysis (Büyüköztürk, 2018). Further, we considered the item factor loads and item-total correlations during the validity studies.

In terms of validity, we examined the standardized item factor loads and found that item factor loads were above 0.70. Following this, we carried out confirmatory factor analysis and examined the Chi- Square Goodness (X2/df), the Root Mean Square Error of Approximation (RMSEA), the Goodness of Fit Index (GFI), the Comparative Fit Index (CFI) and the Non-normed Fit Index (NNFI) (a.k.a. Tucker–Lewis index, TLI). When the values are not acceptable ranges, we examined the Standardized Residual Covariances (SRC) values as well as Modification Indices (MI) values. We removed the items whose SRC values are above 2,58. The fit indexes were reexamined. Table 2 presents the information on goodness of fit indexes (Hu & Bentler, 1999; Kline, 2011; McDonald & Marsh, 1990).

Table 2. Goodness of Fit Indexes

Goodness of fit measures	Good fit	Acceptable fit
X2/df	$0 \leq \chi 2 / df \leq 3$	$3< \chi 2 / df \leq 5$
RMSEA	$0 \leq RMSEA \leq .05$	$.05 < RMSEA \leq .08$
GFI	$0,95 \leq GFI \leq 1$	$0,90 \leq GFI \leq 0,95$
CFI	$0,95 \leq CFI \leq 1$	$0,90 \leq CFI \leq 0,95$
TLI	$0,95 \leq TLI \leq 1$	$0,90 \leq TLI \leq 0,95$

3 | FINDINGS

Analysis of Validity Studies

Validity refers to the extent to which the scores from a measure represent the variable they are meant (Büyüköztürk, 2005; Karasar, 2016). The scales in this present study were examined by four field experts in the instructional technology department, one language expert and one expert from the educational measurement and evaluation department in terms of content validity and comprehensibility of items. Based on the comments of the experts, some items were splitted, some of them were removed, and some of them were revised. Three school administrators were asked to examine the scale and the concepts which were difficult to understand were revised. Further, some explanations were added to the expressions considered to be difficult to understand for administrators.

Equity and Citizenship Advocate Scale

To test whether the data collected via the Equity and Citizenship Advocate Scale were suitable for factor analysis, we conducted the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. The KMO value of the study group was found to be 0.893. The Bartlett's test of sphericity result was $p<0,001$. That the Kaiser-Meyer-Olkin was valued at higher than 0,6 and that the Bartlett's test of sphericity result was statistically significant at the 0.001% level indicate the sampling is adequate and the data were suitable for factor analysis (Field, 2013; Kalaycı, 2010). The items 7, 6 and 5 in the Equity and Citizenship Advocate Scale were removed since they were distributed across over more than one factors. Following the last exploratory factor analysis, the scale items were distributed across three factors, but we repeated exploratory factor analysis by forcing the one-factor structure because of the fact that a one-factor structure seemed to fit the data (above 50%) and the fact that the other factors explained the variance at less than 50%. Table 3 presents the results of EFA.

Table 3. Exploratory Factor Analysis for Equity and Citizenship Advocate Scale

Scale	N of Item	Item Factor Load	Item-Total Correlation

Equity and Citizenship Advocate Scale	8	,776	,730
	1	,769	,719
	10	,766	,725
	3	,763	,709
	13	,757	,712
	9	,743	,701
	2	,734	,676
	12	,708	,656
	11	,670	,606
	4	,651	,580
	% of Variance: 53,74		

As shown in Table 3, the loads of the items included in the scale ranged between ,651 and ,776. According to Büyüköztürk (2018), the factor loadings between 0,30 and 0,59 are at moderate level and those higher than 0,60 are at high level. In this sense, the results showed that all scale items measure the same construct and load onto the same factor.

The item total correlation ranged between ,580 and ,730. Based on the fact that the item total correlation values were higher than 0,30, it can be noted that all items in the scale are suitable for measuring the same construct (Büyüköztürk, 2018; Tavşancıl, 2002).

According to the exploratory factor analysis, the Equity and Citizenship Advocate Scale consisted of 8 items, and the total variance explained was % 53,74. There is evidence that if the total variance is above 30%, then it is acceptable (Büyüköztürk, 2018). In this sense, it can be noted that a one-factor structure seemed to fit the data.

Based on the confirmatory factor analysis for the Equity and Citizenship Advocate Scale, it was revealed that all items' factor loadings were higher than 0,70. However, some values of goodness-of-fit indexes were not satisfactory. First, we examined SRC (Standardized Residual Covariances) values and removed "the item 12" and "the item 13" whose values were higher than 2,58. We repeated CFA and found that the SRC value of the item 8 were above 2,58. We removed the item 8 and repeated CFA. We examined the modification indices values to get the satisfactory goodness-of-fit indexes and combined the coefficient errors between the items 4 and 11 as well as the items 9 and 10. Following this, we re-examined the goodness-of-fit indexes of the rest 7 items. The results show that the Equity and Citizenship Advocate Scale's overall fitting results were acceptable values (X2/df = 4,320; RMSEA = 4,320) and were satisfactory values (GFI=,978), (CFI = ,990) ve (TLI =,980) (Hu & Bentler, 1999; Kline, 2011; McDonald & Marsh, 1990).

Visionary Planner Scale

To test whether the data collected via the Visionary Planner Scale were suitable for factor analysis, we conducted the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. The KMO value of the study group was found to be 0.847. The Bartlett's test of sphericity result was p<0,001. That the Kaiser-Meyer-Olkin was valued at higher than 0,6 and that the Bartlett's test of sphericity result was statistically significant at the 0.001% level indicate the sampling is adequate and the data were suitable for factor analysis (Field, 2013; Kalaycı, 2010). According to the EFA results of the Visionary Planner Scale, the one-factor structure seemed to fit the data. Table 4 presents the results of EFA.

Table 4. Exploratory Factor Analysis for Visionary Planner Scale

Scale	N of Item	Item Factor Load	Item-Total Correlation

Visionary Planner Scale	1	,906	,821
	3	,902	,816
	2	,897	,807
	4	,838	,724
	% of Variance: 78,55		

As shown in Table 4, the loads of the items included in the scale ranged between ,838 and ,906. According to Büyüköztürk (2018), the factor loadings between 0,30 and 0,59 are at moderate level and those higher than 0,60 are at high level. In this sense, the results showed that all scale items measure the same construct and load onto the same factor.

The item total correlation ranged between ,724 and ,821. Based on the fact that the item total correlation values were higher than 0,30, it can be noted that all items in the scale are suitable for measuring the same construct (Büyüköztürk, 2018; Tavşancıl, 2002).

According to the exploratory factor analysis, the Visionary Planner Scale consisted of 4 items, and the total variance explained was % 78,55. There is evidence that if the total variance is above 30%, then it is acceptable (Büyüköztürk, 2018). In this sense, it can be noted that a one-factor structure seemed to fit the data.

Based on the confirmatory factor analysis for the Visionary Planner Scale, it was revealed that all items' factor loadings were higher than 0,70. There were no items with Standardized Residual Covariances values were higher than 2,58. The results show that the Visionary Planner Scale's overall fitting results were satisfactory values (X2/df = ,944), (RMSEA = ,000), (GFI= ,997), (CFI = 1,000) and (TLI=1,000) (Hu & Bentler, 1999; Kline, 2011; McDonald & Marsh, 1990).

Empowering Leader Scale

To test whether the data collected via the Empowering Leader Scale were suitable for factor analysis, we conducted the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. The KMO value of the study group was found to be 0.845. The Bartlett's test of sphericity result was p<0,001. That the Kaiser-Meyer-Olkin was valued at higher than 0,6 and that the Bartlett's test of sphericity result was statistically significant at the 0.001% level indicate the sampling is adequate and the data were suitable for factor analysis (Field, 2013; Kalaycı, 2010). According to the EFA results of the Empowering Leader Scale, the one-factor structure seemed to fit the data. Table 5 presents the results of EFA.

Table 5. Exploratory Factor Analysis for Empowering Leader Scale

Scale	N of Item	Item Factor Load	Item-Total Correlation
Empowering Leader Scale	1	,903	,844
	2	,894	,828
	3	,884	,815
	4	,875	,804
	5	,871	,797
	% of Variance: 78,41		

As shown in Table 5, the loads of the items included in the scale ranged between ,871 and ,903. According to Büyüköztürk (2018), the factor loadings between 0,30 and 0,59 are at moderate level and those higher than 0,60 are at high level. In this sense, the results showed that all scale items measure the same construct and load onto the same factor.

The item total correlation ranged between ,797 and ,844. Based on the fact that the item total correlation values were higher than 0,30, it can be noted that all items in the scale are suitable for measuring the same construct (Büyüköztürk, 2018; Tavşancıl, 2002).

According to the exploratory factor analysis, the Empowering Leader Scale consisted of 5 items, and the total variance explained was % 78,41. There is evidence that if the total variance is above 30%, then it is acceptable (Büyüköztürk, 2018). In this sense, it can be noted that a one-factor structure seemed to fit the data.

Based on the confirmatory factor analysis for the Empowering Leader Scale, it was revealed that all items' factor loadings were higher than 0,70.

However, some values of goodness-of-fit indexes were not satisfactory. First, we examined SRC (Standardized Residual Covariances) values and found that the SRC value of the items were not above 2,58. We examined the modification indices values to get the satisfactory goodness-of-fit indexes and combined the coefficient errors between the items 4 and 5. The results show that the Empowering Leader Scale's overall fitting results were acceptable values (X2/df = 3,442; RMSEA = ,078) and were satisfactyory values (GFI = ,981; CFI = ,993; TLI =,980) (Hu & Bentler, 1999; Kline, 2011; McDonald & Marsh, 1990).

Systems Designer Scale

To test whether the data collected via the Systems Designer Scale were suitable for factor analysis, we conducted the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. The KMO value of the study group was found to be 0.837. The Bartlett's test of sphericity result was p<0,001. That the Kaiser-Meyer-Olkin was valued at higher than 0,6 and that the Bartlett's test of sphericity result was statistically significant at the 0.001% level indicate the sampling is adequate and the data were suitable for factor analysis (Field, 2013; Kalaycı, 2010). According to the EFA results of the Systems Designer Scale, the one-factor structure seemed to fit the data. Table 6 presents the results of EFA.

Table 6. Exploratory Factor Analysis for Systems Designer Scale

Scale	N of Item	Item Factor Load	Item-Total Correlation
Systems Designer Scale	2	,892	,813
	5	,871	,772
	3	,864	,759
	4	,808	,685
	1	,704	,577
	% of Variance: 68,95		

As shown in Table 6, the loads of the items included in the scale ranged between ,704 and ,892. According to Büyüköztürk (2018), the factor loadings between 0,30 and 0,59 are at moderate level and those higher than 0,60 are at high level. In this sense, the results showed that all scale items measure the same construct and load onto the same factor.

The item total correlation ranged between ,577 and ,813. Based on the fact that the item total correlation values were higher than 0,30, it can be noted that all items in the scale are suitable for measuring the same construct (Büyüköztürk, 2018; Tavşancıl, 2002).

According to the exploratory factor analysis, the Systems Designer Scale consisted of 5 items, and the total variance explained was % 68,95. There is evidence that if the total variance is above 30%, then it is acceptable (Büyüköztürk, 2018). In this sense, it can be noted that a one-factor structure seemed to fit the data.

Based on the confirmatory factor analysis for the Systems Designer Scale, it was revealed that all items' factor loadings were higher than 0,70. However, some values of goodness-of-fit indexes were not satisfactory. First, we examined SRC (Standardized Residual Covariances) values and found that the SRC value of the items were not above 2,58. We examined the modification indices values to get the satisfactory goodness-of-fit indexes and combined the coefficient errors between the items 1 and 3 as well as the items 4 and 5. The results show that the Systems Designer Scale's overall fitting results were acceptable values (RMSEA = ,079) and were satisfactory values (X2/df = 2,945; GFI = ,988; CFI = ,994; TLI =,989) (Hu & Bentler, 1999; Kline, 2011; McDonald & Marsh, 1990).

Connected Learner Scale

To test whether the data collected via the Connected Learner Scale were suitable for factor analysis, we conducted the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. The KMO value of the study group was found to be 0.942. The Bartlett's test of sphericity result was p<0,001. That the Kaiser-Meyer-Olkin was valued at higher than 0,6 and that the Bartlett's test of sphericity result was statistically significant at the 0.001% level indicate the sampling is adequate and the data were suitable for factor analysis (Field, 2013; Kalaycı, 2010). According to the EFA results of the Connected Learner Scale, the one-factor structure seemed to fit the data. Table 7 presents the results of EFA.

Table 7. Exploratory Factor Analysis for Connected Learner Scale

Scale	N of Item	Item Factor Load	Item-Total Correlation
Connected Learner Scale	3	,893	,861
	8	,880	,844
	2	,875	,836
	4	,874	,837
	6	,866	,828
	1	,854	,813
	5	,849	,806
	9	,848	,805
	7	,783	,728
	% of Variance: 73,72		

As shown in Table 7, the loads of the items included in the scale ranged between ,783 and ,893. According to Büyüköztürk (2018), the factor loadings between 0,30 and 0,59 are at moderate level and those higher than 0,60 are at high level. In this sense, the results showed that all scale items measure the same construct and load onto the same factor.

The item total correlation ranged between ,728 and ,861. Based on the fact that the item total correlation values were higher than 0,30, it can be noted that all items in the scale are suitable for measuring the same construct (Büyüköztürk, 2018; Tav**ş**ancıl, 2002).

According to the exploratory factor analysis, the Connected Learner Scale consisted of 9 items, and The total variance explained was % 73,72. There is evidence that if the total variance is above 30%, then it is acceptable (Büyüköztürk, 2018). In this sense, it can be noted that a one-factor structure seemed to fit the data.

Based on the confirmatory factor analysis for the Connected Learner Scale, it was revealed that all items' factor loadings were higher than 0,70. However, some values of goodness-of-fit indexes were not satisfactory. First, we examined SRC (Standardized Residual Covariances) values found that the SRC value of the items were not above 2,58. We examined the modification indices values to get the satisfactory

goodness-of-fit indexes and found that the corrected item-total correlation of the item 8 were at higher level. Therefore, the item 8 was removed to the satisfactory goodness-of-fit indexes. We combined the coefficient errors between the items 2 and 5 as well as the items 7 and 9. The results show that the Connected Learner Scale's overall fitting results were acceptable values (RMSEA = ,060) and were satisfactory values (X2/df = 2,078; GFI = ,971; CFI = ,992; TLI =,990) (Hu & Bentler, 1999; Kline, 2011; McDonald & Marsh, 1990).

Analysis of Reliability Studies

Reliability of a scale refers to how consistently the scale measures something in different times (Balcı, 2001). In this sense, to test the reliabilities of the scales, we calculated the Cronbach's Alpha internal consistency coefficients, item distinctiveness in the lower and upper groups and the item total correlations. Table 8 presents the results of the reliability analyses.

Table 8. Cronbach's Alpha and Item Analyses

Scale	Cronbach's Alpha	N of Item	Item-Total Correlation	Item Distinctiveness %27 Lower and Upper Group	
				t	p
Equity and Citizenship Advocate	,927	1	,719	17.698	.000
		2	,676	16.994	.000
		3	,709	14.512	.000
		4	,580	13.915	.000
		5	,701	16.711	.000
		6	,725	18.787	.000
		7	,606	12.979	.000
Visionary Planner	,906	1	,821	10.208	.000
		2	,807	10.982	.000
		3	,816	11.475	.000
		4	,724	9.114	.000
Empowering Leader	,931	1	,844	10.208	.000
		2	,828	9.292	.000
		3	,815	10.229	.000
		4	,804	11.320	.000
		5	,797	11.475	.000
Systems Designer	,879	1	,577	8.681	.000
		2	,813	13.475	.000
		3	,759	9.125	.000
		4	,685	10.328	.000
		5	,772	11.191	.000
Connected Learner	,955	1	,813	14.052	.000
		2	,836	12.765	.000
		3	,861	18.932	.000
		4	,837	20.916	.000
		5	,806	20.258	.000
		6	,828	19.497	.000
		7	,728	15.066	.000
		8	,805	10.308	.000

As shown in Table 8, the Cronbach's Alpha internal consistency coefficients of the scales were as follows: the Equity and Citizenship Advocate Scale (.927), the Visionary Planner Scale (.906), the Empowering Leader Scale (.931), the Systems Designer Scale (.879) and the Connected Learner Scale (.955). There is evidence that if the Cronbach's Alpha internal consistency coefficient is higher than .70, a scale is accepted as reliable data collection instrument (Büyüköztürk, 2018). Further, all items' total correlations were found as higher than .30 and the mean scores of the lower and upper groups differed significantly.

4 | Discussion & Conclusion

The widespread use of technology in education has brought new duties and responsibilities on school administrators. The effective management of the technology integration process in schools is directly related to the information and communication technology competencies of school administrators. Determining the information and communication technology competencies of school administrators and organizing educational studies to develop these competencies are of great importance for an effective technology integration. In this study, we developed a measurement tool including current skills to determine the information and communication technology competencies of school administrators in education.

We have sought to develop the Self-Efficacy Scale for the Use of Information and Communication Technologies in Education: School Administrator Form in this present study. The School Administrator Form consists of the scales based on the ISTE Standards for Education Leaders such as "Equity and Citizenship Advocate", "Visionary Planner", "Empowering Leader", "Systems Designer" and "Connected Learner". Before conducting EFA and CFA, we tested test whether the data were suitable for factor analysis through the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. The EFA results for each scale were as follows: the Equity and Citizenship Advocate Scale 53,74%, the Visionary Planner Scale 78,55%, the Empowering Leader Scale 78,41%, the Systems Designer Scale and 68,95% and the Connected Learner Scale 73,72%. While conducting DFA, three items from the Equity and Citizenship Advocate Scale and one item from the Connected Learner Scale were removed since their Standardized Residual Covariances' values were higher than 2.58. According to DFA, the overall fitting results were acceptable values and were satisfactory values (X2/df, RMSEA, GFI, CFI and TLI).

There is evidence that if the Cronbach's Alpha internal consistency coefficient is higher than .70, a scale is accepted as reliable data collection instrument (Büyüköztürk, 2018). Based on this, the scales developed in this present study can be accepted as reliable instruments. Further, we concluded that all items' total correlations were found as higher than .30 and the mean scores of the lower and upper groups differed significantly.

According to the findings of this present study, we conclude that we have developed an up-to-date, valid and reliable scale for measuring the administrators' self-efficacy for the use of ICT in education. This instrument can be used by researchers to measure and develop ICT competences of school administrators.

This present study was subjected to several limitations, as well. Due to the COVID-19 pandemic, there were some restrictions in terms of data collection to reach larger participants. We were able to recruit a total 329 school administrators for the validation and reliability analyses. Future research could be conducted on larger populations and the validity and the reliability of the scale could be tested again.

Considering the fact that previous scales for measuring the ICT competences of school administrators were also based on the ISTE standards issued in 2002 and 2009 (e.g. (Bano**ğ**lu, 2012; Cantürk, 2016; Hacıfazlıo**ğ**lu et al., 2011), there should be new inquiries in time to delve into current competences needed. Thanks to this, comparisons could be made between this present study and future studies.

Statements of publication ethics

Conflict of interest

The authors declare that there is no conflict of interest.

Acknowledgement

This article was produced from the first author's doctoral dissertation under the supervision of the second author.

References

Afshari, M., Bakar, K. A., Luan, W. S., Samah, B. A., & Fooi, F. S. (2009). Factors affecting teachers' use of information and communication technology. Online Submission, 2(1), 77-104. https://files.eric.ed.gov/fulltext/ED524156.pdf

Akın-Mart, Ö. & Tulunay-Ateş, Ö. (2021). Investigation of technological leadership of the school administrators in Turkey: A meta-analysis study. *Bartın University Journal of Faculty of Education*, 10(1), 169-186. https://doi.org/10.1016/buefad.740794

Anderson, R. E., & Dexter, S. (2005). School technology leadership: An empirical investigation of prevalence and effect. Educational administration quarterly, 41(1), 49-82. https://doi.org/10.1177/0013161X04269517

Balcı, A. (2004). Sosyal bilimlerde araştırma: Yöntem, teknik ve ilkeler [Research in the social sciences: Methods, techniques and principles]. Pegem Publishing.

Banoğlu, K. (2012). Technology Leadership Competencies Scale for Educational Administrators: Development, Validity and Reliability Study. Inonu University Journal Of The Faculty Of Education, 13(3), 43-65. https://dergipark.org.tr/en/pub/inuefd/issue/8695/108614

Beytekin, O. F. (2014). High school administrators perceptions of their technology leadership preparedness. Educational Research and Reviews, 9(14), 441-446. https://doi.org/10.5897/ERR2014.1858

Bilgiç, H. G., Duman, D., & Seferoğlu, S. S. (2011). Dijital yerlilerin özellikleri ve çevrim içi ortamların tasarlanmasındaki etkileri [The Characteristics of Digital Natives' and Their Effects of on the Design of Online Environments]. Akademik Bilişim, 2(4), 1-7. https://ab.org.tr/ab11/kitap/bilgic_duman_AB11.pdf

Bryman, A., & Cramer, D. (2002). Quantitative data analysis with SPSS release 10 for Windows: A guide for social scientists. East Sussex: Routledge.

Bülbül, T., & Çuhadar, C. (2012). Analysis of the relationship between school administrators' perceptions of technology leadership self-efficacy and their acceptance of ICT. Mehmet Akif Ersoy University Journal of Education Faculty, 1(23), 474-499. https://dergipark.org.tr/en/download/article-file/181392

Büyüköztürk, Ş. (2005). Anket geliştirme [Survey Development]. Türk Eğitim Bilimleri Dergisi, 3(2), 133-151. https://dergipark.org.tr/en/pub/tebd/issue/26124/275190

Büyüköztürk, Ş. (2018). Sosyal bilimler için veri analizi el kitabı [Data analysis Handbook for social Sciences]. Pegem Publishing

Cantürk, G. (2016). Okul yöneticilerinin teknolojik liderlik davranışları ve bilişim teknolojilerinin yönetim süreçlerinde kullanımı arasındaki ilişki [School administrators' technological leadership behaviours and the relationship among usage of information and communication technology at management processes] (Publication No. 436734) [Doctoral dissertation, Akdeniz University]. https://tez.yok.gov.tr/UlusalTezMerkezi/giris.jsp

Çalık, T., Çoban, Ö., & Özdemir, N. (2019). Examination of the Relationship between School Administrators' Technological Leadership Self-efficacy and Their Personality Treats . Ankara University Journal of Faculty of Educational Sciences (JFES), 52(1), 83-106. https://doi.org/10.30964/auebfd.457346

Çelik, V. (2000). Eğitimsel liderlik (2. Baskı) [Educational leadership (2nd Edition)]. Pegem Publishing

DeVellis, R. F. (2016). Scale development: Theory and applications (Vol. 26). London: SAGE.

Doğan, İ. (2018). Examination of the technology leadership self-efficacy perceptions of educational managers in terms of the self-efficacy perceptions of information technologies (Malatya province case). Participatory Educational Research, 5(2), 51-66.

Field, A. (2013). Discovering statistics using IBM SPSS statistics. London: SAGE.

Flanagan, L., & Jacobsen, M. (2003). Technology leadership for the twenty-first century principal. Journal of Educational Administration, 41(2), 124–142. https://doi.org/10.1108/09578230310464648

Görgülü, D., & Küçükali, R. (2018). The Research of the Technologic Leadership Self-Efficacy of Teachers. International Journal of Leadership Studies: Theory and Practice, 1(1), 1-12. https://dergipark.org.tr/tr/pub/ijls/issue/38881/421909

Günther, J. (2007). Digital natives & digital immigrants. Innsbruck: StudienVerlag.

Hacıfazlıoğlu, Ö., Karadeniz, Ş., & Dalgıç, G. (2011). Validity and reliability study of technological leadership self-efficacy scale for school administrators. Educational Administration: Theory and Practice, 2(2), 145-166. https://dergipark.org.tr/en/download/article-file/108201

Hamzah, M. I. M., Juraime, F., & Mansor, A. N. (2016). Malaysian principals' technology leadership practices and curriculum management. Creative Education, 7(07), 922. https://doi.org/10.4236/ce.2016.77096.

Helsper, E. J., & Eynon, R. (2010). Digital natives: where is the evidence?. British educational research journal, 36(3), 503-520. https://doi.org/10.1080/01411920902989227

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal, 6(1), 1–55. https://doi.org/10.1080/10705519909540118

ISTE (2002). Nets for administrators: Transforming education. Retrieved from https://www.pobschools.org/cms/lib/NY01001456/Centricity/Domain/45/Ed%20Tech%20Resources/ISTENETS.pdf

ISTE (2009). ISTE standarts for administrators. Retrieved from https://cdn.iste.org/www/root/Libraries/Images/Standards/Download/ISTE%20Standards%20for%20Administrators%2C%202009%20(Permitted%20Educational%20Use).pdf

ISTE (2018). ISTE standarts for education leaders. Retrieved from https://www.iste.org/standards/iste-standards-for-education-leaders

Kalaycı, Ş. (2010). SPSS uygulamalı çok değişkenli istatistik teknikleri [SPSS applied multivariate statistical techniques]. Asil Publishing

Karasar, N. (2016). Bilimsel araştırma yöntemleri, kavramlar, ilkeler ve teknikler [Scientific research methods, concepts, principles and techniques]. Nobel Publishing

Kearsley, G. & Lynch, W. (1994). Educational technology: Leadership perspectives. New Jersey: Educational Technology Publications, Inc.

Kline, R. B. (2011). Convergence of structural equation modeling and multilevel modeling. In M. Williams & W. P. Vogt (Eds.), The SAGE Handbook of Innovation in Social Research Methods (pp. 562-589). London: SAGE. https://dx.doi.org/10.4135/9781446268261.n31

Kör, H., Erbay, H., & Engin, M. (2016). Technology leadership of education administrators and innovative technologies in education: A case study of Çorum city. Universal Journal of Educational Research, 4(n12A), 140-150. https://doi.org/10.13189/ujer.2016.041318

Lei, J. (2009). Digital natives as preservice teachers: What technology preparation is needed?. Journal of Computing in teacher Education, 25(3), 87-97. http://dx.doi.org/10.1080/10402454.2009.10784615

McDonald, R. P., & Marsh, H. W. (1990). Choosing a multivariate model: Noncentrality and goodness of fit. Psychological bulletin, 107(2), 247. https://doi.org/10.1037/0033-2909.107.2.247

Muchsini, B., & Siswandari, S. (2018). Digital natives' behaviours and preferences: pre-service teachers studying accounting. International Journal of Pedagogy and Teacher Education, 2(2), 355-366. https://doi.org/10.20961/ijpte.v%vi%i.24088

Prensky, M. (2001). Digital Natives, Digital Immigrants Part 2: Do They Really Think Differently?. On the Horizon, 9(6), 1–6. doi:10.1108/10748120110424843

Prensky, M. (2004). The emerging online life of the digital native: What they do differently because of technology, and how they do it. https://marcprensky.com/writing/Prensky-The_Emerging_Online_Life_of_the_Digital_Native-03.pdf

Şişman-Eren, E. & Kurt, A. A. (2011). Technological leadership behavior of elementary school principals in the process of supply and use of educational technologies. Education, 131(3), 625-636. https://eric.ed.gov/?id=EJ996380

Tavşancıl, E. (2002). Tutumların ölçülmesi ve SPSS ile veri analizi [Measuring attitudes and data analysis with SPSS]. Nobel Publishing

Turan, S. (2002). Teknolojinin okul yönetiminde etkin kullanımında eğitim yöneticisinin rolü [The role of the education manager in the effective use of technology in school management]. Educational Administration: Theory and Practice, 30(30), 271-281. https://dergipark.org.tr/en/download/article-file/108473

Ünal, E., Uzun, A. M., & Karataş, S. (2015). An examination of school administrators' technology leadership self-efficacy. Croatian Journal of Education, 17(1), 195-215. https://doi.org/10.15516/cje.v17i1.968

Yahşi, Ö . (2020). Okul Yöneticilerinin Teknoloji Liderliği Özyeterliklerinin İncelenmesi: İzmir Örneği . *Akademik Platform Eğitim ve Değişim Dergisi* , 3 (2) , 232-250 . Retrieved from https://dergipark.org.tr/en/pub/apjec/issue/58985/836626

Yıldız, B. B., Tüysüz, H. & Öztürk, M. (2021). Okul yöneticilerinin teknoloji liderliği yeterlik algıları ile yenilik yönetimi yeterlikleri arasındaki ilişkinin incelenmesi [Analysing the Relationship Between School Administrators' Perceptions of Technological Leadership Competencies and Innovation Management Competencies]. *Turkish Studies,* 16(3), 1087-1108.https://dx.doi.org/10.7827/TurkishStudies.50790

Yorulmaz, A., & Can, S. (2016). The technology leadership competencies of elementary and secondary school directors. Educational Policy Analysis and Strategic Research, 11(1), 47-61. https://files.eric.ed.gov/fulltext/EJ1127620.pdf

Eğitimde Bilgi ve İletişim Teknolojileri Kullanımı Öz Yeterlikleri - Okul Yöneticisi Formu

Aşağıda Eğitim sürecine liderlik ederken bilgi ve iletişim teknolojilerini kullanımınıza yönelik 30 madde yer almaktadır. Aşağıdaki ifadelerle ilgili yeterliklerinizi 1 ve 5 rakamları (1 en düşük ve 5 en yüksek) arasında derecelendirerek, seçeneğin altındaki kutuya "X" sembolü ile işaretleme yapınız. Lütfen her maddeyi dikkatli okuyarak bütün maddeleri işaretleyiniz.

Eşitlik ve Vatandaşlığı Koruyucu					
Madde	1	2	3	4	5
1. Okulumda teknolojik alt yapının eşit şartlarda kullanılmasını sağlayabilirim.					
2. Öğrencilerimin bilgi ve iletişim teknolojilerinin amaca uygun kullanımı açısından eşit şartlarda eğitim almasını sağlayabilirim					
3. Okulumda teknolojik imkanların eşit bir şekilde kullanılması ve dağıtılmasını sağlayabilirim.					
4. Teknolojik araçlar kullanırken etik unsurlara dikkat edebilirim. (Örn: Teknolojiyi doğru olmayan bilgilerin yayılması için kullanmamak)					
5. Öğrencilerimin kişisel bilgilerinin korunması için gereken sistemsel önlemleri alabilirim.					
6. Öğretmenlerimin kişisel bilgilerinin korunması için gereken sistemsel önlemleri alabilirim.					
7. Sosyal medyada başkalarını rahatsız edecek içerikler paylaşmamam gerektiğini bilirim.					
Vizyoner Planlayıcı					
Madde	1	2	3	4	5
1. Okulumda teknoloji kullanımının yaygınlaştırılması konusunda planlamalar yapabilirim.					
2. Okulumda teknoloji kullanımının yaygınlaştırılması ile ilgili planlamaları ilgili paydaşlarımla (öğretmen, diğer yöneticiler vb.) birlikte yapabilirim.					
3. Okulumda teknoloji kullanımının yaygınlaştırılması ile ilgili planların etkililiğini denetleyebilirim.					
4. Okul stratejik planı hazırlanırken teknolojik ihtiyaçların giderilmesini sağlayabilirim					
Güçlendirici Lider					
Madde	1	2	3	4	5
1. Öğretmen ve öğrencilerimin teknolojik gelişmeleri araştırmaları için imkân sağlayabilirim					
2. Öğretmen ve öğrencilerimin teknolojiyi kullanmaları için imkân sağlayabilirim					
3. Öğretmen ve öğrencilerimin eğitim süreçlerinde teknoloji kullanımı yeterliliklerini geliştirmelerini destekleyebilirim					
4. Eğitimde teknoloji entegrasyonu sürecini yürütmek için bir ekip kurabilirim					
5. Eğitimde teknoloji entegrasyonu sürecini yürütmek için kurduğum ekibin çalışmalarını takip edebilirim					
Sistem Tasarımcısı					

Madde	1	2	3	4	5
1. Eğitimde teknoloji entegrasyonu için geleceğe yönelik maddi kaynaklar oluşturabilirim					
2. Çalıştığım kurumun teknolojik altyapısının iyileştirilmesi için hedefler belirleyebilirim.					
3. Okulumdaki teknolojik araçların kullanılabilir durumda olup olmadığını takip edebilirim					
4. Öğrenci ve personelin bilgi gizliliği ve güvenliği konusundaki kurallara uymalarını sağlayabilirim					
5. Eğitimde teknoloji kullanımına yönelik gelişmeleri takip etmesi için bir ekip oluşturabilirim					
Bağlantılı Öğrenen					
Madde	1	2	3	4	5
1. Kişisel ve mesleki gelişimimi desteklemek için teknolojiyi kullanabilirim.					
2. Eğitim teknolojileri alanındaki gelişmeleri takip edebilirim.					
3. Diğer eğitim yöneticileriyle iş birliği yapmak için teknolojiyi kullanabilirim					
4. Eğitimde teknoloji kullanımını yaygınlaştırmak adına gerçekleştirdiğim iyi örnekleri ilgi duyan diğer yöneticilerle paylaşabilirim.					
5. Eğitime dair yeniliklerden haberdar olmak için teknolojiyi kullanabilirim.					
6. Eğitimde teknoloji kullanımı konusunda öğretmenlerime öncülük edebilirim.					
7. Mesleki gelişimime yönelik sosyal medya gruplarını takip edebilirim.					
8. Teknolojideki değişimlere kolaylıkla uyum sağlayabilirim.					

The Self-Efficacy Scale for the Use of Information and Communication Technologies in Education: School Administrator Form

This form has 30 items towards your information and communication technology use while leading in education. Please read each item thoroughly and choose the best rate that best describes each statement (1 the lowest – 5 the highest).

Equity and Citizenship Advocate					
Items	1	2	3	4	5
1. I can ensure the even use of the technological facilities in my school.					
2. I can provide my students with equal learning opportunities in purposeful using of information and communication technologies					
3. I can ensure the even distribution of the technological resources in my school.					
4. I can pay attention to ethical considerations while using technological devices (e.g. not using technology to disseminate incorrect information).					
5. I can take necessary systematic precautions to protect my students' privacy.					
6. I can take necessary systematic precautions to protect my teachers' privacy.					
7. I know that I must not share improper content that may disturb others.					
Visionary Planner					
Items	1	2	3	4	5
1. I can make arrangements the widespread use of technology in my school.					
2. I can make arrangements the widespread use of technology in my school with my stakeholders (e.g. teachers, other administrators etc.).					
3. I can supervise the effectiveness of the arrangements towards the widespread use of technology in my school					
4. I can ensure to satisfy the technological needs while preparing the strategic plan of the school.					
Empowering Leader					
Items	1	2	3	4	5
1. I can provide my teachers and students with opportunities to search for technological developments.					
2. I can provide my teachers and students with opportunities to use technology.					
3. I can support my teachers and students to develop their competences towards using technology in educational activities.					
4. I can build a team to run the technological integration process in education.					
5. I can follow the activities of the team running the technological integration process in education					
Systems Designer					
Items	1	2	3	4	5
1. I can ensure financial resources for the technology integration in education to satisfy future demand.					
2. I can define goals to develop the technological facilities in my school.					
3. I can follow whether technological devices in my school are usable or not.					

4. I can ensure that staff and students pay attention to privacy and security while using technology.					
5. I can build a team to follow the latest developments in technology use in education.					
Connected Learner					
Items	1	2	3	4	5
1. I can use technology for my personal and professional development.					
2. I can follow the latest developments in educational technology.					
3. I can use technology to collaborate with other administrators.					
4. I can share my best practices towards the widespread use of technology in education with other administrators interested.					
5. I can use technology to follow the latest developments in education.					
6. I can model for my teachers for using technology in education.					
7. I can follow social networking sites for my professional development.					
8. I can easily adapt to changes and innovations in technology					

BUEFAD | 2021, Volume 10, Issue 3, 681-681
Bartın University Journal of Faculty of Education
dergipark.org.tr/buefad
DOI: 10.14686/buefad.1007792

Pictorial and Narrative Representations of Children's Peace Perceptions

Yasemin Güleç[a*]
a Dr., Univesity of Hacı Bektaş Veli/Nevşehir/Turkey, (https://orcid.org/0000-0001-8843-3270) *yasemingulec8@gmail.com

Correction	Received: 25.09.2021	Published: 05.10.2021

ERRATUM

The correct form of the title in the article's web page referenced as "Güleç, Y. (2021). Pictorial and narrative representations of children's peace perceptions. Bartın University Journal of Faculty of Education, 10(2), 390-411. https://doi.org/10.1016/buefad.816071" is "Pictorial and narrative representations of children's peace perceptions".

Keywords: erratum.

Çocukların Barış Algılarının Resimli ve Anlatısal Temsilleri

DÜZELTME

"Güleç, Y. (2021). Pictorial and narrative representations of children's peace perceptions. Bartın University Journal of Faculty of Education, 10(2), 390-411. https://doi.org/10.1016/buefad.816071" referanslı makalenin internet sayfasındaki başlığın doğru şekli "Pictorial and narrative representations of children's peace perceptions"dir.

Anahtar kelimeler: düzeltme.