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Adres: Nesibe Aydın Okulları Yerleşkesi
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Tel: +(90) 312 498 25 25

Belgegeçer: +(90) 312 498 24 46

E-posta: jef.editor@gmail.com

Web: http://dergipark.gov.tr/jef

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Editor Assistant: Assoc. Prof. Dr. Aliye ERDEM

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Haymana Yolu 5. km
Gölbaşı, Ankara/Turkey

Tel: +(90) 312 498 25 25

Fax: +(90) 312 498 24 46

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Nesibe Aydın Eğitim Kurumları tarafından yayımlanan *Eğitim ve Gelecek Dergisi* on sekizinci sayısında sizinle buluşuyor. Dergimizin on sekizinci sayısında yer alan çalışmaları siz değerli okurlarımıza sunuyoruz.

Mustafa Çetin, H. Özlen Demircan, Ezgi Şenyurt ve Aysun Ata Aktürk tarafından hazırlanan ***"Çocukların STEM Etkinlik Seçimlerinin Cinsiyet Açısından İncelenmesi"*** başlıklı çalışmanın sonuçlarına göre STEM etkinliklere katılan erkek sayısının kızlara göre daha yüksek olduğu tespit edilmiştir. Katılım oranları yaş gruplarına göre incelendiğinde, 5 yaş grubunda erkeklerin, 6 yaş grubunda ise kızların daha çok katılım gösterdiği belirlemiştir.

Eğitim öğretim faaliyetlerini yaşam boyu öğrenmeye dönüştüren özelliklerin başında informal öğrenme gelmektedir. **Murat Bartan** tarafından hazırlanan ***"Okul Öncesi Öğretmenlerinin İnformal Öğrenme Davranışları"*** başlıklı çalışmada okul öncesi öğretmenlerin en sık başvurdukları informal öğrenme etkinliğinin internette arama yapmak olduğu, en az ise üyesi olduğu çevrimiçi topluluğa sormak/danışmak olduğu sonucuna ulaşılmıştır.

Öğretimin kalitesiyle, öğretmenlerin iş tatminleriyle, öğrenci başarısı ve motivasyonuyla oldukça alakalı olan fen öğretmenlerinin öz-yeterliliği birçok araştırmacının ilgisini çekmiştir. **Eren Ceylan** tarafından hazırlanan ***"Estonya, Japonya ve Türkiye'deki Fen Öğretmenlerinin Öğretimdeki ve Öğrenci Motivasyonundaki Öz-yeterlikleri"*** başlıklı çalışmada TALIS 2018 verileri kullanılmıştır. Bulgular, okul iklimi, öz-yeterlik kaynakları ve öğretmen özellikleriyle alakalı bazı değişkenler için anlamlı olasılık oranları gösterse de bu olasılık oranlarının büyüklükleri ülkeler arasında farklılık göstermektedir.

Ahmet Kesici tarafından hazırlanan ***"Lise Öğrencilerinde Sorumluluğun ve Cinsiyetin Dijital Oyun Bağımlılığına Etkisi"*** başlıklı çalışmada; öğrencilerin sorumluk düzeyi Beş Faktör Envanteri'nin sorumluluk alt boyutu kullanılarak, oyun bağımlılığı düzeyleri ise Dijital Oyun Bağımlılığı Ölçeği kullanılarak belirlenmiştir. Araştırma sonucunda hem cinsiyetin hem de sorumluluğun dijital oyun bağımlılığının anlamlı yordayıcıları olduğu ve düşük sorumluk düzeyi ile cinsiyetin (erkek olma) dijital oyun bağımlılığını olumsuz yönde etkilediği belirlenmiştir.

Okulların bütçeleri ve bütçelerinin yönetimi okulların etkin sürdürülmesi açısından önemlidir. **Ece Özdoğan Özbal ve Kasım Karakütük** tarafından hazırlanan ***"Liselerde Eşitliği Sağlayıcı Bütçe Modeli Önerileri: Türkiye Örneği"*** başlıklı araştırmada liselere devlet tarafından sağlanan bütçe ve liselerdeki okul aile birliği bütçesi ile menkul mal, gayri maddi hak alım, bakım onarım giderleri ve hizmet alımları arasında anlamlı bir ilişki olduğu belirlenmiştir.

Tamer Sarı, Funda Nayır ve Ümit Kahraman tarafından hazırlanan ***"Türkiye'de Kapsayıcı Eğitim Üzerine Bir Çalışma"*** başlıklı çalışmada; 2009-2019 yılları arasında ulusal ve uluslararası hakemli dergilerde İngilizce ve Türkçe olarak yayınlanan makaleler sistematik olarak incelenmiştir. Çalışmada, kapsayıcı eğitim hakkında yapılan çalışmaların son yıllarda artmaya başladığı, genellikle nitel araştırma yöntemlerinin kullanıldığı ve daha çok özel eğitim alanındaki araştırmacıların kapsayıcı eğitim çalışmaları yaptığı sonucuna ulaşılmıştır.

Eğitim reform çabaları değişen öğretmen uygulamalarını, öğrencinin öğrenmesini, ekonomik ve eğitimsel temelleri etkileyebilecek olası sonuçlar elde etmenin bir yolu olarak öğretmenlerin mesleki gelişim programlarını desteklemektedir. **Özlem Oktay ve Ali Eryılmaz** tarafından hazırlanan ***"Uzun Süreli Mesleki Gelişimin Etkisinin Öğretmen Değerlendirmesi ile Araştırılması"*** başlıklı çalışmada, mesleki gelişim programından sonra öğretmenlerin derslerinde daha çok öğrenci merkezli yöntemler ve daha çeşitli öğretim materyalleri kullandıkları belirlenmiştir.

Tarık Talan tarafından hazırlanan ***"Eğitimde Scratch Yazılımının Kullanımına Yönelik Yapılan Çalışmaların İncelenmesi"*** başlıklı çalışmada 76 farklı araştırma incelenmiştir. Elde edilen verileri tamamlamak amaçlı meta-tematik analizler yapılmış ve nitel yönlü çalışmaların ortak kod ve temalarından alıntılar yapılarak nitel bulgulara ulaşılmıştır. Araştırmanın sonuçları eğitimde Scratch yazılımı kullanımının motivasyon, öz-yeterlik, tutum, üst düzey düşünme ve akademik başarıya olumlu etkileri olduğunu göstermektedir. Ayrıca Scratch yazılımının programlama öğretimini soyut ve karmaşık yapıdan çıkararak somutlaştırması, 21. yy becerilerini erken yaşlarda kazandırması, öğrencilerin ilgi ve motivasyonlarını yükselterek kendilerine güvenmelerini sağlaması bazı olumlu yönleri olarak ifade edilmiştir.

Okul zorbalığı, kışkırtma unsuru olmaksızın aralarında fiziksel/psikolojik açıdan bir güç eşitsizliği olan çocuklardan güçlünün, karşı tarafa bilerek ve isteyerek, niyetli, kasıtlı, sistemli bir biçimde belli zaman aralıkları ile uyguladığı, mağdurda korku, endişe/zarar vermeyi amaçlayan fiziksel, sözel, psikolojik saldırı/yıldırmayı kapsaması olarak tanımlanmaktadır. **İsmail Hamit Hancı ve Selen Özakar Akça** tarafından hazırlanan ***"Okul Zorbalığı"*** başlıklı çalışma, okul zorbalığı konusunu tanımlayan ve ayrıntılı biçimde inceleyen, ilgili alanyazına katkı sağlayan bir çalışmadır.

Eğitim ve Gelecek Dergisi olarak gösterdiğiniz ilgi ve değerli katkılarınız için teşekkür ediyorum.

Gelecek sayıda buluşmak üzere…

Prof. Dr. Erten GÖKÇE

Eğitim ve Gelecek Dergisi Baş Editörü

Editorial

Journal of Education and Future published by Nesibe Aydın Education Institutions, meets you with the eighteenth issue. We present the studies in the eighteenth issue of JEF to our valuable readers.

The results of the article titled ***"An Analysis of Young Children's Preferences on STEM Activities in terms of Gender"***, which is prepared by **Mustafa Çetin, H. Özlen Demircan, Ezgi Şenyurt and Aysun Ata Aktürk**, reveals that the number of boys that attended the activities was greater than that of girls. More boys participated in the age group 5 than girls. On the other hand, girls' participation was higher than boys in age group 6.

Informal learning is the primary feature that transforms educational activities into lifelong learning. The article titled ***"Preschool Teachers' Informal Learning Behaviors"***, which is prepared by **Murat Bartan**, showed that the most frequently employed informal learning activity by preschool teachers is "search the internet" while the least employed one is "consult to an online community that you are a member of".

Self-efficacy of science teachers has attracted many researcher interest since its association with teachers' quality of instruction, teachers' job satisfaction, and student's achievement and motivation. The variables of the article titled ***"Science Teachers' Self-efficacy in Instruction and Self-efficacy in Student Engagement across Estonia, Japan, and Turkey"***, which is prepared by **Eren Ceylan**, were gathered from the TALIS 2018. The results revealed that whereas significant odds ratios were yielded for some of variables related to school climate, sources of self-efficacy and teachers' backgrounds, the magnitudes of the odds ratios show some variations across the countries.

In the article titled ***"The Effect of Conscientiousness and Gender on Digital Game Addiction in High School Students"***, which is prepared by **Ahmet Kesici**, conscientiousness sub-dimension of The Big Five Inventory and Digital Game Addiction scale have been used. The study has attempted to observe low level conscientiousness and gender (in case of being male) affect digital game addiction negatively in high school students.

The schools' budgets and the management of budgets is important for the effective maintenance of schools. In the article titled ***"Advices on Budget Models for Equality in High Schools: The Case of Turkey"***, which is prepared by **Ece Özdoğan Özbal and Kasım Karakütük**, it was determined that there was a significant relationship between high school budgets and school-parent association budget of the school and the intangible right, movable property, maintenance and repair expenses.

In the article titled ***"A Study on Inclusive Education in Turkey"***, which is prepared by **Tamer Sarı, Funda Nayır and Ümit Kahraman**, articles published in national and international refereed journals in English or Turkish between 2009-2019 were included. It has been concluded that the studies about inclusive education have started to increase in recent years, generally, qualitative research methods are used and more specifically, researchers in special education field have made inclusive education studies.

Educational reform efforts support professional development programs for teachers as a means to establishing possible outcomes that may affect changing teacher practices, student learning, and impact on economic and educational foundations. In the article titled **"*Investigating the Impact of Long-term Professional Development through Teacher Evaluation*"**, which is prepared by **Özlem Oktay and Ali Eryılmaz**, results showed that teachers used more student-centered methods and more varied teaching materials in their lessons following their participation in the Professional development program.

In the article titled **"*Investigation of the Studies on the Use of Scratch Software in Education*"**, which is prepared by **Tarık Talan**, 76 different studies were accessed. Meta-thematic analyses were performed to complement the data obtained, and qualitative findings were obtained by referring to common codes and themes of qualitative studies. The results of the study indicate that the use of Scratch software in education was found to have positive effects on motivation, self-efficacy, attitude, higher-level thinking, and academic success. In addition, materializing software teaching by freeing it from its abstract and complex structure, enabling students to acquire 21st-century skills at an early age, encouraging students to trust themselves by boosting their interest and motivation can be defined as some of the positive aspects of the Scratch software.

School bullying is defined as physical, verbal, psychological attack/intimidation in a physically/psychologically unequal environment perpetrated in an intentional, willing and systematic manner in intervals against less powerful peer without the element of incitement, aiming to cause fear and anxiety/harm in the victim. The article titled **"*School Bullying*"**, which is prepared by **İsmail Hamit Hancı and Selen Özakar Akça**, recognizes bullying behavior and contributes to the literature on school bullying.

Thanks for your interest and valuable contributions for *Journal of Education and Future*.

Look forward to meeting in the next issue…

Prof. Dr. Erten GÖKÇE

Editor in Chief of

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An Analysis of Young Children's Preferences on STEM Activities in terms of Gender

Article Type	Received Date	Accepted Date
Research	23.11.2019	14.07.2020

Mustafa Çetin* **H. Özlen Demircan****

Ezgi Şenyurt*** **Aysun Ata Aktürk******

Abstract

Presenting differences in the participation rates of genders in STEM activities may be a practical way to reveal that a solution to the gender gap should include addressing children at an early age, rather than at later periods in life. Thus, the purpose of the study was to investigate the STEM-related activity preferences of 3 to 8-year-old children. The sample of the study consisted of 193 children, between 3- and 8-years old attended STEM activities presented at the eight-hours-long science fair annually organized. Data was collected through a checklist. The results of the study revealed that the number of boys that attended the activities was greater than that of girls. More boys participated in the age group 5 than girls. On the other hand, girls' participation was higher than boys in age group 6. The results of the study also revealed that the activity preference of girls and boys did not differ for five out of six activities, i.e., Catapult Design, Jumping Wooden Sticks, Design Own Ship, Rescue the Horse, and Constructing with Mirror. However, it was found that among the six activities, boys participated in the magnetic wall activity significantly more than girls. This study may indicate the basis from which the gender gap emerged in STEM-related fields.

Keywords: STEM activities, gender-related preferences, gender gap, early childhood.

* *Corresponding Author:* Dr., Akdeniz University, Faculty of Education, Department of Elementary and Early Childhood Education, Antalya, Turkey. E-mail: cetinmustafacetin@gmail.com https://orcid.org/0000-0002-4461-5969

** Assist. Prof. Dr., Middle East Technical University, Faculty of Education, Department of Elementary and Early Childhood Education, Ankara, Turkey. E-mail: dozlen@metu.edu.tr https://orcid.org/0000-0002-3536-4643

*** Ress. Assist., Middle East Technical University, Faculty of Education, Department of Elementary and Early Childhood Education, Ankara, Turkey. E-mail: esenyurt@metu.edu.tr https://orcid.org/0000-0001-7534-7509

**** Assist. Prof. Dr., Kastamonu University, Faculty of Education, Department of Elementary and Early Childhood Education, Kastamonu, Turkey. E-mail: aata@kastamonu.edu.tr https://orcid.org/0000-0001-9433-5247

Çocukların STEM Etkinlik Seçimlerinin Cinsiyet Açısından İncelenmesi

Makale Türü	Başvuru Tarihi	Kabul Tarihi
Araştırma	23.11.2019	14.07.2020

Mustafa Çetin[*] **H. Özlen Demircan**[**]

Ezgi Şenyurt[***] **Aysun Ata Aktürk**[****]

Öz

STEM etkinliklerine katılım oranlarındaki farklılıkların cinsiyet açısından ortaya konması, cinsiyet eşitsizliğine yönelik önerilen bir çözümün, yalnızca yaşamın ilerleyen dönemlerinde değil, erken çocukluk döneminden başlayarak uygulanmasının gerekliliğini ortaya koymak için nesnel bir gerekçe sunabilir. Bu doğrultuda, bu çalışmanın amacı, 3-8 yaş arası çocukların STEM etkinlik tercihlerinin incelenmesidir. Çalışmanın örneklemi, her yıl düzenlenen sekiz saatlik bir bilim fuarında sunulan STEM etkinliklerine katılan 3-8 yaş arası 193 çocuktan oluşmaktadır. Araştırmanın verileri kontrol listesi aracılığıyla toplanmıştır. Araştırmanın sonuçları, etkinliklere katılan erkek sayısının kızlara göre daha yüksek olduğunu göstermiştir. Katılım oranları yaş gruplarına göre incelendiğinde, 5 yaş grubunda erkeklerin, 6 yaş grubunda ise kızların daha çok katılım gösterdiği belirlemiştir. Altı etkinlikte kız ve erkek çocukların katılımları anlamlı düzeyde farklılaşmamaktadır. Diğer yandan, altı etkinlik arasından, erkeklerin manyetik duvar etkinliğine kızlara oranla anlamlı düzeyde daha fazla katıldığı saptanmıştır. Bu bulgular doğrultusunda, bu araştırma, STEM ile ilgili alanlardaki cinsiyet eşitsizliğinin ortaya çıktığı temelleri işaret etme açısından önemlidir.

Anahtar Sözcükler: STEM etkinlikleri, cinsiyete dayalı tercih, cinsiyet eşitsizliği, erken çocukluk.

[*] *Sorumlu yazar:* Arş. Gör. Dr., Akdeniz Üniversitesi, Eğitim Fakültesi, Temel Eğitim Bölümü, Okul Öncesi Eğitimi Anabilim Dalı, Antalya, Türkiye. E-posta: cetinmustafacetin@gmail.com https://orcid.org/0000-0002-4461-5969

[**]Dr. Öğr. Üyesi, Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Temel Eğitim Bölümü, Okul Öncesi Eğitimi Anabilim Dalı, Ankara, Türkiye. E-posta: dozlen@metu.edu.tr https://orcid.org/0000-0002-3536-4643

[***] Arş. Gör., Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Temel Eğitim Bölümü, Okul Öncesi Eğitimi Anabilim Dalı, Ankara, Türkiye. E-posta: esenyurt@metu.edu.tr https://orcid.org/0000-0001-7534-7509

[******]Dr. Öğr. Üyesi, Kastamonu Üniversitesi, Eğitim Fakültesi, Temel Eğitim Bölümü, Okul Öncesi Eğitimi Anabilim Dalı, Kastamonu, Türkiye. E-posta: aata@kastamonu.edu.tr https://orcid.org/0000-0001-9433-5247

Introduction

Girls and women are considered as lost in STEM-related fields during the period of education in their life (National Academies, 2007). According to Wertheim (2006), socially and culturally transmitted stereotypes have hindered women in their pursuit and maintenance of a STEM career. To explain, social and cultural stereotypes based on ideas that scientists are both male and masculine, have led to a lag of women pursing studies and carriers in STEM fields (Carlone, 2004). Moreover, research shows that a lack of women in STEM majors is caused by both formal and informal educational settings (Shapiro & Sax, 2011). Research conducted by Hill, Corbett, and Rose (2010) revealed that girls receive better test scores in math and display more of a tendency to continue their studies in mathematics, and to pursue a career in math-related fields when significant others, such as teachers and parents, stress that their intelligence can increase through experiencing and learning. This clearly reminds that, in terms of STEM education and gender preferences, the impact of adults and the learning environment is valuable and meaningful during the early childhood years.

Informal and unplanned scientific experiences of children (e.g. examining bugs in school garden) are supported by more scheduled learning experiences (e.g. school visit to museums or science centers), leading children to have a better understanding of scientific concepts (Gelman & Kalish, 2006) through developing their reasoning skills (Halford & Andrews, 2006). Bell and his colleagues (2009) emphasized that informal learning experiences across all cultures can contribute individuals to acquire new knowledge about the world in a systematic way in that informal but designed spaces such as science centers, aquariums, and museums encourage people to engage in science in a real-world context. Furthermore, school- and community-based as well as science-rich organizations give an important place for invaluable programs including scientific practices which are covered by maintained and self-organized experiences of science enthusiasts. Herein, there is an increasing number of proof that structured or structured but out-of-school science programs can arouse interest of children and adults toward science and promote their existing science interest which might be given rise to the selection of science career in future (Bell et al., 2009).

Definitely, in addition to formal educational settings (e.g., Bailey, 1993; Sadker, Sadker, & Klein, 1991), the messages related to gender stereotypes might be mostly conveyed by cultural factors, adults, peers and the mass media, as tools in the socialization environment of children (Hughes, 2003). All of these sources of gender stereotypes push children into believing and behave according to perceived notions of what is appropriate in regards to their gender that reach to a peak of rigidity in preschool years. These gender stereotypes affect children's behaviours, interests and expectations (del Rio & Strasser, 2013). Such as play activities (Caine-Bish & Scheule, 2009), toy preferences (Freeman, 2007; Ruble, Martin, & Berenbaum, 2006), interaction styles (Segal, Montie, & Iverson, 2000), choice of color (Weisgram, Fulcher, & Dinella, 2014), and even digital game preferences (Sullivan, 2016).

Resolving the gender-related STEM activity participation rates of children from the early childhood period, and how these are shaped by the cultural and social environment, may be important in order to understand the basis of the gender gap within the fields of STEM. Presenting differences in the participation rates of genders in STEM activity may be a practical way to reveal that a solution to the gender gap should include addressing children at an early age, rather than at later periods in life. In addition, the STEM education in Turkey, also in the world, is a new research field for early childhood education. Hence, to our knowledge there are limited research studies related to STEM education, specifically addressing gender differences in early years. The research studies which aimed to investigate gender differences between boys and girls in terms of their preferences for science, technology, engineering or mathematics by considering these fields individually or two of them have provided some findings related to gender related preferences of children (e.g. Christidou, 2006; Leibham, Alexander, & Johnson, 2013; Lynn & Mikk, 2008; Mantzicopoulous & Patrick, 2010). In pursuit of the abovementioned statements, the current study is intended to be an attempt at aiming to examine the STEM activity participation rates of the children who are at early childhood period.

Method

Participants

The data of the study was obtained within a science fair which is annually coordinated by one of the public universities in Turkey in 2016. In this fair, researchers of the study prepared a stand which included STEM activities addressing children. In this sense, participants of the study were children at the early childhood period, who voluntarily attended the fair and engaged in these STEM activities with their free choice. According to the National Association for the Education of Young Children (NAEYC) (2009), the period of early childhood includes children between 0 and 8 years of age. Therefore, 193 children, between 3- and 8-years old attended STEM activities presented at the eight-hours-long fair, are considered as the sample of this study. Participant children were not selected by researchers before the study, instead they were volunteers who visited the fair with their parents, peers or teachers during the day, and elected to take part in the prepared activities offered by the stand, of their free will. However, necessary permissions were received from the parents of children for the purpose of data collection. While each activity organized and offered at this stand was designed by the researchers as STEM activities to be conducted at the science fair, they were solely interactive activities for the participants.

STEM Activities

STEM activities were prepared based on "A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas", which was prepared by the National Research Council (NRC) in 2012 for students attending 2nd, 5th, 8th and 12th grades. Just as the framework advocates that children should be engaged in scientific and engineering related processes, the dimensions of the framework have been a starting point for what would be included in the activities, and how they would be formulated. According to the NRC (2012), the framework includes three building-block principles, namely scientific and engineering practices which promote knowledge of how science and engineering succeed in boosting students' competence in the corresponding practices, crosscutting concepts which establish clear and scientific bonds across disciplinary boundaries, related mostly to science and engineering, and disciplinary core ideas.

The main idea behind the abovementioned framework is its specific focus on the integration of ideas and practices of science with the engagement of engineering ideas and practices, so as to have students become aware of science, and to help them become capable of carrying out science with a sense of deep wonder and appreciation by the end of the 12th grade. This aspect of the framework is very important in order to have the necessary knowledge of science and engineering, expressing personal ideas regarding related issues, utilizing scientific and technological information in daily life, being passionate about learning more about science, and preferring careers related to science, engineering and technology. In this regard, the framework which takes its roots in the previous studies, based on the learning and teaching of science, and integrating science and engineering knowledge on to a common ground for K-12 level, highlights important disciplinary core ideas and crosscutting concepts. On this model, K-12 science education should be built, in order to encourage students to engage in scientific inquiry and engineering design. For these reasons, the framework has been used as a guide while preparing STEM activities. The STEM activities and their detailed information, such as relevant problem situation, materials used, process followed, content involved and specific pictures are presented at the Table 1 at Appendix I.

Nature of the event

The science fair has been annually organized and hosted since 2006 by the same university which is one of the most prominent universities in Turkey. In 2016, this fair was coordinated with the name of ''Science is fun'' which was open to all visitors interested in watching, participating or engaging in science activities offered throughout the fair. In the fair, there were different stands arranged by researchers from different fields and prepared for visitors with a specific focus on their area of expertise. Each of the six activities was constantly followed by the four researchers and four teacher candidates with the necessary knowledge regarding STEM education, and who had participated in the brain storming and preparation of these activities. Before the event, research team of the current study which

constitutes one male researcher and three female researchers working in the department of early childhood education in the same university as well as four female teacher candidates from the same department had participated in multiple brain storming in order to prepare the STEM activities and be charged with running the stand. Each member of the research team had knowledge of STEM education as well as each of the six activities. Although each member of the research team constantly followed a specific activity to which s/he was pre-assigned, with the support and guidance of two of the researchers, they rotated by turns during the event. Furthermore, before and during the fair, they abstained from using gender-stereotypic language in that none of the participant children was directed to a specific STEM activity conducted in the stand. Instead, children who visited the stand were asked with which activity they preferred to begin by respecting their free will.

The stand addressed children from three to eight years as a target group. They visited the stand with their significant others such as their parents and close relatives as well as their schools such as their teachers and peers within eight hours on weekend. The stand was set up over a 15 m² area on the second floor of the fair area in which relevant materials of six activities were located. Materials regarding ''Constructing with Mirrors'', ''Design Your Ship'' and ''Rescue the Horse'' activities were located at the front of the area in order for these activities to be easily seen by visitors. The materials used in the ''Jumping Wooden Sticks'' activity were located in the middle of the area, because it required a table to be used by the visitors who were interested in this activity, and it was placed in this region so as not to prevent visitors from passing towards the activities located at the back of the area. The back side of the stand area was designated for the ''Catapult Design'' and "Ways on Magnetic Wall'' activities, due to the need for a greater number of materials. The area was open to all visitors, who were interested in watching, participating or engaging in activities offered throughout the fair. During the science fair, children who visited the stand were free to choose and attain whatever activity excited their attention. While children were engaging in any of the STEM activities, their significant others waited for children in front of the stand without participating or manipulating children physically or verbally.

Instrumentation

According to Gullo (2005), checklists are effective data collection tools in child studies, because its efficacy in assessing young children without intervening children, its simplicity to be used with them as well as its easiness to determine the existence of a certain behavior in them. Hence, in the current study, the data was collected with a checklist prepared by the researchers (see Appendix II). The checklist included three parts, which listed the activity chosen by the children, the gender of the child and the age of the child. The names of the activities were given in the first part of the list, which stated the ''chosen activity''. In the second part, the ''gender of participant'' was given, as there were two items to be marked, boy and girl. In the third and the last part of the checklist, the ''age of the child'' provided the items to be marked, the ages from three to eight. The instrument was easy to use so it did not require a special expertise. However, the researchers had discussed the issues that should be considered. That is, in the data collection process, it was important to make just observation regarding to activity preference of the child and not to intervene with the child at the selection process. The gender of the child and activity chosen by the child were determined through the observation of the researcher, whereas the age of the child was asked to the adult with the child to prevent the errors due to the prediction of the age of the child though observation of the researcher.

Data Analysis

Descriptive statistics and chi-square tests were conducted to determine the statistical difference between girls and boys, in terms of activity participation. Descriptive statistics and histograms were preferred to summarize categorical data; on the other hand, chi-square test was used to make comparisons based on categorical data between expected and acquired frequencies (Fraenkel, Wallen, & Hyun, 2012). In chi-square analysis for gender difference, the percentages of girl and boy participants in total number of participants as expected values were used to control unequal representation of different gender group, instead of 50% for each group (i.e., 41.50% for girls and 58.50% for boys).

Results

The current study aimed to determine the STEM related activity preferences of children at a science fair in terms of gender. Depending on the nature of this study descriptive statistics, like related frequencies and percentages are presented in the following charts. The results of descriptive statistics and the results of chi-square tests are also depicted in tables.

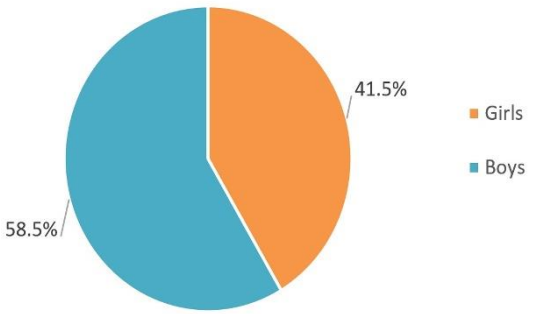

Figure 1. *Distribution of attendees by gender*

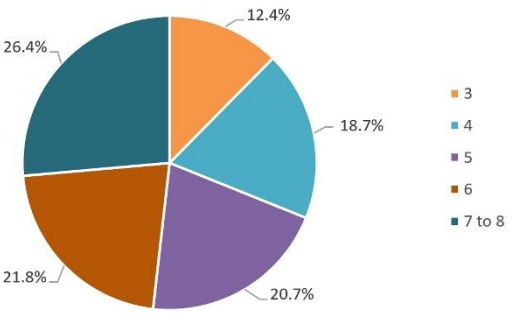

Figure 2. *Distribution of attendees by age*

A chi-square test was performed to examine the difference in gender-related preference of children for overall STEM activities (Table 2). The statistical results, χ^2 (1, n = 193) = 5.642, p = .018, indicate that the frequencies of children that attended the activities are not equally distributed by gender. Rather, the frequencies are statistically different from any figures that were expected to have naturally occurred. It appears that boys (n = 113) are disproportionately over-represented as participants of the activities and girls (n = 80) are under-represented (Figure 1). This result shows that boys participated in the provided activities more than girls.

Table 2

The result of chi-square of attendees' preference by gender

			Gender			
			Girls		Boys	
	X^2	p	f	%	f	%
Overall Participation	5.642	0.018	80	41.50	113	58.50

The results of descriptive statistics indicate that children aged 3 years old participated in STEM activities the least. On the other hand, the highest percentage of participant children were aged 7 and 8 years-old. Similarly, the percentages of children between 5 and 6 years-old, which, respectively, are 20.7% and 21.8%, were close in value. A chi-square test was performed to determine whether there is a significant difference between the preference of girls and boys for each age group (Table 3). The overall participation rates of girls and boys (41.50 for girls and 58.50 for boys) were used as propositions for expected values. The results of the tests revealed that the difference between boys and girls was significant in regards to their preference in age 5, χ^2 (1, n = 40) = 4.486, p = .034). More clearly, this result showed that significantly more boys participated in the age group 5 than girls. Moreover, there was a significant difference between boys and girls in the age group 6, χ^2 (1, n = 42) = 5.620, p = .018. This result showed that girls' participation was higher than boys in age group 6. On the other hand, result of the test revealed that there was no significant difference between the preference of girls and boys in age group 3, χ^2 (1, n = 26) = 0.186, p = .667), age group 4, χ^2 (1, n = 36) = 0.129, p = .720), and age group 7 to 8, χ^2 (1, n = 34) = 0.809, p = .368).

Table 3

The result of chi-square of attendees' preference for each age group

			Gender			
			Girls		Boys	
Activity	**X^2**	**p**	**f**	**%**	**f**	**%**
Age 3	0.186	0.667	11	45.8	13	54.2
Age 4	0.129	0.720	16	44.4	20	55.6
Age 5	4.486	0.034*	10	25.0	30	75.0
Age 6	5.620	0.018*	25	59.5	17	40.5
Age 7 to 8	0.809	0.368	18	35.3	33	67.7

* =p<.05

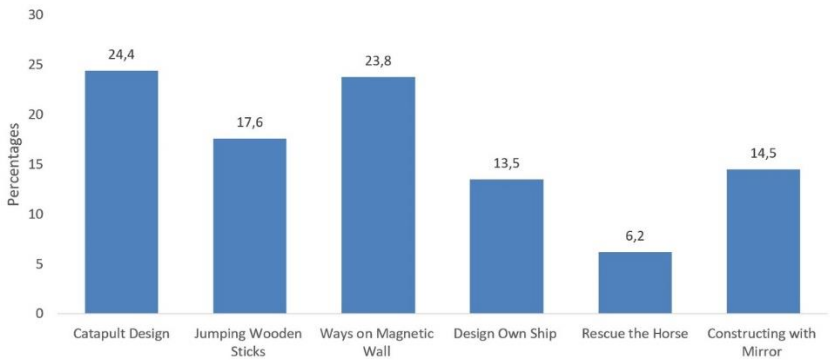

Figure 3. *Overall distribution of activity participations*

Figure 3 indicates the percentage of STEM activities preferred by children. According to this figure, the activities that are most preferred by children are, in order, the Catapult Design (n = 47) and the Ways on Magnetic Wall (n = 46). These activities are followed by Jumping Wooden Sticks (n = 34), Constructing with Mirror (n = 28), and Design Own Ship (n = 26), respectively. Moreover, Rescue the Horse was the activity least participated in (n = 12).

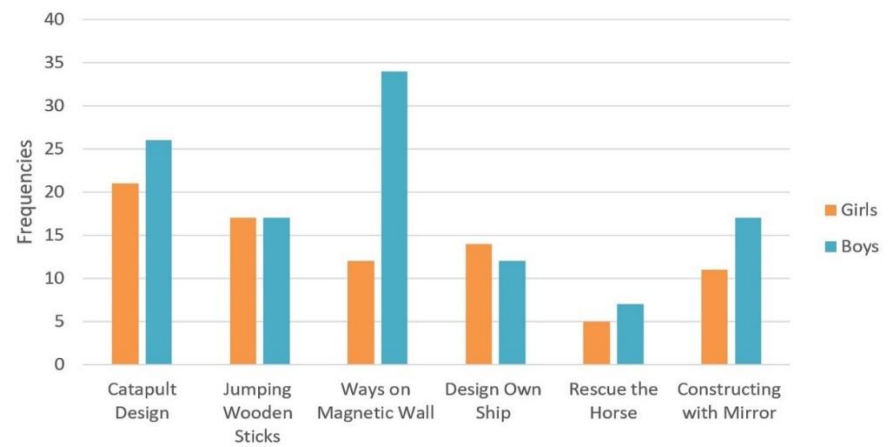

Figure 4. *Distribution of activity participants by gender*

Figure 4 indicates the distribution of activities by the participants' gender. According to the graph, the difference between the number of girls and boys in terms of their activity preferences is the highest

in regards to the magnetic wall activity. The Ways on Magnetic Wall was preferred by 12 girls in comparison to 34 boys. The number of participants for the other activities were; 21 girls and 26 boys for the Catapult Design, 17 girls and 17 boys for the Jumping Wooden Sticks, 14 girls and 12 boys for Design Own Ship, 5 girls and 7 boys for Rescue the Horse, and 11 girls and 17 boys for Constructing with Mirror.

The chi-square test was performed to determine whether there is a significant difference between the preference of girls and boys for each activity (Table 4). In regards to the tests for activity participation, overall participation rates of girls and boys (41.80 for girls and 58.20 for boys) were used as propositions for expected values. The results are presented in Table 4.

Table 4

The result of chi-square of attendees' preference for each activity

			Gender			
			Girls		Boys	
Activity	**X^2**	**p**	**f**	**%**	**f**	**%**
Catapult Design	0.196	0.658	21	44.7%	26	55.3%
Jumping Wooden Sticks	1.012	0.314	17	50.0%	17	50.0%
Ways on Magnetic Wall	4.501	0.034*	12	26.1%	34	73.9%
Design Own Ship	1.632	0.201	14	53.8%	12	46.2%
Rescue the Horse	0.000	0.991	5	41.7%	7	58.3%
Constructing with Mirror	0.057	0.812	11	39.3%	17	60.7%

* =p<.05

According to the results of the test, the difference between boys and girls was significant in regards to their preference for the Ways on Magnetic Wall activity, χ^2 (1, n = 46) = 4.501, p = .034). This result showed that more boys participated in the Ways on Magnetic Wall activity than girls. On the other hand, result of the test revealed that there was no significant difference between the preference of girls and boys in terms of the Catapult Design, χ^2 (1, n = 47) = 0.196, p = .658), Jumping Wooden Sticks, χ^2 (1, n = 34) = 1.012, p = .314), Design Own Ship, χ^2 (1, n = 26) = 1.632, p = .201), Rescue the Horse, χ^2 (1, n = 12) = 0.000, p = .991) and Constructing with Mirror activities, χ^2 (1, n = 34) = 0.057, p = .812).

Discussion, Conclusion, and Recommendations

According to the findings of this study, a greater number of boys visited the stand and participated in activities, than the number of girls. Clearly, the number of boys choosing to participate in STEM activities was higher than the number of girls. This finding may be a clue in terms of understanding the difference regarding gender preference in STEM activities (Christidou, 2006; Leibham et al., 2013; Lynn & Mikk, 2008). The main reason why a great number of boys participated more frequently in STEM activities may be related to some gender-related characteristics attributed to some of the fields. That is, fields such as biology, language and art are seen as feminine fields, while mathematics, physics, chemistry and technology-related fields are regarded as masculine fields (Farenga & Joyce, 1999). Similarly, the fact that the fair where the study was carried out was a science fair, and that there were science and technology related products displayed at the remaining stands, may have led parents to make stereotypical preferences based on the gender of their children.

When the gender difference examined in terms of age groups, the results of the study revealed that there is a difference between girls and boys just in age group of 5 and 6. There might be several possible explanations on the difference between girls and boys in for those age groups, and not for others. First, in Turkey, the early childhood education includes children between 0 to 6 years old (Turkish Ministry of National Education, 2013). On the other, according to OECD (2018), in 2016 most of the children enrolled in early childhood education were at 5 and 6 years old. Children at these age who are enrolled early childhood education might have had chances to select which activity they get involved or which material they engage in because the nature of the early childhood education requires. In such educational environment, children might be more vulnerable to get and internalize the messages given by people (teachers, peers) around them, the messages might be about some activities' and materials being more

appropriate for girls or boys. Second, for younger children in the study (at the age group of 3 and 4), most of whom are not in early childhood system, might be exposed less to the misdirection on their environment. There might be just the effect of their parents in the preference of activities. On the other hand, for children at the age group of 7-8 who are enrolled in primary education might not have a freedom of selection because in Turkish education context, there might be a more formal structure in primary education than early childhood education. Therefore, the arousal of different interest might be more difficult in more teacher directed as well as structured environments.

When the major characteristics of the activities are considered, it may be expected that some aspects of the activities might be interesting for children from different gender due to its characteristics considered appealing to girls or boys. On the other hand, the related literature has suggested contradictory findings for the effects of the content-related characteristics on children's preference. For example, some researchers found that boys are more interested in engineering-related activities such as playing with blocks (Desouza & Czerniak, 2002) and machinery (Murphy & Elwood, 1998). Considering the related literature, one could predict that some art-related materials, such as the paintbrush and paints required to be used in this activity, could have encouraged girls to engage in this activity, and may have appealed to them more than to boys (Early et al., 2010; Ruble, et al., 2006). In line with these research studies, for instance, the findings of the current study might be expected to indicate that more girls would participate in the Catapult activity, which was the only activity that included painting as a part of its required actions. On the other hand, the Design Your Ship activity did not include any painting, and might not be expected to be preferred by more girls than boys. Once again, it may be expected that the Design Your Ship activity would be preferred by boys more than girls, due to its engineering-related content. However, the results of the study revealed the opposite of this expectation. Rather, the findings of the current study, which did not provide significant difference for the preference of the activity preferences of boys and girls for most of the activities, revealed that the gender stereotypes that children are exposed to, can actually be less influential on children's preferences, when activities are appealing to interests of children in early childhood years.

However, significant difference between the activity choices of girls and boys was observed only at the Magnetic Wall Activity. Indeed, more than half of the children that selected the Magnetic Wall activity, were boys. The "Magnetic Wall" activity requires children to create some roads so that a ball can reach its target through the manipulation of some canals with the use of magnets. This process involves physical activities such as the lifting, manipulating and pulling of objects. These types of movements might have made this activity more attractive for boys, because these movements require children to be physically active and constructive. Clearly, the reason why boys chose the activity which requires more physical activity may be related to the differences between girls and boys in terms of their level of physical activity. Indeed, some studies state that boys are more physically active than girls, in activities conducted in preschool classrooms (Finn, Johansen, & Specker, 2002; Timmons, Naylor, & Pfeiffer, 2007). Moreover, boys are found to be more participant in activities related to machines and the manipulation of objects, than girls (Desouza & Czerniak, 2002; Murphy & Elwood, 1998).

Implications

The best way of creating equal opportunities for children in terms of participating in male-dominated fields, such as math and science, can be by valuing the understanding of math and science early in childhood (Bowman, Donovan, & Burns, 2001). Similarly, acts of teachers in the preparation of activities and setting selections are also crucial in having all children, regardless of their gender, involved in learning (Early et al., 2010). In this way, not only boys but also girls can have a chance to participate in different activities provided by teachers who consider all children as unique. At this point, it is also vital that teachers ought to provide activities for girls and boys in ways that involve creating challenges for the development of their current skills and for creating opportunities to practice different skills, which enhance their development and skills regarding STEM areas. That is, if children are challenged based on their skills, their development and the skills involved, may be enhanced. The key point here is again that teachers should give equal attention to both genders, instead of focusing on one particular gender, due to stereotypic thought where they show belief in ideas that STEM-related fields are more appropriate for boys, and that boys are more qualified to enter into these fields.

Another precaution which can be taken in both formal and informal educational settings to address gender bias in the classroom can be providing gender neutral materials and examples for children. Materials that include some gender stereotypic messages should be eliminated from learning environments, so as not to portray the wrong message, and instead gender-neutral materials should be welcomed by teachers (Aina & Cameron, 2011). In order to avoid conveying such a message, teachers can select gender-neutral materials which address all children (The Institution of Engineering and Technology [IET], 2016). Furthermore, if children are provided with materials that do include some gender attributes, teachers may eliminate the stereotypic preferences of children by encouraging them to play with their counterparts. According to the study conducted by Goble et al. (2012), children engaged more in playing with gender-neutral materials rather than gender-specific materials. This study also revealed that girls participated more in spending time with materials regarded as masculine while they were playing with boys in the classroom.

Limitations

Like any other study, the current study had several limitations in itself. Just as the study was built upon informal science learning experience which was open to the public, selection of the participant children was based on their interests and desires to choose a STEM activity to engage in. Herein, there was an obvious difference in the numbers of boys and girls participated in the study, resulting in a possible threat for the validity of the study. However, although it seems as a limitation, this unequal representation of different gender group was controlled by using percentages of girls and boys as expected values, instead of 50% for each group. Moreover, since this study investigated the participation rates of young children in STEM activities prepared for a science fair, examination of whether an interaction occurred between children and toys and materials which would have been interesting for children was beyond the primary aim of the study. For this reason, a possible interaction which might occur between children in early ages and toys and materials can be investigated by scholars in future research.

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Appendices

Appendix I: STEM activities

Table 1 STEM Activities

Activity	Problem Situation	Materials	Process	Content	Picture
Catapult Design	Designing a catapult which enables children to throw sponges, dyed in primary colors, at the same target to obtain accent colors	Wooden sticks Sponges White board Finger paints Rubber band	Children are expected to design their own catapult mechanism by using spatulas and rubber bands in order to throw dyed sponges at a target.	Force Designing Measurement Angle Art	
Jumping Wooden Sticks	Making the first wooden stick in an line move the last one without direct contact	Wooden sticks	The activity was designed to ask children to prepare a pattern with wooden sticks and make further sticks move without touching them.	Potential energy to kinetic energy Pattern Designing	
Ways on Magnetic Wall	Designing a path to enable a ball thrown from a starting point at the top, to reach a pre-determined end point	Pipes with different shapes and sizes Ball Bucket White board	For the activity a variety of magnetic pipes, which provide a path for balls, were used. Participants came in front of a white board and designed their own path by using the magnetic pipes in order to drop the ball to a target on the ground. In this way, they had a chance to experience the impact of gravity, changes in potential and kinetic energies, and frictional force on objects.	Gravity Potential energy to kinetic energy Friction force Designing Measurement Counting	

Table 1 cont.

Activity	Problem Situation	Materials	Process	Content	Picture
Design Your Ship	Designing a ship which can float and move in accordance with air stream	Wooden sticks Balloons Waste materials	Children are asked to make their own ships with waste materials.	Buoyancy of water Designing model Problem solving Measurement Art	
Rescue the Horse	Finding a solution to make sinking toys float	Wooden sticks Miniature toys Easy-to-reach materials	Children are asked to design a construction in order to rescue a horse from drowning.	Problem solving Designing Buoyancy of water Balance Comparing	
Constructing with Mror	Creating unique buildings by using reflections on a mirror	Wooden blocks with different shapes and sizes Mirrors	During the activity two mirrors were located on the floor in a way that made a 90-degree angle. Children were expected to build constructions by using the reflections of the blocks on the mirror located below based on their existing mathematics knowledge.	Symmetry Shapes Quarter/half/whole	

Appendix II: Data collection instrument

Activity chosen by the child	☐ Catapult Design ☐ Jumping Wooden Sticks ☐ Ways on Magnetic Wall ☐ Design Own Ship ☐ Rescue the Horse ☐ Constructing with Mirror
Child gender	☐ Girl ☐ Boy
Age of the child	☐ Age 3 ☐ Age 4 ☐ Age 5 ☐ Age 6 ☐ Age 7 to 8

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Preschool Teachers' Informal Learning Behaviors

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Murat Bartan*

Abstract

Informal learning is the primary feature that transforms educational activities into lifelong learning. Informal learning refers to people's discovering new things and improving their experience in everyday life. That is, it refers to learning outside the classroom. Teachers' informal learning styles are thought of as ways in which they overcome their deficiencies while continuing their profession. This study aims to reveal preschool teachers' informal learning behaviors in their workplaces. Thus, it is a descriptive survey study. The study group was selected through simple random sampling. The participants include 117 preschool teachers working in Kütahya province of Turkey in the 2018-2019 academic year. The study showed that the most frequently employed informal learning activity by preschool teachers is "search the internet" while the least employed one is "consult to an online community that you are a member of". Focusing on informal learning activities of information technologies teachers in their workplaces. An overall evaluation of environmental inhibitors to informal learning of preschool teachers shows that "lack of free time" affects the teachers most while "lack of monetary rewards" affects them least. An overall evaluation of personal characteristics that enhance informal learning for preschool teachers shows that "love of learning" affects teachers' involvement in informal learning activities most while "initiative" has the least effect on informal learning activities.

Keywords: : Informal learning, preschool, teacher, child.

*Dr., Kütahya Dumlupinar University, Faculty of Education, Department of Preschool Education, Kütahya, Turkey. E-mail: murat.bartan@dpu.edu.tr, 0000-0003-2947-5643

Okul Öncesi Öğretmenlerinin İnformal Öğrenme Davranışları

Makale Türü	Başvuru Tarihi	Kabul Tarihi
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Murat Bartan*

Öz

Eğitim öğretim faaliyetlerini yaşam boyu öğrenmeye dönüştüren özelliklerin başında informal öğrenme gelmektedir. İnformal öğrenme, insanların yeni şeyleri keşfetmesi ve tecrübelerini artırması, gündelik hayat içinde gerçekleşebilen, okullarda veya okul dışında meydana gelen öğrenmeler şeklinde de tanımlanmaktadır. Öğretmenlerin informal öğrenme şekilleri, onların mesleklerini devam ettirirken eksikliklerini giderdikleri yollar olarak düşünülmektedir. Bu araştırma okul öncesi öğretmenlerinin iş ortamlarındaki informal öğrenme davranışlarının belirlenmesi amacı ile gerçekleştirilmiştir. Araştırma, betimsel tarama modelinde gerçekleştirilmiştir. Araştırmanın çalışma grubu seçkisiz örnekleme yöntemlerinden basit seçkisiz örnekleme yoluyla belirlenmiş ve 2018-2019 eğitim öğretim yılında Kütahya ilinde görev yapan 117 okul öncesi öğretmeni ile çalışma yürütülmüştür. Araştırma sonucunda okul öncesi öğretmenlerin en sık başvurdukları informal öğrenme etkinliğinin internette arama yapmak olduğu, en az ise üyesi olduğu çevrimiçi topluluğa sormak/danışmak olduğu sonucuna ulaşılmıştır. Okul öncesi öğretmenlerinin informal öğrenme etkinliklerinde bulunmalarını etkileyen çevresel engelleyicilere en fazla zaman eksikliği engelini söylerken en az ise parasal ödüllerin olmasını ifade etmişlerdir. Okul öncesi öğretmenlerinin informal öğrenme etkinliklerinde bulunmalarını etkileyen kişisel özelliklere ise en fazla öğrenme arzusu/hevesi, en az ise bir etkinliğe başlama ve devam etme kararlılığını ifade etmişlerdir.

***Anahtar Sözcükler*:** İnformal öğrenme, okul öncesi, öğretmen, çocuk.

* Dr. Öğr. Üyesi, Kütahya Dumlupınar Üniversitesi Eğitim Fakültesi Okul Öncesi Eğitimi Anabilim Dalı, Kütahya, Türkiye. E-posta: murat.bartan@dpu.edu.tr, 0000-0003-2947-5643

Introduction

International organizations such as the Council of Europe, UNESCO, and the OECD have indicated the concept of lifelong learning as a general principle in the reshaping and implementation of education (Kaya, 2016). Many countries have developed policies, strategies, or mechanisms aimed at establishing lifelong learning systems. Efficient lifelong learning policies aim to make learning a part of the everyday life of citizens (Hanemann, 2015; Yang and Valdes-Cotera, 2011). While the European Union defines lifelong learning as a period of training activities to improve knowledge, skills, and competences (Odabaş and Polat, 2008), another definition describes it as any formal or informal, continuous learning activities carried out for the purpose of fostering knowledge, skills, and abilities within the framework of personal, social, or business life (Güleç, Çelik and Demirhan, 2012). The European Commission shows the scope of lifelong learning as all formal and informal learning from preschool to retirement (Kıvrak, 2007). The European Community Commission (2000) states that informal learning activities should be further supported with an emphasis on lifelong learning activities in education and training processes in the course of transition to information-based society as well as economic and social change. The concept of lifelong learning for teachers is thought to involve identification of the current challenges, demands, and needs by creating various educational pathways in schools (Bedmar and Palma, 2012).

Informal learning is the primary feature that transforms educational activities into lifelong learning (Göğebakan Yıldız, 2017). It is also at the heart of economic, workplace, and educational reform discourses (Garrick, 2001). Informal learning refers to people's discovering new things and improving their experience (Bozdoğan, 2007) in everyday life (Gerber and Marek, 2001). That is, it refers to learning outside the classroom (Kara, 2010). While there are different definitions of informal learning, a brief literature review shows that different features of informal learning are emphasized in previous studies. Watkins and Marsick (1992) state that informal learning is a) based on learning from experience; b) embedded in the organizational context; c) oriented to a focus on action; d) governed by non-routine conditions; e) concerned with tacit dimensions that must be made explicit; f) delimited by the nature of the task; and g) improved by critical reflectivity and creativity. Schugurensky (2000) argues that there are three forms of informal learning, which are self-directed learning, incidental learning, and socialization. Informal learning environments are as important as informal learning itself. In informal learning environments, the aim is to increase the knowledge of individuals and make them gain the ability to solve the problems they may face in their daily lives (Türkmen, 2010). Eraut (2004) states that informal learning allows much more freedom and flexibility to learners than formal environments, and it is more commonly employed in adult education as it draws attention to learning in daily activities and makes individuals learn from their experiences. Research shows that the role and effect of informal learning on individuals' learning efficiency becomes more important as of high school period. Livingstone (2002) stated that more than 90% of adults were involved in informal learning activities and that the time allocated to informal learning activities had increased to 15 hours per week among adults in the last year.

It is stated that the main purpose of activities carried out in informal learning environments is to contribute to active learning, and activities in informal learning environments can be used to strengthen the learning activities carried out in the classroom (Tatar and Bağrıyanık, 2012). Previous studies showed that the skills we aim to equip children with in schools are learned faster by them in informal environments outside the school (Braund and Reiss, 2006; Hofstein and Rosenfeld, 1996; Melber and Brown, 2008; Stocklmayer, Rennie and Gilbert, 2010; Wulf, Mayhew and Finkelstein, 2010).

Taking into account the results of previous studies, it is believed that teachers, also being adults, prefer to learn informally. The literature review showed that there is no study dwelling on preschool teachers' informal learning. Therefore, we believe that this study will contribute to the related literature. To this end, this study aims to reveal preschool teachers' informal learning behaviors in their workplaces.

In this sense, the research questions below are addressed:

1. Which informal learning activities are available in preschool teachers' workplaces?
2. What are the environmental inhibitors that prevent preschool teachers from getting involved in informal learning activities?
3. What are the personal characteristics that enhance the involvement of preschool teachers in informal learning activities?

Method

Research Model

This study seeks to reveal preschool teachers' informal learning behaviors in their workplaces. Thus, it is a descriptive survey study. The survey model is a research model that aims to describe a past or present case as it is and tries to define the individual or the object of study as it is within its own context (Karasar, 2012).

Study Group

The study group was selected through simple random sampling. The participants include 117 preschool teachers working in Kütahya province of Turkey in the 2018-2019 academic year. Table 1 shows the participating teachers' personal details.

Table 1
Personal details of the study group

	N	%		N	%
Gender			**Level of Education**		
Female	107	91.5	Minor in child development	5	4.3
Male	10	8.5	Bachelor's degree from an open education program	21	17.9
			Bachelor's degree from a formal education program	91	77.8
Age			**Workplace**		
Less than 25	21	17.9	Preschool	97	82.9
Between 26 and 30	37	31.6	Kindergarten	17	14.5
Between 31 and 35	35	29.9	Practice kindergarten	3	2.6
Between 36 and 40	18	15.4	**Seniority**		
41 or over	6	5.2	1 to 5 years	41	35.1
Membership to Any Organization			6 to 10 years	44	37.6
Yes	48	41.0	11 to 15 years	21	17.9
No	69	59.0	16 years and over	11	9.4

Table 1 shows that 91.5% (107) of the participating teachers are female while 8.5% (10) are male. 4.5% (5) of the teachers have a minor in child development, 17.9% (21) a bachelor's degree in preschool education from an open education program, and 77.8% (91) a bachelor's degree in preschool education from a formal education program. 17.9% (21) of the participating teachers are younger than 25, 31.6% (37) aged between 26 and 30, 29.9% (35) aged between 31 and 35, 15.4% (18) aged between 36 and 40, and 5.2% (6) aged 41 or over. 82.9% (97) of the teachers work in preschools, 14.5% (17) in kindergartens, and 2.6% (3) in practice kindergartens. 35.1% (41) of the teachers have an experience of 1 to 5 years, 37.6% (44) an experience of 6 to 10 years, 17.9% (21) an experience of 11 to 15 years, and 9.4% (11) an experience of 16 years or more. The table also shows that 41.0% (48) of the teachers have a membership to one of the organizations that are relevant to their field whereas 59.0% (69) do not.

Research Instruments and Procedures

The data collection tool is "Informal Learning Survey" developed by Lohman (2005) and adapted into Turkish by Alakurt (2015). Informal Learning Survey has three sections that are types of

informal learning activities, environmental inhibitors to informal learning, and personal characteristics enhancing informal learning.

There are nine questions in the first section to reveal which informal learning activities the participants engage in their workplaces. The section aims to reveal which features of the participants' workplaces (lack of free time, lack of access to computer technology, lack of proximity to colleagues' work areas, lack of recognition, and lack of monetary rewards) that inhibit their engagement in the informal learning activities which are given in the first section. The third section deals with personal characteristics that enhance their motivation to engage in informal learning activities given in the first section (interest in professional field/subject area, love of learning, initiative, and self-efficacy). A Likert-type scale ranging from 1 (never) to 5 (always) was used for these items. Reliability coefficients were calculated for groups of closed-ended items, yielding the following alpha coefficients: Informal learning activities .63; Environmental influence—Lack of free time, .79; Lack of proximity to colleagues' work areas, .84; Lack of access to computer technology, .93; Lack of monetary rewards, .94; Lack of recognition, .96; Personal characteristic—Initiative, .89; Self-efficacy, .93; Love of learning, .85; and Interest in profession, .88.

Data Collection and Analysis

In the study, the data were collected as a result of the Informal Learning Questionnaire applied face-to-face to preservice teachers. The study is descriptive research and descriptive statistics were used in the analysis of the data.

Results

In this section, there are tables showing types of informal learning activities preschool teachers engage in their workplaces, their environmental inhibitors to informal learning, and personal characteristics enhancing informal learning.

Results Regarding the Types of Informal Learning Activities Preschool Teachers Engage in Their Workplaces

Table 2
Types of informal learning activities preschool teachers engage in their workplaces

Informal Activities*	**N**	**Min**	**Max**	**Mean** $\bar{x}$	**Mod**	**Standard Deviation**
Search the Internet	117	3	5	4.61	5	.617
Share materials and resources with others (friends, colleagues, etc.)	117	3	5	4.48	5	.690
Talk to others (friends, colleagues, etc.)	117	3	5	4.42	5	.685
Collaborate with others (friends, colleagues, etc.)	117	2	5	4.32	5	.729
Reflect on your actions	117	1	5	4.22	4	.862
Observe others (friends, colleagues, etc.)	117	1	5	4.16	4	.787
Trial and error	117	2	5	3.85	4	.912
Scan professional magazines and journals	117	1	5	3.71	4	.992
Consult to an online community that you are a member of	117	1	5	2.97	3	1.303

Based on the mean scores, Table 2 shows that the most frequent informal learning activity that the preschool teachers engage in is "search the Internet" ($\bar{x}$= 4.61). Other informal learning activities in which the teachers engage are respectively as follows: "share materials and sources with others" ($\bar{x}$= 4.48); "talk to others" ($\bar{x}$= 4.42); "collaborate with others" ($\bar{x}$= 4.32); "reflect on your actions" ($\bar{x}$= 4.22); "observe others" ($\bar{x}$= 4.16); "trial and error" ($\bar{x}$= 3.85); "scan the professional magazines and journals" ($\bar{x}$= 3.71); and "consult to an online community that you are a member of" ($\bar{x}$= 2.97). Results regarding preschool teachers' environmental ınhibitors to ınformal learning are shown in table 3.

Table 3

Results regarding preschool teachers' environmental inhibitors to informal learning

		Talk to others (friends, colleagues, etc.)	Collaborate with others (friends, colleagues, etc.)	Observe others (friends, colleagues, etc.)	Share materials and resources with others (friends, colleagues, etc.)	Search the Internet	Scan professional magazines and journals	Trial and error	Reflect on your actions	Consult to an online community that you are a member of
Lack of free time	N	117	117	117	117	117	117	117	117	117
	Min	1	1	1	1	1	1	1	1	1
	Mak	5	5	5	5	5	5	5	5	5
	Ort	3,15	3,14	**3,24**	2,88	2,77	3,16	2,89	**2,70**	2,71
	Mod	3	3	4	3	2	3	3	3	3
	Ss	1,127	1,050	1,039	1,100	1,109	1,066	1,143	1,075	1,209
Lack of proximity to colleagues' work areas	N	117	117	117	117	117	117	117	117	117
	Min	1	1	1	1	1	1	1	1	1
	Mak	5	5	5	5	5	5	5	5	5
	Ort	3,20	3,27	**3,42**	3,18	2,29	2,26	2,15	**2,11**	2,31
	Mod	4	4	4	4	1	1	1	1	1
	Ss	1,212	1,229	1,169	1,243	1,239	1,153	1,172	1,135	1,323
Lack of access to computer technology	N	117	117	117	117	117	117	117	117	117
	Min	1	1	1	1	1	1	1	1	1
	Mak	5	5	5	5	5	5	5	5	5
	Ort	2,62	2,58	2,62	2,80	**3,81**	3,06	2,15	**2,10**	3,19
	Mod	1	1	1	4	5	4	1	1	5
	Ss	1,382	1,346	1,369	1,310	1,306	1.398	1,236	1,258	1,587
Lack of monetary rewards	N	117	117	117	117	117	117	117	117	117
	Min	1	1	1	1	1	1	1	1	1
	Mak	5	5	5	5	5	5	5	5	5
	Ort	1,32	**1,30**	1,36	1,50	1,47	**1,51**	1,38	1,31	1,37
	Mod	1	1	1	1	1	1	1	1	1
	Ss	,772	,772	,843	1,047	1,039	1,064	,936	,793	,906
Lack of recognition	N	117	117	117	117	117	117	117	117	117
	Min	1	1	1	1	1	1	1	1	1
	Mak	5	5	5	5	5	5	5	5	5
	Ort	2,98	**3,11**	2,89	2,85	1,57	1,62	1,58	**1,54**	1,90
	Mod	4	4	4	4	1	1	1	1	1
	Ss	1,203	1,158	1,202	1,302	,958	1,089	1,069	,987	1,262

Table shows that "lack of free time" affects the informal activity to "observe others" ($\bar{x}$= 3.24) most whereas it has the least effect on the informal activity to "reflect on your actions" ($\bar{x}$= 2.70). "Lack of proximity to colleagues' work areas" affects the informal activity "observe others" ($\bar{x}$= 3.42) most whereas it has the least effect on "reflect on your actions" ($\bar{x}$= 2.11). "Lack of access to computer technology" affects the informal activity "search the internet" ($\bar{x}$= 3.81) most whereas it has the least effect on the informal activity "reflect on your actions" ($\bar{x}$= 2.10). "Lack of monetary rewards" affects the informal activity "scan the professional magazines and journals" ($\bar{x}$= 1.51) most whereas it has the least effect on the informal activity "collaborate with others" ($\bar{x}$= 1.30). "Lack of recognition" affects the informal activity "collaborate with others" ($\bar{x}$= 3.11) most whereas it has the least effect on the informal activity "reflect on your actions" ($\bar{x}$= 1.54).

Results Regarding Preschool Teachers' Environmental Inhibitors to Informal Learning

Table 4

Preschool teachers' environmental inhibitors to informal learning

Environmental Inhibitors	N	Min	Max	Mean x̄	Mod	Standard Deviation
Lack of free time	117	9	45	26.65	27	7.338
Lack of proximity to colleagues' work areas	117	9	43	24.18	25	8.106
Lack of access to computer technology	117	9	45	24.92	25	9.130
Lack of monetary rewards	117	9	45	12.53	9	7.522
Lack of recognition	117	9	45	20.05	9	7.485

The total mean scores regarding environmental inhibitors to informal learning, as seen in Table 4, show that the preschool teachers are mostly inhibited by "lack of free time" (x̄= 26.65). It is followed respectively by "lack of access to computer technology" (x̄=24.92), "lack of proximity to colleagues' work areas" (x̄= 24.18), "lack of recognition" (x̄=20.05), and "lack of monetary rewards" (x̄= 12.53). Results regarding preschool teachers' personal characteristics enhancing ınformal learning are shown in table 5.

Table 5

Results regarding preschool teachers' personal characteristics enhancing informal learning

		Talk to others (friends, colleagues, etc.)	Collaborate with others (friends, colleagues, etc.)	Observe others (friends, colleagues, etc.)	Share materials and resources with others (friends, colleagues, etc.)	Search the Internet	Scan professional magazines and journals	Trial and error	Reflect on your actions	Consult to an online community that you are a member of
Initiative	N	117	117	117	117	117	117	117	117	117
	Min	1	1	1	1	1	1	1	1	1
	Mak	5	5	5	5	5	5	5	5	5
	Ort	4,32	4,30	4,22	4,29	**4,40**	4,29	4,30	4,27	**3,85**
	Mod	5	5	5	5	5	5	5	5	5
	Ss	,988	,998	,984	,938	,956	1,034	1,069	1,047	1,324
Self-efficacy	N	117	117	117	117	117	117	117	117	117
	Min	1	1	1	1	1	1	1	1	1
	Mak	5	5	5	5	5	5	5	5	5
	Ort	**4,50**	4,47	4,49	4,49	4,44	4,39	4,45	4,39	**4,03**
	Mod	5	5	5	5	5	5	5	5	5
	Ss	,761	,783	,727	,738	,894	,880	,836	,973	1,245
Love of Learning	N	117	117	117	117	117	117	117	117	117
	Min	1	1	1	1	1	1	1	1	1
	Mak	5	5	5	5	5	5	5	5	5
	Ort	4,59	4,59	4,52	4,48	**4,67**	4,52	4,64	4,61	**4,32**
	Mod	5	5	5	5	5	5	5	5	5
	Ss	,811	,811	,847	,906	,695	,887	,714	,798	1,142
Interest in Professional Field/Subject Area	N	117	117	117	117	117	117	117	117	117
	Min	1	1	1	1	1	1	1	1	1
	Mak	5	5	5	5	5	5	5	5	5
	Ort	4,57	4,46	4,56	4,48	**4,62**	4,49	4,56	4,60	**4,29**
	Mod	5	5	5	5	5	5	5	5	5
	Ss	,791	,846	,793	,826	,717	,837	,803	,788	1,145

As shown in Table 4, "initiative" affects the activity "search the internet" most ($\bar{x}$= 4.40) while it has the least effect on the activity "consult to an online community that you are a member of" ($\bar{x}$= 3.85). "Self-efficacy" affects the activity "talk to others" ($\bar{x}$= 4.50) most whereas it has the least effect on "consult to an online community that you are a member of" ($\bar{x}$= 4.03). "Love of learning" affects the activity "search the internet" most ($\bar{x}$= 4.67) while it has the least effect on "consult to an online community that you are a member of" ($\bar{x}$= 4.32). "Interest in professional field/subject area" affects the activity "search the internet" most whereas it has the least effect on "consult to an online community that you are a member of" ($\bar{x}$= 4.29).

Results Regarding Preschool Teachers' Personal Characteristics Enhancing Informal Learning

Table 6

The preschool teachers' personal characteristics enhancing informal learning

Personal characteristics	**N**	**Min**	**Max**	**Mean** $\bar{x}$	**Mod**	**Standard Deviation**
Initiative	117	9	45	38.19	45	7.745
Self-efficacy	117	9	45	39.64	45	6.070
Love of Learning	117	9	45	40.93	45	6.148
Interest in Professional Field/Subject Area	117	9	45	40.61	45	6.160

The total mean scores regarding personal characteristics that enhance informal learning, as shown in Table 6, show that it is "love of learning" ($\bar{x}$= 40.93) that enhances the preschool teachers' informal learning most. Other characteristics that enhance informal learning are "interest in professional field/subject area" ($\bar{x}$= 40.61), "self-efficacy" ($\bar{x}$= 39.64), and "initiative" ($\bar{x}$= 38.19), respectively.

Discussion, Conclusion and Recommendations

The results of this study revealing preschool teachers' informal learning activities are similar to the results of previous studies in the literature.

The study showed that the most frequently employed informal learning activity by preschool teachers is "search the internet" while the least employed one is "consult to an online community that you are a member of". Focusing on informal learning activities of information technologies teachers in their workplaces, Alakurt (2015) similarly revealed that the most frequently employed informal learning activity is "search the internet". In the study of teachers examining informal learning activities, Lohman (2006) concluded that teachers prefer to talk with their other friends the most, and at least they search for resources related to their field. In the study, in which they examined the informal learning activities used in the workplaces, Berg & Chyung (2008) found that one of the most frequently used ways by the participants was conversations among themselves. In the research conducted by Richter (2011), it was found that while teachers applied to the more professional literature in the following years, cooperation with their colleagues decreased. In her study, Güvercin (2014) found that teachers try to develop their professional competencies by trying new methods, socializing by observing more experienced teachers, and also associating being a good teacher with personal characteristics.

In relation to environmental inhibitors to informal learning, it was seen that "lack of free time" and "lack of proximity to colleagues' work areas" affect the activity "observe others" most while they have the least effect on "reflect on your actions". The inhibitor "lack of access to computer technology" affects the activity "search the internet" most while it has the least effect on "reflect on your actions". The inhibitor "lack of monetary rewards" affects the activity "scan the professional magazines and journals" most while it has the least effect on "collaborate with others". The inhibitor "lack of recognition" affects the activity "collaborate with others" most while it has the least effect on "reflect on your actions".

An overall evaluation of environmental inhibitors to informal learning of preschool teachers shows that "lack of free time" affects the teachers most while "lack of monetary rewards" affects them least. Alakurt (2015) reached a similar result as well. In a similar study, in a research on teachers and preservice teachers about learning out of school conducted by Karademir (2013), it was stated that teachers are reluctant to plan out-of-school learning environment activities, in which the situation of creating out-of-school activities differs in terms of time and cost. In the research conducted by Dağ (2016), it was concluded that informal learning of science teachers was influenced by some factors such as the jobs they worked for, teachers they had when they were students, visits to institutions and organizations such as museums, aquariums and science centres, groups they participate as volunteers or members, their experiences in school and reading articles and essays and also using the internet and watching TV before starting their teaching profession.

In relation to personal characteristics that enhance informal learning, it was seen that "initiative" affects the activity "search the internet" most whereas it has the least effect on "consult to an online community that you are a member of". "Self-efficacy" affects the activity "talk to others" most whereas it has the least effect on "consult to an online community that you are a member of". "Interest in professional field/subject area" affects the activity "search the internet" most whereas it has the least effect on "consult to an online community that you are a member of". An overall evaluation of personal characteristics that enhance informal learning for preschool teachers shows that "love of learning" affects teachers' involvement in informal learning activities most while "initiative" has the least effect on informal learning activities. In the study carried out by Kwakman (2003), it was concluded that professional attitudes, evaluating the appropriateness of learning activities, the significance of learning activities affect informal learning. In the study conducted by Yaşar (2013), it was concluded that smartphones are used in informal learning and that these activities are mostly conducted in the form of research for their search engines, media files or documents, and social networks. Efe (2014) stated that mobile devices are used for instant learning and they carry out informal learning in this way.

Some recommendations can be made based on the research results. The teachers were seen to be using the internet most. Therefore, qualitative studies may be conducted to see what their searches are about in detail. The effects of other variables on informal learning may be analyzed. Teachers may be trained about ways of informal learning as part of lifelong learning. Teachers' awareness regarding the publications in their fields/subject areas may be raised, and they may be helped to access these publications.

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Science Teachers' Self-efficacy in Instruction and Self-efficacy in Student Engagement across Estonia, Japan, and Turkey

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Eren Ceylan*

Abstract

Self-efficacy of science teachers has attracted many researcher interest since its association with teachers' quality of instruction, teachers' job satisfaction, and student's achievement and motivation. Therefore, it is very crucial to investigate the factors that affect science teacher's self-efficacy beliefs such as the components of school climate, the indicators of sources of self-efficacy, and teachers' background characteristics. In this respect, this study was carried out to reveal the effect of a set of variables such as professional collaboration among teachers, teacher-student relation, disciplinary climate, needs for professional development in subject matter and pedagogy, workplace well-being and stress, experience of teachers, and gender of teachers on science teachers' self-efficacy in instruction and self-efficacy in student engagement in Estonia, Japan, and Turkey. The variables of this study were gathered from the TALIS 2018. Multiple Logistic Regression was run to estimate the science teachers' odds of having high self-efficacy in instruction and in student engagement across three countries. The results revealed that whereas significant odds ratios were yielded for some of variables related to school climate, sources of self-efficacy and teachers' backgrounds, the magnitudes of the odds ratios show some variations across the countries.

Keywords: Science teachers' self-efficacy, school climate, TALIS 2018, sources of self-efficacy.

* *Corresponding Author:* Associate Professor, Ankara University, Faculty of Educational Sciences, Elemantary Education Department, Ankara, Turkey. E-mail: ernceylan@gmail.com https://orcid.org/0000-0001-8244-8260

Estonya, Japonya ve Türkiye'deki Fen Öğretmenlerinin Öğretimdeki ve Öğrenci Motivasyonundaki Öz-yeterlikleri

Makale Türü	Başvuru Tarihi	Kabul Tarihi
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Eren Ceylan*

Öz

Öğretimin kalitesiyle, öğretmenlerin iş tatminleriyle, öğrenci başarısı ve motivasyonuyla oldukça alakalı olan fen öğretmenlerinin öz-yeterliliği birçok araştırmacının ilgisini çekmiştir. Bu nedenle, fen öğretmenlerinin öz-yeterlik inanışlarını etkileyen okul iklimini oluşturan bileşenler, öz-yeterlik kaynaklarının göstergeleri ve öğretmen özellikleri gibi etmenleri incelemek oldukça önemlidir. Bu bağlamda, bu çalışma Estonya, Japonya ve Türkiye'de bulunan fen öğretmenlerinin öz-yeterliklerine öğretmenler arası iş birliği, öğretmen öğrenci ilişkileri, disiplin iklimi, öğretmenlerin alan ve pedagoji bilgisine yönelik mesleki gelişim ihtiyaçları, işyerinde iyi hissetme ve stres, öğretmen deneyimi ve cinsiyet gibi değişkenlerin etkisini ortaya çıkarmak için yapılmıştır. Bu çalışmada TALIS 2018 verileri kullanılmıştır. Bu üç ülkede, fen öğretmenlerinin öğretim ve öğrenci motivasyonunda yüksek öz-yeterlikte bulunma olasılıkları çoklu lojistik regresyon analizi ile kestirilmiştir. Bulgular, okul iklimi, öz-yeterlik kaynakları ve öğretmen özellikleriyle alakalı bazı değişkenler için anlamlı olasılık oranları gösterse de bu olasılık oranlarının büyüklükleri ülkeler arasında farklılık göstermektedir.

Anahtar Sözcükler: Fen öğretmenlerinin öz-yeterlikleri; okul iklimi; TALIS 2018, öz-yeterlik kaynakları.

* *Sorumlu Yazar:* Doç. Dr., Ankara Üniversitesi Eğitim Bilimleri Fakültesi Temel Eğitim Bölümü, Ankara, Türkiye. E-posta: ernceylan@gmail.com, https://orcid.org/0000-0001-8244-8260

Introduction

Being one of the essential characteristics of teachers and having a potential of being associated with teachers' quality of instruction which is directly related to the students motivation and achievement, self-efficacy of teachers have attracted many researchers interest in the field of education (Holzberger, Philipp and Kunter, 2013). In addition to the robust relations with students' educational outcomes, the association of self-efficacy with the teachers' job satisfaction which is also effects teachers' burnout and their well-being was also expressed in the literature (Skaalvik and Skaalvik, 2010).

Self-efficacy beliefs was defined as the individual perceptions of their ability to successfully plan and carry out a particular courses of action (Bandura, 1997). It was stated that although self-efficacy beliefs are affected by external factors, these beliefs are self-referent which means subjective inferences about one's own ability (Usher and Pajares, 2008). Different self-efficacy beliefs may emerge in different teaching environment and different teaching practices (Klassen et al., 2011; Malinen et al., 2013). Therefore, it was argued that teacher self-efficacy in teaching is not a construct that have only one dimension. Multidimensional framework which includes three self-efficacy core factors such as self-efficacy in instruction, self-efficacy in student engagement, and self-efficacy in classroom management was proposed to investigate teachers' self-efficacy in an accurate way (Klassen et al., 2011).

Although few things are known about the sources of teachers' self-efficacy function into the practice, the sources of self-efficacy were categorized into four as mastery experience, verbal persuasion, vicarious experience, and physiological arousal (Bandura, 1997; Tschannen-Moran et al., 1998). Mastery experiences defined as the authentic experiences that a person performs an ability to sustain and succeed the task. So, the association of higher self-referent subject matter knowledge and higher levels of self-efficacy was reported in the literature (Rice and Roychoudhury, 2003). Second source of self-efficacy was defined as vicarious experiences which refer to see or observe a person succeed a task. The third source of self-efficacy was stated as verbal persuasion which refer a significant person's faith about one's capabilities. Reaction of stress, fatigue, and mood refers to the fourth source of self-efficacy: physiological arousal (Bandura, 1997). In addition, Bandura (2012) expressed that the circumstances in which a given task is performed effects the one's self-efficacy. Therefore, school climate refers the circumstances in which teaching occurs has a great potential to influence teachers' self-efficacy. In some studies, school climate has been used as a mediator between self-efficacy and teachers job satisfaction (Malinen & Savolainen, 2016).

Science teachers' self-efficacy was investigated in many studies (Petersen and Treagust, 2014; Tosun, 2000) and it was reported that science teachers' low self-efficacy causes expository methods rather than inquiry to be used in science teaching (Palmer, Dixon & Archer, 2015). In the recent years, the opportunities inserted to the science method courses to enhance teacher candidate's self-efficacy by exposing them to the practices in science teaching (Settlage, Southerland, Smith, & Ceglie, 2009). But, the results of these initiatives have not indicated the effectiveness on teachers' self-efficacy yet.

Teaching and Learning International Survey (TALIS) which is carried out lastly in 2018 with the participation of 48 countries at lower secondary level presents researchers fruitful opportunities to investigate broad issues related to the teachers such as teachers' instructional practices and teachers' professional practices, teachers' background and initial preparation, teacher's self-efficacy, and teachers' job satisfaction and motivation (Ainley and Carstens, 2018). In TALIS 2018, teachers' self-efficacy was approached in a multidimensional framework which covers self-efficacy in instruction, self-efficacy in student engagement, and self-efficacy in classroom managements. In addition, TALIS 2018 covers constructs related to school climate which can be associated with the dimensions of teachers' self-efficacy such as professional collaboration among teachers in the school, teacher-student relation, and teachers perceived disciplinary climate in school. Moreover, TALIS 2018 also presents some constructs related to sources of teachers' self-efficacy such as teachers need of professional development in content and pedagogy, and their workplace well-being and stress which are strongly related to mastery experience and physiological condition.

In the literature, many studies were conducted to reveal the potential sources of self-efficacy by investigating the association of science teachers' self-efficacy with the related dimensions (Holzberger, Philipp and Kunter, 2013; Skaalvik and Skaalvik, 2010). In addition, many studies were carried out to investigate the way of enhancing the science teachers' self-efficacy (Avery & Meyer, 2012; Ford, Fifield, Madsen, & Qian, 2013). However, few studies were conducted to focus international large-scale assessments to investigate the dimensions of teacher self-efficacy by comparing different countries. In this study, the effects of the variables related to school climate, sources of self-efficacy, and teacher backgrounds on science teachers two self-efficacy dimensions, namely self-efficacy in instruction and self-efficacy in students engagement, were investigated across Estonia, Japan, and Turkey. In this respect, it is believed that this study has a potential to contribute the literature about the science teacher self-efficacy by taking consideration into cultural and educational system variations among three countries.

Purpose of the Study and Research Questions

The relation of the science teachers' self-efficacy dimensions with some of the indicators of the sources of self-efficacy and science teachers' views on school climate and teachers' background characteristics were scrutinized in Estonia, Japan, and Turkey, respectively. In other words, the similarities and discrepancies of the effects of school climate, sources of self-efficacy, and teachers' backgrounds on different dimensions of self-efficacy such as teachers self-efficacy in student engagement and teachers self-efficacy in instruction was examine for three countries. This study was carried out by using the lower secondary level science teachers views at TALIS 2018 (Teaching and Learning International Survey 2018) in Estonia, Japan, and Turkey. The research question can be stated more specifically as follow:

1) Do the presence of teachers professional collaboration, good relations between students and teachers, presence of disciplinary climate in class, teachers need of professional development in content and pedagogy, presence of stress in the workplace, teachers' gender, and teachers' experience have an effect of science teachers' self-efficacy in students engagement in Estonia, Japan, Turkey?

2) Do presence of teachers professional collaboration, good relations between students and teachers, presence of disciplinary climate in class, teachers need of professional development in content and pedagogy, presence of stress in the workplace, teachers' gender, and teachers' experience have an effect of science teachers' self-efficacy in instruction in Estonia, Japan, Turkey?

Method

Participants

More than 100000 teachers from 48 countries participated TALIS 2018 at lower secondary level. In TALIS 2018, a stratified two-staged probability sampling design was used to determine participants in each country. In the first stage, the selection of schools were took place randomly in each country and in the second stage, teachers were randomly selected from the schools selected at the first stage.

This study was carried out based on the lower secondary level science teachers view in Estonia, Japan, and Turkey. The rationale for the selection of these countries can be explained as the performances of these countries in PISA 2018 (Programme for International Student Assessment). Whereas Japan, located at east Asia, has the highest country mean score (530) in science literacy among the OECD countries, Estonia, located at Europe, has the second highest mean score (529) in science literacy among the OECD countries in PISA 2018. On the other hand, whereas Turkey, located as a bridge between Europe and Asia, performed under the OECD average (468), has a higher average when compare to the previous PISA (OECD, 2019a). Therefore, by involving of these countries to this study, the teachers' views will be analyzed not only align with performances of the countries, but also will be discussed regarding to variations of cultural and educational system among three countries.

The total number of the teachers who were involved in TALIS 2018 are 3004, 3555, and 3952 in Estonia, Japan, and Turkey, respectively. The percentage of female teachers are 83,3%, 42,2%, and 55,8% in Estonia, Japan, and Turkey, respectively. For purpose of the study, science teachers at lower secondary level were selected from each of the countries. The numbers of the science teachers who

participated TALIS 2018 at lower secondary level are 541, 498, and 598 in Estonia, Japan, and Turkey, respectively.

Instrument and Variables

Teaching and Learning International Survey (TALIS 2018) covers many items related to teachers views and perceptions. The TALIS 2018 database included not only items as variables, it also covers scale scores or index scores of the latent variables which were produced based on group of items. The process of the calculation of these scale and index scores were described in detail with the OECD documents (OECD, 2019b). The dependent variables and the explanatory variables were described as follows:

Dependent Variables

Self-efficacy in instruction: This latent variable was produced by asking teachers to what extent they can do the following (OECD, 2019b):

(a) Craft good questions for students
(b) Use a variety of assessment strategies
(c) Provide an alternative explanation, for example when students are confused
(d) Vary instructional strategies in my classroom

The response alternatives of these items were designed as: “Not at all” (1), “To some extent” (2), “Quite a bit” (3), “A lot” (4). The omega coefficients, which the critical value was indicated as 0.70 (OECDb, 2019), of the latent construct were calculated as 0.77, 0,79, 0,82 for Estonia, Japan, and Turkey, respectively. Two response alternative as “low self-efficacy” and “high self-efficacy” was produced by recoding response alternatives. The combination of “not at all” and “to some extent” was labelled as “low self-efficacy” (0) and the combination of “quite a bit” and “a lot” was combined to was labelled as “high self-efficacy” (1).

Self-efficacy in student engagement: Teachers were asked to what extent they can do the following:

(a) Get students to believe they can do well in schoolwork
(b) Help students value learning
(c) Motivate students who show low interest in schoolwork
(d) Help students think critically

The response alternatives were with the previous dependent variable: “Not at all” (1), “To some extent” (2), “Quite a bit” (3), “A lot” (4). The omega coefficients were calculated as 0.73, 0.72, and 0.81 for Estonia, Japan, and Turkey, respectively. The response alternatives of “not at all” , “to some extent” were combined and recoded to create the “low self -efficacy” (0) and “quite a bit” , “a lot” were combined and recoded to create “high self-efficacy” (1).

Explanatory Variables

Professional collaboration in lessons among teachers: Teachers were asked to indicate the frequency of doing in the school the following items which constitutes this latent construct:

(a) Teach jointly as a team in the same class
(b) Provide feedback to other teachers about their practice
(c) Engage in joint activities across different classes and age groups (e.g. projects)
(d) Participate in collaborative professional learning

The response options of these items were presented as: Never” (1), “Once a year or less” (2), “2–4 times a year” (3), “5–10 times a year” (4), “1–3 times a month” (5), “Once a week or more” (6). The omega coefficients were calculated as 0.66, 0.65, and 0.77 for Estonia, Japan, and Turkey, respectively. The response alternatives of Never” (1), “Once a year or less” (2) were combined to indicate “no collaboration” (0) and the other alternative responses were combined to indicate “collaboration” (1).

Teacher-student relations: The items included in this latent construct were presented to teachers by asking whether they agree these items that happens in the school. The items were presented as follows:

(a) Teachers and students usually get on well with each other.
(b) Most teachers believe that the students' well-being is important.
(c) Most teachers are interested in what students have to say.
(d) If a student needs extra assistance, the school provides it.

The response alternatives were designed as "strongly disagree" (1), "disagree" (2), "agree" (3), "strongly agree" (4).The omega coefficients of the latent variable were calculated as 0,81, 0,87, and 0.88 for Estonia, Japan, and Turkey, respectively. The response alternatives of strongly disagree and strongly agree were combined to express "poor relations" (1) and the response alternatives of agree and strongly agree were combined to indicate "good relations" (0).

Teachers perceived disciplinary climate: The items constitute this latent construct were presented to teachers by asking how strongly they agree or disagree statements (items) that happens in the school. The items were presented as follows:

(a) When the lesson begins, I have to wait quite a long time for students to quieten down
(b) Students in this class take care to create a pleasant learning atmosphere
(c) I lose quite a lot of time because of students interrupting the lesson
(d) There is much disruptive noise in this classroom

The response alternatives were presented from "strongly disagree" to "strongly agree". The omega coefficients of this latent construct were calculated as 0.91, 0.88, and 0.90 for Estonia, Japan, and Turkey, respectively. The response alternatives of strongly disagree and strongly agree were combined to express "disciplined" (1) and the response alternatives of agree and strongly agree were combined to indicate "no discipline" (0).

Needs for professional development in subject matter and pedagogy: The items that were presented to constitute this latent variables were presented to the teachers by asking the teachers' need to the professional development. The items were stated as follows:

(a) Knowledge and understanding of my subject field(s)
(b) Pedagogical competencies in teaching my subject field(s)
(c) Knowledge of the curriculum
(d) Student assessment practices
(e) Student behaviour and classroom management

The response alternatives that were presented after these items designed as no need at present" (1), "Low level of need (2)", "Moderate level of need" (3), "High level of need" (4). The omega coefficients were calculated for this latent variable as 0,84, 0,78, and 0,90 for Estonia, Japan, and Turkey, respectively. The low level of need and moderate level of need were combined to indicate "no need" (1) and moderate level of need and high level of need were combined to indicate "need" (0).

Workplace well-being and stress: The items that were included under this latent variable were presented by asking teachers to the frequency of the following occur. The items were presented as follow:

(a) I experience stress in my work
(b) My job leaves me time for my personal life
(c) My job negatively impacts my mental health
(d) My job negatively impacts my physical health

The response alternatives that were presented to the teachers were stated as "not at all" (1), "to some extent" (2), "quite a bit" (3), "a lot" (4). The omega coefficients were calculated as 0.84, 0.89, and 0.83 for Estonia, Japan, and Turkey, respectively. The response options of not at all and to some extent were combined to indicate "no stress" (0) and "quite a bit" and "a lot" were combined to indicate "stress".

Experience of teachers: In this study, as categorized in the literature (Rosenholtz and Simpson, 1990), teachers who have an experience from 1 to 5 years were categorized as novice teachers, teachers who have an experience from 6 to 10 years were labelled as mid-career teachers, and teachers who have an experience more than 11 years were categorized as veteran teachers.

Data Analysis

In this study, multiple logistic regression was run to understand which variables affect teacher's self-efficacy to be low or high (Pallant, 2011). The probabilities of science teachers' self-efficacy in instruction and their self-efficacy in student engagement based on a set of predictors were investigated for Estonia, Japan, and Turkey.

For the first research question, multiple logistic regression was performed to reveal the effects of professional collaboration among teachers, teacher-student relations, teachers perceived disciplinary climate, teachers needs for professional development in subject matter and pedagogy, teachers' well-being and stress, teachers' experience, and teachers' gender (hereafter "set of variables") on science teachers' odds of having high self-efficacy in Estonia, Japan, and Turkey. Model 1 for the first research question can be expressed as:

$$\Pr(\textit{Self-efficacy in instruction}_t = 1) = \frac{\exp(\beta_0 + \beta_1 Colloboration_s + \beta_2 Teach\text{-}stu_s + \beta_3 Disciplinary_t + \beta_4 Need_t + \beta_5 Stress_t + \beta_6 Experience_t\, \beta_7 Gender_t)}{1 + \exp(\beta_0 + \beta_1 Colloboration_s + \beta_2 Teach\text{-}stu_s + \beta_3 Disciplinary_t + \beta_4 Need_t + \beta_5 Stress_t + \beta_6 Experience_t\, \beta_7 Gender_t)}$$

Multiple logistic regression was performed again to reveal the effect of same set of explanatory variables on science teachers' odds of having high self-efficacy in Estonia, Japan, and Turkey (second research question). Model 2 for the first research question can be expressed as;

$$\Pr(\textit{Self-efficacy in students engagement} = 1) = \frac{\exp(\beta_0 + \beta_1 Colloboration_s + \beta_2 Teach\text{-}stu_s + \beta_3 Disciplinary_t + \beta_4 Need_t + \beta_5 Stress_t + \beta_6 Experience_t\, \beta_7 Gender_t)}{1 + \exp(\beta_0 + \beta_1 Colloboration_s + \beta_2 Teach\text{-}stu_s + \beta_3 Disciplinary_t + \beta_4 Need_t + \beta_5 Stress_t + \beta_6 Experience_t\, \beta_7 Gender_t)}$$

Self-efficacy in instruction$_t$ and Self-efficacy in students engagement$_t$ indicate two-level categorical variables in which whether teacher t in Estonia, Japan or Turkey has a high self-efficacy in two dimension; colloboration$_s$ is the collaboration among teachers in school *s*; Teach-stu$_s$ is the student teacher relations in school *s*, Disciplinary$_t$ is defined as the teachers' perceived disciplinary climate, Need$_t$ is the teachers needs for professional development in subject matter and pedagogy, Stress$_t$ is the teachers stress, Experience$_t$ is the teachers' experience, Gender$_t$ is the teachers' gender.

Results

The sample of the study includes 1637 science teachers from Estonia, Japan, and Turkey (Estonia=541, Japan=498, and Turkey=598). The percentages of science teachers regarding to gender, experience was presented in Table 1. The percentages of female science teachers are 80,8%, 29,4%, and 55,5% in Estonia, Japan, and Turkey, respectively. As its seen in the Table 1, the number of science teachers regarding to the experience in Japan and Turkey are similar to each other. However, the percentages of veteran teachers in Estonia is nearly 20% higher than the percentages of veteran science teachers in Japan and Turkey.

Table 1
Percentages of science teachers regarding to gender and experience

	Estonia N = 541	Japan N = 498	Turkey N = 598	Total N = 1637
Gender				
Female	80,8	29,4	55,5	44,9
Male	19,2	70,5	44,5	55,1
Experience of science teachers				
Novice (1-5 years)	12,8	23,8	23,1	28,62
Mid-career (6-11 years)	12,1	19,9	20,9	25,9

Veteran (more than 11 years)	75,1	56,2	55,9	45,4

In Table 2, the percentages of science teachers who have low and high self-efficacy in instruction and self-efficacy in student engagement were presented. Whereas the percentage of teachers who have high self-efficacy in instruction is highest in Japan among the three countries, the percentages of teachers who have high self-efficacy in student engagement are so close to each other in Estonia and Japan. The percentages of teachers who have high self-efficacy in student engagement is the lowest in Turkey when compare to Estonia and Japan.

Table 2

The Percentages of science teachers regarding to the Self-efficacy in Instruction and Self-efficacy in student engagement

	Estonia N = 541	Japan N = 498	Turkey N = 598	Total N = 1637
Self-efficacy in instruction				
Low self-efficacy	63,8	48,7	51	50,2
High self-efficacy	36,2	51,3	49	49,8
Self-efficacy in student engagement				
Low self-efficacy	58,4	58,2	51,3	54,4
High self-efficacy	41,6	41,7	48,6	45,6

For the first research question, multiple logistic regression was run regarding to the first model to reveal the effect of set of variables (professional collaboration among teachers, teacher-student relations, teachers perceived disciplinary climate, teachers needs for professional development in subject matter and pedagogy, teachers' well-being and stress, teachers' experience, and teachers' gender) on science teachers' self-efficacy in instruction in Estonia, Japan, and Turkey. Table 3 presents the variables in the first model and the odds ratios that corresponds to these variables.

In Estonia, the odds ratio was estimated 2.05 (OR = 2.05; CI: 1.40 - 2.98, $p<0.05$) for the explanatory variable of "professional collaboration in lessons among teachers" which is the highest among the three countries. This means that teachers who told that there is a professional collaboration in lessons among teachers, in other words there is a collaboration culture among teachers, have more than 2 times the odds of having high self-efficacy in instruction comparing the science teachers who told that there is not any collaboration among teachers . So, the effect of the professional collaboration among teachers on science teachers' self-efficacy in instruction is the highest when compare to Japan and Turkey. In addition, in Estonia, science teachers who are working in the school in which the teacher and students' relations are good have more than 2 times the odds of having high self-efficacy in instruction when compare to the teachers who are working the school in which the teacher-student relations are poor (OR = 2.21, CI: 1.50 - 2.25, $p<0.05$). Moreover, in Estonia, the science teachers who thought that they are working in a disciplined school have 61% greater odds of having self-efficacy in instruction (OR = 1.61; CI: 1.09 - 2.38, $p<0.05$). Lastly, in Estonia, the science teachers who have getting experience in their teaching career have 43% lower odds of having high self-efficacy in instruction in Estonia (OR = 0.57; CI: 0.44 - 075, $p<0.05$).

Table 3

Estimated odds ratio for the teachers who have high self-efficacy in instruction

	Estonia	Japan	Turkey
Professional Collaboration	2.05*	1.01	1.43*
	(0.2)	(0.2)	(0.2)
Teach-student relations	2.21*	1.77*	2.79*
	(0.2)	(0.2)	(0.2)
Disciplinary climate	1.61*	1.50*	1.22
	(0.2)	(0.2)	(0.2)
Need for PD in subject and pedagogy	0.77	1.03	1.92*
	(0.2)	(0.2)	(0.2)
Teachers well-being and stress	089	0.82	0.97
	(0.2)	(0.2)	(0.2)
Teachers' experience	0.57*	1.42*	0.87
	(0.1)	(0.1)	(0.1)
Gender of teachers	1.25	0.72	1,07
	(0.2)	(0.2)	(0.2)
Intercept	0.92*	0.36*	0.41*
	(0,4)	(0.3)	(0.3)

*p<0.05. Standard errors shown in parenthesis.

In Japan, the odds ratio was estimated 1.77 (OR = 1.77; CI: 1.18 - 2.66, p<0.05) for the explanatory variable of "teacher-student relations". This value indicates that science teachers who are working in the school in which the teacher and students' relations are good have 77% greater odds of having self-efficacy in instruction than science teachers who are working in a school in which the teacher-students relations are poor. In addition, science teachers who are working in a disciplined school have 50% greater odds of having high self-efficacy in instruction than the science teachers who are working in school to be thought not disciplined (OR = 1.95; CI: 1.02 - 2.19, p<0.05). Moreover, teachers who are getting experience in their teaching career have 42% greater odds of having high self-efficacy in instruction (OR = 1.42; CI: 1.13 - 1,79, p<0.05).

In Turkey, science teachers who are working in a school that the professional collaboration among teachers was encouraged have 43% greater odds of having high self-efficacy in instruction than the science teachers who are working in a school in which there is not any collaboration culture among teachers in the school (OR = 1.43; CI: 1.01 - 2.03, p<0.05). In addition, in Turkey, science teachers who are working in a school in which the teacher-student relations are good have more than 2.5 times the odds of having high self-efficacy in instruction comparing the science teachers who are working in which the teacher-student relations are poor (OR = 2.79; CI: 1.92 - 4.05, p<0.05). Moreover, in Turkey, science teachers who told that they do not need any professional development in subject matter and pedagogy have 92% greater odds of having high self-efficacy in instruction than teachers who thought that they need professional development in subject matter and pedagogy (OR =1.92; CI: 1.34 - 2.76, p<0.05).

For the second research question, multiple logistic regression was performed to investigate the effects of set of variables on science teachers' self-efficacy in student engagement in Estonia, Japan, and Turkey. Table 4 included the variables in the second model and the corresponding odds ratios.

Table 4

Estimated odds ratio for the teachers who have high self-efficacy in student engagement

	Estonia	Japan	Turkey
Professional Collaboration	2.12*	1.65*	1.54*
	(0.2)	(0.2)	(0.2)
Teach-student relations	2.40*	1.44	3.56*
	(0.2)	(0.2)	(0.2)
Disciplinary climate	1.41	1.70*	1.13
	(0.2)	(0.2)	(0.2)
Need for PD in subject and pedagogy	0.99	1.10	2,64*
	(0.2)	(0.2)	(0.2)
Teachers well-being and stress	0.98	0.89	1.24
	(0.2)	(0.2)	(0.2)
Teachers' experience	0.80	1.47*	0.93
	(0.1)	(0.1)	(0.1)
Gender of teachers	1.23	0.57*	1,30
	(0.2)	(0.2)	(0.2)
Intercept	0.42*	0.16*	0.26*
	(0,4)	(0.4)	(0.3)

*p<0.05. Standard errors shown in parenthesis.

In Estonia, science teachers who are working in a school in which professional collaboration among teachers is encouraged have more than 2 times the odds of having high self-efficacy in student engagement comparing the science teachers in which there is nor any collaboration culture among teachers in the school (OR = 2.12; CI from 1.47 - 3.05, p<0.05). In addition, science teachers who are working in a school in which teacher-student relation are good have nearly 2.5 times the odds having high self-efficacy in student engagement comparing the science teachers who are working in a school in which teacher-student relations are poor (OR = 2.40; CI: 1.65 - 3.50, p<0.05).

In Japan, science teachers who are working in a school in which professional collaboration among teachers is encouraged have 65% greater odds of having high self-efficacy in student engagement comparing the science teachers in which there is nor any collaboration culture among teachers in the school (OR = 1.65; CI: 1.13 - 2,42, $p<0.05$). In addition, science teachers who are working in a disciplined school have 70% greater odds of having high self-efficacy in instruction than the science teachers who are working in school to be thought not disciplined (OR = 1.70; CI: 1.14 - 2.52, $p<0.05$). Moreover, teachers who are getting experience in their teaching career have 47% greater odds of having high self-efficacy in student engagement (OR = 1.47; CI: 1.15 - 1,87, $p<0.05$). Moreover, in Japan, female teachers have 43% lower odds of having high self-efficacy in student engagement than male teachers OR = 0.57; CI: 0.37 - 0.87, $p<0.05$).

In Turkey, science teachers who are working in a school in which professional collaboration among teachers was encouraged have 54% greater odds of having high self-efficacy in student engagement than the science teachers who are working in a school in which there is not any collaboration culture among teachers in the school (OR = 1.54; CI: 1.07 - 2.20, $p<0.05$). In addition, in Turkey, science teachers who are working in a school in which the teacher-student relations are good have more than 3.5 times the odds of having high self-efficacy in student engagement comparing the science teachers who are working in which the teacher-student relations are poor (OR = 3.56; CI: 2.41 - 5.28, $p<0.05$). Moreover, in Turkey, science teachers who told that they do not need any professional development in subject matter and pedagogy have more than 2.5 times the odds of having high self-efficacy in instruction than teachers who thought that they need professional development in subject matter and pedagogy (OR =2.64; CI: 1.82 - 3.82, $p<0.05$).

Discussion, Conclusion and Recommendations

The effectiveness of the teachers' high self-efficacy were expressed regarding to instructional quality (Holzberger, Philipp and Kunter, 2013), teachers' job satisfaction and their commitments (Avanzi et al., 2013), and students' achievement and motivation (Caprara et al., 2006). Although it is believed that self-efficacy is an unidimensional concept, the importance of investigating teachers' self-efficacy within the multidimensional framework was emphasized due to the teaching practices includes several aspects (Klassen et al., 2011). Revealing the factors that have a potential to effect dimensions of the self-efficacy is very crucial since it is importance on educational outcomes. For instance, the effect of school climate on teachers' self-efficacy was also expressed in some studies (Bandura, 1997; Malinen & Savolainen, 2016).

This study was conducted to understand the effects of school climate related variables such as professional collaboration among teachers, teacher-student relations, and teachers perceived disciplinary climate on science teachers' self-efficacy in instruction and self-efficacy in student engagement. In addition, some of the indicators related to sources of self-efficacy such as teachers' need of professional development in content and pedagogy and teachers' workplace well-being and stress was also examined with their effects on science teachers' self-efficacy in instruction and self-efficacy in student engagement. Moreover, lastly, the effects of teachers' background characteristics such as experience and gender on science teachers' self-efficacy in instruction and self-efficacy in student engagement was examined.

Although school climate is stated as a multidimensional concept, in TALIS 2018, it was preferred capture school climate mainly by the indicators of teacher-student relations, classroom disciplinary climate, participation of stakeholders to the school decision (Ainley and Carstens, 2018; OECD, 2019). In another study, Malinen and Savolainen (2016) included collaboration among teachers, student relationship, decision making, and instructional innovation to capture general school climate.

In this study, the indicators about professional collaboration among teachers, teacher-student relations, and disciplinary climate were selected to capture school climate. For the first model, the results revealed that among these variables, the effect of teacher-student relations on science teachers' self-efficacy in instruction is significant for Estonia, Japan, and Turkey. Science teachers who are working in the school in which teacher-student relations are good have more than 2 times odds of having high self-efficacy in instruction in Estonia and Turkey, have nearly 2 times odds of having high self -efficacy in instruction in Japan. In addition, science teachers who are working in a school in which professional

collaboration is enhanced have 2 times odds of having high self-efficacy in instruction comparing the science teachers who are working in a school in which the professional collaboration is not emphasized in Estonia. Moreover, science teachers who are working in a disciplined school have 61% greater odds and 50% greater odds of having high self-efficacy in instruction in Estonia and Japan, respectively. For the second model, the results revealed that among the school climate variables the effect of professional collaboration among teachers on science teachers' self-efficacy engagement is significant for all three countries. As similar to the fist model, teacher-student relations is very important especially Estonia and Turkey with its effect on science teachers self-efficacy in students engagement.

As Bandura (2012) expressed that the circumstances in which teaching occurs are strongly related with teachers' self-efficacy, many studies reported the positive association between self-efficacy and school climate (Collie, Shapka, and Perry 2012; Meristo and Eisenschmidt 2014). In addition, Wilson, Woolfson, and Durkin (2018) expressed that school environment is very crucial and examined to investigate the development of self-efficacy. They asserted that school environment which is positive and supportive lead teachers to feel capable of working with students. In another study, Malinen and Savolainen (2016) found high correlations between school climate to collective efficacy in student discipline and moderate correlation with self-efficacy in managing behavior. So, the results of this study show consistency with previous studies that was related to the effect of school climate on teachers' self-efficacy.

In both models, the results reveal that the effect of professional collaboration among teachers has greatest effect in Estonia comparing to Japan and Turkey. In a study which is conducted to investigate school environmental factors that have a potential to support the innovative behaviors of teachers in Estonia based on the TALIS 2013 data, revealed the association of teachers' self-efficacy and professional collaboration among teachers (Nemeržitski , Loogma , Heinla & Eisenschmidt, 2013). In this study, it was revealed that the effect of professional collaboration among teachers and teacher student relations on both dimensions of science teachers' self-efficacy was found significant, on the other hand, the effect of disciplinary climate on both dimensions on self-efficacy was found non-significant. However, in a study (Arslan, 2015) which is conducted to investigate the relationship between factors related to the school climate with the teachers' self-efficacy based on the TALIS 2008 data in Turkey and Korea, revealed that one best construct that explains teachers' self-efficacy is disciplinary climate for Turkey. Although the results of Aslan's (2015) study show some contradictions with the findings of this study, the influence of professional collaboration among teachers and teacher student relations on teachers' self-efficacy were also expressed for Turkey.

As it was indicated before, there is a robust relationship between teachers' self-referent subject matter knowledge and higher levels of self-efficacy (Rice and Roychoudhury, 2003). In this study, teachers' need for professional development in subject matter and pedagogy was used to reveal teachers' self-refence evaluation about teacher needs in this issue. Teachers who do not need any professional development was evaluated as they feel sufficient in subject matter and pedagogy. The significant results only yielded in Turkey among three countries for this variable which means that science teachers who do not need any professional development in subject matter or pedagogy have greater odds of having high self-efficacy in instruction and in student engagement. The importance of mastery experience for higher self-efficacy of teachers was also indicated in the literature (Tschannen-Moran and McMaster 2009). On other hand, the non-significant odds ratios yielded in this variable for Estonia and Japan could be explained by the Henson's (2002) expression of practically nonexistent research on exploring the sources of self-efficacy.

Although the effect of teacher's experience yielded non-significant results on sciences teachers' self-efficacy in instruction and student engagement for Turkey, significant odds ratios were gathered for Estonian and Japanese science teachers. Whereas, in Estonia, science teachers who are getting experience in their teaching career have lower odds of having high self-efficacy, in Japan, science teachers who are getting experience in their teaching career have greater odds of having high self-efficacy in instruction.

The findings of this study supported the some of the components' effects of school climate on science teacher's self-efficacy in instruction and in student engagement. However, the degree of the

odds of having high self-efficacy related to these components varies across the countries. Therefore, longitudinal studies are recommended to investigate the trend of these effects within a country and across the countries regarding to multidimensional aspects of science teachers' self-efficacy. International large-scale assessments give researchers opportunities to get fruitful findings on science teachers self-efficacy.

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The Effect of Conscientiousness and Gender on Digital Game Addiction in High School Students

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Ahmet Kesici*

Abstract

This study aims to investigate the effect of conscientiousness and gender on digital game addiction in high school students. This study has been conducted to 470 students from three vocational schools and four common high schools in Siirt in 2017-2018 academic year through a relational survey method. In this research, conscientiousness sub-dimension of The Big Five Inventory and Digital Game Addiction scale have been used. It has also been determined that conscientiousness and gender are significant predictors of digital game addiction, and both of the variables are able to explain approximately 12% of digital game addiction. Depending on this, this study has attempted to observe low level conscientiousness and gender (in case of being male) affect digital game addiction negatively in high school students. In addition to this, it has aimed to show that gender and low conscientiousness are the possible risk factors for students in term of digital game addiction. For this reason, the students' traits of conscientiousness, particularly of male students, must be developed. Sense of responsibility is related to conscientiousness. Therefore, the traits of conscientiousness might be developed by enhancing the adolescents' sense of responsibility, and hence some positive outcomes can be acquired against the digital game addiction.

Keywords: Conscientiousness, responsibility, digital game addiction, values education.

Ahmet Kesici: Dr., National Education Directorate, Siirt, Turkey, E-mail: ahmetkesici@yahoo.com, https://orcid.org/0000-0003-1830-497X

Lise Öğrencilerinde Sorumluluğun ve Cinsiyetin Dijital Oyun Bağımlılığına Etkisi

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Ahmet Kesici*

Öz

Bu çalışma, sorumluluk ile cinsiyetin lise öğrencilerinde dijital oyun bağımlılığına etkisini incelemek amacıyla yapılmıştır. İlişkisel tarama modeli ile gerçekleştirilen bu araştırmaya 2017 - 2018 Eğitim Öğretim yılında Siirt'te farklı lise türlerinde (3 meslek lisesi, 4 genel lise) öğrenim gören 470 öğrenci katılmıştır. Öğrencilerin sorumluk düzeyi Beş Faktör Envanteri'nin sorumluluk alt boyutu kullanılarak, oyun bağımlılığı düzeyleri ise Dijital Oyun Bağımlılığı Ölçeği kullanılarak belirlenmiştir. Yapılan regresyon analizinde sorumluluk ve cinsiyetten oluşan model, lise öğrencilerinde dijital oyun bağımlılığının yaklaşık %12'sini anlamlı olarak açıklamaktadır. Araştırmada hem cinsiyetin hem de sorumluluğun dijital oyun bağımlılığının anlamlı yordayıcıları olduğu ve düşük sorumluk düzeyi ile cinsiyetin (erkek olma) dijital oyun bağımlılığını olumsuz yönde etkilediği belirlenmiştir. Araştırmada elde edilen bu bulgular, düşük sorumluluk düzeyi ile cinsiyetin (erkek olma) lise öğrencilerinde dijital oyun bağımlılığı için risk teşkil eden faktörler olduğunu göstermektedir. Bu nedenle lisede öğrenim gören öğrencilerin (özellikle erkek öğrencilerin) sorumluluk özelliği geliştirilerek onları dijital oyun bağımlılığının olumsuz etkilerine karşı korunabileceği söylenebilir.

***Anahtar Sözcükler*:** Sorumluluk, kişilik, dijital oyun bağımlılığı, değerler eğitimi.

* Dr., Milli Eğitim Müdürlüğü, Siirt, Türkiye, E-posta: ahmetkesici@yahoo.com, https://orcid.org/0000-0003-1830-497X

Introduction

Personality can be defined as the sum of the consistently displayed traits by the individual that distinct him/her from others (Can, 2014). Some of the physical attributes that constitute the personality are innate. However, some other personality traits such as attitude, value, and purpose begin to take shape spontaneously through life experiences in the process. Personality (Sardoğan & Karahan, 2011);

1. It contains the distinctive behaviors, unique to individual.
2. The consistency and the continuity of the behaviors can be mentioned
3. It is relatively lasting. However, it is a dynamic process that can evolve in the contextual context.

Many theories have been put forward to define the personality. One of these theories is the trait theory. In this approach, the personality is explained through the observatory behaviors and individual differences (Basım, Çetin & Tabak, 2009). According to this theory, individual differences are reflected on the spoken language, that is, on words. Depending on this view, Goldberg and his friends have codified the words that reflect on the personality in a language and put these codes to factor analysis. Therefore, they have stated that personality is a kind of structure that consists of five dimensions. The model that defines personality with five traits is called as five-factor model of personality. These five traits are simply known as extroversion, agreeableness, conscientiousness, neuroticism and openness (Costa & McCrae, 1995; Somer, 1998; Tatlılıoğlu, 2014). Some cross-cultural studies have been carried out to support the validity of this model (Schmitt, Allik, McCrae, & Benet-Martinez, 2007).

Conscientiousness includes the characteristics such as one's obedience, one's sense of responsibility, one's self-discipline and one's tendency to success. Sense of conscientiousness is translated as responsibility in Turkish since it means one's best efforts to fulfill a given task. It has been noted that the individuals with high level of conscientiousness are disciplined, attentive, willed to succeed while the ones with low level of conscientiousness are inattentive, disorganized and lazy (Costa & McCrae, 1995). The exorbitant level of conscientiousness manifests itself as a distressing disorder that causes one to suffer from punctiliousness and tidiness in obsessive degrees. On the other hand, the low level of conscientiousness causes one to become flexible in one's reaching goals and moral manners (Costa, McCrae & Dye, 1991; Somer, Korkmaz & Tatar, 2004). For this reason, conscientiousness is a feature to be developed through training. Conscientiousness is associated with one aspect of ego strength. This dimension has a basic function under the drive's control. Therefore, conscientiousness has both developing and inhibiting sides (Costa, McCrae & Dye, 1991; Somer, Korkmaz & Tatar, 2004). In this respect, conscientiousness is thought to be associated with digital addiction (mobile phone addiction, internet addiction, game addiction in virtual platforms). Digital addiction is a problem that results from the drive control. It is the drive that causes one to keep using the digital tools excessively although it is known that the individual will suffer from physical, mental and social problems (Kesici & Tunç, 2018).

Lately, digital game addiction, a kind of digital addiction has become a common problem that has particularly been experienced by the adolescents (Irmak & Erdoğan, 2016). Adolescence is a period when abstract and logical thinking make progress in adolescents. In this period, the individual is ready to make decision and to have responsibility. Adolescence, a period that sets a balance between autonomy, freedom and responsibility in individuals is vital for the personality development as well (Acar, 2012). In fact, the researches that have been carried out have revealed the relation between the digital game addiction and the personality (Ayas, 2012; Charlton & Danforth, 2010; Kim et al., 2008; Servidio, 2014).

Digital games that are played in virtual settings are places for entertainment that are limited by its own rules and independent of the real world (Garris, Ahlers & Driskell, 2002). In virtual space, they are classified as console games, computer games, and online games. There are such various kinds as action, adventure, simulation, sport, strategy and network. They can be played with single or multiple players. Some games have communicative and interactive dimensions as well (Gürcan, Özhan & Uslu, 2008).

Games are used in education in terms of the fact that they create a secure place by making one feel relaxed, concentrated as well as increasing one's motivation and self-efficacy. Nowadays, digital games are used in the fields such as science, math, medicine, engineering, language learning, problem solving and developing strategically thinking skills (Bayırtepe & Tüzün, 2007; Garris, Ahlers & Driskell, 2002). Moreover, they are used to change some unwanted behaviors or to inform the individuals about various topics (Hewitt et al., 2001; Johnston, Massey & Marker-Hoffman, 2012; Kato et al., 2008).

It has been argued that playing games has many benefits if not excessively. It helps one feel relaxed, gives one a sense of self-development and also enables one to meet one's social needs. Moreover, it helps develop one's eye-hand coordination, visual and spatial skills, problem solving and multi-task skills. It also enables one to develop one's cooperation skills and emphatic behaviors that are most cared by the parents (Gürcan, Özhan & Uslu, 2008; Irmak & Erdoğan, 2016; Prot et al., 2014). One's game addiction might be the case in point only if one does not control his will to play games and depending on this, if one's emotional, mental and social life is affected negatively by it (Young, 2009). DGA (Digital Game Addiction) is defined as "drive control disorder" that contains the symptoms such as not controlling the time for playing games, showing lack of interest to other activities, keeping playing games despite its negative effects and feeling tired psychologically in times of not playing games (Irmak & Erdoğan, 2016). In the researches, conducted, it has been observed that various problems have arisen because of the DGA. It has been reported that DGA has caused social (at work, in spending free time, in education and in social relations) psychological (too much stress, isolation from real life, loneliness, decrease in academic success, increase in carelessness, aggressiveness, not handling the situation, decrease in verbal memory performance, and suicidal ideation) physiological (obesity, wrist-ache, neck-ache, hand-vibration syndrome, sleeping anomalies) problems (Griffiths, Kuss & King, 2012).

In literature, DGA is commonly examined as behavioral addiction. However, APA (American Psychiatrists' Association) views DGA as a disorder of playing games online and encourages more studies to be done over it (Irmak & Erdoğan, 2016). Nowadays, DGA is similarly regarded as a problem related to internet addiction (Nazlıgül et al., 2018). However, it is different from Internet addiction though DGA is a concept in relation to Internet addiction. This difference mostly depends upon gender. It is stated that males are particularly associated with DGA (Király et al, 2014). It is also noted in literature that gender is a striking element in relation to DGA. For this reason, it must be paid attention in the researches, conducted on DGA (Nazlıgül et al., 2018).

This study has been conducted to observe the relation between the conscientiousness, gender and DGA in high school students. It has also been aimed to see the impact of gender and conscientiousness, a type of personality trait, on the DGA.

Different concepts such as game addiction in virtual context, video game addiction, pathological game addiction, computer game addiction, online game addiction are used in literature. In this study, however, the DGA is used to describe the addiction related to playing games excessively in virtual context.

Method

In this study, relational survey model has been used. Through this model, it has been aimed to show how gender differences and the change in conscientiousness have affected the DGA (Karasar, 2014).

Participants

Present study was conducted in Siirt in 2017-2018 educational year. 470 students from three vocational schools (200 students) and four common high schools (270 students) participated in the study. While choosing the participants, convenience sampling method was applied. To reach the whole target population is challenging so convenience sample were formed according to accessibility. The convenience sample and study groups were formed according to accessibility (Kılıç, 2013). The data related to the participants are given in Table 1.

Table 1
The distribution of the students with regard to gender and class

		N	%
Gender			
	Male	232	49.36
	Female	238	50.64
Class			
	9	206	43.82
	10	116	24.68
	11	148	31.50

Data Collection Tools

Conscientiousness Scale

Benet-Martinez and John (1998) have determined the participants' levels of conscientiousness with the sub-dimension conscientiousness of The Big Five Inventory, a scale including five factors. The Big Five Inventory measures the personality with five sub dimensions as "Conscientiousness", "agreeableness", "extroversion", "neuroticism" and "openness". The scale is a five point likert scale with 44 articles. Conscientiousness dimension consists of 9 articles. Cronbach Alpha values, related to this dimension have been obtained as .78 when this scale is developed (Schmitt et al., 2007). The Big Five Inventory has been adapted to Turkish by Sumer and Sumer (2005) within the context of the study, conducted by Schmidt (2007) that aims to enable individuals to identify their own profiles in 56 countries (Basım, Çetin & Tabak, 2009). The applicability of the structure of the Big Five Inventory model has been observed in the sample adolescent groups in Turkey as well (Korkmaz, Somer, & Güngör, 2013). In this study, the construct validity of the scale was examined through explaratory factor analysis (EFA). According to EFA, the value of Kaise-Malkin-Olkin (KMO) is 0.771 and the value of Bartlett Test is 662.80 ($p<0.01$). The scale explains %34.63 of the variance. The minimum factor load value is .49 and the maximum value is .68. The highest item-total correlation coefficient is .45 and the lowest is .37. Based on these findings, it can be said that the scale is suitable for high school students. In this study, Cronbach Alpha reliability of conscientiousness dimension scale has been measured as .71.

Game Addiction Scale

The participants' digital game addiction has been identified with the game addiction scale, developed by Lemmens, Valkenburg and Peter (2009) and later adapted to Turkish by Yalçın, Irmak and Erdogan (2015) to determine the participants' problematic behaviors related to playing digital games. The scale has seven articles. It is one dimensional, and five likert type. Cronbach factor has been accounted as .72 for Turkish form and it has been reported to explain %56.96 of variation. It has been observed as a result of the confirmatory factor analysis that the scale has adapted well (Yalçın Irmak & Erdoğan, 2015). In this study, Cronbach Alpha reliability of DGA scale has been measured as .809.

Data Collection and Analysis

The data has been collected in the classes by the teachers after the necessary permissions have been obtained. The collected data have been analyzed through the correlation and multi-linear regression methods by using SPSS. The normality condition has been provided since 476 data have been used in this study for three variations at total, including one independent variation and two dependent variations (Wooldridge, 2013). For gender, dummy variable (for the case of being male) has been used. VIF and Tolerance values have been checked for conscientiousness and gender scores. It has been determined that there is not a multicollinearity problem (VIF < 10; Tolerance > 0.2). The scatter graph of error terms has been analyzed. It has been established that the error terms have nearly normative distribution (Alpar, 2012; Tabachnick & Fidell, 2007). Consequently, all conditions for the multi-linear regression analysis have been met.

Findings

In this study, the point averages and the standard deviation values, obtained from the scales, used to determine the participants' levels of DGA and conscientiousness have been given in Table 2.

Table 2
The point average of the participants' DGA and conscientiousness

Scale	N	$\bar{x}$	sd.
Conscientiousness	470	4.16	0.58
DGA	470	1.71	0.71

As can be observed in Table 2, the participants' average point in conscientiousness scale has been measured as 4.16 (sd. = .58) out of 5. However, the participants' average point in DGA scale has been measured as 1.71 (sd. = .71) out of 5.

The correlation analysis has been done to determine the relation between conscientiousness and DGA. The obtained Pearson correlation factor has been given in Table 3.

Table 3
Correlation analysis results that explained the relation betwen conscientiousness and DGA

	DGA	Conscientiousness
DGA	1	-.316**
Conscientiousness	.	1

** p<.01; n = 470

As can be seen in Table 3, it has been established that there is an inverse, low level but meaningful relation (r = -.316, p<.01) between DGA and Conscientiousness.

In this study, multi-linear regression analysis has been applied to see the impact of gender and conscientiousness on the DGA. The acquired results have been given in Table 4.

Table 4
Regression analysis results

Model	B	Standard Error	Beta (β)	t	p
Constant	3.114	.228		13.838	.000
Conscientiousness	-.362	.053	-.298	-6.836	.000
Gender	.218	.062	.154	3.520	.000

$F_{(2\text{-}470)}$ = 32.731; p = 0.000; R = .351; R^2 = .123; Gender (1=male; 0=female)

As can be seen in Table 4, F value in relation to regression model is statistically meaningful (F = 32.731; p< .01). Therefore, it is possible to say that regression model has predicted the DGA meaninfully (Büyüköztürk, 2011). The participants' conscientiousness level and gender (being male) have shown a meaningful relation with DGA (R = 0.351; R^2=0.123, p < .01). Both variables together are able to explain %12 of the change on the DGA.

In the t-test results in relation to the meaningfulness of the regression factors (β), both conscientiousness and gender variables are seen in Table 4 as the meaningful predictors of the DGA (p<0.01). According to the standardized regression factors, The relative order of importance of the predictor-variables has been determined as conscientiousness and gender (being male). According to the multi-regression anlaysis result, The regression equation in relation to the prediction of DGA score is as follows:

DGA = 3.114 + (-0.362) x Conscientiousness Score + (0.218) x Gender (1=male; 0=female)

Discussion and Results

This study has been conducted to determine the relation between the conscientiousness as a personality trait and DGA in high school students. It has also aimed to see the impact of

conscientiousness and gender on the DGA. In this study, it has been established that there is an inverse, low level and statistically meaningful relation between the DGA and conscientiousness. Accordingly, the decrease in the conscientiousness level has caused an increase in the DGA. In the regression analysis, conducted, it has been established that conscientiousness and gender are the meaningful predictors of the DGA and both variables together have explained %12.3 of the change on the DGA.

In this research, it was determined that the low level of conscientiousness has a negative effect on the DGA. This finding is compatible with other studies' findings in literature that have explained the relation the adults' conscientiousness and the DGA (Batıgün & Kiliç, 2011; Kim et al., 2008). In another study, it has been established that the adults who join the social network for playing games have meaningfully lower conscientiousness scores than the ones who join the social networks for other purposes (Seviniş & Bilgin, 2017). This finding is such as to support the finding of this research. Çelik, Atak & Başal (2012), Kayiş et al. (2016), Rahmani & Lavasani, 2011; Randler, Horzum & Vollmer (2014), Servidio (2014), Taş & Ayas (2015) and Van der Aa et al. (2009) found a relationship between internet addiction and conscientious; likewise, this study found a correlation between DGA and digital addiction. Internet addiction and DGA can be assessed under the category of digital addiction. Therefore, it can be said that these studies support our research findings. However, another study that was conducted on teachers found that conscientiousness is not meaningful predictor of the DGA (Aydın & Horzum, 2015). The reason for this difference might be because of the choice of the sample consisting of adults with a high level of conscientiousness.

In the study, it has been observed that gender is a meaningful predictor of the DGA. It has also been found out that gender (for males) has a positive effect on the DGA. This finding is such as to support the views that gender is a remarkable element in the DGA (Nazlıgül et al., 2018; Király et al., 2018; Ko at al., 2005; Chou & Tsai, 2007). Moreover, it has been noticed that this finding of the study is compatible with other studies that have been conducted on the various samples such as primary and secondary school students (Gökçearslan & Durakoğlu, 2014; Horzum, 2011; Li & Wang, 2013; Turner et al., 2012), and university students (Çakır, Ayas & Horzum, 2011). It has been explained that the liability to the DGA in males depends not only on the males' higher desire for sense of achievement and communication but also on their higher motivation for playing games than the females have. In addition to this, males' liability to the DGA has been explained in the cultural context. It has been noted that the females have been much more exposed to the cultural imposition than males and that this fact has posed an obstacle before females' playing games (Ko et al., 2005). This argument can be said to be compatible with the cultural characteristics of the sample on whom the study has been conducted. In a study that has been conducted on teachers, gender has been determined as not one of the predictors of the DGA (Aydın & Horzum, 2015). This finding is thought to result from a specific sample with high level of conscientiousness. Similarly, there are also studies that have argued gender is not an effective variable on the DGA (Kim et al., 2008; Taş, Eker & Anlı, 2014).

In this study, it has been concluded that the students with low level of conscientiousness and male students are more liable to the DGA. Accordingly, it can be said that the adolescents with low level of conscientiousness and male students are risk factors in terms of the DGA. Developing the sense of conscientiousness in individuals will protect them against the DGA. For this reason, the high school students' traits of conscientiousness must be developed. Sense of responsibility is related to conscientiousness (Costa & McCrae, 1995). In literature, it has been reported that the educational programs that aim to develop the sense of responsibility have had successful outcomes (Acar, 2012; Howard, 2005; Dilmaç, 2007). Therefore, the traits of conscientiousness might be developed by enhancing the adolescents' sense of responsibility, and hence some positive outcomes can be acquired against the DGA. Considering this protective side of developing the sense of conscientiousness, the teachers and parents should be informed about its protective effect against the DGA. Also, some studies must be carried out about what things can be done in order to raise individuals with a good sense of responsibility.

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Advices on Budget Models for Equality in High Schools: The Case of Turkey*

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Ece Özdoğan Özbal** **Kasım Karakütük*****

Abstract

The schools' budgets and the management of budgets is important for the effective maintenance of schools. School budgets are an important tool for ensuring equality within and among schools. In this study which aims to assert a suggestion on budget management model providing equity and decreasing problems, detecting different income and expense relationships in the school's budgets, the associational status of incomes and expenses of 1180 high schools in Turkey has been examined and the views of 60 school members (school principal, teacher, student, parents, school parent association member) about the budget management model have been evaluated. In the study, it was determined that there was a significant relationship between high school budgets and school-parent association budget of the school and the intangible right, movable property, maintenance and repair expenses. While high school principals define the ideal budget model as a model in which the budget is provided by the state and they have a more effective role, other school members consider the budget must be comprised of the contributions of individuals and different institutions other than the state, and different school members also participate in the budget management process in addition to the school principal.

Keywords: School budget, school finance, budget management, management.

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** *Corresponding Author:* Dr, Ankara University, Faculty of Educational Sciences, Elementary Education Department, Ankara, Turkey. E-mail: eozdogan@ankara.*edu.tr*, https://orcid.org/0000-0002-6876-183X

***Prof. Dr., Ankara University, Faculty of Educational Sciences, Education Administration Department, Ankara, Turkey. E-mail: karakut@education.ankara.edu.tr, https://orcid.org/0000-0003-3136-1979

Liselerde Eşitliği Sağlayıcı Bütçe Modeli Önerileri: Türkiye Örneği [*]

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Ece Özdoğan Özbal** **Kasım Karakütük*****

Öz

Okulların bütçeleri ve bütçelerinin yönetimi okulların etkin sürdürülmesi açısından önemlidir. Okul bütçeleri, okul içinde ve okullar arasında eşitliği sağlamada önemli bir araçtır. Okul bütçelerindeki farklı gelir ve gider ilişkilerinin belirlenerek, sorunları azaltıcı ve eşitliği sağlayıcı bütçe yönetim model önerisinin ortaya konulmasının amaçlandığı bu araştırmada Türkiye'deki 1180 lisenin gelir ve giderlerinin ilişkisel durumu incelenmiş, ayrıca 60 okul üyesinin (okul müdürü, öğretmen, öğrenci, veli, okul aile birliği üyesi) bütçe yönetim modeline ilişkin görüşleri değerlendirilmiştir. Araştırmada liselere devlet tarafından sağlanan bütçe ve liselerdeki okul aile birliği bütçesi ile menkul mal, gayri maddi hak alım, bakım onarım giderleri ve hizmet alımları arasında anlamlı bir ilişki olduğu belirlenmiştir. Lise müdürleri, ideal bütçe modelini devlet tarafından bütçenin sağlandığı ve kendilerinin daha etkin role sahip olduğu bir model olarak tanımlarken, diğer okul üyeleri devletin sağladığı bütçenin yanı sıra bireylerin ve farklı kurumların katkıları ile bütçenin oluşturulması ve okul müdürü dışında faklı okul üye temsilcilerinin de bütçe yönetim sürecine katılması görüşündedirler.

Anahtar Sözcükler: Okul bütçesi, okul finansmanı, bütçe yönetimi, yönetim.

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** *Sorumlu Yazar:* Dr., Ankara Universitesi, Eğitim Bilimleri Fakültesi, Temel Eğitim Bölümü, Sınıf Eğitimi Anabilim Dalı, Ankara, Türkiye. E-posta: eozdogan@ankara.*edu.tr,* https://orcid.org/0000-0002-6876-183X

*** Prof. Dr., Ankara Üniversitesi, Eğitim Bilimleri Fakültesi, Eğitim Bilimleri Bölümü, Eğitim Yönetimi Anabilim Dalı, Ankara, Türkiye. E-posta: karakut@education.ankara.edu.tr, https://orcid.org/0000-0003-3136-1979

Introduction

Resource, environment and teaching staff are key points for the continuity of education. Budget must be provided to the education services, in order to meet the resources, The education sector is quite large and generating additional income for schools has been a difficult topic for policy makers for years (Guthrie, 1997). The failure to allocate sufficient budget and the lack of educational opportunities raise concerns due to its impact on the quality and maintenance of the education service.

The formation of the budget allocated for education by the state or private sector, the way education expenses are made are directly related to the educational policies of the countries. The budgets of the schools are established in line with the policies applied and the responsibilities of the institutions or persons concerned with the use of the budget are determined. In some countries, the distribution of the education budget is carried out centrally, while in others the planning and management of budget are made at local level or school-based budgeting. When evaluated globally, schools are often controlled and run by governments. In particular, government policies directly affect the ongoing educational and administrative processes in schools. As the distribution process of the allocated budgets and the management process are shaped in line with the resources forming the budget, government funds shape the management process. The state funds are mainly distributed through three mechanisms, in most cases: the level of basic funding, categorical financing, and the balancing of local tax revenues by the state (Terman and Behrman, 1997). In the local and school- centered approaches, providing, separation and use processes of the budget continue based on the school. In this approach, it can be said that the school principals has a more effective role. School- centered management approaches are called different names in the literature. Self managing schools, locally-autonomous schools, local management of schools, restructured schools, shared decision-making and devolution are some of these names (Davies and Hentschke, 1994). Budget management is important both in the state-dominated budget system and in the school-based budget system.

The determination of the budget allocated to schools and the budget management process directly related with the elimination of inequalities among schools or the deepening of inequalities. For this reason, the distribution of the budget to be allocated to schools has great importance. In order to minimize inequality among schools, considering the general tendency of the countries, three basic equalization approaches have been identified in various countries: the equalization of tax base to support education (e.g. in the United Kingdom, Australia and West Germany), equalization of expense per student or per capita (e.g. in USA and Canada) and equalization of physical inputs, mainly teaching service (e.g. in the Netherlands, Sweden and Norway) (Hough, 1993). However, these practices are not sufficient to ensure equity since the school institution is a multivariate and living institution, and there are the differences of the variables that make up the budget (the socio- economic situation of the families, the support of the local governments, the registration fees of schools, etc.).

It is emphasized that the point needed a solution in school budget is the "adequacy". However, the question of how "adequate" the education is, or how to transform educational measures into a financial formula is not explicitly mentioned (Augenblisck et al., 1997). Some studies (Odden et al., 2007) mention some methods (cost function, professional judgment, successful schools / regions and evidence- based) for the adequacy of financing. Among these, successful school / region and cost-function approaches provide estimates of sufficient expenses based on student level (and regulations for various student requirements), while professional judgment and evidence-based approaches suggest that the proposals are met with sufficient resources; and also focus on management, maintenance and transport functions as well as a series of program and strategies in primary, secondary schools and high schools (Odden et al., 2007). Although the aim of the methods used is to make the fair distribution of the budget come true, inequalities in schools have been reproduced in many parts ofthe world. In addition to the budget provided by the state in schools, the effort to create different additional budgets is noteworthy. This effort is related to the desire to provide more qualified education with increasing budget. While education expenditures per student vary, it is a fact that educational expenditures vary from region to region, and there may even be gaps between schools in close proximity in terms of school budgets. However, all of the state constitutions emphasize that education should be maintained sufficiently and equally, especially in public schools. In this way, the educational services can be given

through school finance mechanisms / budgets designed to increase equity, competence and efficiency (Howell and Miller, 1997).

Competence related to the establishment of the school budget and the allocation of budget to schools has a public value adopted by the society. However, the budget inequalities of the wealthy and poor school districts show the contrast in practice. Inadequate budgeting and changing policies for schools deepen the gap between school budgets, especially under the influence of globalization. Even though school districts earn income from local funding sources, the state as well as federal aid and funding are insufficient to increase the capacity of students to meet their needs (Ikpa, 2016). The increase in the number of students in the school because of the increase in the population, the expectations from the education system, and the increased public expectations for the outputs cause direct additions to the schools' budget. While the requirements of the school are increased in both quantitative and qualitative terms, there is no increase in the budget of the school. While there are efforts to create a budget balance for schools having additional support (family, local government, etc.), it is observed that the schools that do not take this support due to low socio-economic environment have difficulties in their budgets.

Kozol's study (2005), contains a suffix to illustrate the inequality levels of resource allocation in the principal areas of the United States and the socio- economic distinction among school districts in these areas. As a result of the research, the financing / budget of school districts with very high level of child poverty is relatively low. This situation demonstrates that the socio-economic status of the environment in the school is its related to the school's budget, and supports the view that the differences in the socio-economic environment in which the school is located constitute the inequalities in the school budget. Välijärvi and Malin (2000) explain the socio-economic differences of the school for two reasons. The first one is the geographical location of the school, and the second is the selection of schools. The geographic location of the school determines where the students come from; therefore, students represent the social structure of that environment. Another point is that the school's choice of student or the student's choice of school cause the differences depending on the social status among schools. Socio-economic differences in the school budget are largely influenced by the contribution of families to schools. Adequate and well-educated parents contribute to schools where their children are educated and also contribute to the schools by collecting money through school-parent associations and by private donations (Brighouse, 2007). In regions with low levels of education and low income levels, the family is not expected to contribute to the school budget or the level of contribution is low. In support of these findings, Card and Payne (2002) reported that in the 1980s in the states where the school financial system was reported to be against the constitution, the resources of low-income regions increased, the increase in state aid to the poorer regions increased the expenditure in these regions, thus they concluded that the difference in expenses of poor and rich regions decreased. It was observed that the budgetary deficiencies of the schools also had a share in the common exams held as a result of the research, and therefore egalitarian systems to be provided in schools' budgets also had an effect on student education processes.

In any case, after a school has a budget, the important point is how to use the budget and how to distribute the expenses such as goods and services. To address this problem, school financing of the 1990s should go beyond financial inequalities and identify links between student achievement, educational progress and education financing (Odden, 1992). It is important that school budgets have budget management models that minimize inequalities among schools. It is more important to take into account the dynamics of the school as countries have different ways to create school budgets, and there are many reasons for differentiation, from cultural factors to countries' governance. In particular, education's meaning for countries and their expectations from education outline the budget and budget management processes in schools.

Considering this case in Turkey, schools are run in two ways as state and private and the financing of schools is mainly provided by the Ministry of National Education. In terms of education budget, the budgets for preschool education, primary and secondary education is considered as general budget; higher education budgets, as special budget. In the source provided to schools by the Ministry of National Education from the central budget, primary and secondary schools do not have a direct budget (primary school and secondary schools are not given a cash budget), while high schools are paid directly

from the budget. The budget allocated to public high schools in Turkey, in particular, does not cover teachers' salaries. All processes related to teacher employment and payment of teacher salaries are carried out centrally by the Ministry of National Education. The budget allocated directly to state high schools is spent for the cost of goods, service expenses, maintenance and repair expenses, current transfers, capital expenditures and other expenses. Apart from the budget allocated by the state, high schools have additional income sources. The most striking and almost the only source of these is the school- parent association fund. The school-parent association is one of the most important budgetary sources for high schools in which high-school rental income, donations and parental contributions are collected. The budget allocated by the state to the high school and the budget of the school-parent association are used under the supervision of the high school principal. The school-parent association income is one of the main factors of budgetary differences between schools. It can be said that the inequality in the budgets of schools in Turkey results from the other sources than the budget provided by the state.

In order to eliminate the inequality in the budgets of schools, it is important to evaluate the budget resources and expenditures through different variables and to propose models that eliminate inequality. When the literature was studied, there was no study related to this problem and it was determined that there was a gap in this area. Therefore, in this study, it is aimed to determine different relations of income and expense in high school budgets and to present the budget management model proposal to reduce problems and ensure equality. For this purpose, the following questions were attempted to be answered:

- What is the ratio of other income sources except the state budget to total budgets of high schools?
- Does the socio-economic environment of high schools make a difference in budgets other than the state-provided budget?
- Is there any relationship between income and expense of high schools?
- What are the views of the high school members (principal, teacher, student, parent, school-parent association member) on the ideal school budget model?

Method

The research, which is designed to propose a budget model to prevent inequalities in education, has been structured on three types of inequalities in educational opportunities; 1-Internal, 2-State, 3-Environmental (Underwood, 1994). In this study, it was focused on the inequalities arising from the state and the environment, because the measurement of internal inequalities is impossible and its evaluation can not provide healthy data for the suggestion of the model. In order to evaluate the inequalities arising from the state and the environment and to propose the equality-providing budget model, all the budget inputs to the schools were studied at the high school level. In this context, as the inequalities of schools, especially by the state and the environment, affect the social inequalities, the relationship between the state and environmental supports is evaluated. In this research, the relationship between incomes and expenditures of high school budgets was evaluated, as well as determining the income needed in high school budgets. In the study, the teachers' salary was not included in the budget since they were paid by the Ministry of National Education.

In the study, for socio-economic differences, the definitions of Välijärvi and Malin (2000) on socioeconomic differences were used. The geographical location of the school represents the social structure of that environment. However, another factor of the study, the school's choice of student was not excluded. Anatolian high schools, which are a kind of general high schools in Turkey, are studied within the scope of that study, and since schools choose student or student choose school, it was thought that the variable of social status could be effective. Therefore, the principals from research participants were asked to define the socio-economic environment (1-lower, 2-medium, 3- high) in which their schools were located.In the study, Hanushek's (2013) discussions about the relationship between school budget and student performance were not included since student performance can originate from very different variables (intelligence, age, family education level, socio-economic environment, social development, etc.) and the measurement of all these variables are not possible as well as the contribution of the similar student performance evaluations (national / international exams) in providing equity is limited.

Research Design

In this research, mixed method was used to determine different relations of income and expense in general high school budgets, and to reveal the opinions of school members about budget management model proposals.

Research Instruments and Procedures

In order to determine the income and expense relations of high school budgets and to reveal the views of principals about the budget management model proposals in the quantitative side of the research, the budget information related to the incomes and expenses of high schools in Turkey and the budget management proposals were collected through "Survey for Views of Anatolian High School Principals About the Budget Management". "Survey for Views of Anatolian High School Principals About the Budget Management" was sent to 20 field experts and 3 expert of assessment and evaluation before they were applied, updated with their opinions and after applying pilot scheme to 2 Anatolian high school principals, it was applied to high school principals who participated in the study. A total of five different semi-structured interview forms were prepared for each member of school (school principal, teacher, student, parent, school-parent association) to obtain their in-depth views on the budget management model proposals for the qualitative side of the research. Prior to the application of the forms, they were sent to 20 field experts and 3 experts of assessment and evaluation, updated with their opinions and after applying pilot scheme to a school principal, a teacher, a student, a parent, and a member of school-parent association, the forms got the finishing touches and were applied.

Participants

High school principals are important in the management of the budget provided to the general high schools by both state and non-governmental sources. Although some laws (Public Financial Management and Control Law No. 5018, Public Procurement Law No. 4734) provides an understanding of the budget management processes, these laws cover all public institutions and do not include direct articles for budget management in the school. According to the Regulation on Secondary Education of the Ministry of National Education, it is foreseen that the processes related to budget and budget management will be ensured with the cooperation of the school principal, the deputy directors and the school-parent association. In this case, it is very important for high school principals to manage the process in budget management. After the budget is allocated to the school and the allowances are made available, the school principal executes the management process. Official processes related to budget management is monitored via an online database (TEFBIS- Information Management System of Educational Finance and Educations Expenses in Turkey).

There are 2232 principals of the Anatolian high schools in Turkey. Within the scope of the research, the number of sample was determined as 1180 public high school principals for the 2% acceptable error rate in the calculation using the sample formula of Cochran (1977, 75). Through stratified sampling, the associational situations of income and expense data of total 1180 high schools in the representational rate from all cities of Turkey (81 cities). In order to obtain in-depth information about the model proposals, the opinions of 60 school members (school principal, teacher, student, parent, school-parent association member) which were selected by purposive sampling technique were evaluated. Purposeful sampling allows the researcher to select participants who are suitable for the purpose of the research. In this way, people who can answer research questions and have experience related to research questions can be selected. As a sampling type in the study, interviews were conducted with selected school components with different gender ages and experiences from regions with high, medium and low socioeconomic income by using maximum diversity sampling.

Data Analysis

The quantitative data of the study were gathered reaching participants themselves through a 33-item questionnaire and high school principals. In the analysis of the data, statistical techniques such as frequency, percentage, one-way analysis of variance (ANOVA), correlation analysis and regression analysis were used among descriptive statistics in accordance with the problem of research and research questions. In the qualitative side of the study, data were collected face to face by means of interview forms prepared by taking expert opinions. Descriptive and content analysis were used to analyze the

data. In addition, the relationship matrix was created through the MAXQDA program. As the research covered all Turkey, the legal permission was taken for the field study from the Ministry of National Education. In addition, due to face-to-face data collection from the participants, the permission was received from Ethics Committee in Ankara University.

Results

This title covers budgetary sources and socio-economic environment, the model of high school's income-expense relationship and the budget types of high schools and model proposals for budgetary participation topics.

Budget Sources and Socioeconomic Environment

Apart from the budget given by the state, high schools also have different budgetary resources. In the scope of this study, the data related to the ratio of additional budgets to total budget other than the budget given to the high schools by the state has been analyzed using percentage and frequency values. The ratio of additional budget resources of high schools other than that given by the state to the total budget was studied. The ratio of additional budgets other than the budget given by the state to the total budgets of high schools is given in Table 1.

Table 1

Ratio of additional budgetary resources to the total budgets of high schools (%)

Ratio of additional budgetary resources to the total budget(%)	**n**	**%**
0	100	8.5
1-10	259	22.0
11-20	234	19.8
21-30	158	13.4
31-40	144	12.2
41-50	104	8.8
51-60	79	6.7
61-70	50	4.2
71-80	28	2.4
81-90	18	1.5
91-100	6	0.5
Total	**1180**	**100**

As it can be seen in Table 1, 8.5% of the high schools in the sample maintain their education only through the government budget without any additional income. This means that there is no environmental financial contribution to the high school except for the state contribution. This situation is a quite critical issue. This situation also shows that high schools cannot spend on the quality of education except for the compulsory expenditures. Çınkır's study (2010), called “Problems of Primary School Principals: Sources for Problems and Support Strategies”also supports these findings. This research indicates that the first problem of the school budget among the problems faced by primary school principals in Turkey is related to the problems about the school budget and management of general and administrative services.

Another remarkable point in Table 1 is that a high school group of 2% (24) gets more than 80 % of their total budgets by external sources. This means that more than 80% of the income of these high schools is made up of environmental resources; that is, additional budgets other than the budget allocated by the state. In addition to not having any environmental resources, it is clear that inequality will deepen among the high schools that provide almost all of their budget from sources other than the state.

High school stake additional budgets other than the state-provided budget by different sources such as school-parent associations, parent donations, sponsors. For this reason, the ratio of additional budgetary resources within the total budget is important. The results of one-way analysis ofvariance related to socioeconomic environment relationship and the ratio of additional budget resources of high schools to total budget are given in Table 2.

Table 2

The results of ANOVA analysis related to the relationship of socioeconomic level and the ratio of additional budgetary resources to total budget of high schools

Socio Economic Level	Sum of Squares	Df	Meanof Squares	F	p
between groups	23162.57	2	11581.28		
within groups	546475.14	1177	464.29	24.94	0.00*
Total	**569637.70**	**1179**			

Within the scope of research, one-way analysis of variance (ANOVA) was performed for the comparison of the ratio of non-budgetary financial resources of high schools at lower, middle and high socio economic levels to total budgets. According to the results of one-way analysis of variance, a significant difference was observed between the extra-budgetary financial resources of schools in high socioeconomic level (SEL) (p <0.05). The results of comparisons among groups are shown in Table 3.

Table 3

ANOVA results of multiple comparisons between the ratio of additional budgetary resources to total budgets based on the socio-economic level of high schools

Socio economic level	Socio economic level	Mean difference	P
Lower	Medium	-6.75	.000
	High	-22.04	.000
Medium	Lower	6.75	.000
	High	-15.29	.000
High	Lower	22.04	.000
	Medium	15.29	.000

As it can be seen in Table 3, there is a significant difference among the ratio of the additional budgets to the total budgets of the high schools in lower, medium and high levels. The ratio of additional budgetary resources to total budgets for high schools in high socioeconomic regions is higher than that of the high schools in lower and medium socioeconomic level. The ratio of additional budgetary resources to total budgets of high schools in medium socioeconomic level is higher than that of high schools in lower socioeconomic level. Özdemir's (2011) research also supports these findings. It was concluded that as the socio-economic level of the schools increased, the amount of income obtained by the school-parent associations increased. The presence of schools in the high socio-economic region is related to the parent profile with high level of income.

The Model of Income-Expenditure Relationship of High Schools

When the quantitative data obtained from the survey were examined, it was observed that for the reasons of the most common problems 63.1% of the principals of high schools said that they could not some maintenance and repair work of school; 43.7%, that they could not allocate source for poor students; 43.4% that they could not allocate source for the participation of students in art and sports activities; 37.8%, that they could not improve the library of school physically and for its content; 35%, they could not provide cleaning service; 27%, they could not support the participation of teachers of school in the scientific and professional meetings/trainings; 16.4%, they could not provide source for

the education of female students; 13.5%, they could not provide material for courses; 8%, they could not pay the bills of electricity, water, natural gas and phone; 1.4%, they could not allocate source for the security of school; 53.6% said "other". In other answers, they stated that high school principals could not pay salary payments for auxiliary personnel (cleaning, etc.), not pay the debts of the school, not be able to employ sufficient number of auxiliary services personnel, not improve the physical conditions of the school, not make major repairs, not pay the internet bills, and cannot meet their residency requirements.

Based on these responses, multiple regression model applications have been performed in order to examine the expenses and income relations in the most problematic areas and to propose a model for the solution of the problems in this direction. In this study, first of all, multiple linear regression analysis modeling method was used in order to examine to what extent the budget by the state and school-parent association fund predict the expenses, including "movable property, intangible right, maintenance repair expense"; that is the purchase for the maintenance-repair work. This expense was chosen for the analysis since it was the most problematic expense. The results of the multiple regression modeling method are given in Table 4.

Table 4

The regression analysis results of the expenses of movable property, intangible right and maintenance-repair work and the funds by the state and the school-parent association

Variables	B	Std Error	ß	T	p	Binaryr	Partilar
Constant	14781.634	1445.399		10.227	0.00		
Funds provided by the Ministry of National Education	0.58	0.008	0.234	6.862	0.00	0.234	0.236
School-parent association incomes	0.124	0.035	0.120	3.518	0.00	0.120	0.123

$R = .266$, $R^2 = .071$, $F = 30.499$, $p < .001$

When the model is examined, $p < 0.05$ is seen. According to this model, there is a significant relationship between expenses of movable property, intangible right and maintenance-repair work and the funds by the state and the school-parent association. It can be said that there is a significant and low level ($R = 0.266$) relationship between the expenses of movable property, intangible right and maintenance-repair work and the funds by the state and the school-parent association. It is seen that there is a significant relationship between the budget provided by the state, the school-parent association, and the expenses of movable property, intangible right and maintenance-repair work, which are two variables. However, this data explains 7% of the total variance ($R^2 = 0.07$). When the coefficients of the binary correlation are examined, it is seen that the state budget ($r = 0.234$) and the school- parent association funds ($r = 0.120$) have a low and positive relationship. According to the standardized regression coefficients (ß), the order of relative importance of the independent variables to the dependent variables, the expenses of movable property, intangible right and maintenance-repair work, and the order funds given by the state and school-parent association to the high schools are given. As a result, it was seen that the budget allocated to the school by the government affects the expenses of movable property, intangible right and maintenance-repair work. Therefore, there is a need to increase the budget provided by the state to the school for the need of maintenance-repair work, which has been reported to be problem by the high school principals.

Another important expense within the scope of the research is the service purchases, which include cleaning, security etc. For this reason, in this study, first of all, multiple linear regression analysis modeling method was used in order to determine to what extent the budget by the state and

school-parent association fund is related to the service purchases. The results of the multiple regression modeling method are given in Table 5.

Table 5
Regression analysis results of the service purchases and funds by the national state and the school-parent association

Variables	B	Std	ß	T	p	Binaryr	Partilar
Constant	37168.5	8978.59		4.140	0.00		
Funds provided by Ministry of National Education	0.344	0.152	0.108	2.254	0.025	0.260	0.261
School-parent association incomes	0.241	0.44	0.260	5.454	0.00	0.107	0.111

$R = .277$, $R^2 = .077$, $F = 16{,}868$, $p < .001$

When the model is analyzed in Table 5, $p < 0.05$ value is seen. According to this model, there is a significant relationship between service purchases and funds by the national state and the school-parent association. It can be said that there is a meaningful and low level ($R = 0{,}277$) relationship between the service purchases of high schools and the funds allocated by the state and the school-parent association funds. It is seen that there is a significant relationship between the service purchases and the funds by the national state and the school-parent association. However, this data explains 7% of the total variance ($R^2 = 0.07$). When the coefficients of the binary correlation are examined, it is seen that the state budget ($r = 0.260$) and the school-parent association funds ($r = 0.107$) have a low and positive relationship. According to the standardized regression coefficients (ß), the relative importance of the independent variables to the service purchase expenditures, which are the dependent variable, is listed as the budget provided by the state to high school budget and school-parent association funds. As a result, it was seen that the funds provided by Ministry of National Education and school-parent association incomes affects service purchases.

Model Proposal for the Budget Type and Budget Participation of High Schools

On the quantitative side of the study, for the data obtained from 1180 high schools the school principals were asked how to finance the schools. Principals were able to mark more than one option. The answers obtained are shown in Table 6.

Table 6
Distribution of findings about budget model planned by high school principals

Planned Budget Model	n	%
I will plan a model in which schools are independent in creating source and spending.	319	27.0
I will plan a model in which all sources will be provided by Ministry of Education and additional sources will not be needed.	676	57.3
I will plan a model in which schools manage the budget independently in cooperation with the school-parent association.	170	14.4
I will plan a model in which there will be a specific employee who is responsible for the records of income and expenses in school.	436	36.9
I will plan a model in which all authority belongs to the principal.	360	30.5
I will plan a model in which all components of the school (student, teacher, officials, service personnel, school-parent association member, parent) have a say in the budget management.	220	18.6
I will plan a model in which train specially school principals.	11	0.9
Others	3	0.3

As shown in Table 6, it has been seen that 57.3% of high school principals will plan a model in which all sources will be provided by the state and additional sources will not be needed; 36.9%, in which there will be a specific employee who is responsible for the records of income and expenses in school; 30.5%, in which all authority belongs to the principal; 27%, in which schools are independent in creating source and spending; 18.6%, in which all members of the school (student, teacher, officials,

service personnel, school-parent association member, parent) have a say in the budget management; 14.4%, in which schools manage the budget independently in cooperation with the school-parent association. It is also noteworthy that there are the ones (0.9%) that emphasize the need to train school principals.

In addition to the high school principals, other school members were asked how they would design a school budget management model on the qualitative side of the research. For the budget management system to be designed by the members of the school, it was seen that they gave the responses of public-provided budgeting, mixed budget, special budget and bag budgeting for the financing of the sources. The answers of school members to whom there should be in decision-making process in the designed model and budget funds are given in Figure 1.

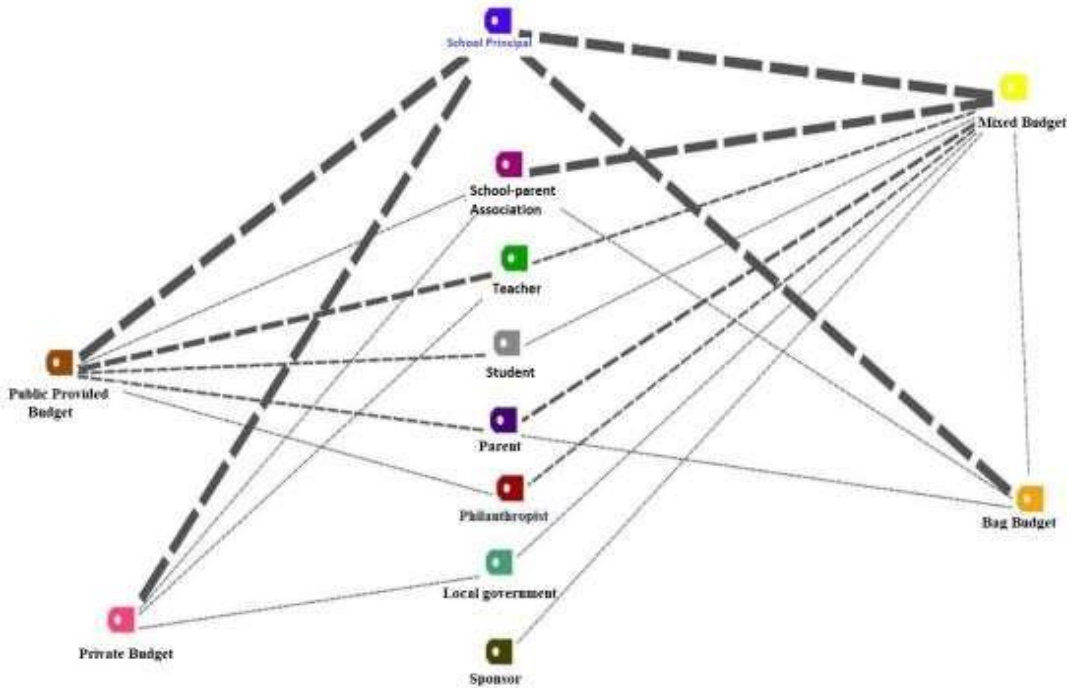

Figure 1. Matrices of school members related to budget management

When the matrix related to the model is examined, it is observed that the most intense relationship between the units is between the principal and the public-provided budget, private budget, mixed budget and bag budgeting. At the same time, there is an intense relationship between the school-parent association and the demand for mixed budget. When the model matrix is examined, it is seen that teachers and students predominantly propose a public-provided budget. It is observed that those who want parents to co-ordinate the system prefer the mixed budget more intensely. It is seen that those whose models include principal choose the public-provided budget, private budget, mixed budget and predominantly bag budgeting.

Conclusion

The additional budgetary resources of the high schools except the state budget are affected by the socio-economic conditions of the school. If a high school is in a high socioeconomic environment, the budget provided by the state to the high school does not have a large contribution compared to the additional budget. This means that additional budgets can reach such large proportions that additional budgets are more important within the total budget. However, it is difficult to find additional budgetary resources for the schools in the lower socioeconomic environment. The most important budget for these schools is the budget given by the state. For this reason,in order to ensure equality,the socio-economic environments in which schools are located can be mapped and this map can bee valuated in the distribution of the budget.

There is a low relationship between the income and expenses of high schools. The expenses of movable property, intangible right, maintenance-repair are affected by the budget provided by the state. Therefore, by allocating more budget to the schools by the state, problems in maintenance and repair can be solved. However, considering that public resources are limited, additional budgetary resources can be created to meet the expense items.

It is the ideal system for high schools to have the budget provided by the state and to manage their budget with the participation of different school members. The participation of different school members is important in order to reveal the problems of the system from different angles and to provide the quality of education by spending the budget in order to solve these problems.

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A Study on Inclusive Education in Turkey*

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Tamer Sarı** **Funda Nayir***** **Ümit Kahraman******

Abstract

The purpose of this research is to examine inclusive education research and to guide applications and research according to the results obtained. Within the framework of this aim, the studies carried out in the field of inclusive education in Turkey were systematically examined. Articles published in national and international refereed journals in English or Turkish between 2009-2019 were included in the research The research is qualitative research in which the studies are examined according to the publication year, publication language, subject, research design, the field of the researchers and the scope of the articles. The data of the study were collected through document review. In this study, it has been concluded that the studies about inclusive education have started to increase in recent years, generally, qualitative research methods are used and more specifically, researchers in special education field have made inclusive education studies. When the articles were examined in terms of scope, it was seen that the majority of the studies were on attitude and descriptive studies. At this point, it can be said that the priority of the studies related to inclusive education in Turkey is not to produce theoretical knowledge or to create the infrastructure of new studies by examining the studies done. In the studies carried out, studies that reveal the opinions, attitudes and perceptions of the participants regarding inclusive education were more prominent. In order to contribute to both national and international literature, it would be useful to conduct further research on theoretical and literature research and to plan experimental research to reveal the effectiveness of inclusive education-related practices. Similar studies will be conducted in different countries and the comparison of the findings will contribute to the literature in terms of revealing the international trend.

Keywords: inclusive education, individual differences, cultural differences, education for each student.

* This study is an extended version of the paper presented at the 14th Education Management Congress held in Çeşme between 2-4 May 2019.

** Dr., Pamukkale University, School of Foreign Languages, Denizli, Turkey. E-mail: tamersari@pau.edu.tr, https://orcid.org/0000-0003-3752-9277

*** Assoc. Prof., Pamukkale University, Education Faculty, Educational Sciences, Denizli, Turkey. E-mail: fnayir@pau.edu.tr, https://orcid.org/0000-0002-9313-4942

**** *Corresponding Author:* Assist. Prof., Bilecik Şeyh Edebali University, Faculty of Health Sciences, Child Development, Bilecik, Turkey. E-mail: ukahraman8364@gmail.com, https://orcid.org/0000-0002-4547-6753

Türkiye'de Kapsayıcı Eğitim Üzerine Bir Çalışma*

Makale Türü	Başvuru Tarihi	Kabul Tarihi
Araştırma	5.11.2019	21.07.2020

Tamer Sarı** **Funda Nayır***** **Ümit Kahraman******

Öz

Bu araştırmanın amacı, kapsayıcı eğitim araştırmalarının incelenmesi ve elde edilen sonuçlar doğrultusunda uygulamalara ve araştırmalara yön verilmesidir. Bu amaç çerçevesinde Türkiye'de kapsayıcı eğitim alanında yapılan çalışmalar sistematik olarak incelenmiştir. 2009-2019 yılları arasında ulusal ve uluslararası hakemli dergilerde İngilizce ve Türkçe olarak yayınlanan makaleler araştırma kapsamına alınmıştır. Araştırma, çalışmaların yayın yılı, yayın dili, konusu, araştırma deseni, araştırmacıların alanı ve makalelerin kapsamına göre incelendiği nitel bir araştırmadır. Araştırmanın verileri doküman incelemesi yoluyla toplanmıştır. Çalışmada, kapsayıcı eğitim hakkında yapılan çalışmaların son yıllarda artmaya başladığı, genellikle nitel araştırma yöntemlerinin kullanıldığı ve daha çok özel eğitim alanındaki araştırmacıların kapsayıcı eğitim çalışmaları yaptığı sonucuna ulaşılmıştır. Makaleler kapsam açısından incelendiğinde yapılan çalışmaların büyük çoğunluğunun tutum araştırmaları ve tanımlayıcı araştırmalar olduğu görülmüştür. Bu noktada Türkiye'de kapsayıcı eğitim ile ilgili yapılan çalışmaların önceliğinin kuramsal bilgi üretmek ya da yapılmış çalışmaları inceleyerek yeni çalışmaların altyapısını oluşturmak olmadığını görülmektedir. Yapılan çalışmalarda öne çıkan eğilim kapsayıcı eğitime ilişkin olarak katılımcıların görüşlerini, tutumlarını ve algılarını ortaya çıkaran çalışmalar daha ön plandadır. Gerek ulusal gerekse uluslararası alanyazına katkı sağlamak için kuramsal ve alanyazın taraması araştırmaların daha fazla yapılması, kapsayıcı eğitim ile ilgili uygulamaların etkililiğini ortaya çıkarmak için deneysel araştırmaların planlanması yararlı olacaktır. Benzer çalışmanın farklı ülkelerde yapılması ve bulguların karşılaştırılması da konu ile ilgili uluslararası eğilimi ortaya çıkarması açısından alanyazına katkı sağlayacaktır.

Anahtar Sözcükler: Kapsayıcı eğitim, bireysel farklılıklar, kültürel farklılıklar, her öğrenci için eğitim.

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** Dr., Pamukkale Üniversitesi Yabancı Diller Okulu, Denizli, Türkiye. E-posta: tamersari@pau.edu.tr, https://orcid.org/ 0000-0003-3752-9277

*** Doç. Dr., Pamukkale Üniversitesi Eğitim Fakültesi Eğitim Bilimleri Bölümü, Denizli, Türkiye. E-posta: fnayir@pau.edu.tr, https://orcid.org/0000-0002-9313-4942

**** *Sorumlu Yazar:* Dr. Öğr. Üyesi, Bilecik Şeyh Edebali Üniversitesi, Sağlık Bilimleri Fakültesi, Çocuk Gelişimi Bölümü, Bilecik, Türkiye. E-posta: ukahraman8364@gmail.com, https://orcid.org/0000-0002-4547-6753

Introduction

Inclusive education has begun to take place as an important concept in the education policies of all countries in recent years. It can be said that the increase in the importance given to human rights and the fact that education is the fundamental right of all people is effective on the basis of this interest. In fact, the Expression “Everyone has the right to education" in the United Nations Universal Declaration of Human Rights (1948) also emphasizes that education is a fundamental right. This right is also secured with the Constitution of Turkey (1982). In accordance with Article 42 of the Constitution of the Republic of Turkey: "No one shall be deprived of education and training". The right of education to all individuals without discrimination raises the issue of equality of opportunity in education and the fact that all individuals should benefit from education services equally.

When the history of inclusive education is examined, it is seen that it is primarily considered as an education service provided to individuals with special needs. In ancient times, individuals with special needs were believed to be burdens and these individuals were removed from society (dehumanization). With the advent of heavenly religions, religious beliefs played an important role in approaches to individuals with special needs, and the idea of protecting these individuals was adopted (protection). In the 1600s, these individuals were excluded from the society again (exclusion), and by the 1800s, schools were opened for these individuals. By the 1900s, segregation approach was adopted and these individuals were provided with education in environments designed separately from the general education environment (segregation). In the 1960s, the approach of normalization (normalization) was adopted and the idea that these individuals receive education in normal settings as much as possible was accepted. 1970s were the years when the least restrictive environment approach was adopted (Yücesoy Özkan, Kırkgöz and Beşdere, 2019) (least restrictive environment). The least restrictive environment is the environment where individuals with special needs can receive education in the same environments with their families and peers and the educational needs can be met in the best way (Kırcaali İftar and Batu, 2005). The least restrictive environment also formed the basis of the mainstreaming education that emerged in the 1980s (mainstreaming). In this period, while the inclusion perception expresses the participation of the students in the general classroom activities, it is expressed as ensuring equal opportunities for the students to perform at the highest level (Yücesoy Özkan, Kırkgöz and Beşdere, 2019). In the 1990s, this turned into an integration approach in which, in light of the equal opportunity, all the things that could be done for students to progress in general education classes were discussed and support services were at the forefront (integration). Education for all in the 2000s has been a global movement aimed at enabling all individuals to benefit from basic education and meeting their educational needs (UNESCO, 2000). This movement turned into an inclusive education approach in 2010's (Alquraini and Gut, 2012). At this point, inclusive education is the education given in accordance with their age in general education environments with their peers by providing support and socialization for all students to be successful (Alquraini and Gut, 2012). In other words, inclusive education is the focus of all students who are excluded because of their differences in a way to cover the whole school (Gürgür, 2019).

The meaning of equal opportunity in education is that it has educational opportunities according to the needs of individuals rather than mathematical equality (Yılmaz and Sarpkaya, 2017). Equality of opportunity in education can be fulfilled by organizing education to cover all individuals. At this point, the concept of inclusive education gains importance. Booth and Ainscow (2002) describe the philosophy of inclusive education as the physical conditions of schools are not tailored to the needs of the students with special needs, but all components of the education are adapted to the mainstream process, and the educational programs are restructured so that every child feels like part of the class.

Inclusive education is the process of strengthening the capacity of the education system to reach out to all students (UNESCO, 2009a) and it has emerged with the aim and effort to eliminate / compensate for the deficiencies of a discriminatory educational entity. Meeting educational needs of students is part of the development of fair provisions in an inclusive society where individual rights are recognized and protected (OECD, 2003). The emergence of the institution (Ünal, 1996), which will carry out this education, can be seen as an indicator of production-based education at a time when it is no longer possible to transfer the knowledge and culture which are increasing more and more thanks to social and technical developments to new generations by using the same technics such as, the master-

apprentice relationship method. Education, defined as the process that gives the individual the desired behaviour, knowledge, skill and quality (Adem, 2008), can be defined as the investment in human beings (Marshall, 1920) considered to be the most valuable of the capital for the civilization. Since direct contribution to production is seen as the main purpose, it can be said that those who have different characteristics are ignored when compared to those who have mainstream characteristics. This neglect manifests itself as the first discrimination of education and the elimination of this discrimination has only begun in the last 30 years (Amor et al., 2018). However, only physical barriers may not be indicative of specific needs. While inclusive education is closely related to the right to education for children with disabilities, it is not only limited to the right to education of children in this group, but it is a necessary approach for the provision of the right to education for all children who are disadvantaged for different reasons (UNICEF, 2011). This requires education to protect students against gender, language, religion, disability and racial discrimination, to take account of these differences and to make sure that all individuals benefit from education services equally. In this context, it can be said that the basic idea of inclusive education is to ensure equality of opportunity in education.

The acceleration of inclusive education activities was carried out in 1994 together with the "Conference on Special Needs Education", "Access and Quality" conducted in Spain with more than 300 participants representing 92 governments and 25 international organizations (UNESCO, 2009a). In addition, in 2015, the meeting held in New York was determined as one of the goals of sustainable development, to provide inclusive and fair quality education and to promote opportunities for lifelong learning for all (OECD, 2016). All these developments have been one of the most powerful driving forces in changing education policies and practices worldwide in recent years (Deng, Wang, Guan and Wang, 2017).

In inclusive education, stereotype insulating special education system should be eliminated and schools need to be more accessible and more sensitive to students with different learning needs to ensure quality education rights (UNESCO, 2009b). Accordingly, inclusive education can be defined as the response process by increasing the participation of all learners, cultures and communities, increasing participation in learning and reducing discrimination within the education system (Düşkün, 2016). In order to achieve this process, inclusive education should provide local schools for all children regardless of any perceived differences, disabilities or other social, emotional, cultural or linguistic differences (Florian, 2008).

The national legislation in Turkey, especially the education of children with a disability, is regarded to be compatible with international legislation (Düşkün, 2016). Turkey is a signatory to the Convention on the Rights of the Child (1989), legislation by signing the United Nations Convention on the Rights of Persons with Disabilities in 2006 and practices in the prevention of discrimination and has taken on the responsibility of troubleshooting, moreover, Turkey made the arrangements for special needs individuals education services in 1997, the Turkish Ministry of National Education (MoNE) has been influential in the development of policies for the education of children with disabilities and special needs. However, it is difficult to say that it is equally comprehensive in terms of gender, language, religion and ethnicity. Although comprehensive education projects (MoNE Inclusive Education Project 2016-2018) have been conducted in recent years especially for Syrian migrants, discrimination based on gender has been prohibited in the Constitution and many other regulations, however, comprehensive arrangements have not been made to make the education environments inclusive for girls and children with different sexual orientations (Düşkün, 2016). However, according to the approaches that consider inclusive education as part of human rights and participatory democracy (eg, Barton, 1995; Polat, 2011), it is not possible for policy makers, administrators, teachers, normally developing students and parents to reach the goals of inclusive education as long as their thoughts and attitudes towards inclusive education are not evaluated from the social justice and diversity framework (www.herkesicineğitim.org). Having regulations in legislation does not mean that problems will be solved or resolved. In order to solve the problems in general, the school administrators and teachers should be informed and the applications should be monitored. In addition, the families who are responsible for the care and education of their children need to be informed and applications should be carried out by taking the opinions of the parents about what can be done for the continuation of the education life of the students.

Studies on inclusive education have shown that there are more studies based on students with disability in Turkey. In recent years, the studies on the concepts such as language, religion, ethnic origin can be said to have increased. When these studies are examined, it can be said that there is also a methodological diversity. In some studies, it is found that various research methods and the difficulties faced by disadvantaged students are included; other studies, it is observed that the curriculum and textbooks are examined. It is emphasized that one of the most important stakeholders of inclusive education are teachers and the attitude of teachers towards inclusive education (Düşkün, 2016). At this point, it is thought that examining the researches about inclusive education will guide the practitioners by revealing the perception about inclusive education and the tendency in these researches. In this context, the aim of this study is to examine the articles on inclusive education in Turkey between 2009-2019 and published in international refereed journals in English or Turkish according to different variables. In this respect, the answers to the following questions have been sought.

1) What is the distribution of the articles according to years and the language of publication?
2) What is the distribution of the articles according to the subject content?
3) What is the distribution of the articles according to the research design?
4) What is the distribution of articles according to the fields of researchers?
5) What are the articles classified by type?

Method

The aim of the study was to examine the studies in the field of inclusive education in Turkey by publication year, publication language, publication topic, research pattern, the fields of the researchers and the types of the articles, therefore qualitative approach was used in the study.

Limitations of the study

The research is limited to Turkish and English articles published in international journals in the last decade (2009-2019) with the words "inclusive education" / "kapsayıcı eğitim" in the title, abstract or keywords of the articles or the content of the article. The selected articles were examined one by one and the studies that were not covered by inclusive education words in the title of the article, abstract or keywords, or which were not related to content education applications of the article were excluded from the scope of the study.

Data Collection Tool

The data of the study were collected through document review. The document review covers the analysis of written materials that contain information about the requested phenomenon or facts. In this kind of research, the researcher can obtain the data he/she needs without having to observe or interview. In this type of analysis, what kind of documents can be used as a data source is determined according to the research problem. Document review makes it possible to analyse a research problem in a time frame based on documents produced within a certain time frame or documents produced in more than one source and at different intervals in relation to a research problem (Yıldırım and Şimşek, 2013). In this respect, the articles that were completed between 2009 and 2019 and which meet the definitions defined in the limitations of the study were examined.

ERIC, EBSCO, Google Scholar and ULAKBIM search engines were used to reach the articles included in the research. The term "inclusive education" / "kapsayıcı eğitim" as a keyword in the search section is written and the results are listed by three separate researchers. The process of inclusion of articles that are decided by the criteria determined by the search engines is shown in Figure 1.

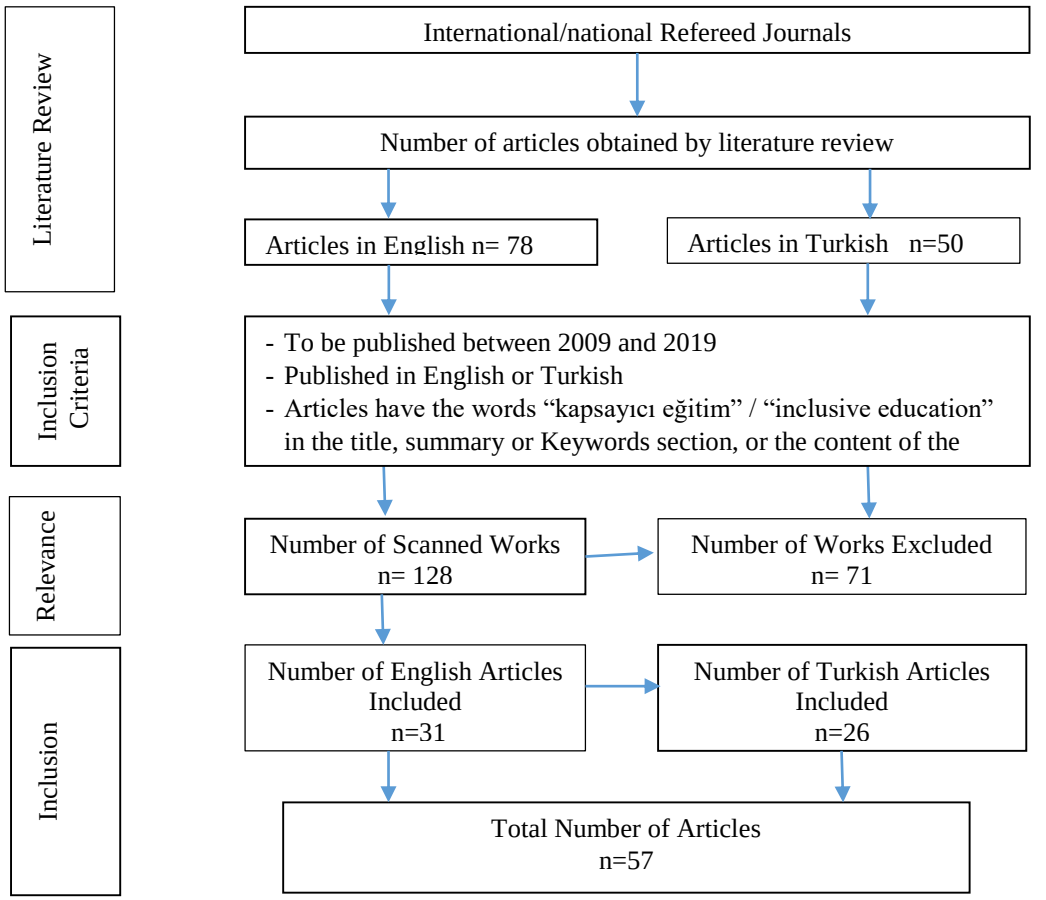

Figure 1. *The process of including articles in the research process*

As shown in Figure 1, Turkish and English articles published in national and international refereed journals were discussed in 2009-2019 in order to find out how inclusive educational studies are progressing in Turkey. In this context, 78 English and 50 Turkish articles were reached first. At this point, a total of 128 articles were examined and 71 articles were excluded which did not meet the criteria of inclusion. As a result, a total of 57 articles, 31 in English and 26 in Turkish, were included in the study.

Data Analysis

Content analysis was used in data analysis. Themes have been created for the articles studied within the scope of the research. The related categories are discussed as attitudinal, descriptive, theoretical, literature review and Intervention. Definitions related to themes are given in Table 1.

Table 1

Definitions of article categories

Category	Description
Attitudinal	Articles focused on understanding the attitudes and/or perceptions of different stakeholders in regard to inclusive education. Typically, these articles report findings from quantitative and/or qualitative data collection
Descriptive	Articles that describe based on quantitative and/or qualitative data, the current status of inclusive education in a school, community, or country. The goal of the analysis can be to describe current conditions or barriers for success. Studies examining the current status of inclusive education (e.g. number of students included in a given context) were categorised into this category.
Theory	Articles providing rationale for inclusive education based on existing or developing theory. This could be applied at the level of country-wide policy development or local policies in schools or communities, as well as by theoretically-driven frameworks for developing professional development related to inclusive education.
Literature reviews	Articles describing findings from a literature review or meta-analysis about inclusive education. The specific focus was on synthesising existing research related to inclusive education
Intervention	Articles that reported data on student-level outcomes as a result of the implementation of inclusive practice. The 'intervention' could include models of inclusive education or specific practices implemented in an inclusive setting.

Source: Amor et al. (2018).

As seen in Table 1, attitudinal studies are the studies aimed at revealing the attitudes and perceptions of the participants about inclusive education. Descriptive studies are studies aimed at revealing existing practices and situation related to inclusive education. Theoretical studies are studies to develop theories and policies for inclusive education. Theoretical studies are studies to develop theories and policies for inclusive education. Literature survey is the study in which the findings of studies related to inclusive education are interpreted based on literature. Intervention studies are studies in which the results of an application for inclusive education are evaluated (Amor et al. 2018). Then the articles were classified according to the publication language and publication year, and the research pattern, the field of the researchers and the research sample were coded separately in each article.

Validity-Reliability

In qualitative research, trustworthiness is used instead of validity and reliability is based on credibility, transferability, dependability and confirmability criteria (Guba and Lincoln, 2005). Creswell (2003) states that one or more of these criteria should be specified. In this study, credibility and transferability criteria are taken as basis. Credibility is related to the internal validity of the research and is related to the fact that the findings are compatible with the reality (Meriam and Tisdell, 2005). In this study, credibility between encoders and matching with previous research (Amor et al., 2018) findings were used for trustworthiness. For this purpose, the coding was done by the researchers separately and the goodness percentage was calculated. Miles and Huberman's (1994) formula were used and 91.75% calculated as the percentage of agreement. In addition, the results of the research were compared and interpreted with other research findings in the literature. The transferability of the research is related to external validity (Guba and Lincoln, 2005). The method used in the research, how the data is encoded, the inclusion and exclusion criteria are elaborated in detail.

Results

The findings obtained in accordance with the purpose of the study were examined using graphics and word clouds. Figure 2 shows the distribution of the work done according to years.

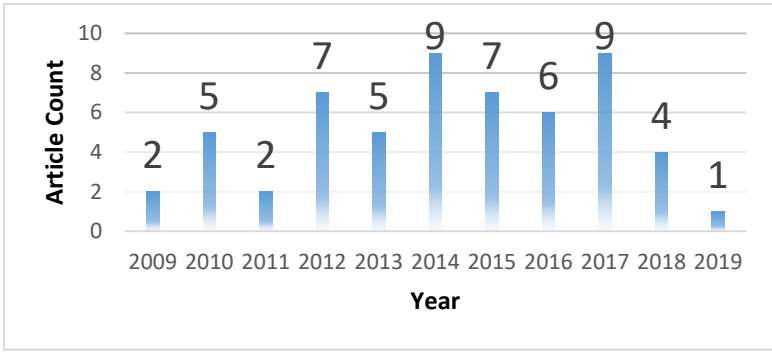

Figure 2. *Distribution of articles by year of publication*

When the distribution of the articles according to the publication years is shown in Figure 2, it is observed that the studies mostly conducted between 2014 and 2017 (n = 32; 15.8%). When the table is examined in general, there are 21 studies between the years 2009-2013. Between 2014-2019, 36 studies were conducted. Accordingly, it can be said that in recent years, studies on inclusive education have increased.

The distribution of the studies according to the language of publication is given in Figure 3.

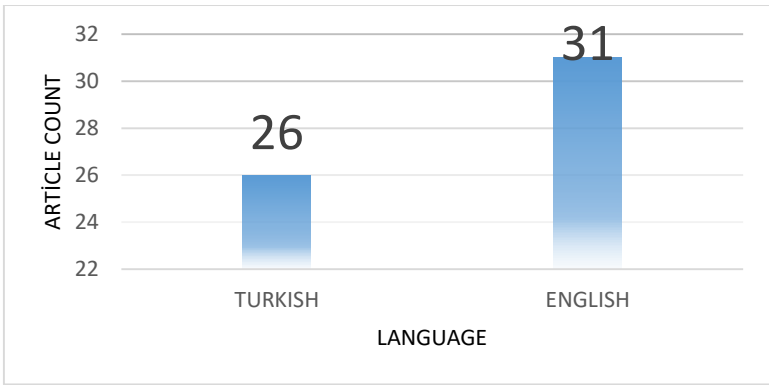

Figure 3. *Distribution of articles by language of publication*

According to the distribution of the Articles showing in Figure 3, 31 of the studies (54.4%) were prepared in English; 26 (45.6%) were prepared in Turkish. In agreement with the results, it can be said that the studies were mostly conducted in English. The contents of the studies discussed within the scope of the research are given in Figure 4.

Figure 4. *Word cloud related to the subject content of inclusive education work*

Figure 4 is the word cloud showing the classification of the researches by subject content. When the contents of the studies were examined, it was perceived that inclusive education research focused more on mainstream education (n = 31; 54.4%). 15 of the studies were studied in special education and 7 in migrant students. Lastly, 4 of the researches are the studies covered within the scope of inclusive education.

The findings of the research design of the articles are given in Figure 5.

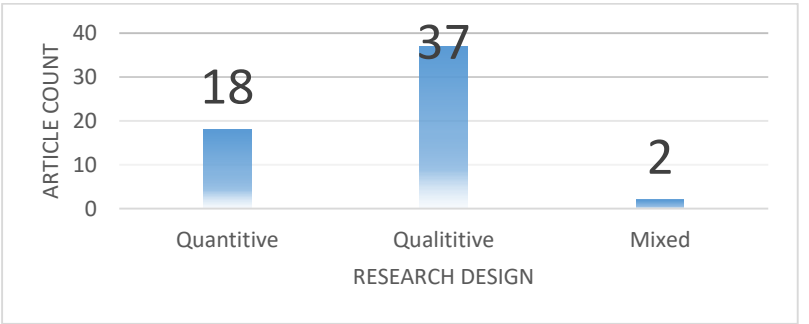

Figure 5. *Distribution of articles by research design*

When the distribution of the articles according to the research designs is shown in Figure 5, it can be said that the most qualitative research design (n = 37; 64.9%) was performed. 18 of the studies were quantitative (31.6%) and 2 (3.5%) were in mixed research design. It can be said that studies related to inclusive education are mostly carried out in qualitative research design. Qualitative research may be more likely because inclusive education is broad on the subject area (such as special education, individuals with special needs, migrant students) and because inclusive education practices need to be examined in more depth. Mixed method research is rarely encountered. Mixed method research may be less used because it requires both qualitative and quantitative research skills.

The results of the study areas of the researchers are given in Figure 6.

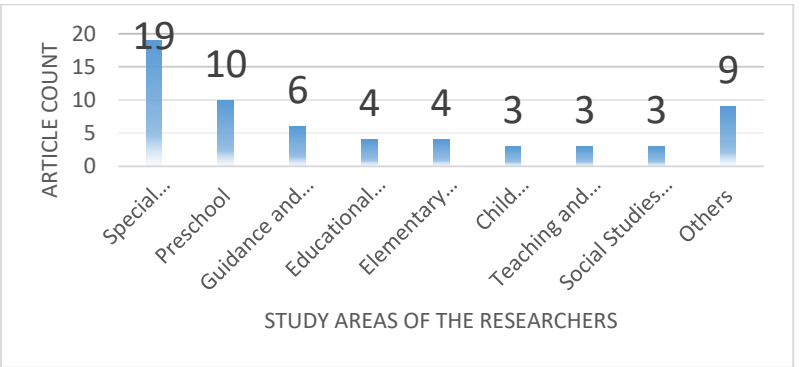

Figure 6. The results of the study areas of the researchers

Figure 6 shows that the researchers in the field of special education (N=19; 31.1%) conducted studies on inclusive education mostly. This is followed by 10 studies (16.4%) in Preschool Education and 6 studies (9.8%) in Psychological Counselling and Guidance. 4 of the researchers in the field of Education Administration and Primary Education each, 3 of the researchers in the field of Child Development, Educational Programs and Social Studies Education have been found. 9 of the researchers are in other fields (Political Science and Public Administration, Architecture, Educational Psychology, etc.). When the graphs are examined in general terms, it is figured out that inclusive education activities are carried out in a wide range of areas and outside the education area. However, it can be said that Educational Administration researchers, who are expected to carry out studies on the development of educational policies, conducted relatively few studies on inclusive education.

The results related to the classification of the articles are given in Figure 7.

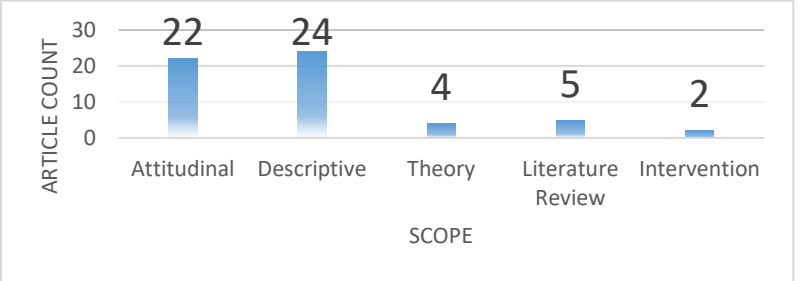

Figure 7. Distribution of articles by scope

In Figure 7, it can be seen that the vast majority of inclusive education articles are based on attitudinal research (n = 22; 38.6%) and descriptive research (n = 24; 42.1%). Five of the articles were literature review (8,8%) and 4 were theoretical (7%). Only 2 of the studies were intervention studies (3.5%).

Discussion, Conclusion and Recommendations

In this research, 57 studies, 26 of them in Turkish and 31 in English, were carried out in the scope of “inclusive education” or "kapsayıcı eğitim" in the title or keywords between the years 2009-2019. When years of research are examined, it is concluded that that 1 article in 2019; 2 articles in 2009 and 2011; 4 articles in 2018; 5 articles in 2010 and 2013; 6 articles in 2016; 7 articles in 2012 and 2015; and 9 articles in 2014 and 2017. In general, it is observed that the studies towards inclusive education increased between the years 2014-2019. This may be due to the recent legal regulations on education in Turkey and the increase in the number of migrants in Turkey. In this respect, it is affirmed that education policies of countries have an effect on education researches.

When the articles are examined according to the language of publication, it is stated that there are more articles published in English. Amor et al. (2018) revealed that more studies in English on inclusive education were published between 2002 and 2016. This may be due to the fact that English is preferred more as a Lingua Franca and the international access rate is high, so studies can reach more readers and increase the chance of citation.

When the scopes of the articles are considered, it is understood that it is mostly related to the mainstream students, special education and immigrant students. In this case it can be interpreted as inclusive education is considered as a concept for the training of more disadvantaged groups in Turkey and this is not true only for Turkey. Amor et al. (2018), Messiou (2017), Nilholm and Göransson (2017) also revealed that inclusive education is generally addressed for students with disability. Although inclusive education is considered for groups with disability/disadvantage, it is an education that aims to meet all students’ and academic achievements (Ainscow, Booth and Dyson, 2006; UNESCO, 2008; Nilholm and Göransson, 2017). However, the increased migration figure in Turkey in recent years may be the reason for the increase in the study of migrants in the context of inclusive education. As of 2018, there are approximately 4.3 million refugees from many different countries (Iraq, Afghanistan, Iran and Somalia, mainly Syria). Considering only those coming from Syria, 50% of the migrants arriving are under 18 and the schooling rate at primary level is 95% (Migration and Compliance Report, 2018). This requires the integration of immigrant students into the education system and includes many difficulties (European Commission, 2019). In this case, it is possible to say that immigrant students are considered as disadvantaged groups and included in inclusive education.

When the research design used in the articles is examined, it is seen that qualitative research is more preferred. The qualitative research focuses on the status of individuals in the world (Patton, 2015), and an interpretative study based on the examination of individuals in specific situations in their natural environment (Denzin and Lincoln, 1994). The interpretive approach is an approach that focuses on how individuals perceive the world (Robson and McCartan, 2016), trying to uncover the reality underlying the action (Kaya, 2019), and aims to reveal the meanings attributed to individuals by understanding the events (Keat and Urry, 2010). It is possible to say that qualitative research has been carried out in order

to present the meanings loaded by individuals on the events more deeply, based on the findings that the studies related to inclusive education are concentrated on individuals with disability/disadvantage and immigrant students. In addition, individuals with disability/disadvantage and immigrant students may be considered as the case and qualitative research may be preferred to reveal the perceptions of this phenomenon.

When the articles are examined, it can be said that the researchers in the field of special education are mostly involved in inclusive education. As a result of the consideration of the disability and disadvantaged groups (Amor et al., 2018) in relation to inclusive education, it is generally expected that special education researchers should study on this issue. It can also be said that the use of special education and inclusive education in the regulations published by the MoNE in 1997 and 2006 is effective in the formation of this perception.

Considering the types of articles, attitudes and descriptive researches are seen to be clearly ahead, similar findings have also been obtained in the project "education for all" funded by the European Union and of which Turkey is a partner. According to this, when the literature on inclusive education in Turkey is scanned, it is observed that the attitudes of teachers and teacher candidates towards it are measured in most of these studies. These studies, which are useful in describing the current situation of coverage, repeat each other in a methodological way. In addition, research questions and empirical results were asked and interpreted without any theoretical framework (http://www.herkesicinegitim.org). Literature review is a summary of previous research on the subject. Theoretical studies are carried out to test existing theory or knowledge and to create a new one (Ekiz, 2013). At this point, it is observed that the priority of the studies related to inclusive education in Turkey is not to produce theoretical knowledge or to create the infrastructure of new studies by examining the studies done. The main trend in the studies is that studies that reveal the opinions, attitudes and perceptions of the participants in relation to inclusive education are more prominent. However, the main purpose of a scientific study is to produce knowledge and to create new ideas by using existing knowledge. This situation is not peculiar to Turkey. In their study on inclusive education, Nilholm and Göransson (2017) found that the most empirical studies were carried out and were followed by the position paper discussing and evaluating the subject. Amor et al. (2018) found that theoretical studies related to inclusive education were more prevalent and followed by descriptive studies. At this point, it is possible to say that there is a different trend regarding the type of studies carried out on inclusive education in Turkey. Descriptive and behavioural studies based on data reporting take precedence in Turkey. This may be due to the fact that descriptive and attitudinal work is more methodically easier. However, for scientific progress, it is necessary to go beyond the problem and possible analyses (McCart, Sailor, Bezdek, and Satter. 2014).

In conclusion, in this study, it was aimed to reveal the trends related to the research on inclusive education in Turkey. For this purpose, articles published in national and international peer-reviewed journals were examined. According to the research findings, studies on inclusive education in Turkey have been increasing in recent years. Qualitative research pattern and English language are preferred more frequently in the articles. The articles were mostly conducted in the special education area and students with disabilities/disadvantaged and migrant students were investigated. Considering the type of articles, it is concluded that descriptive and attitudinal research containing data reporting is more preferred.

In this study, the perceptions of inclusive education in Turkey were found to be limited to students with disability/disadvantage students, special education students, and immigrants. For this reason, it is recommended to extend the scope of research in different disciplines by considering inclusive education for all students. Moreover, it may be said that more studies are required in the Turkish language, since more studies in the English language might reduce accessibility at the national level. The increase in studies on inclusive education in recent years is a positive result. This can be attributed to national and international legal regulations on education. In this respect, it can be suggested that countries should refer to inclusive education more in the legal regulations related to education policies. The studies are mainly done in qualitative research designs and this is followed by quantitative studies.

However, it is an important finding that the number of mixed researches is very low. Mixed research is a method that extends the understanding of the individual about the event where qualitative

and quantitative methods are combined and the advantages of both patterns are used where researchers can use multiple methods and data collection techniques (Onwuegbuzie and Leech, 2004). At this point, it would be useful to use more of the mixed method in researches about inclusive education. Another important result in the study is that there are more descriptive and attitudinal studies based on data reporting.

In order to contribute to both national and international literature, it would be useful to conduct further research on theoretical and literature research and to plan experimental research to reveal the effectiveness of inclusive education-related practices. Similar studies will be conducted in different countries and the comparison of the findings will contribute to the literature in terms of revealing the international trend.

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Investigating the Impact of Long-term Professional Development through Teacher Evaluation*

Article Type	Received Date	Accepted Date
Research	19.03.2020	17.07.2020

Özlem Oktay ** **Ali Eryılmaz** ***

Abstract

Educational reform efforts support professional development (PD) programs for teachers as a means to establishing possible outcomes that may affect changing teacher practices, student learning, and impact on economic and educational foundations. PD programs require evaluation in order to appraise their effectiveness, and seeking participant opinion following program implementation is one such valid method. The aim of the current study is to determine in-service physics teachers' evaluation about the impact of a long-term PD program. Qualitative research methodology was employed in this study. Research was conducted with seven teachers, with data collected through a workshop session evaluation checklist (WSEC) and a PD program evaluation interview protocol (PDEIP). Interviews were audio-recorded and then responses to each question transcribed. According to the WSEC data, all sessions broadly reached their aims. The session which teachers considered the least contributive to their developmental gain was on the topic of "Misconception." The PDEIP results showed that teachers used more student-centered methods and more varied teaching materials in their lessons following their participation in the PD program. Following the PD program, some teachers reportedly started using placement assessment.

Keywords: Professional development, in-service physics teachers, teacher evaluation, qualitative study.

* This research article is a part of the first author's PhD dissertation.

** *Corresponding Author:* Dr., Atatürk University, Kazım Karabekir Education Faculty, Department of Mathematics and Science Education, Erzurum, Turkey. E-mail: oktayozlm@gmail.com, https://orcid.org/0000-0002-0207-1211

*** Prof. Dr., Middle East Technical University, Faculty of Education, Department of Mathematics and Science Education, Ankara, Turkey. E-mail: eryilmaz@metu.edu.tr, https://orcid.org/0000-0003-2161-6018

Uzun Süreli Mesleki Gelişimin Etkisinin Öğretmen Değerlendirmesi ile Araştırılması*

Makale Türü	Başvuru Tarihi	Kabul Tarihi
Araştırma	19.03.2020	17.07.2020

Özlem Oktay ** **Ali Eryılmaz** ***

Öz

Eğitim reform çabaları değişen öğretmen uygulamalarını, öğrencinin öğrenmesini, ekonomik ve eğitimsel temelleri etkileyebilecek olası sonuçlar elde etmenin bir yolu olarak öğretmenlerin mesleki gelişim (MG) programlarını desteklemektedir. MG programları, etkilerinin ortaya çıkması için değerlendirme yapılmasını gerektirir ve programın uygulanmasından sonra katılımcı fikrinin alınması bunun için geçerli yöntemlerden biridir. Bu çalışmanın amacı, fizik öğretmenlerinin uzun süreli bir MG programının etkisine ilişkin değerlendirmelerini belirlemektir. Bu çalışma nitel bir araştırmadır. Araştırma yedi öğretmen ile yürütülmüş, veriler Çalıştay Oturum Değerlendirme Listesi (ÇODL) ve Mesleki Gelişim Eğitiminin Değerlendirilmesi ile ilgili Öğretmen Görüşme Formu (MGÖGF) ile toplanmıştır. Görüşmeler sesli olarak kaydedilmiş ve sonra her soruya ait cevaplar transkript edilmiştir. ÇODL verilerine göre, tüm oturumlar amaçlarına geniş ölçüde ulaşmıştır. Öğretmenlerin gelişimsel kazanımlarına en az katkıda bulunduğu düşünülen "Kavram yanılgıları" konusu ile ilgili oturumdur. MGÖGF sonuçları genel anlamda özetlenirse, MG programından sonra öğretmenler derslerinde daha çok öğrenci merkezli yöntemler ve daha çeşitli öğretim materyalleri kullandıklarını belirtmişlerdir. Ek olarak, bazı öğretmenler yerleştirme (placement) amaçlı değerlendirmeyi derslerinde kullanmaya başladıklarını ifade etmişlerdir.

Anahtar Sözcükler: Mesleki gelişim, fizik öğretmenleri, öğretmen değerlendirmesi, nitel çalışma.

* Bu araştırma makalesi, ilk yazarın doktora tezinin bir parçasıdır.

** *Sorumlu Yazar:* Dr., Atatürk Üniversitesi, Kazım Karabekir Eğitim Fakültesi, Matematik ve Fen Bilimleri Eğitimi Bölümü, Erzurum, Türkiye. E-posta: oktayozlm@gmail.com, https://orcid.org/0000-0002-0207-1211

*** Prof. Dr., Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Matematik ve Fen Bilimleri Eğitimi Bölümü, Ankara, Türkiye. E-posta: eryilmaz@metu.edu.tr, https://orcid.org/0000-0003-2161-6018

Introduction

Educational reform initiatives cannot succeed without teachers' involvement. Reform efforts support professional development (PD) programs as a means to establishing possible outcomes that may affect changing teacher practices, student learning, and impact on economic and educational foundations. PD of teachers is one of the biggest investments in education. According to the definition put forward by Guskey (1986), PD is an organized initiative for change. Change can be in teachers' classroom implementations, their attitudes, beliefs, or in student learning. PD includes various activities in specific disciplines that contribute to teachers' learning. PD introduces deep learning of content and offers appropriate tools associated with curriculum and learners' needs. Effective teaching requires using proper instructional practices, content understanding, and the effective integration of content and pedagogy in teaching (Ball, 2000).

Of the PD models established in the literature, one of the more well-known is by Bell and Gilbert (1996). Their model includes personal, social, and professional development attributes. The PD model contains three phases, and each phase includes all three types of development. The personal development phase requires solving problems associated with the practice of teaching. The social development phase includes collaboration with peers, during which teachers start to build professional relationships with their colleagues. Then they search for different development opportunities that are relevant to their PD. In the professional development phase, PD emerges from developing more consistent practice. Teachers prepare and implement new activities in the classroom.

Guskey and Sparks (1996) proposed a model with three factors that affect the quality of PD programs. Content is the first factor, and represents the "What" variable. It relates to the new knowledge, skills acquired, subject matter and understanding of pedagogical knowledge during PD, and the involvement of parents in the support of student learning. Second is the process factor, which is the "How" variable when organizing and implementing PD. The third factor is context, in which the "Who," "When," "Where," and "Why" variables are addressed, such as institute, society, and system.

Kubitskey, Fishman, and Marx (2002) examined a design approach model, suggesting four elements of a PD framework as planning, activities, community, and structure. Planning should start with descriptions of PD and support continuous PD assessment. Activities provide the active learning of subjects. Community leads to collaborative working among participants from the same grade, discipline, or institution. Structure is related to the classroom needs of teachers and their experiences.

The problem-based learning PD model explained by Clossen (2008) utilizes small groups to solve problems. A trainer or group leader presents the problem, and then supports the groups. Learning together is utilized in order to identify problems and reach a consensus on a way forward. Teachers spend their time within a socially supportive environment in applying new knowledge and sharing their ideas.

Oktay (2015) proposed a professional development model for in-service physics teachers in order to provide support and feedback so as to build upon their teaching models within the context of physics teaching. The proposed PD program also aimed at overcoming common misunderstandings related to subject content. The PD model framework includes teachers working together face-to-face on a voluntary basis through workshops and other non-face-to-face interactive forms. Considering adult learning theory, this model incorporates effective PD characteristics in a research designed to investigate what happens before and after the implementation of a PD program in terms of teacher practices. A set of 12 PD characteristics were formulated in the PD model framework, and these are: Considering the needs of participants; Raising participants' awareness related to current situation; Providing support; Considering motivating elements towards training participation; Applying feedback strategies; Providing opportunities to practice; Developing planned but flexible PD programs that include effective communication; Considering long-term duration and ongoing structure; Developing a content-specific PD program aligned with curricula; Providing an active learning environment (effective/productive working, reflective thinking, and discussion); Including interactive and collaborative working; and, Building a learning community. An illustration of Oktay's (2015) PD model framework can be seen in Figure 1.

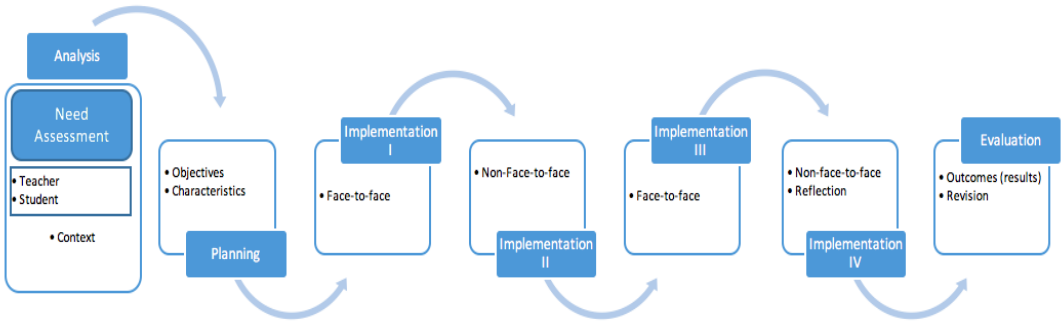

Figure 1. *PD model framework (Oktay, 2015)*

In Oktay's (2015) study, data were collected from a proposed PD model aimed at improving in-service physics teachers' practices. Since the Turkish physics curriculum was updated in 2013, in-service physics teachers' classroom practices were assessed on the common topics of two units: "Nature of Physics" (NOP) in 2012 and "Introduction to Science of Physics" (ISOP) in 2013. Classroom documents were used to provide evidence for teachers' behavioral changes in their classrooms. Teachers also evaluated themselves with regards to their own changes following attendance of the PD program. In addition, the teachers opined about the strengths and weaknesses of the PD program.

The purpose of the current study is to evaluate Oktay's (2015) proposed model framework through teachers' opinions. Guskey (2000) emphasized five levels of PD evaluation in order to measure its impact, which are: Participants' reactions; Participant learning; Organizational support and change; Participants' usage of new knowledge and skills; and, Student learning. Evaluation is also necessary to determine if any future program should be accepted, revised, or rejected (Ornstein & Hunkins, 1988). From the results of the current study, it is aimed to see the changes from a participants' perspective, and as such, the following research question forms the root of the study's investigation: "What are the evaluations of in-service physics teachers after participating in a long-term professional development program?

Method

Participants

The study was conducted with seven teachers (one male, six female). For the purposes of maintaining participant anonymity, the teachers are referred to in this study as TA, TB, TC, TD, TE, TF, and TG. The participant teachers had an average of 20.7 years teaching experience.

Instruments

Teachers' evaluations were assessed using a workshop session evaluation checklist (WSEC) and a PD program evaluation interview protocol (PDEIP). At the end of each day's session of Workshop I, a WSEC was given to each participant in-service teacher. The WSEC includes six Likert-type statements and one general question in order to elicit positive and negative feedback from that day's session. The teachers' reactions were measured by way of a set of questions at the end of the teacher PD program using the PDEIP. It was constructed consisting of five open-ended questions and a rating scale. The participant teachers were then requested to provide their opinion about the PD activities overall and to evaluate the strengths and weaknesses of the PD program. Data were collected from the participant teachers through 40 minute semi-structured interviews that were audio-recorded with the permission of the participants.

Research Methodology and Data Analysis

The study utilizes qualitative methodology. Interviews were audio-recorded and then transcribed question by question. The researcher wrote notes and codes on the manuscripts. The researchers then reread the data many times over in order to be familiar with the contexts. A thematic approach (Miles

& Huberman, 1994) was used to analyze the coded transcripts. During the interviews, everyday vocabulary was preferred instead of using terminology. Prompts (nonverbal noises such as "Ok" and "Yes") and probes (e.g., Had anyone else mentioned similar thoughts?) were used to stimulate and expand discussions.

The validity and reliability of the qualitative findings were ensured through the following. First, the two researchers consulted with each other while developing the tools, and when collecting, coding, analyzing, and interpreting the data. Iterations of the data analysis were debated until final consensus as reached. Experts also gave feedback during the development of the measurement tools. In reporting the results, narratives from the data are given as quotations so as to reflect the actual teachers' responses. To ensure dependability of the analysis, interrater (agreement among different researchers) reliability was calculated, with scores found as being 94% and 95%, respectively. As these scores far exceed the 70% acceptability mark, the results are considered to be reliable (Miles & Huberman, 1994).

Participants were made fully aware of the purpose of the study and the measuring tools employed; therefore, there was no element of deception on behalf of the participants of the study. Permissions were taken from the teachers prior to audio-recording their interviews. In reporting the results of the study, the teachers' names were coded as letters of the alphabet for the sake of maintaining participant anonymity. No data was shared with any third parties. The teachers had the opportunity to withdraw their participation from the study at any time.

Procedure

Workshop I included a total of 20 hours in five sessions of four hours, and included both theoretical and practical applications. Data from WSEC were obtained from Workshop I.

The first activity in Session 1 was about the SI unit system and basic quantities; whereas, the second activity related to the scalar and vector quantities. Lastly, the semester's observation results were overviewed in Session 2 in terms of teaching strategies. Good examples related to teaching methods were displayed by some of the teachers (e.g., modeling activity, argumentation: technology and physics, a scientific method from Galileo, measurement of mass and length). Session 3 started with a Science and Society activity that is generally used as an introduction to the Nature of Science (NOS) concept (Cavallo, 2008). How a scientist works and uses scientific processes were tested by the teachers in their activity. Misconceptions and cautions were the main topic of Session 4. An academician who is an expert in the field of NOS attended the session in order to provide knowledge and material support. He lectured on superconductivity and demonstrated the Meissner Effect, and integrated scientific law and theory concepts into the activity. The last session was devoted to the assessment dimension, and an academician was invited along to the training. The expert wanted to draw attention to assessment techniques that could be employed for different purposes, and focused on placement, formative, diagnostic, and summative assessments.

At the end of the all the sessions, the teachers evaluated them using the WSEC. Semi-structured interviews were then conducted with the teachers based on what the teachers took from the PD program using PDEIP. The participating teachers of the study were divided into lower and upper groups, according to a participation rate of approximately 80% (participation value having sharp changes) and then results were discussed.

Results

Evaluation of the Professional Development Workshop

The participant teachers performed an evaluation at the end of each session, using six statements in a five-point, Likert-type format. Figure 2 illustrates the evaluations that the teachers made following the training received in each session of Workshop I.

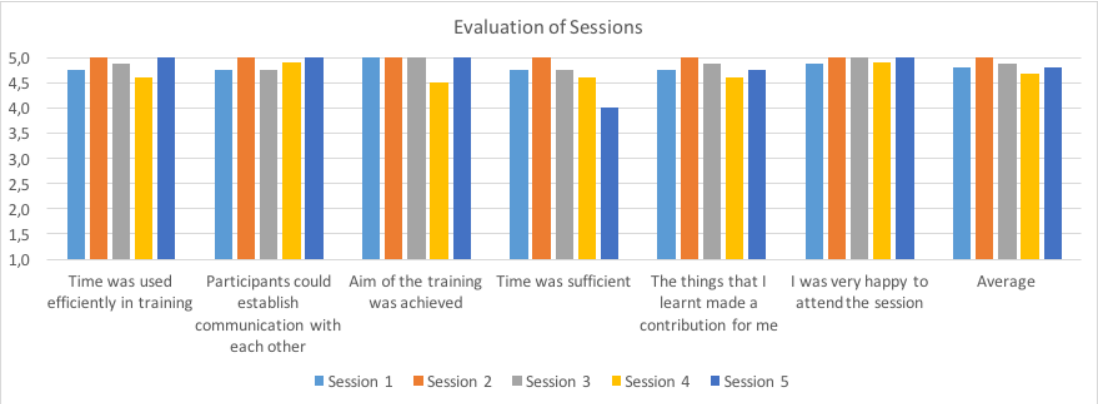

Figure 2. *Evaluation of sessions*

It was observed that the teachers were generally satisfied with the sessions (Item 6). The teachers stated that training in Session 4, in which misconception content was covered, achieved its goal less than in the other sessions (Item 3, average 4.5). According to the teachers, the purpose was achieved completely in all other sessions. The level of participants being able to establish communication with each other was evaluated in the range of 4.8 to 5.0 (Item 2). As observed, the level of being able to establish minimum communication was 95%. The lowest value given for efficient time usage in the training was 4.6 on average (Item 1 and Item 4) in Session 4. Session 2 and Session 5 were reported as the sessions in which time was used most efficiently, and Session 5 was the shortest session, followed by Session 4 in which misconception was the content. In Session 2 on methods, the teaching strategies were considered entirely sufficient in terms of time usage. Lastly, Session 4 was reported as the session in which teachers thought that what had been learnt had made the least contribution for the participants (Item 5, average: 4.6). When the sessions were generally evaluated according to their average point, they are arranged respectively as Session 2, Session 3, Session 1, Session 5, and Session 4.

Evaluation of Strengths and Weaknesses of the PD Program

In this section, questions measuring the impact of the PD program in the delivery of the unit, and whether or not the training was efficient and effective were asked using the PDEIP. Teachers were posed these questions after participating in the PD program and after they had an opportunity to implement what they had learned into their teaching.

1. **In this semester, did you deliver the ISOP unit by student-centered or teacher-centered method? Please explain.**

Four from a total of seven teachers who participated in the study mentioned that they delivered the ISOP unit by involving the participation of their students more in the lesson. The teachers stated that they used student-centered lesson delivery method as follows (see Table 1).

Table 1

Number of teachers and student-centered lesson delivery methods

Student-centered lesson delivery method	Number of teachers
Student participation in the learning process, lesson (question-answer, asking for ideas)	5
Using visual materials	3
Student projects and experiments	3
Motivating students, drawing their attention to the lesson	2
Assigning research topics before and after the lesson (or assignment)	2

The teachers applied a student-centered lesson delivery method by asking students for their ideas, and then involving them more actively in the process. The materials used, and the projects and experiments performed all contributed to this process, together with the given assignments. The teacher stated her view on this subject as follows:

> *I tried to use a more student-centered method after the PD program. I tried to get the students to join in the process and the lesson by taking on their ideas. I tried to use different teaching strategies and activities in the lesson after the PD program. In addition, sometimes I just lectured according to the situation. If we left it up to the children, then time and the management of class could be lost, and two whole physics lessons spent on making an activity. In summary, it has been different from last year, but I am satisfied (Teacher TD).*

One teacher emphasized both the students' behaviors and skills from the past, and the impact of class level on the application of new things learned from the PD.

> *The purpose was to engage students in the activities more by putting them at the center of the process, but when we consider their skills and behaviors from past years, then teacher-centered method was automatically more prominent. Unfortunately, the class did not perform as I had hoped and requested; the other classes were better in this lesson (Teacher TE).*

2. Please explain the positive and negative changes occurred in your inter-class applications after taking the PD program considering the following issues;

a) In terms of content of the unit (common topics and skill objectives), did your students experience any difficulties in this dimension? Please explain.

The teachers stated that "They care more about the objectives" after the PD program (four teachers). For example, one stated that:

> *We knew the subjects, but we didn't pay too much attention to the objectives. I tried to determine which objectives to focus upon, and which objectives to give at which level. I thought whether I should prepare exam questions according to the objectives and whether I could measure the students. Additionally, I became aware of looking more at the curriculum. I paid more attention as to which questions the students were unable to answer in the exam. I adopted objective-focused lesson delivery more, although they still experienced problems on certain units and they couldn't understand the modeling (Teacher TG).*

Besides, historical development, dependent-independent variables, evidence-inference as new subjects have begun to be given in lessons. The hardest subjects for the students at this level are:

- Using units
- Making a hypothesis
- Law, theory-related misconceptions
- Making mathematical modeling

Another teacher, who has a successful student profile, stated the following:

> *I had to face the students myself, because the books available on the market are not written in accordance with the objectives. For example, I didn't deliver unit transformation to the students as it is not part of the new curriculum, but students told me that they saw it in many books and they questioned why they didn't learn it (Teacher TC).*

b) In terms of teaching strategy (tasks/activities), did your students experience any difficulties in this dimension? Please explain.

All of the teachers said that they delivered "Richer" lessons in terms of teaching strategies after the PD program. They provided the environment by implementing group works (three teachers), and doing different experiments (two teachers). Two of the teachers stated that they used the simple pendulum activity in Workshop I. But, the most encountered problem especially in group works and activities was the noise. The teachers considered that the situation was due to students not being used to this kind of work, and their past experiences not being very positive in this way.

> *This year, I tried an activity with my students with a simple pendulum and they liked it. We solved the puzzle we developed in the PD program together and I saw variety in the methods they used compared to last year (Teacher TD).*

c) In terms of technology/material you use, did your students experience any difficulties in this dimension? Please explain.

Most of the teachers mentioned that they started using more materials in their lessons after the PD program (five teachers). They began to use the smartboard more and delivered lessons with visual materials such as video and simulations. As a result, the students paid more attention to the lessons which also appeared to be more enjoyable (two teachers). Besides, the students prepared materials such as posters (two teachers), a history line (one teacher), and a board (two teachers). On this topic, one teacher said:

> *I made them watch videos, which I hadn't done before. They used the technology, they prepared posters and made up boards. For example, they prepared a history line about the historical development of an atom. I wanted to make them prepare different materials and use other things. I think that the students liked it and I will now use it as a performance assignment. I collected the materials prepared by students in order to use as examples next year (Teacher TB).*

d) In terms of assessment approach used (measuring prior knowledge, revealing difficult subjects, measuring what is known/not known in the process, and awarding grades), did your students experience any difficulties in this dimension? Please explain.

Six of the teachers mentioned that they started to prepare questions more carefully after the PD program. For example, they started to consider the objectives more in their question preparation, and they understood that they should ask questions in terms of skills measurement. Following the PD program, three of the teachers started creating exams for placement purpose for the first time. Some of the teachers prepared exams measuring the pre-knowledge of students, whilst some of them prepared rubrics for the purpose of performance assessment (three teachers). However, two of the teachers mentioned that such activities take time and that they were not used to such kinds of activities. One of the teachers summarized her lesson assessment process as the following:

> *I used assessment for placement. I made the students solve example questions we used in the PD program in the lesson. In the process, I prepared worksheet papers and gave them to the students; this showed its benefit with the high grades that they achieved in their first physics exam (Teacher TB).*

3. Was there anything you couldn't do this year but plan to do next semester in the four dimensions of the PD program (content/skills/misconceptions, teaching strategies, technologies/materials and assessment approaches)? If any, please briefly explain the reason why they couldn't be achieved this semester.

Table 2 summarizes the activities planned for the next semester's lessons, and weren't made in the first applications following the PD program, and the reasons why.

Table 2

Future planned activities, and reasons for not implementing this semester

Future planned activity	Reason not yet implemented
Misconceptions tests	Lack of time
Worksheets	Lack of time
Preparation of visuals	Lack of time
Assigning project with strict follow-up	Lack of time
Increased number of experiments	Lack of experience
Asking for students' written opinions	Lack of time
Application of things learned to other units	Lack of experience
Presentations by students	Lack of time

One teacher summarized the activities planned to be made by the teachers in the next term as follows:

> *I gave the students some projects, but I want to give them as performance assignments and follow them up more strictly. I thought of increasing the experiments more. I want answers for questions such as. 'What wouldn't be in our daily life if physics didn't exist?' When I ask verbally, I don't get an answer; but I want to get their opinions in some subjects in writing. I need to think of creating more activities. Maybe this year was just an intensive semester; I was unprepared to apply the new program this year, but that was my fault (Teacher TF).*

The reason mentioned by most for not implementing certain activities this semester was a time-based problem. Apart from this, the teachers mentioned they lacked experience. Another notable result was that the teachers considered that the practices performed during the PD program will be internalized over time.

4. How much of your expectations were met by this PD program?

All of the teachers participating in the study mentioned that their expectations had mostly been met. They stated that they were pleased in having created a discussion environment in their PD sessions in which they shared their opinions and experiences (five teachers). They declared seeing themselves as stakeholders in the education process through a determination of needs prior to the PD program, and focusing of training in practice, as well as by given the opportunities for delivering lessons which significantly contributed towards their motivation. The following view of one teacher is given as example:

> *If we compare this course with courses from the Ministry of National Education, we would say that we only used to attend the course, listen to it, and come straight back. We undertook practical sessions in your course. We discussed the unit, we were taught, we made presentations and critiques, I mean, we didn't just come and sit, these were the best things. It was so different to the courses of the Ministry of National Education. We saw our errors and corrected them together (Teacher TA).*

Suggestions put forward by teachers on the development of a PD program can be listed as follows:

- Worksheets and handouts could be prepared more;
- Workshop II could have been longer;
- It could have been connected with the other units;
- MoNE could support more (e.g., upgrade in position and salary); and,
- Other feedback mechanisms could be used in order to control regular on-the-job performance after the PD program (e.g., school community meetings, via online platforms, etc.).

5. Following the teachers' interviews, they were asked to assess the PD program using a five-point, Likert-type measurement that consisted of 12 questions

The participant teachers assessed the items between 4.6 and 5.0 points on average. The lowest score was given for the expression "I used the program materials in my lessons." One of the teachers who assessed the item with 3 points, said:

> *The student profile was inadequate. I saw that I couldn't obtain sufficient student feedback even though I tried to use it, which made me take a step backwards; I wanted to deliver the lesson in this way but nobody took notes, there were some students trying to make something, I mean, very few students completed their assignment (history of atom models), and there are some issues with the students' work, with some having just copied subjects from the Internet. It's not a problem though, but I think the more we reach, the better it will be, but thus far I couldn't create the requested student profile (Teacher TG).*

The other eight items scored a full 5.0. The PD was found by the teachers to have been quite successful. In fact, longer PD programs with increased content levels were requested by some of the participating teachers. The overall scores for each item are given in Figure 3.

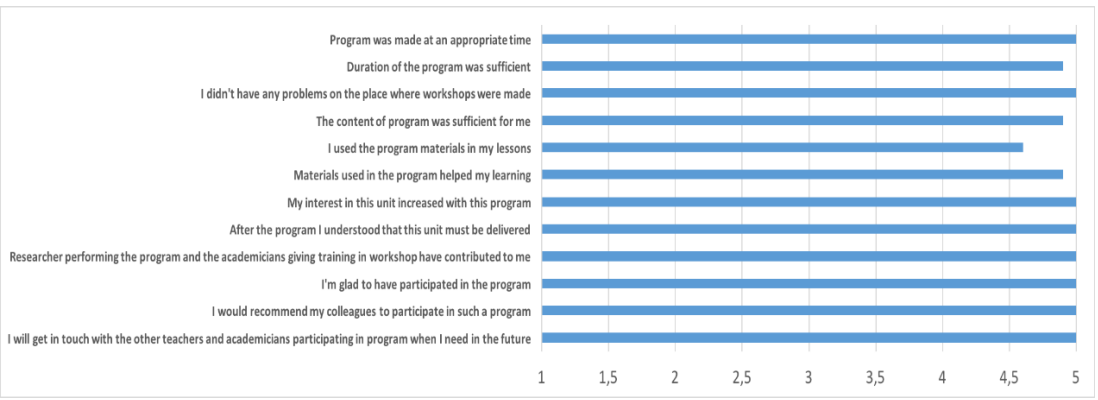

Figure 3. *Assessment of PD program as a five-point, Likert-type measurement*

6. Do you have any additional suggestions or comments on the PD program? Please explain briefly.

As it was the first application this year, the teachers increased their awareness by clearly determining which unit content and skills objectives would be delivered and in what timeframe. Some of the teachers were unable to deliver their lessons in the way requested, but this may be due to the change not being immediately followed by practice as an internalization stage, as progress takes time.

Some of the teachers with good student success profiles mentioned that the general attitudes of the students towards physics impacted their practice.

> *It is a really helpful experience when you talk to other teachers. We now communicate more with each other. All of us share ideas and I get to see how other colleagues practice in their schools, recommended certain practices to us, and provide constructive feedback in order to improve our own practices. I then come back to my school, and try to examine how it works for my students. I self-criticize my own practices more, and add or delete parts so as to improve my teaching (Teacher TD).*

The teachers mentioned that they are used to making assessment by giving scores, but that they had not considered alternative assessment types for different purposes, as they saw in the workshop training. They reported on having wider availability of these kinds of assessments with having seen concrete examples from the PD program, and which thereby helped them to prepare similar assessment tools in their own classrooms.

> *All of the teachers indicated that observations of their lessons by the researcher proved to be very useful. At first they said that they were a bit nervous and felt uncomfortable, but that they soon became used to being observed by someone. One of the teachers stated that, "I had the chance to see both my strengths and weaknesses during the teaching. You [the researcher] gave me feedback and it makes me more concerned with and alert to both my lessons and my students" (Teacher TB).*

Discussion, Conclusion and Recommendations

Teachers' evaluations were based on data captured using WSEC and PDEIP. According to the WSEC data, teachers were mostly satisfied with each of the PD program sessions, although they considered that the "Misconception" session made the least contribution when compared to the other sessions. Delivery of the unit was assessed by the PDEIP. Five teachers asserted that they used more student-centered methods which required student participation in the lesson. They indicated that they taught the unit with active student participation through the employment of different teaching strategies, visual materials, and assessment types, as well as the giving of assignments and projects in their classes following the PD program. Four of the teachers stated that they considered common topics and skills objectives during the teaching. Mostly, the teachers indicated using units, making hypotheses, mathematical modeling, and law, theory-related misconceptions as still seen as difficult subjects from the students' perspective. Both the teachers and the students have a weak understanding of the concepts related with NOS (Hipkins, Barker, & Bolstad, 2005).

Based on their views, all of the teachers believed that they used more diverse (e.g., by making group works, doing different experiments) and better quality teaching strategies after the PD program. However, some students were not involved in these kinds of activities, therefore certain problems such as too much noise were reported to have occurred in group works. Five of the teachers mentioned that they used different materials (e.g., video, simulations, posters, history line, and board) following the PD program. In the same manner, they reported noise issues during the use of materials and technology in the classroom.

In terms of the assessment dimension, six of the teachers reportedly now consider objectives when preparing questions. They indicated they are now more familiar with summative assessment, as well as placement, diagnostic and formative assessment types. They were satisfied to see these types of assessments given with concrete examples. Two of the teachers explained the difficulty of making diagnostic and formative assessments because of time limitations. None of the teachers were familiar with placement assessment. After the PD program, three of the teachers started using placement purpose for the first time. Some of the teachers indicated that they could not use some of the activities due to time constraints. This could be seen as one of the barriers to the implementation of science contents following PD programs (Buczynski & Hansen, 2010). Apart from this, the teachers considered that they

would like to experience more similar types of training. One teacher (TG), from the lower group of teachers in terms of content, material/technology and assessment dimensions, emphasized that they learned most of the things during the PD program, but failed to apply them to the desired level. The teacher believed that such changes are not easy and that it requires time to practice more. PD attempts must not be seen as a one-shot process. Change needs time (Demirkol, 2010; Loucks-Horsley, Hewson, Love, & Stiles, 1998).

All of the teachers expressed that they were satisfied with the development program. This result is similar to other studies on the effectiveness of PD programs (Finsterwald, Wagner, Schober, Lüftenegger, & Spiel, 2013; Van Keer & Verhaeghe, 2005). The teachers reported that the aspect of the PD program that they most liked were the discussions held in each session, where they could share their thoughts and opinions, take the opportunity for practice, and be an active being a member of the PD program in terms of the giving and receiving of guidance and feedback, and showing data as evidence about their teaching.

The teachers also assessed the PD program on a five-point, Likert-type scale. The range of the scores was 4.6 to 5.0 points on average. The lowest score was given to the item: "I used the products in training in my lessons." As a reason for this, one of the teachers (TG) remarked that she has very low level students. All of the teachers assessed that the PD program was quite successful for them. The results taken from the PD program evaluation interviews support the idea that teachers used more varied and richer teaching strategies in order to make their students more participative in their lessons. This study helps to see how those changes are meaningfully constructed in teachers' minds when participating in a PD program. It also shows which program elements (e.g., active participation, providing opportunity for practice, etc.) promote teachers' changes. It is hoped that these can be applied in the planning of future PD programs.

As a limitation, it is recognized that the study was conducted with only seven teachers, and that they are unlikely therefore to be representative for the majority of physics teachers. For a further study, the sample could be substantially increased and the research results generalized to other science teaching disciplines. In addition, different evaluation levels such as student outcomes could be used as evidence of measuring the impact of any proposed PD program.

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Investigation of the Studies on the Use of Scratch Software in Education

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Research	22.04.2019	22.05.2020

Tarık Talan*

Abstract

The aim of this study is to classify the methodological tendencies and outputs of the studies conducted on the use of Scratch software in education with their main lines and to examine them in a comprehensive and holistic way. A literature review was conducted based on different databases in line with the purpose of the study and we accessed 76 different studies within this scope. Document review steps were followed to explain the data obtained in the study and to access the necessary concepts and relations. Meta-thematic analyses were performed to complement the data obtained, and qualitative findings were obtained by referring to common codes and themes of qualitative studies. The results of the study indicate that the use of Scratch software in education was found to have positive effects on motivation, self-efficacy, attitude, higher-level thinking, and academic success. In addition, materializing software teaching by freeing it from its abstract and complex structure, enabling students to acquire 21st-century skills at an early age, encouraging students to trust themselves by boosting their interest and motivation can be defined as some of the positive aspects of the Scratch software. The limitations of the Scratch software were determined as being unsuitable for advanced coding, limited code structure, and difficulty in understanding the logic of some basic structures.

Keywords: Programming, coding, Scratch, content analysis.

* *Corresponding Author:* Dr., Gaziantep Islam Science and Technology University, Faculty of Engineering and Natural Sciences, Gaziantep, Turkey. E-mail:ttalan46@hotmail.com, https://orcid.org/0000-0002-5371-4520

Eğitimde Scratch Yazılımının Kullanımına Yönelik Yapılan Çalışmaların İncelenmesi

Makale Türü	Başvuru Tarihi	Kabul Tarihi
Araştırma	22.04.2019	22.05.2020

Tarık Talan[**]

Öz

Bu çalışmanın amacı, eğitimde Scratch yazılımının kullanılmasına yönelik yapılan çalışmaların yöntemsel eğilimleri ve çıktılarını ana hatlarıyla sınıflandırarak kapsamlı ve bütüncül bir şekilde incelenmesidir. Araştırmanın amacına uygun olarak farklı veri tabanları üzerinden alanyazın taraması yapılmış ve bu kapsamda 76 farklı çalışmaya ulaşılmıştır. Çalışmada elde edilen verileri açıklayabilmek, gerekli kavram ve ilişkilere ulaşabilmek amacıyla doküman incelemesi adımları izlenmiştir. Elde edilen verileri tamamlamak amaçlı meta-tematik analizler yapılmış ve nitel yönlü çalışmaların ortak kod ve temalarından alıntılar yapılarak nitel bulgulara ulaşılmıştır. Araştırmanın sonuçları eğitimde Scratch yazılımı kullanımının motivasyon, öz-yeterlik, tutum, üst düzey düşünme ve akademik başarıya olumlu etkileri olduğunu göstermektedir. Ayrıca Scratch yazılımının programlama öğretimini soyut ve karmaşık yapıdan çıkararak somutlaştırması, 21. yy becerilerini erken yaşlarda kazandırması, öğrencilerin ilgi ve motivasyonlarını yükselterek kendilerine güvenmelerini sağlaması bazı olumlu yönleri olarak ifade edilebilir. İleri derece kodlama yapanlar için uygun olmaması, kod yapısının sınırlı olması ve bazı temel yapıların mantığının anlaşılamaması Scratch yazılımının sınırlılığı olarak tespit edilmiştir.

Anahtar Sözcükler: Programlama, kodlama, Scratch, içerik analizi.

[**] *Sorumlu Yazar:* Dr. Tarık TALAN, Gaziantep İslam Bilim ve Teknoloji Üniversitesi, Mühendislik ve Doğa Bilimleri Fakültesi, Gaziantep, Türkiye, E-posta:ttalan46@hotmail.com, https://orcid.org/0000-0002-5371-4520

Introduction

Most of the students consider classical programming languages, such as Basic or Fortran, as a work that can only be handled by highly trained experts both in terms of visuality and difficulty and complexity of coding (Genç & Karakuş, 2011). Visual programming languages, such as Visual Basic or C++, are considered very complex to be the first choice. Therefore, the problems experienced in the teaching of programming may have a negative effect on students' attitudes and motivation towards programming (Anastasiadou & Karakos, 2011; Dinçer, 2018). This, in turn, adversely affects students' success in programming, and many drop the course or the related program (Lahtinen et al., 2005; Kinnunen & Malmi, 2008). In recent years, user-friendly programming languages, such as Scratch, which are easy to learn, do not require code and are suitable for all ages, have been developed to reduce such negativities and to teach the logic of programming effectively.

Included in many education programs in many countries and used efficiently, Scratch is a free, block-based visual programming application developed with the aim of boosting the programming skills of children. Scratch is a project of the Lifelong Kindergarten Group at the MIT Media Lab in 2003 and it was designed for younger age groups; however, it has become software that can be used by people of all ages (Resnick et al., 2009; Fesakis & Serafeim, 2009). Although there are studies in the literature claiming that Scratch is more attractive for young age groups (Smith, 2009), some universities, including Harvard and the University of California, use Scratch software in the transition to programming (Resnick et al., 2009). Along with the teaching of Algorithm and Programming, Scratch software is used in various courses, such as Foreign Language, Mathematics, Social Sciences, and Physical Sciences in terms of creating projects with many multimedia items.

Scratch focuses on programming logic and algorithmic thinking rather than a programming language and it works by dragging and dropping visual blocks without the requirement to write codes (Maloney et al., 2010). Unlike traditional programming languages, Scratch allows the users to classify ready-made functions into categories according to their liking and to comprehend the structure of algorithms without using complex structures, such as if and for. In this way, Scratch makes programming more fun and visual, as well as providing game and story design opportunities and renders the process of the algorithm more understandable and frees the problem-solving process from its abstract structure and transforms it into a concrete product (Ramadhan, 2000; Utting et al., 2010; Armoni et al., 2015; Maloney et al., 2010).

Thanks to its advantages, such as not experiencing coding mistakes, including a simple method, such as drag-and-drop, enabling game design, providing instant visual output, and involving not just programming but also design, Scratch considerably contributes to students in the process of introduction to programming training (Şimşek, 2018). While these features render Scratch more accessible to users from different age groups, they also enable them to easily program and easily prepare projects such as interactive stories, visuals, games, animations, simulations, etc., which makes learning more enjoyable (Genç & Karakuş, 2011; Maloney et al., 2010; Meerbaum-Salant, Armoni & Ben-Ari, 2013). Individuals can also share these projects that they created with users from all around the world over the "scratch.mit.edu" website (Brennan & Resnick, 2013; Scratch About, 2019) if they wish. Therefore, members in different parts of the world are able to see these produced projects, learn the coding they are curious about and generate new ideas downloading them to their computers (Adams, 2010).

Scratch has recently been used extensively in the literature and it was found to be effective in providing coding skills to individuals and offering a more memorable, more meaningful and more social environment compared to other programming environments (Maloney et al., 2010). In addition, the studies conducted show that the teaching of programming with Scratch had a significant effect in terms of creativity (Kobsiripat, 2015; Oh, Lee & Kim, 2013; Taylor, Harlow & Forret, 2010; Yünkül et al., 2017), that it facilitated mathematical thinking (Brown et al., 2008; Calder, 2010), that it provided a cooperative learning environment (Papatğa, 2016; Taylor, Harlow & Forret, 2010), that it affected students' self-efficacy perceptions positively (Yükseltürk & Altıok, 2016a), that it helped students to interact with each other, and that it positively affected their communication (Lopez, Gonzalez & Cano, 2016; Maloney et al., 2010).

The Purpose and Significance of the Study

This study aims to generally classify the methodological tendencies and outputs of the studies regarding the use of Scratch software in education in recent years and to examine them in a comprehensive and holistic way. Conducting such a study is important in terms of rendering Scratch software more qualified and applicable in education as a whole. It is considered that the number of publications related to the use of Scratch software in education has increased rapidly in the related literature, and it has attracted researchers' attention a lot, and hence, current reviews will shed light on the field. Such analyses are especially needed for determining the studies, which will be different from the studies conducted previously in the literature and fulfill the need. It is considered that the results obtained from this research will present a different dimension to the new studies planned to be carried out in the field and will lead the way.

In this study, a comprehensive content analysis was conducted as well as performing a meta-thematic analysis regarding the subject. This situation differentiates our study from other studies and reveals the originality of the study. With the addition of the meta-thematic dimension, it was ensured that the qualitative views obtained in relation to the subject in the literature, which share a common quality, were combined. Therefore, it is considered that this study will be beneficial for researchers, educators, and students in terms of evaluating the studies published on the use of Scratch software in education according to different criteria regarding its scope. From this point forth, in this study, the studies in the literature were examined and a detailed source was presented to researchers who are interested in using Scratch software in education. Moreover, in this study, information was given about the studies on the subject, and it was aimed to present suggestions to researchers who want to work in this field by determining the less studied or untreated subjects in this field. In accordance with the purpose of study, answers to the following questions were sought:

1. For the studies conducted on the use of Scratch software in education between 2009 and 2019,
   a. what is the publication type and how are they distributed by years?
   b. how are they distributed by teaching stages and numbers?
   c. how are they distributed according to the education areas on which they were carried out?
   d. how are they distributed according to the experimental application periods?
   e. how are they distributed according to research methods?
   f. how are they distributed according to data collection tools?
   g. how are they distributed according to data analysis methods?
   h. how are they distributed according to the variables (study results) examined?
   i. how are they distributed by keywords?
2. What are the positive and negative aspects of Scratch software in education within the scope of thematic examination based on document analysis?

Method

In this study, qualitative method was used as a research model and document analysis was conducted to explain the data obtained in accordance with the purpose of the study and to access the necessary concepts and relations. As a matter of fact, the document review aims to obtain written and oral materials containing information about the subjects to be researched and to reach results according to the analysis of these data. In the document review, which is among qualitative research methods, the researcher can reach the needed data without observation or interview. Therefore, such researches will contribute to the researcher in terms of saving a certain amount of time and money (Yıldırım & Şimşek, 2013).

Data Collection Process

In line with the purpose of the study, initially, the studies conducted on Scratch Programming were accessed for the purpose of collecting the study data. The studies to be examined within the scope of the research were obtained by scanning ERIC, ProQuest and the Higher Education Council (YÖK) National Thesis Center databases. "Scratch" keyword was used to scan the databases.

Afterward, the "Education / Educational Research" category filter was applied. Finally, a filter application was carried out for studies conducted in English and Turkish. The theses and articles examined were limited to the years between 2009 and 2019. As a consequence of the preliminary examination of the studies, 76 studies, which are appropriate for the purpose and contain necessary and sufficient information, were accessed.

The meta-thematic analysis was also performed by screening qualitative studies to contribute to the internal validity of the research and to provide data diversity. In the literature, meta-thematic analysis can be explained as creating wide-ranging and generalized themes and codes by evaluating the themes and codes in the qualitative studies carried out in a certain subject on common ground (Batdı & Batdı, 2015). In this respect, qualitative studies regarding "Scratch programming" were reviewed in the literature. The data obtained from the scan were analyzed using the MAXQDA-11 program.

Data Analysis

The data collected in the study were analyzed by content analysis method. Content analysis refers to examining the studies conducted within a certain period of time, in a certain field and collecting the data obtained from them under the chosen codes and themes. In content analysis, the data collected under the determined headings are explained and their relations are identified. The collected data are processed, and in-depth information on the subject examined is tried to be obtained and it is tried to come to a conclusion with the data (Yıldırım & Şimşek, 2013). The expressions in the studies where the related themes and codes were quoted were given in the text in order to support the codes and themes in the current study. For example, 509354-p.79 shows page 79 of the study numbered 509354.

The studies selected for the reliability of the research were examined in detail by two independent evaluators, experts in educational sciences and publish many qualitative studies. The evaluators shared ideas after the coding process and reached common decisions on different opinions.

The compliance values (Cohen Kappa) between the data encoders were calculated for the reliability of the meta-thematic dimension based on document analysis (Viera & Garrett, 2005). The compliance values calculated for the themes reached this point were found to be positive aspects (.788) and negative aspects (.709) of "Scratch programming". These values' being "a very good level of compliance" revealed that data coding was reliable.

Results

The findings of 76 studies conducted within the framework of the use of Scratch software in education and reached within the scope of the research were presented under nine categories:

Publication Type and Years of Studies

Figure 1 shows the distribution of the studies regarding the use of Scratch software in education according to publication type and years of studies. The analyzed studies were gathered under three main headings as "Ph.D. dissertation", "master's thesis" and "article". Besides, the publication years of the studies were determined as 2009-2019.

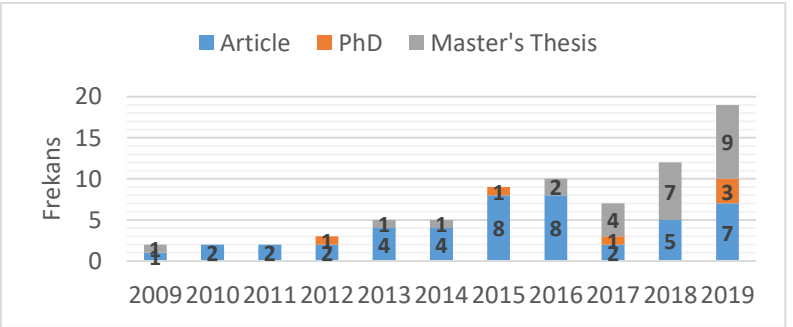

Figure 1. *Distribution of Studies by publication type and years*

When the graph in Figure 1 was examined, it was found that six studies were conducted between 2009 and 2011, and three studies were conducted in 2012. An increase was observed in the number of studies conducted in the following years. Besides, it was determined that 45 out of the 76 analyzed studies were articles, and 25 of them were master's theses. Only six of the studies examined were Ph.D. dissertations.

Teaching Stages and Numbers in the Studies

At which stage and with how many people the studies are conducted have significant effects on the research results. In this context, the teaching level and sample numbers of the studies examined were determined. Figure 2 gives the obtained results.

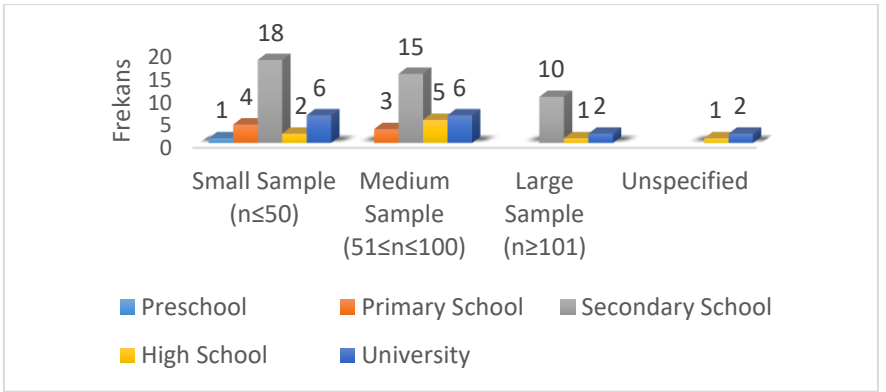

Figure 2. *Distribution of the studies by teaching stages and numbers*

Considering the graph in Figure 2, it was found that the target groups examined in the studies were mostly at the secondary school level (n=43). Based on this finding, it can be interpreted that the use of Scratch software in education was developed aiming at the 11-15 age group as the target group. On the other hand, the least number of studies is observed to have been performed at preschool (n=1), then primary (n=7) and high school levels (n=9). It was also determined that 29 of the studies were carried out through the medium sample (51≤n≤100).

Fields of Education in which the Studies were Conducted

Within the scope of the research, the disciplines (subject areas) in which this software was used were determined in order to reveal the potential of Scratch software in the educational field and to evaluate the results. The disciplines (course/subject) were separated into four different groups as Science (Biology, Chemistry, Physics, Science Education, Science, and Technology), Social Sciences (Geography, Music, Visual Arts, History, and Language Education), Mathematics, and Computer Science (Computer and Information Technology, Information Technologies and Software, Programming Language, Computer) to investigate the total effect sizes of the meta-analytic studies. As a result of the analysis, two studies were not taken into consideration because the discipline in which the study was performed was not mentioned. The distribution regarding the disciplines in which the studies examined within this scope were examined is presented in Figure 3.

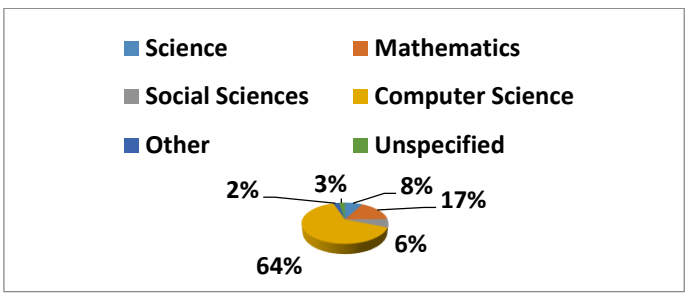

Figure 3. *Fields of education in which the studies were conducted*

When the graph in Figure 3 was examined, it was determined that Scratch software was mostly used in the field of Computer Science with 49 (64%) studies and usually on "Algorithm and the Teaching of Programming". This discipline consists of the teaching of subjects in the fields of mathematics (17%) and science (8%), respectively. Not many studies were found in the literature regarding the use of the fields of social sciences (6%). Since there was a tendency toward an educational field other than the determined ones in the two studies conducted, they were included in the "other" category.

Experimental Application Periods Specified in Studies

In the study, the application duration of the studies on the use of Scratch software in education was also examined. Knowing the duration of the application of the studies on the subject facilitates the evaluation of the studies and the interpretation of the results. The findings related to the application duration of the studies examined in this context are presented in Figure 4.

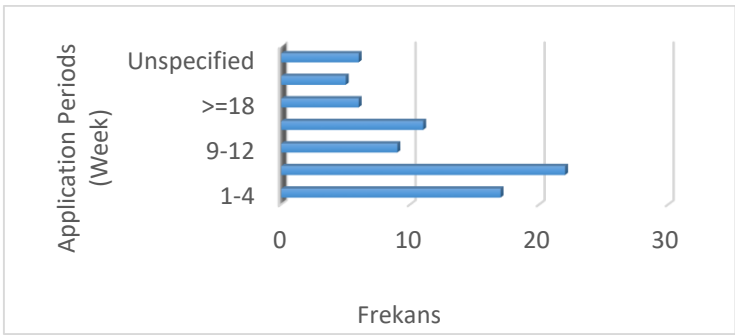

Figure 4. *Investigation of studies in terms of application periods*

In terms of application periods, 22 studies with a 5-8 week period were identified. Moreover, 17 studies lasted 1-4 weeks, and 11 studies were carried out in 13-17 weeks. Six of the examined studies lasted more than 18 weeks. There was no clear information about the duration of the application of six studies. In addition, five studies were included in the "other" category, because the "hour/session" value was indicated as duration.

Research Methods Used in Studies

The findings of the research methods used in the studies are given in Figure 5. This study is valuable in terms of identifying the types of studies towards which there is a tendency in the literature and the type of research lacking in the field. While determining the themes related to the research method, three basic methods were classified as quantitative, qualitative and mixed methods. The classification of the researches in terms of methodology was made according to researchers' discourse.

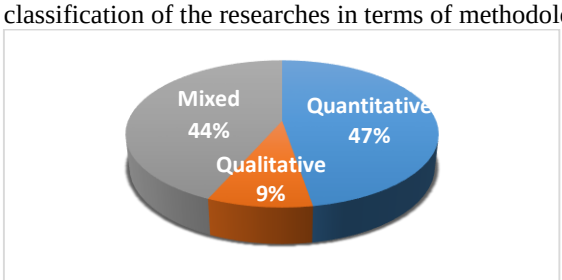

Figure 5. *Distribution of the studies by research methods*

When the graph in Figure 5 was examined, it was determined that 36 (47%) of the research methods used in the studies were quantitative, 33 (44%) of them were mixed, and seven (9%) of them were conducted by the qualitative research method. It draws attention that quantitative and mixed methods were used in close ratios as research methods, but the qualitative method was relatively not preferred.

Data Collection Tools Used in the Studies

The distribution of data collection tools used in the studies is presented in Figure 7.

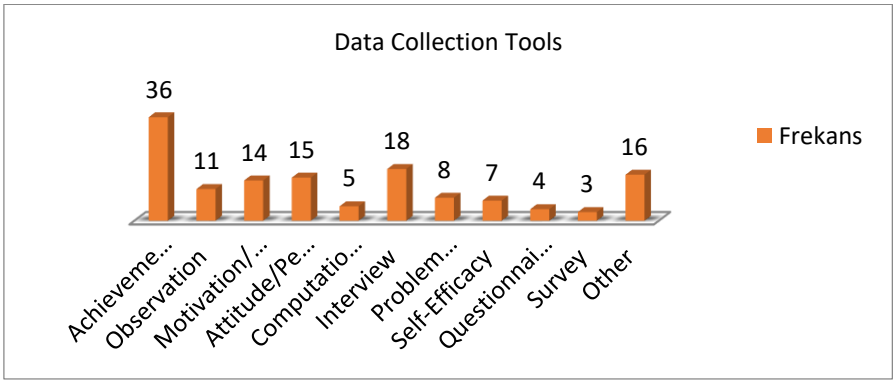

Figure 6. *Distribution of Data Collection Tools Used in the Studies*

It was determined that most preferred data collection tools are achievement tests (f=36) and interview form (f=18). In addition, the motivation (f=14), attitude/perception (f=15) and observation form (f=11) are among the frequently preferred data collection tools. It can be said that the reason for these findings to be close to 137 numerically is due to the use of more than one data collection tool at the same time in some studies examined.

Data Analysis Methods Used in the Studies

The distribution of data analysis methods used in the studies is presented in Table 1.

Table 1

Distribution of data analysis methods used in the studies

Category	f
Quantitative Descriptive	
Frequency/Percentage	17
Mean/Standard Deviation	14
Graphical Display	7
Quantitative Predictive	
t-test	34
ANOVA	8
Wilcoxon Sign Rank	9
ANCOVA	4
Mann Whitney U	8
Correlation	8
MANOVA	3
MANCOVA	1
Kruskal-Wallis H	2
Chi-square	2
Other	5
Qualitative	
Content Analyses	16
Descriptive Analyses	3
Other	2

When Table 1 is analyzed, it was observed that 38 of the studies use descriptive, that 84 use predictive and 21 use qualitative analysis techniques. The frequencies/percentages were observed in 17 studies, while the mean/standard deviation values in 14 of the studies were calculated. In addition, the graphical display method was used in 7 studies. Studies in which predictive analysis was conducted, it was observed that mainly t-test (f=34), ANOVA (f=8), Wilcoxon signed-rank (f=9),

Mann Whitney U (f=8) and correlation tests (f=8) were used. When qualitative analysis methods are examined, it was observed that content analyses are used in 16 of the studies.

Distribution of Keywords Used in Studies

Within the scope of the study, the keywords used in the studies were also examined. In the research, we tried to reduce confusion by collecting key expressions that are quite close to each other or synonymous with one keyword. The word cloud of the keywords used in the studies is presented in Figure 7.

Figure 7. *Word cloud for keywords*

As a result of the analyses, it was determined that in some of the studies, the keywords remained superficial in reflecting the feature and content of the research, while other studies explained the feature of the research. It was determined that a total of 157 different keywords were included in the studies. When the keywords in the studies were analyzed, it was found that the frequency of using the "Scratch" keyword (f=56) was higher than the other keywords. The most frequently used keywords after the Scratch keyword are "programming" (f=32), "achievement" (f=30), "motivation" (f=15) and "attitude" (f=15). 105 keywords used in the studies were included only once. In addition, no keywords were used in 8 studies.

Study results

The studies carried out by using Scratch software in education were collected under three headings as cognitive, affective and aimed at the learning environment, and sub-themes related to these topics were formed. Table 2 shows the obtained findings. The results obtained in the studies are separately shown as "positive results" and "results without a significant difference".

According to the results of the studies regarding cognitive processes, the effect of Scratch software on learning level/success was found to be the most investigated topic with 36 studies. Eight studies were found to be conducted on its impact on problem-solving skills, and seven studies on its effects on self-efficacy. The most investigated effects of Scratch software in the results regarding affective processes were on attitudes (n=12) and motivation (n=13) variables. In the results regarding the learning environment, the effects on collaborative work, active participation, and system availability were examined in three separate studies. When the results were generally interpreted, the effects of Scratch software on cognitive and affective processes and learning environment were found to be positive to a large extent.

Table 2

Findings regarding the study results

Variables	Number of Positive Results	Number of Results without Significant Difference
Results Regarding Cognitive Processes		
Learning level / Success	33	3
Problem solving skills	6	2
Self-efficacy	5	2
Information Processing Thinking	3	1
Creativity	3	
Mathematical thinking skills	3	
Programming skills	2	
Computational thinking skills	4	1
Self-regulating skills	1	
Permanent learning	3	
Algorithmic thinking skills	1	
Reading comprehension skills	1	
Effect on thinking styles	1	
Designing games	1	
Reasoning skills	1	
Critical thinking skills	1	
Results Regarding Affective Processes		
Attitude	8	4
Motivation	9	4
Interest	3	
Satisfaction	1	
Self-Confidence	1	
Concerns about programming	1	
Results on Learning Environment / System		
Cooperative Work	1	
Active Participation	1	
System Availability	1	

Thematic Examination Based on Document Analysis

The themes and codes obtained as a result of the thematic study to complement the obtained data are presented in different models. As a result of detailed examination, thematic data were grouped under different themes in two models. The models highlighting the positive and negative aspects of Scratch software are presented below.

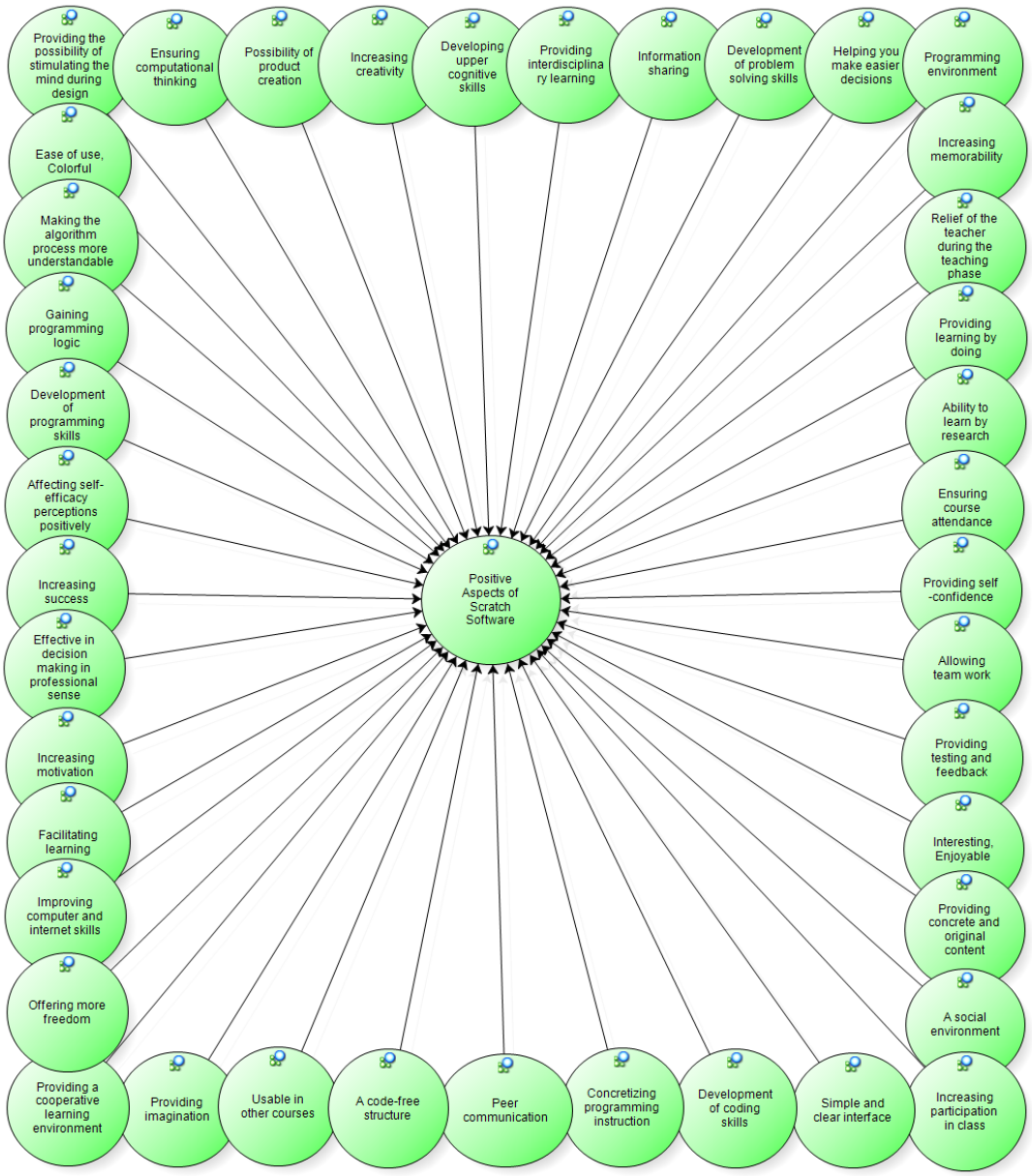

Figure 6. *Positive Aspects of Scratch Software*

Some of the positive aspects of the Scratch software make the learning fun, more motivating, more understandable, helping to acquire mental skills, such as programming logic, problem-solving, creativity, algorithmic and computational thinking skills, and affecting students' self-confidence, attitudes, and self-efficacy perceptions positively. Within the context of this theme, the expression cited from the study coded 509354-p.79 "*Creating animation with Scratch made me dream. I had a game plan in my head. At first, I thought it was simple. But then as I learn to code, I dream of putting different objects in the game. I want to write and play my game with my friends as soon as possible.*" and the expression cited from the study coded M3-p.5 "*As the weeks progressed, I realized how easy programming was*" were taken into account as reference sentences and used in the formation of codes.

In addition to the positive aspects of Scratch software, some negative and deficient aspects of it were identified in the studies, and Figure 9 shows the related model.

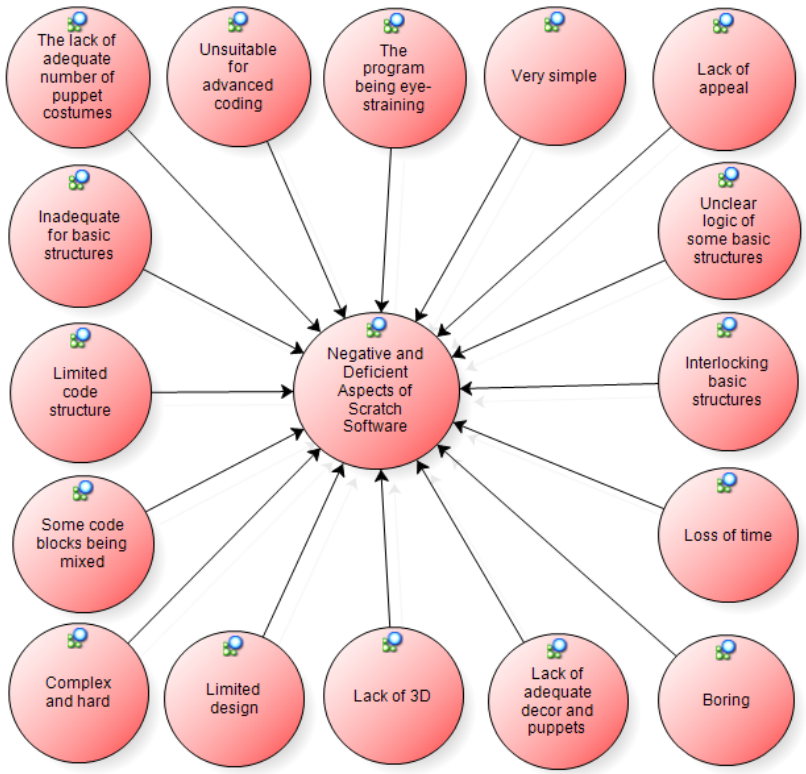

Figure 7. *Negative and Deficient Aspects of Scratch Software*

Some of the codes related to the negative aspects of Scratch software are as follows: "Insufficient for basic structures, unsuitable for advanced coding, some code blocks are mixed and design is limited". Some of the expressions referenced in the creation of related codes cited from the 395186-p.95 coded study are "*It may be enough for basic programming, but it may not be enough for advanced programming due to being very simple.*" or, cited from M1-p.5 coded study "*It really did not capture my attention, it is boring, it should have been easier.*"

Discussion and Conclusion

This study aimed to examine the scientific studies conducted on the use of Scratch software in education in a comprehensive and holistic manner and to present the current situation. The processes were carried out in line with document analysis to render the subject applicable in the context of current research and to determine its level of effectiveness in terms of different variables. Hence, it can be said that this study will constitute a resource for the literature. In this context, the data of the studies on the subject were examined, and it was determined that the results of many studies overlapped. When the obtained results were analyzed, it was understood that the studies were generally carried out in the middle school level, article publication type, and Computer Science field. On the other hand, it was found that there has been a steady increase in the related publications since 2013, concentrated on the 5-8 week period and realized through the medium sample. It is concluded that the most used data collection tools are achievement tests, interview form, motivation, attitude and observation form. Considering that the quantitative research method was adopted in these studies, it is an expected result that the scale, survey, and test tools, which are among data collection tools, are used more. Furthermore, it was determined that the most used data analysis methods were descriptive statistics and t-test. In the keyword analysis, it was determined that the data related to Scratch and programming are concentrated according to the search criteria. It can be said that the keywords used in the studies are related to the subject.

In the studies, the effect of Scratch software on various variables was examined, and it was found that the software affected the variables and showed positive results in the general framework. Regarding the results concerning cognitive processes, it may be asserted that scratch software had a significant effect on both learning level/ achievement (Demir, 2015; Erol, 2015; Meerbaum-Salant et al., 2013; Papadakis et al., 2016; Saygıner, 2017; Su et al., 2015; Yıldırım, 2017) and on higher-order thinking skills including problem-solving, computational thinking, creativity, computational thinking and critical thinking (Calao et al., 2015; Oh, Lee, & Kim, 2013; Yünkül et al., 2017; Yıldırım, 2017). The characteristics that are expressed as not having a mixed code structure, easy to learn, students' have the chance to learn while having fun and providing active participation in the teaching process can be listed as the reasons explaining the increase in students' success. In the results regarding the affective processes, it can be stated that Scratch software had a significant effect on students' attitudes and motivations thanks to its being fun, interesting, simple and its understandable interface and multimedia support (Ke, 2014; Ortiz-Colón & Maroto Romo, 2016; Saygıner, 2017; Saez-Lopez, Roman-Gonzalez & Vazquez-Cano, 2016). It can also be added that it provides a collaborative work environment (Papatğa, 2016; Taylor, Harlow & Forret, 2010), active participation (Saez-Lopez, Roman-Gonzalez & Vazquez-Cano, 2016)) and is not only used in programming courses but also in different courses (Saygıner, 2017).

Within the scope of the study, meta-thematic analyses were also conducted, and positive and negative aspects of the use of Scratch software in education were determined, and various themes and codes related to it were created. Some of the positive aspects of Scratch software are that teaching is materialized by being freed from an abstract and complex structure (Demir, 2015; Ersoy, Madran & Gülbahar, 2011), that it positively affects students' self-efficacy perceptions (Ihmaid, 2017; Psycharis & Kallia, 2017; Yükseltürk & Altıok, 2016a) and it develops programming skills (Oluk & Korkmaz, 2016; Ruf, Mühling & Hubwieser, 2014; Yıldırım, 2017). Moreover, it can be stated that coding with Scratch facilitates students' understanding of the basics of programming, excites them and thereby increases their motivation for computer programming, enables them to trust themselves and prevents negative situations such as losing interest, not making efforts and giving up on the course (Calder, 2010; Ersoy et al., 2011; Yükseltürk & Altıok, 2016b). Furthermore, Scratch software provides users with an easy, practical and entertaining programming experience, which can be effective in helping users gain 21st-century skills, such as creativity, problem-solving, algorithmic, mathematical and computational thinking at an early age (Calder, 2010; Kobsiripat, 2015; Oh, Lee & Kim, 2013; Taylor, Harlow & Forret, 2010; Yıldırım, 2017; Yünkül et al., 2017). In addition to all these features, Scratch software makes the process of algorithms more understandable, enables students to create more concrete and original content, and renders this process more interesting (Erol, 2015; Utting et al., 2010).

It should be noted that Scratch software has some negative and deficient aspects along with its contributions to education. In the studies, Scratch's insufficiency for some basic structures, the interlocking of the structures and the failure to understand the logic (Erol, 2015) are expressed as the limitations of the software. In addition, the complexity, difficulty, and dullness of its algorithm, that the program is eye-straining and the loss of time it causes in setting the stage (Gezgin et al., 2017; Quan, 2015) is expressed as the negative aspects of the software. Besides, it was concluded that the fact that puppets were not 3 dimensional and that the number of decors, puppets, and costumes was limited the student at the animation stage (Vatansever, 2018).

Suggestions

This study is limited to scientific researches and search terms for the use of Scratch software in education between 2009 and 2019. In addition, this study is limited to full-text access of masters, doctoral thesis and articles published in refereed journals in English and Turkish languages. It does not include studies conducted in different languages and other types of publications (such as book chapters, papers, book reviews, and opinion essays). The findings and results obtained can only be generalized only when evaluated within the same context. Therefore, different research findings can be obtained by making wider and more comprehensive searches.

It is considered that the findings and results obtained will constitute an important reference base for researchers and educators and contribute to the field. Based on the results of the studies examined, the suggestions of the research are given below.

Running a content analysis on the use of Scratch software in education for certain years is considered important by the researcher for the follow-up of this subject. Therefore, similar researches can be repeated at certain periods and the development in the field can be followed. This type of research on the subject of the research can reveal the existing trends, new trends and possible research topics in the study fields.

In the evaluation made by years, it is observed that the number of studies on the subject is increasing day by day. This increase in numbers is mostly seen in articles and master's theses. It can be suggested to increase the number of doctoral theses which can be considered more qualified in scientific terms and to encourage doctoral students to work in this field.

As a result of the research, it was determined that the target population examined in the studies was mostly the middle school level and the sample selection was mostly based on small and medium samples. Accordingly, in the studies to be carried out, selection of samples suitable for the study design and selection of all stakeholders on the subject as the sample group can be an important data source for the quality of publications, areas of application, policy developers, the literature and future studies.

Based on the data obtained as a result of the content analysis, it is seen that the publications are mostly concentrated in the field of Computer sciences. Accordingly, making academic publications in different fields can make a significant contribution in terms of being inclusive of education fields.

Researchers can focus on qualitative studies as well as quantitative research. In addition, in the new studies to be conducted, diversification of data and diversity of data collection tools are suggested in order to obtain more reliable data and add depth to the research.

It was observed that there is a variety of research subjects that are revealed as a result of the analysis, though little in number. It is recommended that the studies on the subject should be diversified and their numbers should be increased, and that other variables and subjects that have not been investigated are investigated very little should be researched and studied.

In conclusion, in light of these suggestions, it is considered that examining the studies conducted on the use of Scratch software in education in the specified contexts will contribute to the literature, will reveal the differences and similarities in the studies and will shed light on the studies to be conducted.

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School Bullying

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İsmail Hamit Hancı* **Selen Özakar Akça****

Abstract

School bullying is defined as physical, verbal, psychological attack/intimidation in a physically/psychologically unequal environment perpetrated in an intentional, willing and systematic manner in intervals against less powerful peer without the element of incitement, aiming to cause fear and anxiety/harm in the victim. Accordingly, this study is considered to be important in terms of recognizing bullying behavior and contributing to the literature on school bullying.
School bullying can be seen in students at all levels of education, but the highest risk group is the adolescents aged 13-15. Bullying have typologies such as social exclusion, physical and verbal bullying. Since verbal and physical bullying is observable and visible, they are considered to be direct bullying, while social exclusion is considered to be indirect bullying as it occurs in a less visible manner. A number of different factors have been identified that contribute to the bullying, and thus school bullying, and are generally divided into three main groups: individual, family and school-related factors. School bullying greatly influences students' academic achievement, physical and psychological health, and these negativities can persist into their lives. For this reason, school bullying is an issue that health professionals such as school nurses, psychologists, psychological counselors and physicians should handle with care. Determining the causes of bullying in schools and implementing effective measures to prevent bullying should be ensured by an interdisciplinary team so that students cannot be harmed by bullying behaviors.

Keywords: School bullying, prevent, violence.

* Prof. Dr., Ankara University, Faculty of Medical, Forensic Medicine Department, Ankara, Turkey. E-mail: *hanci@medicine.ankara.edu.tr*, https://orcid.org/0000-0002-3504-3751

** *Corresponding Author:* Assoc. Prof. Dr., Hitit University, Faculty of Health Sciences, Department of Child Health and Diseases Nursing, Çorum, Turkey. E-mail: *selenozakar@hotmail.com*, https://orcid.org/0000-0002-6943-6713

Okul Zorbalığı

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İsmail Hamit Hancı* **Selen Özakar Akça****

Öz

Okul zorbalığı, kışkırtma unsuru olmaksızın aralarında fiziksel/psikolojik açıdan bir güç eşitsizliği olan çocuklardan güçlünün, karşı tarafa bilerek ve isteyerek, niyetli, kasıtlı, sistemli bir biçimde belli zaman aralıkları ile uyguladığı, mağdurda korku, endişe/zarar vermeyi amaçlayan fiziksel, sözel, psikolojik saldırı/yıldırmayı kapsaması olarak tanımlanmaktadır. Bu doğrultuda bu çalışmanın zorbalık davranışını tanıma ve okul zorbalığı hususundaki alan yazına katkı sağlaması açısından önemli olduğu düşünülmektedir. Okul zorbalığı, öğrenim gören her düzeydeki öğrencilerde görülebilmekle birlikte özellikle en yüksek risk grubunu erken adolesanlar (13-15 yaş) oluşturmaktadır. Sosyal dışlama, fiziksel zorbalık ve sözel zorbalık tipolojileri olan zorbalığın, sözel ve fiziksel zorbalık gözlenebilir olması sebebiyle doğrudan zorbalık olarak nitelendirilmiş, sosyal dışlama ise dolaylı zorbalık olarak değerlendirilmiştir. Doğrudan zorbalık itme, vurma, alay etme, tehdit etme gibi açık saldırılar şeklinde iken dolaylı zorbalık, zorba ve mağdurun doğrudan karşılaşmasını gerektirmeyen sosyal gruptan dışlama, dedikodu yayma, şeklinde kendini gösterebilmektedir. Zorbalık davranışlarının dolayısıyla okul zorbalığının meydana gelmesine katkıda bulunan çok sayıda farklı nedenler belirlenmiş olup bunlar genel olarak bireysel, ailesel ve okuldan kaynaklanan nedenler olmak üzere üç ana grupta toplanmıştır. Okul zorbalığı öğrencilerin akademik başarılarını, fiziksel ve psikolojik sağlıklarını ciddi boyutta olumsuz etkilemekte ve bu olumsuzluklar öğrencilerin yaşamları boyunca da devam edebilmektedir. Bu nedenle okul zorbalığı, okulda görevli okul hemşiresi, psikolog, psikolojik danışman, hekim gibi sağlık profesyonellerinin ilgilenmesi gereken bir konudur. Okullarda zorbalık nedenlerinin belirlenmesi ve etkili zorbalığı önleme girişimlerinin disiplinlerarası bir ekip tarafından uygulanması sağlanmalı, öğrencilerin zorbaca davranışlardan zarar görmesi önlenmelidir.

Anahtar Sözcükler: Okul zorbalığı, önleme, şiddet.

* Prof. Dr., Ankara Üniversitesi Tıp Fakültesi Adli Bilimler Anabilim Dalı, Ankara, Türkiye. E-posta: *hanci@medicine.ankara.edu.tr*, https://orcid.org/0000-0002-3504-3751.

** *Sorumlu Yazar*: Doç. Dr., Hitit Üniversitesi, Sağlık Bilimleri Fakültesi, Çocuk Sağlığı ve Hastalıkları Hemşireliği Anabilim Dalı, Çorum, Türkiye. E-posta: *selenozakar@hotmail.com*, https://orcid.org/0000-0002-6943-6713.

Introduction

School is an institution that provides the individual with social responsibilities, self-control and respect for other individuals as well as with education and training. Every child and young person has the right to get access to education in a safe school environment (Leach, 2005). However, children / young people can be deprived of these rights due to many reasons, and unwanted behaviors defined as bullying in schools can be encountered. Studies (Gökler, 2009; Hoşgörür and Orhan, 2017) show that bullying, one of the most important problems of schools, have spread, and that it is a problem preventing schools from being safe institutions.

Bullying can be defined as the aggressive behavior that a person applies systematically in order to harm to another person whom he sees as less powerful (Olweus, 2013). However, while some researchers define bullying as deliberate aggressive behavior against others, some researchers state that such behavior should be repeated regularly in order to qualify to be bullying. Therefore, a full consensus has not been reached among the researchers on the definition (Yaman, Eroğlu and Peker, 2011). The one put forward by Olweus (1993) is the most commonly used definition of bullying, and accordingly, bullying is "intentional, repeated, negative (unpleasant or hurtful) behavior by one or more persons directed against a person who has difficulty defending himself or herself."

Bullying can be observed in students at all levels of education. However, it is more common in early adolescent (13-15 years) children who reject family authority, share their problems, feelings, fears, concerns with peer groups, spend most of their time in school with their friends and think that acceptance and social status are very important in the group (Ashley and Foshee, 2005; Özdinçer Arslan and Savaşer, 2009). According to The United Nations Children's Fund's (UNICEF) September 2018 report, half the students aged 13-15 (around 150 million) worldwide are bullied in and around the school (UNICEF, 2018).

According to the literature, bullying behaviors are reported to be different among girls and boys (Perkins and Montford, 2005), and children subjected to domestic violence are more likely to bully and be exposed to bullying (Grinberg, Dawkins, Dawkins and Fullilove, 2005). It is stated that boys typically perform direct bullying-type actions, while girls mostly use indirect bullying methods, but girls are less likely to be bullied by or bully others in comparison to boys in school (Gültan, 2019).

School bullying causes serious harm and psychological effects that both victims and bullies will be affected throughout their lives. It is inevitable that traumas will affect individuals in adolescence for the rest of their lives (UNICEF, 2018). It is stated that school bullying decreases children's attendance to school and causes the behavior of absenteeism, negatively affecting the physical and psychological health of the child. The fact that the results of school bullying are not limited to school life, but has negative consequences even leading to suicide, makes bullying a syndrome in schools (Yaman et al, 2011; Yelboğa and Koçak, 2019). Because of the increase in bullying incidents in schools in recent years in our country and cases resulting in death, bullying is a hot issue that institutions, especially the "Ministry of Education" and the media focus on, and research on bullying in Turkey is gaining momentum day by day (Kapcı, 2004; Uludağlı and Uçanok, 2005; Yelboğa and Koçak, 2019). Accordingly, this study is considered to be important in terms of recognizing bullying behavior and contributing to the literature on school bullying.

Definition and Scope of School Bullying

Bullying is a common and widespread problem all over the world that can affect all people in any setting, regardless of age, gender, ethnicity, religious belief, or socioeconomic status. The prevalence of bullying, which concerns all countries of the world, threatens the physical and psychosocial health of children and young people. It is accepted that the effects of bullying is a serious trauma for students (Due, Holstein and Lynch, 2005; Özdinçer Arslan and Savaşer, 2009), it is not limited to the school period, it lasts for life and negatively affects public health (Bullying Prevention Training Course, 2019).

Researchers report that bullying, perpetrated by one or more persons taking advantage of power imbalance, is one's long-term and systematic exposure to physical behaviors such as forging, hitting and kicking, and is the exposure of the individual to psychologically and verbally negative behaviors such as ridicule, mocking, name-calling, exclusion, isolation and slander (Burnukara and Uçonak, 2012;

Tatlılıoğlu, 2016; Yaman et al, 2011). School bullying, on the other hand, is 1) to physically, intentionally, willingly and continuously (kick, slap, push, pull, etc.) target the less powerful peer 2) to verbally taunt, tease, mock, name-call, rebuke and humiliate 3) to gossip and spread rumors and threaten to take money or other belongings from less powerful students, which is defined as a type of aggression that excludes the victims from the group of friends and leaves them to loneliness, resulting in discomfort where the victim is unable to protect herself (Gültan, 2019; Özdinçer Arslan and Savaşer, 2009; Yelboğa and Koçak, 2019). If school bullying is to be defined in general, it can be defined as physical, verbal, psychological attack/intimidation in a physically/psychologically unequal environment perpetrated deliberately, willingly and systematically in intervals by the strong against the less powerful peer without the element of incitement, aiming to cause fear and anxiety/harm in the victim (Klomek, Marrocco, Kleinman, Schonfeld and Gould, 2007; Sülükçü and Altunkaya, 2018).

Bullying actually dates back to very ancient history (Olweus and Mona, 2003). The first studies on school bullying were initiated by Norwegian researcher Dan Olweus in the 1970s, and in later years he took part in commissions to create anti-bullying programs in Norway and other Scandinavian countries (Berger, 2007; Hughes, 2005). This subject, which was limited only to Scandinavia for a while, started to attract interest in countries such as the USA, England and Holland after 1990s (Uludağlı and Uçonak, 2005; Yıldırım, 2012;). The first researcher dealing with bullying, Heinemann (1973), used "group violence" for school bullying, and stated that the reaction shown by the group was based on defending the group against a deviant group/individual (Yaman et al, 2011). In the study of Berger (2007) evaluating research findings related to bullying, it is stated that 289 researches were published in databases only in PsycINFO for 10 years between 1990 and 2000, while this number reached 562 in four years between 2000 and 2004.

Types of School Bullying

Although there are different typologies, there are three types of bullying according to Olweus (1994), which are social exclusion, physical bullying and verbal bullying. Since the latter two can be observed, they are addressed as direct bullying while social exclusion is considered indirect bullying (Smith and Ananiadou, 2003; Smith, 2004).

While direct bullying takes the form of open attacks such as pushing, hitting, teasing, threatening, damaging the peer's possessions, indirect bullying can manifest itself in the form of exclusion from the social group, spreading gossip, embarrassment or cyberbullying, which does not require the direct encounter of the bully and victim (Li, 2006). Students are exposed to direct bullying in the classroom or in the school yard, indirect bullying often takes place at school and on and off school. Direct bullying incidents are reported to be more common among male students while girls are more likely to be exposed to indirect bullying (Berger, 2007; Hughes, 2005; Pepler et al, 2006; Rigby and Johnson, 2005).

General Characteristics of School Bullying

School bullying (Gültan, 2019; Hoşgörür and Orhan, 2017; Lee, 2004; Sullivan, Cleary and Sullivan, 2004) varies according to country and cultural differences in the researches. When it comes to the general characteristics of school bullying;

- It is stated that according to the nature of bullying, it can be physical, emotional, social / psychological, and that bullying is not impulsive or accidental, rather than planned, systematic and calculated.
- While the number of bullying boys is higher than girls, there is an equal number in both sexes among victims. While boys are often driven by individual powers, girls as a group exclude the victim they choose.
- In the period between the ages of 8 and 16, the number of individuals who stated that they were bullied decreased regularly, while the number of those who stated that they were bullying did not decrease. With age, there is a transition from physical bullying to indirect and relational bullying.
- In most cases, the bullying student is in the same class / age group as the victim. Being bullied by a younger peer is very unlikely and the bully is more powerful than the victim.

- Bullying can be performed by a child / gang. It can be occasional and short-term / continuous and long-term. The majority, considering themselves victims, do not open up to their teachers / family members about bullying. The proportion of those who do not step forward increases as the age grows, which indicates that being a victim in older age groups is a more serious problem.
- Boys are bullied by other boys, but girls can be bullied by both sexes.
- Bullying usually takes place within public buildings, such as playgrounds, classrooms, or corridors. Although many school variables are factors in bullying incidents, it is seen that the socio-economic situation especially in the service areas has a tremendous impact.

Incidence of School Bullying

Since school bullying is a problem that concerns all nations, it has been studied in a variety of different countries and cultures since 1970s. There are also differences in the frequency of bullying in different cultures (Chatira and Nikolopoulos, 2019; Karaca, 2018; Melzer-Lange et al, 2005; Olweus, 1994; O'Moore and Minton, 2005; Öztuna, 2018; Pişkin, 2010; Plexousakis, Kourkoutas, Giovazolias, Yöndem and Totan, 2008; Sapouna, 2008; Theriot, Dulmus, Sowers and Johnson, 2005). Looking at some research results regarding the frequency of school bullying;

More than 130,000 Norwegian students participated in the first comprehensive school bullying study conducted by Olweus in 1993, of which 15% stated that they were involved in bullying or as a victim. Other research by other countries, such as Sweden, Finland, the UK, the United States, Canada, the Netherlands, Japan, Ireland, Spain and Australia, shows that this problem exists with the same or more prevalence rates in other countries than Norway. (Olweus, 1994). In a study conducted by Theriot et al. (2005) reported that bullying prevalence was 21.9% in their study with primary and secondary school students, determining that 22.9% of them did not define themselves as victims while meeting the criteria of being victims. In a national survey involving a total of 20,442 students in 26 states of Ireland between 1993 and 1994, 31.3% of primary school students and 15.6% of secondary school students were victims of bullying in their final semesters, and 26.5% of primary school students and 14.9% of secondary school students stated that they bullied others (O'Moore and Minton, 2005). More than 13,000 students participated in the Bullying Project, which included sixty-three schools from four different school districts of Wisconsin, and 29% of these students reported they were bullied at school / on the way to school, 37% bullied other students at school (Melzer-Lange et al, 2005). According to the results of a study involving 1.758 students aged 10-14 in 20 schools in Thessaloniki, Greece in 2007, 8.2% of students were victims, 5.8% were bullies and 1.1% were both bullies and victims. It was observed that male and female students participated in bullying incidents in equal proportions and younger peers were more likely to be exposed to bullying (Sapouna, 2008). In their study conducted by Plexousakis et al. (2019) with 433 students aged 8 to 17 in Greece, 23.5% of the students reported that they were bullied in the academic year they were in, leading to the conclusion that male students were more likely to bully.

When the studies conducted in our country were examined, it was observed that 27.23% of 584 adolescents were somehow involved in bullying activities according to the research conducted by Yöndem and Totan (2008). In terms of gender, bullying was found to be close to each other in both sexes (girls 11.41% and boys 11.55%). In the study conducted by Pişkin (2010) in Ankara aiming to determine the prevalence of bullying among 1154 people, it was determined that 35.1% were victims, 30.2% were both bullies and victims, and 6% were just bullies. In the same study, 52% of the students are male, 48% are female, of whom 41.3% are victims, 25.4% are both bully and victim and 2.9% are just bully. 29.4% of male students were victims, 34.6% were both bully and victim, and 9% were just bully. These findings show that in comparison to girls, boys are more involved in bullying. Again, in the study of Karaca (2018) conducted to investigate the prevalence of peer bullying in secondary schools and the depression and anxiety levels of bully-victims, the bullying scores of the students were found to show a significant difference according to their gender, the type of school where they study, the grade level, the age and educational level of the mother, revealing that victim scores of the students showed significant difference according to gender and educational level of the mother. In the study of Öztuna (2018) with 350 participants including 9th and 10th grade students; it was found that boys were bullied

through intimidation, suppression or open attack, while the most common type of bullying among girls was relational attack and derogatory comments.

Factors in Bullying

Many a number of different factors have been found that contribute to bullying behaviors, and thus school bullying, and are generally grouped into three: individual, family, and school-related factors (Gültan, 2019; Kanık, 2010; Özdinçer Arslan and Savaşer, 2009; Yelboğa and Koçak, 2019).

Individual factors are about the nature of the child, that is, the main tendencies that cause the child to develop certain personality types and interpersonal behaviors. Boys, who are active and aggressive due to their nature and who are stronger than their peers, are more prone to bullying because of these characteristics, but still there are many of those children who never bully (Tutty and Este, 2005). Generally, bullies have an aggressive attitude towards their friends, often aggressive towards adults, too, and their need to be strong and dominant over others is obvious (Kanık, 2010).

Family factors, according to a research on bullying, are very important in the development of personalities of children who are bullying or victims of others. The attitudes and behaviors of families greatly affect the behavior of children in social life. Any negative attitude between either of the parents and the child, excessive punishment, physical discipline / inconsistent and loose control, using socially acceptable physical attack, negative relationship between the parents and the child, and the nature of the child are very important elements in terms of bullying (Kanık, 2010) . Moreover, overprotective behaviors of parents and their dependence on the family make the child a potential victim of bullying. The opposite of this which is to free the child, not to show love and attention, lack of emphaty, domestic violance and conflicts increase the likelihood to bully (Gökler, 2009).

School-related factors; social context and control in schools play an essential role in the frequency and severity of bullying problems. Supervision of students is very important as teachers and administrators can reduce the severity of bullying problems through appropriate supervision, intervention and climate at school (Özdinçer Arslan and Savaşer, 2009). Bullying actions increase for a certain number of reasons such as insufficient controls of principals, vice principals and teachers over students in schools, difficulties in control in crowded schools, ignorance of bullying problems by the school board, not giving due importance to the issue and even toleration to such bullying behaviors in some schools (Kanık, 2010).

Prevention of School Bullying

Failure to respond to it appropriately increases the risk of recurrence when bullying occurs in any form. In order for students to feel safe in the school setting, they need to know that school management follows a zero tolerance approach against bullying (Grene, 2006,).

To prevent school bullying; (Gültan, 2019; Özdinçer Arslan and Savaşer, 2009; Rigby and Johnson, 2004; Sidelinger, Guerrero, Rodríguez-Frau and Mirabal-Colón, 2005; Yelboğa, 2018):

- children should be equipped with positive behavior and habits at an early age,
- risky groups that can bully / be bullied should be identified,
- anti-bullying programs in schools should be developed and implemented, which should be followed up by school administrators, employees, teachers and parents,
- workshops to break the bully cycle of bullies, victims and audiences should be established,
- the approaches to developing human rights, life skills and positive communication skills in schools should be taught, and training to increase these skills should be made available,
- anti-bullying programs should be established and implemented. While creating these programs, theoretical views (individual differences between students, as a developmental phase and a socio-cultural phenomenon, a reaction against the peer pressure seen in the school and serving as a kind of restorative justice) should be taken as basis. The effects of these theoretical views are very important in determining what schools should and should not do when developing and implementing anti-bullying policies.
- when implementing anti-bullying initiatives, these practices should not be of the type that will cause negative perceptions by students (expulsion from school, etc.),

- families should be ensured to participate in the anti-bullying program
- since bullying is a combination of many factors, a multidisciplinary team of school administrators, school guidance service, teachers, school nurse and physician should work in coordination when needed.
- an active role and responsibility in implementing the anti-bullying program fall on to school nurses as well as other school staff, which requires the expansion and empowerment of school nursing.

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