



Erken Çocuklukta BİT Çerçevesi: Bir İçerik Analizi

Sinem GÜÇHAN-ÖZGÜL¹, Zeynel Abidin MISIRLI²

¹ Balıkesir Üniversitesi, Balıkesir, Türkiye, sinemguchan@gmail.com,
<http://orcid.org/0000-0002-5702-2150>

² Balıkesir Üniversitesi, Balıkesir, Türkiye, abidinm@gmail.com,
<http://orcid.org/0000-0002-9504-4836>

Gönderme Tarihi: 22.12.2020

Kabul Tarihi: 27.12.2020

Doi: 10.17522/balikesirnef.845386

Özet – Teknolojinin hızlı bir şekilde büyümesi ve sosyal yaşam ile eğitimin tüm alanlarına yayılmasıyla birlikte teknoloji kullanımı dünyanın dört bir yanındaki araştırmacılar tarafından en çok çalışılan konulardan biri haline gelmiştir. Türk alan yazını da teknoloji ile ilgili konulara ve teknolojinin sosyal ve eğitsel boyutlarına her zamankinden daha fazla odaklanmaktadır. Bu çalışma, 2015-2020 yılları arasında erken çocukluk ve BİT ile ilgili yapılan tezleri gözden geçirmeyi amaçlamaktadır. YÖK Tez Veri tabanının arşivi, araştırma amacı doğrultusunda erken çocukluk ve BİT konularında dikkatle incelenmiş ve 73 tez belirlenmiştir. Erken çocukluk dönemi kapsamında teknoloji kavramlarını ele alan 43 tez, belirlenen kriterleri karşıladıkları için araştırmanın örneklemini oluşturmuştur. İki yazarın yaptıkları kodlamaların güvenilirlik hesaplamalarında Kappa değeri 0.88 olarak bulunmuştur ve bu neredeyse mükemmel tutarlılığı açıklamaktadır. Bu çalışmada incelenen tezlerin tüm özellikleri ve bulgular oluşturulan ana başlıklar kapsamında özetlenerek sunulmaktadır. Çalışmanın sonraki araştırmalar için önerileri bulunmaktadır.

Anahtar kelimeler: Okul Öncesi, Erken Çocukluk, Teknoloji, BİT, Meta Analiz.

Sorumlu yazar: Sinem GÜÇHAN-ÖZGÜL, sinemguchan@gmail.com

Geniş Özet

Giriş

İçinde bulunduğumuz dijital çağda, bilgi ve iletişim teknolojilerinin (BİT) ortaya çıkışıyla birlikte insanların düşünme stilleri, tutumları, iletişim yolları, meslekleri ve yaşam tarzlarında köklü değişiklikler meydana gelmiştir. BİT 'teki gelişmeler, yeni bilgi üretim yollarının geliştirilmesine, eğitimde çeşitliliğe ve bilginin yayılmasına katkıda bulunmuştur (UNESCO, 2005). Bilgi toplumdaki gelişmelerin sonucu olarak, yaşam boyu öğrenme, yenilikçilik ve

sürekli deęişim gibi konularda genel bir fikir birliğine varılmıştır. Bunlar öğrenen bir toplumun kritik özellikleridir (OECD, 2019).

Bolstad (2004), çocukları dijital öğrenme ve çalışma ortamlarının gereksinimlerine hazırlamak için erken çocukluk eğitiminde BİT becerilerinin kazandırılmasına odaklanılması gerektiğini vurgulamaktadır. Erken çocukluk eğitiminde (EÇE) BİT'in neden önemli olduğu üç ana başlık altında toplanarak Bolstad (2004), tarafından özetlenmektedir:

- İlk olarak, bireyleri ve kültürleri etkileyen BİT, küçük çocukların öğrenmelerini de desteklemektedir.
- İkinci olarak, BİT, erken çocukluk eğitimi uygulamalarını çok yönlü olarak güçlendirmek için yeni fırsatlar sunmaktadır.
- Üçüncüsü, BİT'in geliştirilmesi, eğitim politikalarına, programlara ve tüm eğitim uygulamalarına entegre edilmesi desteklenmektedir.

Teknoloji, bizlerin olduğu kadar çocukların da günlük hayatlarının tam merkezinde bulunmaktadır. Erken çocukluk eğitiminde teknolojinin kullanılması artık bir seçim değil, bir gereklilik olarak ifade edilmektedir. İlgili literatür, son yıllarda erken çocukluk döneminde teknoloji kullanımına ilişkin endişelerin ve araştırma sorunlarının "neden" sorularının yerini "nasıl" sorusuna bıraktığını ortaya koymaktadır. Eğitim ve teknoloji alanındaki araştırmalar, teknolojinin öğrenme ve öğretmede etkili kullanımını, psikolojik boyutları ve yenilikçi tasarımların etkililiğini ele almaktadır. Teknolojinin hızlı gelişimi ile sosyal yaşamın ve eğitimin tüm alanlarına yayılmasıyla birlikte, teknoloji kullanımı dünyanın dört bir yanındaki araştırmacılar tarafından en çok çalışılan konulardan biri haline gelmiştir. Dahası, Türkçe alan yazında teknoloji ile ilgili konulara ve bu konuların sosyal ve eğitimsel boyutlarına her zamankinden daha fazla odaklanmaktadır. Bu çalışma, 2015-2020 yılları arasında erken çocukluk ve BİT ile ilgili yapılan tezleri gözden geçirmeyi amaçlamaktadır.

Yöntem

Bu araştırmada lisans üstü düzeyde hazırlanmış tezler üzerinde içerik analizi yapılmıştır. Tezlere Türkiye Yükseköğretim Kurulu web sitesi (YÖK) üzerinden erişilmiştir. YÖK, Türkiye'de bugüne kadar yapılmış yüksek lisans ve doktora tezlerinin tamamını içeren ve tüm araştırmacılara açık bir elektronik arşive sahiptir.

Literatür taraması yapılırken 2015-2020 yılları arasında yapılan ilgili yüksek lisans ve doktora tezleri aşağıdaki anahtar kelimeler kullanılarak taranmıştır:

- Okul öncesi, teknoloji, bilgisayar
- Erken çocukluk, teknoloji

- Okul öncesi, teknoloji, çevrimiçi
- Okul öncesi, erken çocukluk, sanal
- Okul öncesi, dijital, internet

Çalışmanın amacı ile ilgili olarak YÖK arşivi erken çocukluk ve BİT ile ilgili konular açısından kapsamlı bir şekilde incelenmiş ve 73 tez listelenmiştir. Daha sonra yukarıda belirtilen anahtar kelimeler ve konular kullanılarak, bu 73 tez taranmış ve araştırmacılar tarafından derinlemesine analiz edilmiştir. Son olarak, erken çocukluk döneminde teknoloji kullanımını ile ilgili konularda hazırlanmış 43 tez araştırmanın örnekleme olarak belirlenmiştir.

2015-2020 yılları arasında erken çocukluk ve BİT ile ilgili yapılan tezleri inceleyen bu çalışma kapsamında 43 tez, yayın yılı, üniversite, derece, disiplin, anahtar kelimeler, araştırma tasarımı ve yöntemleri, örneklem büyüklüğü, katılımcılar, veri toplama araçları ve bulgulara göre incelenmiştir. Araştırmacılar tarafından oluşturulan Google Forms veri tabanı, yukarıda belirtilen kriterlere göre örneklem grubundaki tezleri daha detaylı ve sistematik biçimde incelemeye olanak tanımıştır. Araştırmacılar 43 tezin kodlamalarını Google Forms veri tabanı kullanarak yapmış, daha sonra her iki yazarın kodlamaları analiz edilmiş ve birbirlerinininkiyle karşılaştırılmıştır. Kodlayıcılar arası tutarlılığı incelemek için yapılan Kappa analizinde 0.88 bulunan değer mükemmel yakın uyumu işaret etmektedir.

Bulgular ve Tartışma

Bu çalışmanın bulgularına dayanarak, tezler yıllara göre incelendiğinde, erken çocukluk ve teknoloji ile ilgili kavramları ele alan tezlerin sayısında kısmi bir artış olduğu görülmektedir. İncelenen lisansüstü araştırmaların çoğunu yüksek lisans tezleri oluşturmaktadır. Ülkemizde doktora programı sayısının sınırlı olması nedeniyle yüksek lisans öğrencisi sayısı doktora öğrencisi sayısından fazladır. En çok katkısı olan üniversiteler göz önüne alındığında, Hacettepe Üniversitesi ve ODTÜ öne çıkmaktadır. Bu üniversitelerde hem Okul Öncesi Eğitimi hem de Bilgisayar ve Öğretim Teknolojileri Eğitimi bölümleri olduğu bilinmektedir. Bu bölümlere odaklanılmasının nedenlerinden biri, incelenen tezlerin yaklaşık yarısının BÖTE ve Okul Öncesi Eğitimi programlarında tamamlanmış olmasıdır. Diğer bir neden ise araştırma konusunun BÖTE ve Okul Öncesi Eğitimi bölümündeki araştırmacılar için ortak bir ilgi alanı olmasıdır.

Tezler araştırma yöntemlerine göre detaylı olarak incelendiğinde, on tanesi ilişkisel, yedisi betimleyici, üçü yarı deneysel, bir tane de diğer kategoride olmak üzere toplam 21 adet nicel tez olduğu görülmektedir. 18 nitel araştırmanın altısı durum çalışması, beşi eylem

araştırması, biri gömülü teori ve altısı diğer nitel araştırma yöntemleri kullanılarak gerçekleştirilmiştir. Dört tez, nitel ve nicel araştırma yaklaşımlarını bir araya getiren karma yöntem kullanılarak gerçekleştirilmiştir. Yüksek lisans tezlerinde, daha az karmaşık olan ve daha az uzmanlık gerektiren nicel araştırma tekniklerinin kullanılması sıklıkla rastlanan bir durumdur. Nitel araştırma çalışmalarının sayısı ise örneklem grubundaki tasarım ve uygulama geliştirme çalışmalarının bulunması nedeniyle oldukça fazladır. Bununla birlikte, eğitimle ilgili derinlemesine inceleme ve sorunların çözülmesine olanak tanıyan eylem araştırmaları ve tasarım temelli araştırmaların fazlaşması ve bu sayede yalnızca problemin belirlenmesi düzeyinde kalan nicel çalışmalardan, çözümler üreten nitel veya karma desenlerde çalışmalara ağırlık verilmesi önerilmektedir.

Tezlerin sonuçları incelendiğinde sırasıyla "ebeveynler ve çocuklar", "eğitimde teknoloji" ve "okul öncesi öğretmenleri ve öğretmen adayları" başlıkları belirlenmiş ve önemli bulgular özetlenmiştir. Araştırmaların çoğu, çocukların ve ebeveynlerin dijital medya, internet kullanımı ve dijital oyunlara yönelik tercihlerini ve görüşlerini ortaya koymaktadır. Teknoloji temelli etkinliklerin etkililiğiyle ilgili tezlerde, biri hariç tüm tezler, teknoloji destekli öğretim materyalleri lehine önemli bir fark olduğunu ortaya koymaktadır. Bu araştırmaya dahil edilen tez örneğinde, öğretmenlerin teknolojiyi öğretimlerine entegre etmeye ilişkin görüşlerini, tutumlarını veya mesleki konumlarını inceleyen çok sınırlı sayıda araştırma bulunmaktadır.

Bu meta-analiz çalışması, gelecekteki araştırmacıların son yıllarda yapılan lisansüstü çalışmaların okul öncesi ve teknoloji kavramlarına ilişkin bakış açısı kazanmalarına olanak sağlayacaktır. Böylece, araştırmacıların güncel araştırma eğilimlerini, konularını ve ayrıca alan yazında ihmal edilen kavramları belirlemeleri mümkün olacaktır.

Framing ICT in Early Childhood: A Content Analysis

Sinem GÜÇHAN-ÖZGÜL ¹, Zeynel Abidin MISIRLI ²

¹ Balıkesir University, Balıkesir, Turkey, sinemguchan@gmail.com,
<http://orcid.org/0000-0002-5702-2150>

² Balıkesir University, Balıkesir, Turkey, abidinm@gmail.com,
<http://orcid.org/0000-0002-9504-4836>

Received : 22.12.2020

Accepted : 27.12.2020

Doi: 10.17522/balikesirnef.845386

Abstract – With the rapid growth of technology and its dissemination through all areas of social life and education, the use of technology has become one of the most studied subjects by researchers around the world. Moreover, Turkish literature focuses more than ever on technology-related subjects and their social and educational dimensions. This study aims to review the dissertations about early childhood and ICT conducted between the years 2015 and 2020. TCHE's archive, relevant to the purpose of the study, was carefully analysed in the early childhood and in ICT topics and 73 dissertations were identified. Finally, 43 theses relevant to technological issues in early childhood have been determined to be the research sample because they fulfil the criteria. The coding of the two authors was evaluated and compared. For reliability, the Kappa value is 0.88, which explains almost perfect consistency. All features and findings are summarized and presented in this current study. This research has thrown up many suggestions and questions in need of further research.

Key words: Preschool, Early Childhood, Technology, ICT, Meta-Analysis.

Corresponding author: Sinem GÜÇHAN-ÖZGÜL, sinemguchan@gmail.com

Introduction

The digital era has profoundly changed the thinking styles, patterns, attitudes, the ways of communication, jobs and lifestyles of people, influenced by the advent of information and communication technologies (ICT). This has contributed to the development of new ways of knowledge production, diversity in education and dissemination of knowledge (UNESCO, 2005). As a result of growing focus on the knowledge society, a general consensus on topics such as lifelong learning, innovation, and continuous change has been achieved. These are critical features of a learning society (OECD, 2019).

"ICT, which is an acronym for information and communication technology, can be defined as a mixture of computer, video and telecommunications technologies, as observed in the use of multimedia computers and networks, as well as the services on which they are based (Van Damme, 2003). Hence, the demand for educational institutions to use ICT to teach students the skills and information they need for the 21st century is increasing (Tomei, 2005). For this purpose, it is essential to equip individuals with information and communication technology (ICT) skills from the early years of childhood to prepare them for the requirements of the digital learning and working settings. Bolstad (2004) emphasizes that the implementation and usage of ICT in early childhood education should be focused on a clear understanding of early childhood education's aims, procedures, and social context and summarizes literature in which three explanations of why ICT matters in early childhood education revealed:

- First, ICT is now affecting the individuals and cultures, acting the learning of young children.
- Second, ICT offers new opportunities to strengthen many aspects of early childhood education practice
- Third, there is support for the development and integration of ICT into education policy, curriculum, and practice across the whole education sector

ICT Use in Childhood Education

Environments of the new millennium are digital. Shortly after birth, media are incorporated into children's lives, and multimedia creates a continuing framework for daily life during creation (Calvert & Valkenburg, 2013). In their houses, children use the media as they move down the highway, in shops and schools, nearly everywhere. Digital media has taken centre stage in kids' homes as the planet copes with the Covid19 pandemic. Today, internet

access for kids decides more than ever whether kids can continue their education, search knowledge, keep in contact with the family, and enjoy digital entertainment.

Plowman and Stephen (2006) have also urged early childhood practitioners to extend their definition of ICT to include digital still and video cameras, cell phones, electronic keyboards, rather than referring to ICT only as computers, more than a decade ago. The technology field is now more complex than ever, thanks to the advent of touch-screen interfaces and more recently, the Internet of Things and educational robotics.

An analysis of recent studies shows that terms such as technology, ICT, digital media are used interchangeably in the ECE sense alone to refer to a wide variety of digital devices and apps (Stephen and Edwards, 2018; Mertala, 2017).

Debates on Technology and Early Childhood Education

In recent 20 years, discussions regarding the appropriateness of early childhood technologies are often set aside, and the pressing question is not "Should we introduce computers?" but "How are we going to incorporate them?"(Clements & Sarama, 2003). From technology to pedagogy, the emphasis has changed (Bers, 2008). According to NAEYC Position Statement (2020);

Effective uses of technology and media by children are active, hands-on, engaging, and empowering; give children control; provide adaptive scaffolds to help each child progress in skills development at their individual pace; and are used as one of many options to support children's learning.

The International Society for Technology in Education (2007) emphasizes the fundamental skills and principles of technology operations by age 5. The learning and creative benefit that high-quality interactive media can bring to children should also be taken into account by educators, especially when paired with skillful teaching and complementary curriculum tools that work together to speed up learning and narrow the achievement gaps between children from different backgrounds (NAEYC & Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College, 2012).

Although the Council on Communications and Technology (2011) of the American Academy of Pediatrics (AAP) recommends that children under the age of two should not be

exposed to any screen media, it agrees at the same time that high-quality interactive media may have educational benefits for children over the age of two, enhancing "social skills, language skills, and even school readiness" (p. 1041). Calvert (2006) states that early media experiences in early childhood have an impact on the improvement of the well-being of children and preparing them for school entry and academic and social success. Therefore, the literature on technology in early childhood has been evolving to seek more balanced and creative ways for integrating these domains in better ways (Epstein, 2015). Işıkoğlu (2003) clarifies that schools are their own driving principles, beliefs, schedules, themes, and events in every classroom; therefore, the integration of technology differs from classroom to classroom and emphasizes the need to consider how technology is incorporated into different forms of education for early childhood. Similarly Can-Yaşar, Uyanık, İnal and Kandır (2013) state that technological products that are appropriately integrated into educational settings, according to children's developmental stages and needs, are essential for improving the quality of education.

Technology is just in the centre of our daily lives as well as children's. The use of technology in early childhood education is thus no longer a choice but a requirement. Related literature reveals that in recent decades the concerns and research problems about technology use in early childhood concentrate on "how" instead of "why" questions. Research in education and technology mainly address the effective use of technology in learning and teaching, user's psychological aspects and the effectiveness of innovative designs. With the rapid growth of technology and its dissemination through all areas of social life and education, the use of technology has become one of the most studied subjects by researchers around the world. Moreover, Turkish literature focuses more than ever on technology-related topics and their social and educational dimensions. This study aims to review the dissertations about early childhood and ICT conducted between the years 2015 and 2020.

Method

In the present research, content analysis was carried out on theses. The theses were accessed through the Turkish Council of Higher Education website (TCHE). TCHE has an electronic archive containing all of the master theses and doctoral dissertations that have been carried out so far in Turkey and which are open to all researchers.

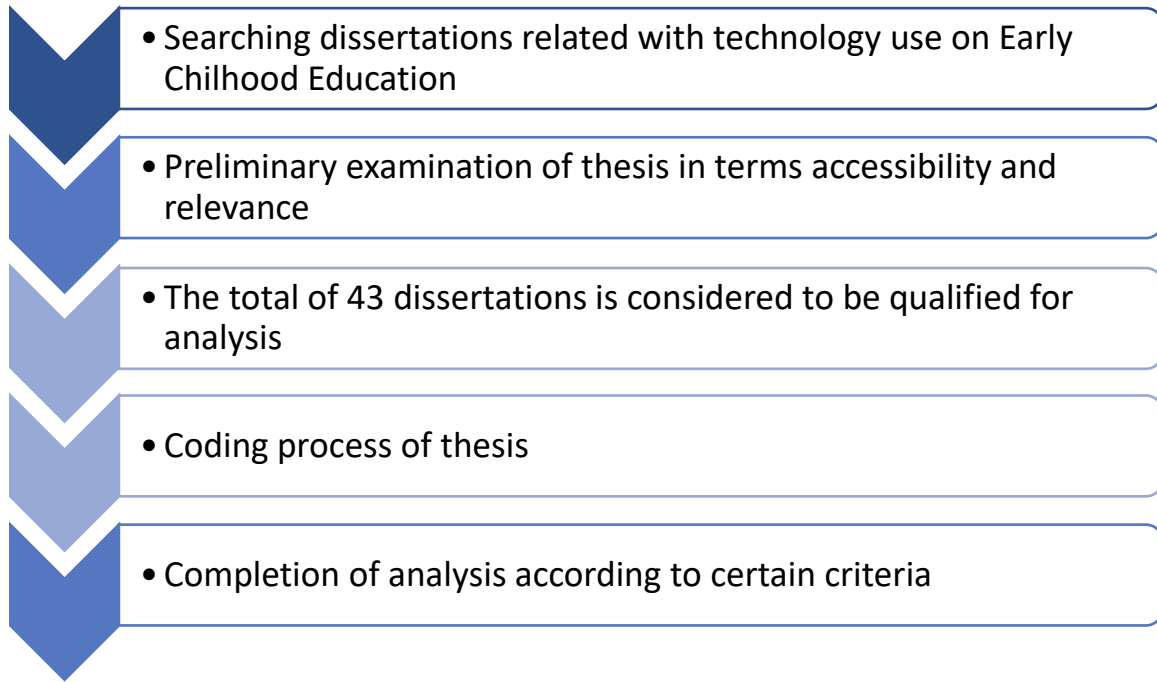


Figure 1 Search & Analysis Process of Study

The following keywords were used while searching for the relevant master theses and dissertations conducted between 2015-2020 during the analysis of the literature:

- Preschool, technology, computer
- Early childhood, technology
- Preschool, technology, online
- Preschool, early childhood, virtual
- Preschool, digital, internet

Related with the aim of the study, TCHE archive examined thoroughly in terms of early childhood and ICT related topics and 73 dissertations were listed. Then using the aforementioned keywords and subjects, these 73 dissertations were screened and analysed by researchers in-depth. Finally, as they met the requirements, 43 dissertations related to the issues about technology in early childhood were determined as the sample of the study.

After the selection procedure was completed, researchers examined 43 theses simultaneously. Then both authors' coding was analysed and compared with each other's. In order to make inter-rater reliability calculations, the "Weighted Kappa Coefficient" calculation was made, taking into account the structure of analysis. This method is a generalized form of

simple Kappa calculated by using weights showing relative differences between categories (Şencan, 2005).

- – 0.20 slight agreement
- 0.21 – 0.40 fair agreement
- 0.41 – 0.60 moderate agreement
- 0.61 – 0.80 substantial agreement
- 0.81 – 1.00 almost perfect or perfect agreement (Landis, J.R. & Koch, G.G. 1977).

The Kappa value is 0.88 for inter-rater reliability, this explains almost perfect agreement (Landis, J.R. & Koch, G.G. 1977).

In order to easily define the main features of each theses, a Google Forms database was developed. In Google Forms database consists of these categories; publishing year, university, degree, discipline, keywords, research design and methods, sample size, participants, data collection tools and results (See Figure 1 Search & Analysis Process of Study).

Findings

According to the purpose of this paper that is reviewing research related to technology in early childhood over the six years from 2015 to 2020, a descriptive analysis of the key features in the database is examined. In this section, all data gathered from the content analysis are examined and outlined in detail.

Distribution of Theses According to Years

As shown in Figure 2. there is a partial but non-gradual increase in the number of theses by years. Especially considering the sharp increase in 2019, the expectation about the number theses is in this direction in 2020 as well. However, regarding the operation of the TCHE system, it is thought that the last year's theses may not be uploaded to the archive yet.

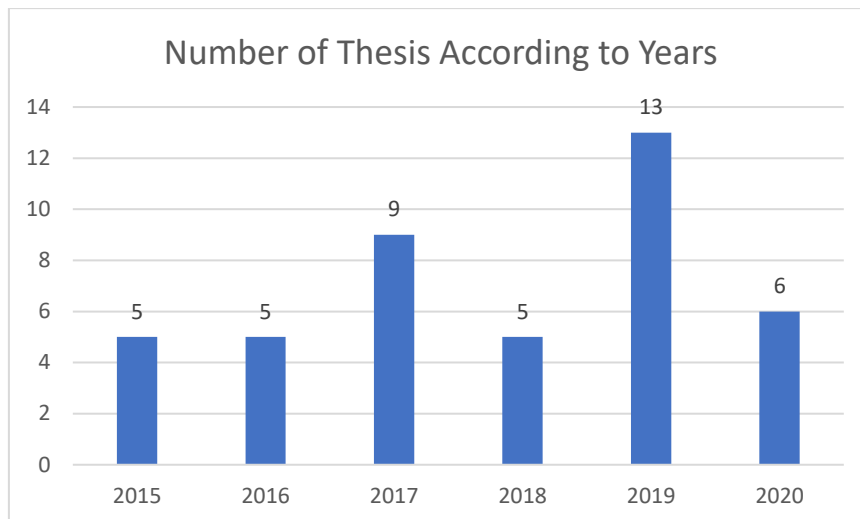


Figure 2. Number of Theses According to Years

Grade Levels

As the graduate theses addressing technology and early childhood together and completed in during the past six years, it is seen that the vast majority is on behalf of the master theses. Of the 43 theses studied, 32 (74%) are master's theses, and only 11 (26%) are doctoral theses (See Figure 3.).

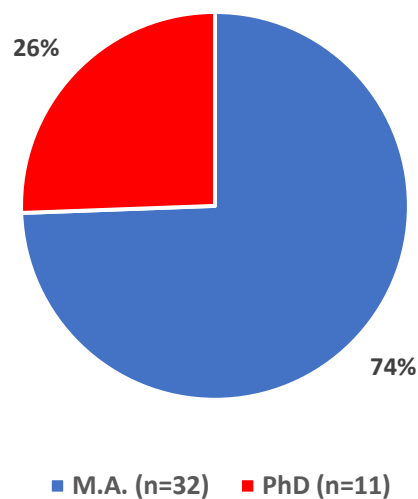


Figure 3. Distribution of Theses According to Degree

University

The findings presented in this section reveal the distribution of theses regarding the universities. From the data Figure 4., it is apparent that Middle East Technical University and Hacettepe University contributed with three theses on related topics of this study examines.

Having said that Afyon Kocatepe University, Ankara University, Bahçeşehir University, Çanakkale 18 Mart University, Gazi University, İstanbul Aydın University, İstanbul Okan University and Yıldız Technical University make contribution with two theses, each by own. Moreover, in each one of the 21 universities only one thesis was presented about the related topics.

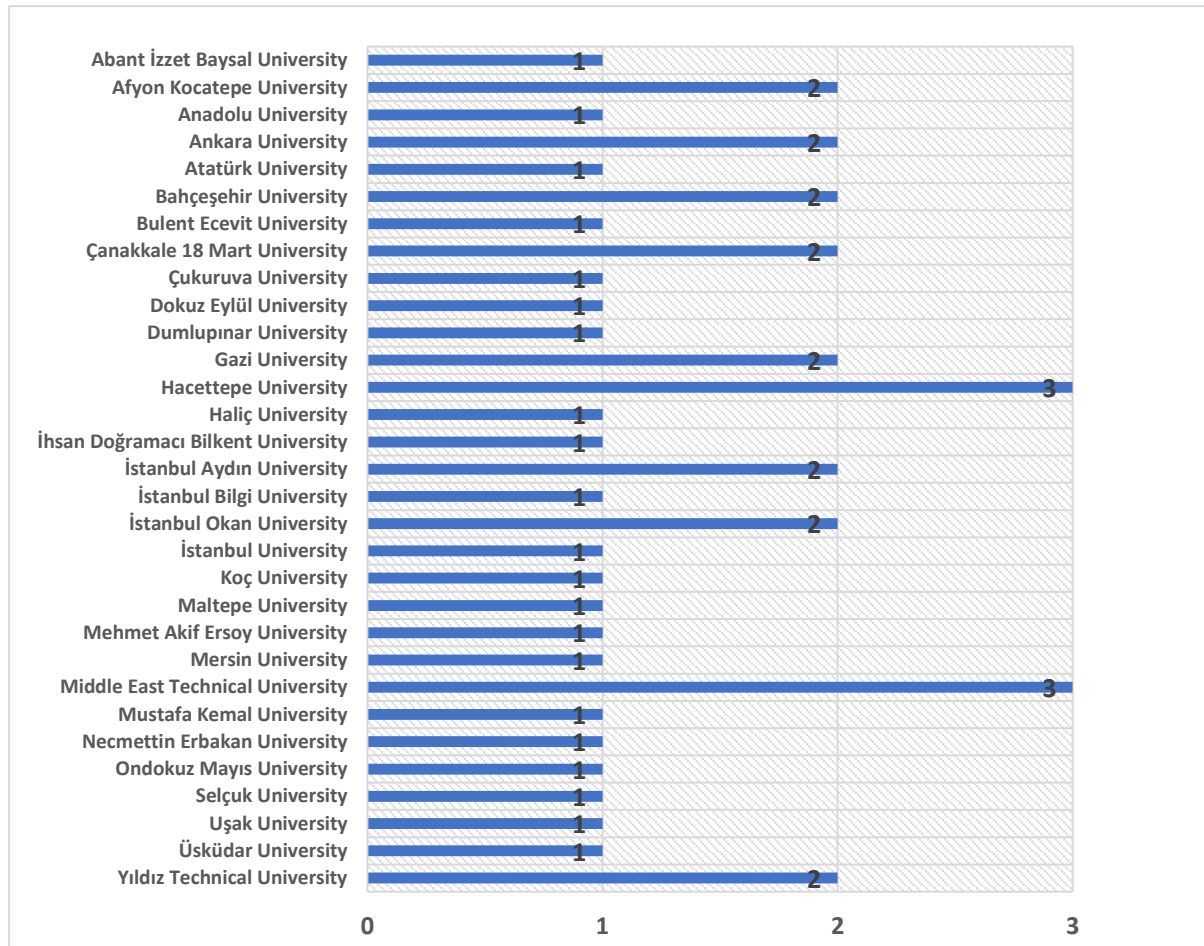


Figure 4. Number of Theses According to Universities

Research Design

When evaluating the theses according to the research method, it is seen that 21 theses are quantitative, 18 are qualitative, and four are mixed style. As the theses examined in detail, it is seen that there are a total of 21 quantitative theses, ten correlational, seven descriptive, three semi-experimental, one belonging to the other group. Figure 5 shows that six of the 18 qualitative studies were conducted using case studies, five using action research, one using grounded theory, and six using other qualitative research methods. Four theses are developed in a mixed-method that incorporates qualitative and quantitative research approaches together.

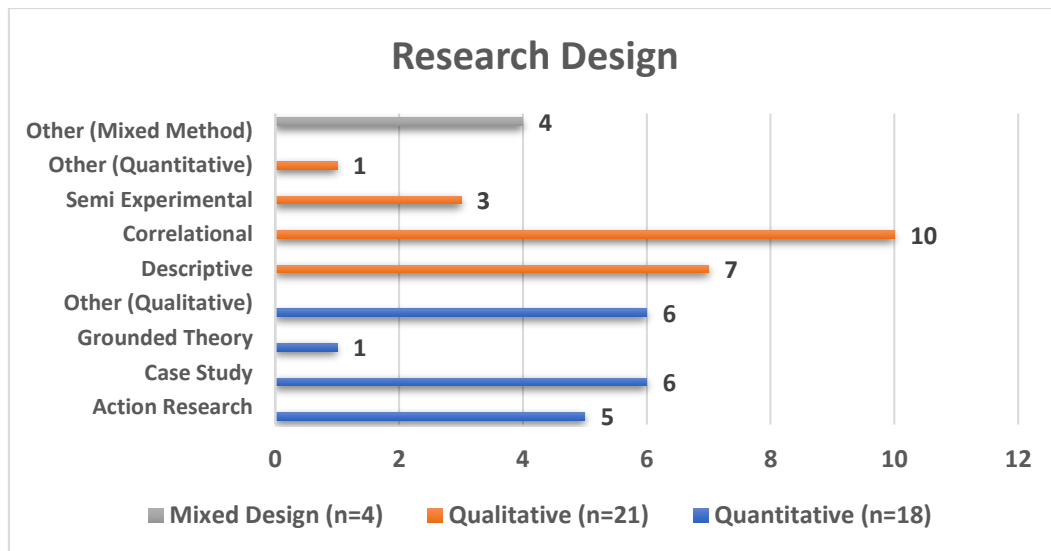


Figure 5. Research Design

Keywords

The theses reviewed consist of 187 keywords in total. While analysing the keywords, similar concepts are grouped. Through, four main categories consist of the leading frameworks related to the concepts emerged, as seen in Figure 6. Most frequently encountered keywords in the theses are technology-related concepts (n=74), early childhood education (n=35), education learning and teaching (n=34). Because some of the theses used in the research are in several different disciplines such as medicine, computer science and business administration, numerous keywords outside the framework of this study have been discovered.

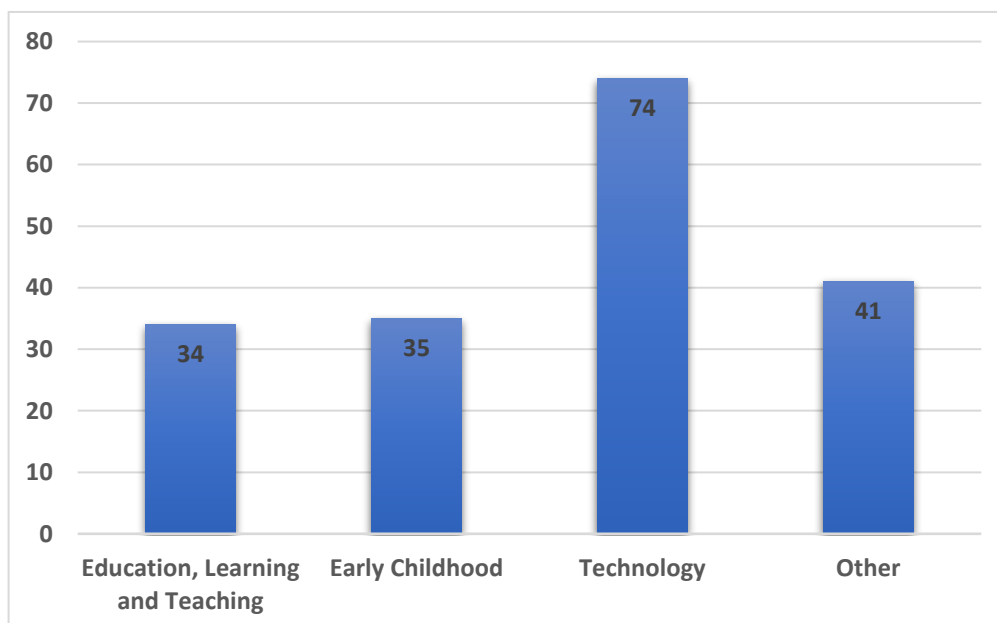


Figure 6. Keywords



Figure 7. Word Cloud of Keywords

The word cloud presented in Figure 6 visually gives the details of the keyword categories in Figure 5. In the word cloud shown below, the keywords with the highest frequency are bigger, and the keywords with lower frequency are smaller. Some of the highlighted keywords on “technology” are the use of technology, mobile games, instructional technology tools, digital, multimedia, ICT, internet, augmented reality and so on. Most frequent keywords about “early childhood” are children, preschool, early childhood, parents, preschool children, preschool education. Keywords on “education, learning and teaching” are teachers, concept development, spatial learning, school period, technology education, computational thinking. Some of the prominent words in the word cloud among 41 keywords gathered under the title of “other” are methods, data collection and psychological aspects.

Academic disciplines

Considering the distribution of the theses according to academic disciplines, the departments of early childhood education, Computer Education and Instructional Technologies (CEIT), educational sciences, computer engineering and communication technologies come to the fore. There are nine theses from the early childhood education department, seven from the CEIT department, four from the educational sciences department, three from the computer engineering and three from the communication technologies. Other contributing departments are; child development and education, business and administration management, educational technology, design technology and society, graphic, psychology, new media and journalism,

language and speech therapy, new media and communication systems, medicine, nursing, arts and design and primary education. Considering that there are pre-school education and CEIT departments in 31 universities where the theses are conducted, it is a natural consequence that the theses focus in these fields.

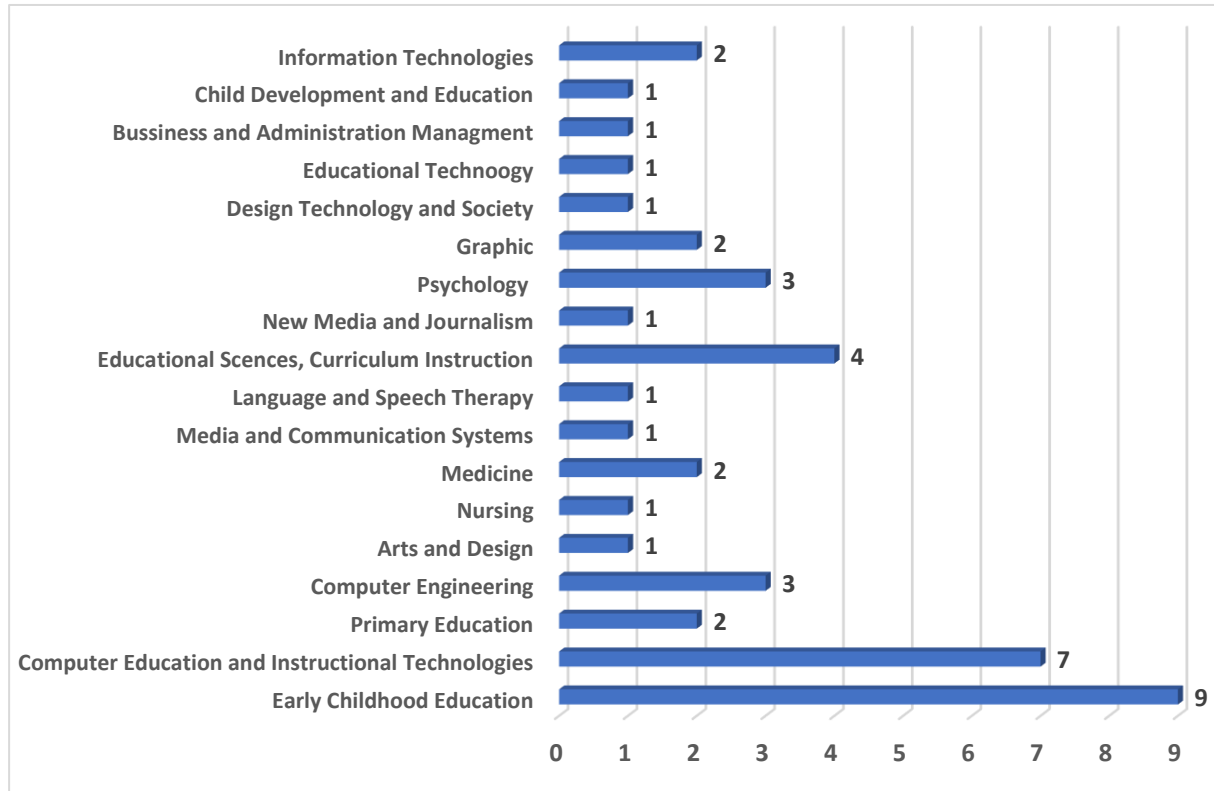


Figure 8. Distribution of Dissertations According to Academic Disciplines

Participants

After analysing the participants of these theses, it has been seen that most theses have one group of participants, while others have more than one. Participants of the 23 studies were 0-8 years children, 16 were parents, eight were teachers, seven were teacher candidates, and one was academicians. As seen in Figure 9, the theses related to technology and early childhood mostly preferred to study with young children and their parents.

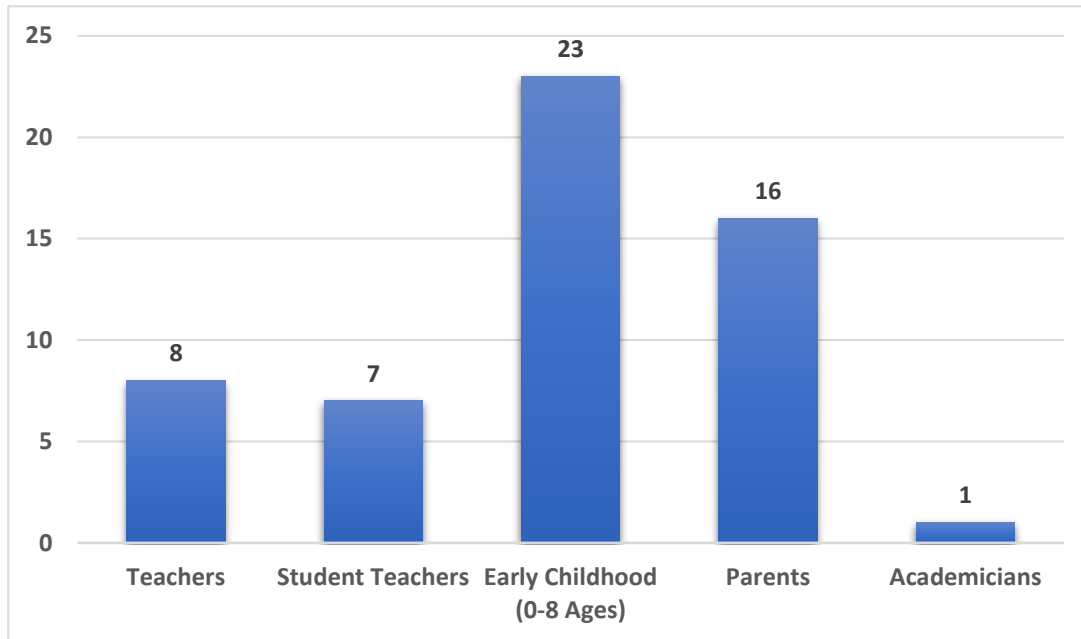


Figure 9. Participants

Sample Sizes

The most prominent finding to emerge from this analysis (Figure 10) is that the sample sizes of the theses mostly range from 11 to 500 ($n=34$). The most common sample size range is 101-250 used in 12 studies. Then, it is seen that there are nine studies with 11-50 sample numbers, seven studies with 251-500 samples and six studies in the range 51-100 respectively. The number of theses in other sample size ranges is quite limited ($n=9$) compared to the number of other theses.

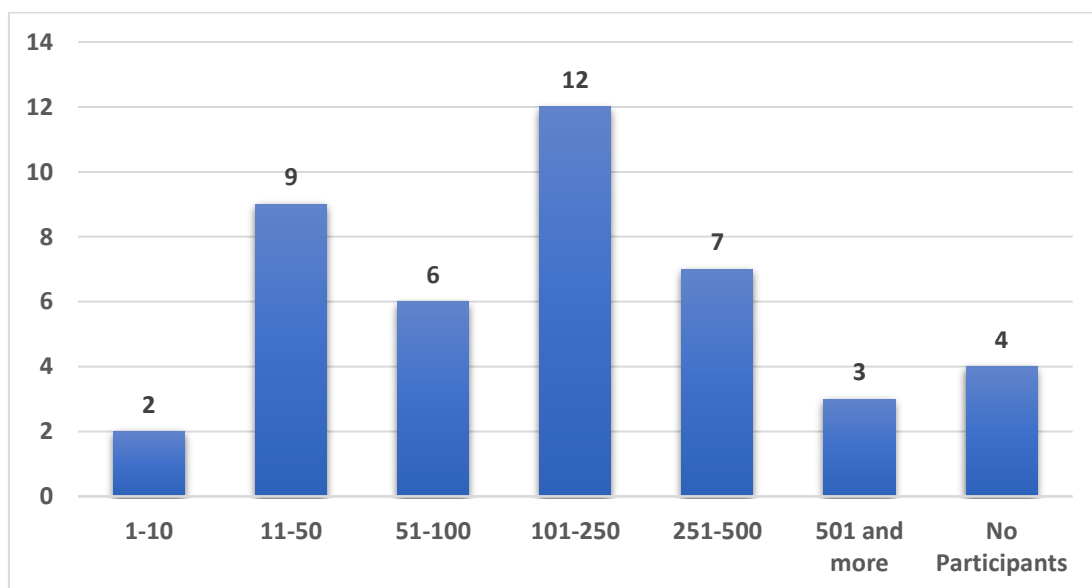


Figure 10. Sample Size

Data Collection Tools

Regarding data collection tools, studies using interviews, scales and questionnaires constitute the majority (Figure 11). Of the four theses produced, two are document analysis, and the other two are a software development and design. Therefore, the participants section of four theses is blank. The interview method was used in 18 theses, 16 of 43 theses consist of scales, and 15 of them collected the data with surveys. Further information about data collection tools used is that nearly half of the total number of theses have two or more data collection techniques.

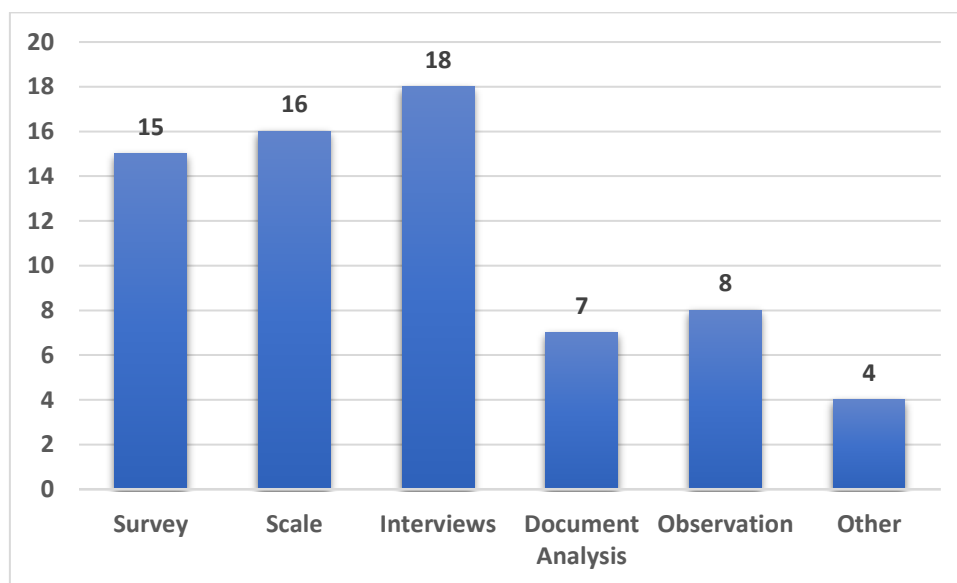


Figure 11. Data Collection Tools

Findings of Theses

The results of the theses in this section are discussed under three major headings. These headings were determined as, respectively, "parents and children", "technology in education" and "early childhood teachers and student teachers", and significant findings were summarized.

Parents and Children

The findings of the theses examining the technology use and technology addiction of children and families are presented in this section. The study conducted by Sümer (2018) parents' frequency of screen-based media use for child-related purposes (e.g., to calm their child when she/he is upset) was not correlated with children's performance-based scores at self-regulation abilities (Sümer, 2018). Similarly, Omrak (2019) stated that the score of emotion

regulation and secure attachment observed decreasing when the time of using technological devices increase. In the study conducted by Delikanlı (2019), the social behaviours differ significantly in terms of physical aggression, relational aggression and depressive affect sub-dimensions in favour of the children who have an internet connection at home.

According to Çakar (2019), Çelik (2017), D. Akın (2019), Yavuz (2018) and Omrak (2019) studies, there are similarities between the frequency of parents' use of technology and the frequency of use of technology by children and differences in technology regarding intrafamilial factors. Yiğit (2019) reported that 81.52% of children spent their time playing digital games; however, the education level of parents and their habits of digital gaming is what is affecting the child gaming time most. Kırmusaoğlu (2020) stated that the reason for the preference of digital games is the ease of use of these game tools and the fascinating, attractive, entertaining and curious features of the virtual environment. Still, no significant difference was found in the game preferences of children living in two different cities (Kırmusaoğlu, 2020).

Kılınç (2015) also investigated the attitudes of parents toward technology use at preschool age and reported that male parents have more positive attitudes toward technology use at preschool age than female parents. In the descriptive studies of Yılmayan (2017) and Şahan (2017), some parents think that digital technologies have a positive impact on their children; however, some of them keep the children away from digital devices. Nevertheless, it is stated that they noticed and accepted their deficiency about filters for protecting their children (Avinç, 2017 & Yılmayan, 2017). Merdin (2017) and Vural-Şenel (2020) both studied on the parental mediation roles towards technology use. Findings revealed that mothers and younger parents and parents with higher education reported as more active and performing more supportive mediation roles (Merdin, 2017 & Vural-Şenel, 2020).

In Yaylacı's study (2019) Internet addiction of family members was investigated, and a significant correlation between Internet addiction of parents and children was found. Similarly, Biçer (2020) reported that the frequency of game addiction was significantly higher in the ADHD group compared to the control group. In another study examines the digital addiction of preschool teachers show that the digital addiction scores of preschool teachers differed according to socioeconomic status, the most used digital tool, the purpose of using the digital tool, and the average daily internet usage time variables (Kaymal, 2020).

Technology use in Education

The theses include technological intervention processes and software, or application development are discussed in this major heading of findings. Some theses concerning the effectiveness of technology-based activities, the intervention programs were developed and tested. According to Çetin (2016), it has been seen that computational thinking activities prepared with cognitive tools and information technology support are appropriate for preschool children and contributes to children's thinking skills. In the study conducted by Patan (2016), it was observed that the students who were applied to the preschool coding curriculum showed a positive attitude towards coding and success compared to the control group. According to Kuzgun (2019), the use of augmented reality technology in early childhood, attracts children's interest and attention, brings the feeling of reality to the children, embodies the content, supports the peer relations positively but sometimes it is a distraction tool that causes the activity to go out of its purpose. Moreover, Gecu-Parmaksız (2017) developed an augmented and virtual manipulatives-based geometry teaching program and stated that virtual manipulatives had a statistically significant difference in children's spatial ability test scores. Yıldız (2017), in his study, emphasized that the most influential element in conceptualization is interactive pedagogical reciprocity, not the source (human or computer).

In Tecen's (2018) and Dural's (2015) theses an application for speech therapy was developed, and the findings from two theses differ from each other. In one of the studies, there is a significant difference in favour of technology-supported teaching material (Tecen, 2018); however, in the other research, there is no difference (Dural, 2015). In the study conducted by Akdeniz (2019), the artificial intelligence-based smart toy developed and evaluated by parents and teachers as appropriate for young children and easy to use and successful in supporting the concept development. The puzzle application developed by Kelekçi-Olgun (2018) to reinforce preschool learning about art education was successful.

Gençer (2017) aimed to reveal the design problems in educational applications developed for early childhood and presented an application to teach mathematical and abstract concepts such as shapes and colours through nature. Similarly, Özel (2020) evaluated the design elements of the interactive e-book for preschool children regarding visual design principles. Baykal (2018) introduced an interdisciplinary design process to support young children's early spatial learning. Güler (2019) aimed to develop a digital game to support the self-care skills

which correlates with design-based developmental studies, has provided an instructional content road map for the interactive game development process.

With the preschool management system developed by Özçelik (2016), it was ensured that the system of both the teacher and the children were facilitated by tracking the growth of preschool pupils, minimizing the workload of the school administration and teachers, correctly leading the students, deciding the educational process and also the type of education, thus allowing the use of the evolving technological advantages of education. An electronic performance support system (EPSS) developed by T. Akın (2019) was used to support teachers in the process of monitoring and reporting the development of young children with special needs. Teachers stated that EPSS contributed to their performance, and they were pleased to use the system (T. Akın, 2019).

Early Childhood Teachers and Student Teachers

The findings of the theses conducted with early childhood teachers and student teachers are examined in this major heading of findings. Güleröğlü's study (2015) revealed pre-service early childhood teachers' positive opinions and willingness about game-based learning and mobile games and the benefits and barriers for integrating these tools into teaching. Likewise, Yavuz-Konokman (2015), stated that there was a difference between pre-test and post-test technology-based instruction resistance scores of the prospective teachers who attended digital story based on inquiry-based activity in which they integrated the digital story into instruction. In compliance with the results of Yıldız (2016), numerous recommendations were made for participants with various learning styles on which of the two relevant materials (Traditional Educational Videos and Hyper Presentations) would be more appropriate and the research also recommends some tips for online content creators about the eligibility of the program they would prefer. According to Gök's study (2017), the correlations between "Unethical Computer Using Behaviour Scale" and "Schwartz's Value Survey" are negative Preschool teacher candidates' scores from individual-level, their unethical information technology use behaviours decrease. In Aydın's (2020) study in which pre-service teachers' perceptions of instructional technologies were examined with the "word association test", it was found that preschool teachers mostly associated instructional technologies with the concepts of "design and technology".

In the study findings of Tosun (2019), teachers agree that kids should not play computer games very often, but those who are educated about computer games and technologies believe

that these games can be useful. In another study conducted by Ömrüuzun (2019) aimed to explain the factors affect preschool teacher's technology-related attitudes, these factors are found as perceived usefulness, perceived ease of use, perceived enjoyment and job relevance.

Conclusions and Discussion

This study aims to review the dissertations about early childhood and ICT conducted between the years 2015 and 2020. In this regard 43 theses were examined according to criteria consists of the categories of publishing year, university, degree, discipline, keywords, research design and methods, sample size, participants, data collection tools and findings. This method of analysis has allowed for more detailed and systematic investigations. As a consequence of these findings, a partial rise in the number of theses on early childhood and technology is found when the theses analysed by years. Similarly, this situation was indicated in İnci and Kandır's study (2017) that the interest of researchers in studies on the use of digital technology in pre-school education is increasing. Much of the postgraduate research reviewed was master's theses. This is an expected result. Since the number of doctoral programs is limited in Turkey, the number of master's students is greater than the number of PhD students (Durak, Çankaya, Yünkül, & Misirli, 2018)). Considering the universities with more contributions, it is known that these universities have both ECE and CEIT departments. One of the reasons for focusing these departments is that about half of the theses studied have been completed in the doctoral programs of CEIT and ECE. Since the research focus is a common area of interest for researchers in CEIT and ECE, most of the study studies have been carried out by researchers in these fields (İnci & Kandır, 2017).

As the theses examined in detail according to research methods, it is seen that there are a total of 21 quantitative theses, ten correlational, seven descriptive, three semi-experimental, and one belonging to the other group. Six of the 18 qualitative studies were conducted using case studies, five using action research, one using grounded theory, and six using other qualitative research methods. Four theses are developed in a mixed-method that incorporates qualitative and quantitative research approaches together. It is commonly recognised that in master theses, it is better to follow less complicated and less specialised quantitative research techniques. The number of qualitative research studies is, therefore, directly proportional to the number of design and application development studies in the sample group. However, by increasing the number of action researches and design-based researches that allow in-depth examination and solve problems related to education, it is recommended to switch from

quantitative studies remaining only at identifying the problem stage to qualitative solutions that also provide solutions to problems.

Usage of technology, mobile games, educational technology software, digital, multimedia, ICT, internet, virtual reality and so on are some of the keywords illustrated on "technology". Children, preschool, early childhood, parents, preschool children, preschool education are the most common keywords for "early childhood". Teachers, concept development, spatial learning, school time, technology education, computational thinking are the keywords for "education, learning and teaching". These keywords provide a framework related to the aims, sample, method and dependent variables of the studies. Correct and explicit use of keywords guides researchers.

While Sayan (2016) stated that there is limited research on young children's use of technology, in this study, the majority of the studies involve preschool children and their parents. As Öztürk-Yılmaztekin and Olgan (2013) and İnci and Kandır (2017) pointed out the research based on early childhood and technology considerably focus on children rather than teachers. Similarly, in this study dissertations concerns with teachers and their educational practices are not sufficient in number.

While reviewing results of the theses, the headings were determined as "parents and children", "technology in education" and "early childhood teachers and student teachers" respectively, and significant results were summarized. The majority of studies reveal children's and parents' preferences and opinions towards digital media, internet use and digital games. Although parents often think that technological tools will be beneficial for their children, they are unaware of their supervision and mediation roles at all. It is recommended to develop management software that will control the usage time and application contents while children use mobile devices (Sezgin & Tonguç, 2016), and to support parents' access and use of these software.

In some theses concerning the effectiveness of technology-based activities, all theses except one reported significant difference in favour of technology-supported teaching materials. In other studies, under the major heading of "Technology in Education", technology-based educational materials were evaluated in terms of design elements and recommendations were made. Likewise, İnci and Kandır (2017) stated that the effects of educational software on concept development, software development and design components are often discussed in the theses about the use of technology in preschool education; however, no studies have been found

regarding the purposeful, conscious and effective use of technology in preschool education. In addition, Sezgin and Tonguç (2016) indicate that the position and the integration of mobile technologies in education is a significant question.

In the sample of theses included in this study, there is very limited research that examines teachers' views, attitudes or professional positions regarding technology into teaching. This result conflicts with other studies conducted by İnci and Kandır (2017) and Öztürk-Yılmaztekin and Olgan (2013). A reasonable approach to tackle this issue could be planning and conducting post-graduate research aim to reveal teachers' attitudes, practices and self-efficiencies.

This study reviewed the technology in early childhood related theses from THCE database published from 2015 to 2020. From a content analysis, it emerged that the main issues of these studies focused on the different aspects of technology use in early childhood. This study showed that ICT plays an essential role in young children's lives like other individuals. This study is limited to the theses conducted between the years 2015-2020 in Turkish Universities. This review will, therefore, allow future researchers to gain insights into recent post-graduate studies. They would be able to comprehend current research trends and topics and also neglected issues in literature.

References

- Akdeniz, M. (2019). *Artificial intelligence based smart toys for preschool children: A design-based study* (Unpublished master's thesis). Afyon Kocatepe University, Institute of Science, Afyon.
- Akın, D. (2019). *Investigation of preschool children's use of information communication technologies according to some variables* (Unpublished master's thesis). Uşak University, Institute of Social Sciences, Uşak.
- Akın, T. (2019). *Design and development of electronic performance support system for early childhood special education* (Unpublished doctoral dissertation). Hacettepe University, Institute of Social Sciences, Ankara.
- Avinç, Z. (2017). *Internet and mobile technology habit and safer internet use of children between age of 0-8* (Unpublished master's thesis). Atatürk University, Institute of Social Sciences, Erzurum.

- American Academy of Pediatrics Council on Communications and Media. (2011). Policy statement: Media use by children younger than 2 years. *Pediatrics*, 128(5), 1040–1045. doi: 10.1542/peds.2011-1753.
- OECD. (2019). Helping our youngest to learn and grow: policies for early learning, international summit on the teaching profession, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264313873-en>
- Aydın, S. (2020). *Phenomenology study on teachers 'perceptions on teaching technologies* (Unpublished master's thesis). Yıldız Technical University & İstanbul Aydın University, Institute of Education and Social Sciences, İstanbul.
- Baykal, G., E. (2018). *Developing transmedia learning environment to facilitate spatial skills of pre-schoolers: A child-centered approach to design* (Unpublished doctoral dissertation). Koç University / Institute of Social Sciences, İstanbul.
- Bolstad, R. 2004. The Role and Potential of ICT in Early Childhood Education: A Review of New Zealand and International Literature. Wellington: Ministry of Education.
- Biçer, B., B. (2020). *Evaluation of screen exposure and parent and parent internet safety and conscious internet use information in children between the ages of 6-12 with a diagnosis of attention lack and hyperactivity disorders* (Unpublished master's thesis). Ankara University, Faculty of Medicine, Ankara.
- Calvert, S. (2006). Media and early development. In K. McCartney & D. Phillips (Ed.), *Blackwell Handbook of Early Childhood Development* (pp. 508–530). Malden, MA: Blackwell.
- Calvert, S. L., & Valkenburg, P. M. (2013). In M. Taylor (Ed.), The influence of television, video, games, and the Internet on children's imagination and creativity. *Oxford Handbook of the Development of Imagination* (pp. 438–450). New York, NY: Oxford University Press.
- Can-Yasar, M., Uyanik, O., İnal, G., & Kandır, A. (2012). Using technology in pre-school education. *US- China Education Review*, 2, 376-383.
- Clements, D. H., and Sarama, J. (2003). "Strip mining for gold: Research and policy in educational technology – A response to "Fool's Gold." *AACE Journal*, 11(1), 7–69.
- Çakar, M., T. (2019). *The effect of the technology use of the parents of preschool children on the children's technology use* (Unpublished master's thesis). İstanbul Okan University, Institute of Social Sciences, İstanbul.

- Çelik, E. (2017). *Screen usage of 4–6 year-old children, and its' relation with parental screen usage and family functions* (Unpublished master's thesis). Çukurova University, Faculty of Medicine, Adana.
- Çetin, E. (2016). *A case study for the use of technology aided graphical organizers in preschool children's problem-solving process* (Unpublished doctoral dissertation). Gazi University, Institute of Educational Sciences, Ankara.
- Delikanlı, B. (2019). *Investigation of social behavior of 48-60 month old children by technological device usage status* (Unpublished master's thesis). Mehmet Akif Ersoy University, Institute of Educational Sciences, Burdur.
- Durak, G., Çankaya, S., Yünkül, E., & Mısırlı, Z. A. (2018). A content analysis of dissertations in the field of educational technology: The case of Turkey. *Turkish Online Journal of Distance Education*, 19(2), 128–148.
- Dural, R. (2015). *Examining the effectiveness of computer-based articulation therapy application in preschool speech sound disorder therapies* (Unpublished master's thesis). Anadolu University, Institute of Medical Sciences, Eskişehir.
- Epstein, A.S. (2015). Using technology appropriately in the preschool classroom. *Highscope Extensions*, 28(1), 1-19
http://www.highscope.org/file/NewsandInformation/Extensions/Extol28No1_low.pdf
- Gecu-Parmaksız, Z. (2017). *Augmented reality activities for children: A comparative analysis on understanding geometric shapes and improving spatial skills* (Unpublished doctoral dissertation). Middle East Technical University, Institute of Natural and Applied Sciences, Ankara.
- Gençer, Y. (2017). *Graphic design problems in pre-school educational applications for tablets and application recommendation* (Unpublished master's thesis). Hacettepe University, Institute of Fine Arts, Ankara.
- Güler, H. (2019). *Development of digital games to support self-care skills education of preschool children through design-based developmental research* (Unpublished doctoral dissertation). Mustafa Kemal University, Institute of Science, Hatay.
- Güleroğlu, M. (2015). *Pre-service teachers' beliefs, experiences and perceptions on mobile games* (Unpublished master's thesis). Middle East Technical University, Institute of Natural and Applied Sciences, Ankara.

- Gök, A., S. (2017). *Examination of preschool teacher candidates' value priorities and unethical information technology use behaviours according to the locus of control* (Unpublished master's thesis). Selçuk University, Institute of Social Sciences, Konya.
- ISTE (International Society for Technology in Education). 2007. NETS for students 2007 profiles. Washington, DC, www.iste.org/standards/nets-for-students/nets-for-students-2007-profiles.aspx#PK-2
- Işıkoğlu, N. (2003). New toys for young children: integration of computer technology into early childhood education. *The Turkish Online Journal of Educational Technology*, 2(4), 27-34.
- İnci, M. A., & Kandır, A. (2017). Okul öncesi eğitim’de dijital teknolojinin kullanımıyla ilgili bilimsel çalışmaların değerlendirilmesi. *Hitit Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 10(2), 1705-1724.
- Jennings, N. A., Hooker, S. D., & Linebarger, D. L. (2009). Educational television as mediated literacy environments for preschoolers. *Learning, Media, and Technology*, 34(2), 229–242. <http://dx.doi.org/10.1080/17439880903141513>.
- Kaymal, B. (2020). *A study of the digital addictions of preschool teachers* (Unpublished master's thesis). İstanbul Aydın University, Graduate School, İstanbul.
- Kelekçi-Olgun, M. (2018). *Graphic application learning model developed for preschool art education* (Unpublished doctoral dissertation). Yıldız Technical University, Institute of Social Sciences, İstanbul.
- Kılınç, S. (2015). *Investigation of parents' views about preschool age children technology use* (Unpublished master's thesis). Dumlupınar University, Institute of Educational Sciences, Kütahya.
- Kırmusaoğlu, L. (2020). *The decision of pre-school children between digital games and outdoor games: a field study regarding teacher observations* (Unpublished master's thesis). Üsküdar University, Institute of Social Sciences, İstanbul.
- Kuzgun, H. (2019). *Utilization of augmented reality in early childhood: a case study* (Unpublished master's thesis). Afyon Kocatepe University, Institute of Science, Afyon.
- Landis, J., & Koch, G. (1977). The Measurement of Observer Agreement for Categorical Data. *Biometrics*, 33(1), 159-174. doi:10.2307/2529310

- Mertala, P. 2017. "Digital technologies in early childhood education-A frame analysis of preservice teachers' Perceptions." *Early Child Development and Care*, 44(3), 1–14. doi:10.1080/03004430.2017.1372756.
- NAEYC & Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College. (2012). Technology and interactive media as tools in early childhood programs serving children from birth through age 8. Joint position statement. Washington, DC: NAEYC.
- NAEYC (2020). Developmentally appropriate practices: A position statement of the National Association for the Education of Young Children. https://www.naeyc.org/sites/default/files/globally-shared/downloads/PDFs/resources/position-statements/dap-statement_0.pdf
- Merdivin, E. (2017). *Young children's electronic media use and parental mediation* (Unpublished master's thesis). Middle East Technical University, The Graduate School of Social Sciences, Ankara.
- Omrak, C. (2019). *The relationship between attachment pattern, emotion regulation skills and technology use of pre-school children* (Unpublished master's thesis). Maltepe University Institute of Social Sciences, İstanbul.
- Ömrüüzun, I. (2019). *Factors affecting early childhood education teachers' technology use: A path model* (Unpublished master's thesis). Hacettepe University, Institute of Social Sciences, Ankara.
- Özçelik, S. (2016). *Developing a software program that determines student improvement in a pre-school education institution* (Unpublished master's thesis). Haliç University, Institute of Science, İstanbul.
- Özel, E., N. (2020). *Evaluation of design elements of interactive e-books for children in creative industries* (Unpublished master's thesis). Dokuz Eylül University, Institute of Fine Arts, İzmir.
- Öztürk Yılmaztekin, E., Olgan, R. (2013). Trends and issues: a review of studies related to technology usage in early childhood education. *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi*, 32(2), 421-440.
- Patan, B. (2016). *Development of coding curriculum for kindergarten* (Unpublished master's thesis). Bahçeşehir University, Institute of Science, İstanbul.

- Sayan, H. (2016). Using technology in preschool education. *21. Yüzyılda Eğitim ve Toplum* 5(13), 67-83.
- Sezgin, E., Tonguç, G. (2016). A sample research on using mobile technologies in preschool education. *Journal of Research in Education and Teaching (Special Issue)*,5(2), 296-303.
- Sümer, C. (2018). *Relationships between preschoolers' screen-based media use and self-regulation abilities* (Unpublished master's thesis). İhsan Doğramacı Bilkent University, Economy and Social Sciences, Ankara.
- Stephen, C., and S. Edwards. (2018). *Young Children Playing and Learning in a Digital Age*. Milton Park: Routledge.
- Şahan, D. (2017). *Analysis of the relationship between the opinions of parents towards children's use of technology and their purposes for use of technology, interest in technology and competency levels* (Unpublished master's thesis). Çanakkale Onsekiz Mart University, Institute of Educational Sciences, Çanakkale.
- Şencan, H. (2005). *Sosyal ve Davranışsal Ölçümlerde Güvenirlik ve Geçerlilik*. Ankara: Seçkin Yayıncılık.
- Tecen, B. (2018). *The effects of digital gaming based supporting activities on the learning of vowel of students in pre-school period sound education* (Unpublished master's thesis). Bahçeşehir University, Institute of Educational Sciences, İstanbul.
- Tomei, L. A. (2005). *Taxonomy for the technology domain*. USA: Information Science Publishing.
- Tosun, İ. (2019). *An investigation of the habits of playing computer games in the preschool period from teacher and parents* (Unpublished master's thesis). Necmettin Erbakan University, Institute of Educational Sciences, Konya.
- UNESCO (2005). Why a summit on the information society? World summit on the information Societies. <http://www.itu.int/wsis/index.html>.
- Van Damme, G. (2003). ICT in Practice for Physical Education & Sports. <http://www.sports-media.org/Sporttapolisnewsletter5.htm>
- Vural-Şenel, B. (2020). *The relation between parental mediation roles and parental media and technology attitudes in early childhood* (Unpublished master's thesis). Ankara University, Institute of Educational Sciences, Ankara.
- Yavuz-Konokman, G. (2015). *The effects of composing digital story based on inquiry-based learning on the prospective teachers' resistance behaviours and learning approaches*

- (Unpublished doctoral dissertation). Mersin University, Institute of Educational Sciences, Mersin.
- Yavuz, Ş. (2018). *For children of 60-72 months, popular culture items and preferences in the use of technology* (Unpublished master's thesis). İstanbul Okan University, Institute of Social Sciences, İstanbul.
- Yaylacı, B. (2019). *The effect of parent-child relationship on internet usage among preschool children* (Unpublished master's thesis). Zonguldak Bülent Ecevit University, Institute of Medical Sciences, Zonguldak.
- Yıldız, A., M. (2016). *The effect of two learning materials prepared in different structures on academic achievements and motivations of the students with different learning styles* (Unpublished master's thesis). Çanakkale Onsekiz Mart University, Institute of Educational Sciences, Çanakkale.
- Yıldız, T. (2017). *Setting up the cage of meaning: Effects of human-human and software-human interactions on conceptual development via touchscreen devices* (Unpublished doctoral dissertation). İstanbul University, Institute of Social Sciences, İstanbul.
- Yılmayan, E. (2017). *Parents' attitudes towards the use of digital media among preschoolers* (Unpublished master's thesis). İstanbul Bilgi University, Institute of Social Sciences, İstanbul.
- Yiğit, N. (2019). *Parental views and practices on digital gaming habits of children in early childhood period* (Unpublished master's thesis). Ondokuz Mayıs University, Institute of Educational Sciences, Samsun.