About the Journal

Journal of Educational Technology and Online Learning (JETOL) is an international, refereed, open access e-journal. The Journal targets both researchers and practitioners of educational technology and online learning fields. JETOL has been being published triannual, in January, May, and September. JETOL is currently indexed by Bielefeld Academic Search Engine, DRJI, Eurasion Scientific Journal Index, Google Scholar, i2or, Index Copernicus, J-Gate, ResearchBib, ROAD, Rootindexing.

Editorial Board

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From the Editors

Dear JETOL readers,

We are proudly present the first volume second issue of JETOL: Journal of Educational Technology and Online Learning. JETOL is a refereed, open access e-journal that disseminates original research, theory, and best practice on educational technology and online learning. We hope that JETOL will be a premier source for those who seek and pursuit knowledge. Therefore, we believe that we will a leading journal by the scientific contributions that will be made by you.

We are also excited to announce that JETOL is currently indexed by Google Scholar, i2or, J-Gate, Eurasion Scientific Journal Index, Bielefeld Academic Search Engine, DRJI, ResearchBib, ROAD, Rootindexing, Index Copernicus.

The first article, written by Emine Büyükkol Köse, Gülcan Çetin, Eyup Yünkül, is entitled as "A Content Analysis of Studies related to Technology and Multimedia in Biology Education". With the spread of use of education technologies in all areas, the way of using these technologies and the consequences of use of these technologies have gradually gained importance. In this respect, the present study aimed at presenting the results of content analysis on the articles related to educational technology in Biology education in Scopus database between 2013 and 2017. A total of 55 papers were examined to determine the concept list, top journal list, research methods and models, participants, data collection tools and in these articles. The study is considered to be important since it tried to reveal the studies related to educational technology in biology education. The results of the study revealed a considerable increase in the number of studies involving the use of education technologies in biology teaching especially in 2017. It is seen in these studies that the quantitative research design was favored more as the research method; that the participants were mostly undergraduate students; and that pretest-posttest and scales were among the most popular data collection tools. Lastly, academic performance was the most common dependent variable in the studies.

The second article, written by Fatma Nur Aksu And Gülcan Öztürk, is entitled as "Examining Secondary School Teachers' Self-Efficacies in Interactive Whiteboard Use. The present study aimed to determine secondary school teachers' self-efficacy levels regarding the use of interactive whiteboard and to examine whether their self-efficacy perceptions regarding the use of interactive whiteboard differed with respect to certain variables such as gender, field of teaching, training received on interactive whiteboard use, frequency of using the contents in Educational Informatics Network (EIN), frequency of interactive whiteboard use in lessons, suggesting interactive whiteboard use in lessons to other teachers and interactive whiteboard use time. The research sample included a total of 154 teachers from secondary schools in a district located in Western Anatolia. For the analysis of the data, the teachers' self-efficacy total and mean scores regarding interactive whiteboard use were examined. The research findings revealed that the teachers had high levels of self-efficacies regarding interactive whiteboard use; that their self-efficacy scores increased as the EIN content use increased; that their self-efficacy scores increased as their interactive whiteboard use time increased; and that the teachers who suggested using interactive whiteboard in lessons had higher levels of self-efficacy when compared to those who did not. In addition, it was found that the teachers' self-

efficacy scores did not differ significantly depending on their gender and field of teaching. In the study, several suggestions were put forward for future related studies.

The third article, written by Sunagul Sani-Bozkurt, is entitled as "Book Review: Recent Advances in Assistive Technologies to Support Children with Developmental Disorders". The book review examines assistive technologies within the perspective of special education.

The fourth article, written by Nil Goksel, is entitled as "Book Review: Mobile Technologies and Augmented Reality in Open Education" The book review covers mobile technologies and augmented reality within the perspective of open education.

Yours respectfully,

Dr. Gürhan Durak

Dr. Aras Bozkurt

Editors in Chief

A Content Analysis of Studies Related to Educational Technologies in Biology Education

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Article Info	Abstract
  Review Article	With the spread of use of education technologies in all areas, the way of using these technologies and the consequences of use of these technologies have gradually gained importance. In this respect, the present study aimed at presenting the results of content analysis on the articles related to educational technology in Biology education in Scopus database between 2013 and 2017. A total of 55 papers were examined to determine the concept list, top journal list, research methods and models, participants, data collection tools and in these articles. The study is considered to be important since it tried to reveal the studies related to educational technology in biology education. The results of the study revealed a considerable increase in the number of studies involving the use of education technologies in biology teaching especially in 2017. It is seen in these studies that the quantitative research design was favored more as the research method; that the participants were mostly undergraduate students; and that pretest-posttest and scales were among the most popular data collection tools. Lastly, academic performance was the most common dependent variable in the studies.

1. INTRODUCTION

With the industrial revolution of 4.0 in the 21st century, expectations from students have changed accordingly. Today, there is now a need for individuals who not only have theoretical knowledge but also can apply their theoretical knowledge. In this respect, education technologies have played quite an important role in gaining these skills. Parallel to the development of technology, the practical area of education technologies has become larger initially with multimedia software and currently with technological renovations such as simulations, augmented reality & virtual reality, 3D printers and virtual labs. As a consequence of this, it is seen that use of education Technologies has become more common in various basic areas like biology, chemistry and physics in recent years. For instance, use of digital material in biology teaching is reported to contribute to the development of learners' critical thinking and analysis skills (Kuech, Zogg, Zeeman, & Johnson, 2003). When related literature is reviewed, it is seen that education Technologies produce effective results in biology and science teaching and that use of these Technologies together with appropriate teaching methods and will allow learners to receive more effective and productive education (Daşdemir & Doymuş, 2012; Karaçöp, 2010).

Figure 1 presents graphs related to the research articles published in the database of web of science regarding the use of education Technologies in the field of biology teaching in the last 10 years.
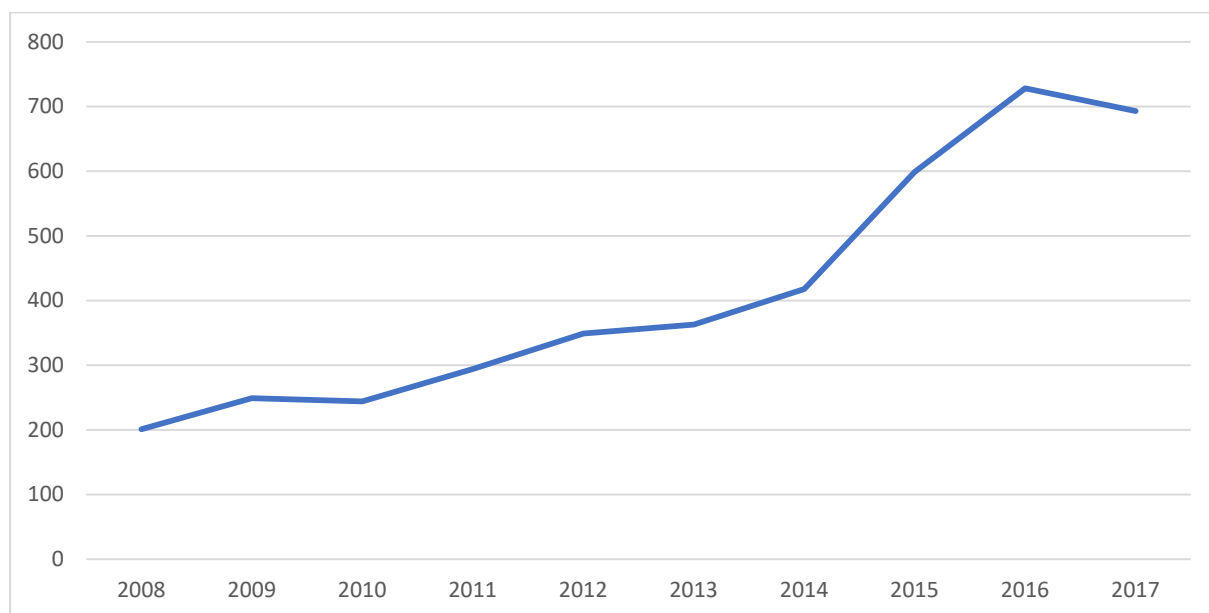

Figure 1. The number of related articles by years in Web of Science database

According to Figure 1, it could be stated that the number of studies on technology use in biology teaching has gradually increased in recent years. In other words, it is seen that researchers have increasingly conducted more studies in this field. Although there are several content analyses conducted in the field of education Technologies in related literature (Durak, Cankaya, Yunkul, & Mısırlı, 2018), there is no content analysis research examining education Technologies in the field of biology teaching. For this reason, it is important to carry out a study which will guide researchers willing to conduct related studies in this field and which will help reveal the tendencies in education Technologies in the field of biology teaching. In this respect, the purpose of the present study was to provide content analysis of scientific articles which involved education Technologies in the field of biology teaching and to reveal the related tendencies in this field.

2. THE LITERATURE REVIEW

Lee ve Tsai (2013) conducted a literature review of using educational technology in biology learning from 2001 to 2010. A total of 36 empirical articles were included for review. The results of the analyses demonstrated that mostly simulation and visualization tools were mostly used in the studies. In addition, most of the studies examined achievement, which was followed by affective skills and less frequently by higher-order skills. Also, a few studies investigated students' learning processes. Another study carried out by Umdu-Topsakal, Çalık and Çavuş (2012) examined the studies on biology education in Turkey. The results of the study revealed that the studies were mostly descriptive and that mostly undergraduate students constituted the research samples. When the studies were examined with respect to the research methodology used, it was seen that survey and experimental research design were more popular. Similar to this study, Kumandaş (2015) examined 67 articles and found that the research samples mostly included undergraduate students. The sample sizes in the studies ranged between 31 and 100. The quantitative and qualitative research methods were equal in number, and the number of studies carried out using the mixed method was quite low. As for

the data collection tools, the most popular tools were achievement tests. In one study conducted by Doğru, Gençosman, Ataalkın and Şeker (2012), the researchers conducted content analysis on the M.A. and Phd theses carried out between 1990 and 2009. In their study, the researchers reached a total of 218 studies in the field of biology using the keywords of "biology education, biology teaching and biology subjects", yet they examined only 108 of them for several reasons. In most of the theses examined, it was seen that the participants were K-12 students. It was also revealed that the theses were carried out using descriptive and experimental research designs and that achievement tests constituted the most popular data collection tools. Gül and Sozbilir (2015) conducted content analysis on 633 studies in the field of biology and found that "learning, teaching and attitudes" were among the most popular concepts. In addition, quantitative methods were the most common methods used in these studies, and the most popular data collection tools were achievement tests. In another study, Gül and Sözbilir (2016) examined a total of 1376 articles in the same field from various aspects. The results of the study revealed that most of the articles were published in the journals of JBE and IJSE. The dependent variables in these studies included teaching, learning, attitude, perception and self-efficacy. As for the sub-concepts included in the contents of these articles, they were misconception, determining achievement/knowledge levels, comparison of teaching methods and strategies and influence of teaching on achievement. Different from other studies, mostly qualitative methods were used, and among these qualitative methods, descriptive and case study models were prominent. Also, the quantitative methods mostly included experimental and survey models, while the mixed research design mostly included the method of triangulation. In relation to the use of data collection tools, they mostly included survey, interview and document analyses, which were followed by achievement tests and observation. Most of the participants were secondary and high school students, and the sample size was found to range mostly between 31-100 and between 101-300. In their study, Kula and Sadi (2016) examined a total of 363 articles published in the field of science teaching in four important journals Education and Science, Hacettepe University Journal of Education, Eurasian Journal of Educational Research, Elementary Education Online and found that only 77 of these articles were carried out in the field of biology. These studies mostly focused on teaching and learning. In addition, in the studies, mostly experimental and survey methods were used as the quantitative research model. As for the data collection tools used in these studies, it was seen that the most frequent tools included achievement tests and surveys. It was also seen that most of the participants were preservice teachers, or undergraduate students. Lastly, the sample size was found to range between 26-300.

3. METHOD

In the present study, content analysis was conducted on the articles in the database of Scopus regarding education technologies in biology teaching. In the study, the reasons for choosing the Scopus database were as follows;

- It was the biggest database including summaries and references,
- It allows easy access to full-text articles,
- It has a user-friendly interface.

The related literature was reviewed to reach the studies based on the following criteria:

- The article should be published in the last five years (2013-2017),
- The article should not have any restriction for access,
- The article should be authored in English.

In order to reach the articles, Scopus database was searched in line with the above criteria. In this search, the word "biology" was typed as the article title, and various concepts regarding

education Technologies were typed in the summary part. In this way, the purpose was to reach the articles most appropriate to the research purpose. The search don on Scopus was as follows:

(TITLE (biology) AND TITLE-ABS-KEY ("education" OR "learning" OR "school" OR "training" OR "instruction" OR "teaching" OR "student" OR "teacher") AND TITLE-ABS-KEY ("elearning" OR "e-learning" OR "multimedia" OR "m-learning" OR "mlearning" OR "mobile learning" OR "educational technology" OR "web-based" OR "web based" OR "instructional technology" OR "learning environment" OR "mooc" OR "gamification" OR "virtual classroom" OR "digital storytelling" OR "adaptive learning" OR "blended learning" OR "asynchronous learning" OR "differentiated learning" OR "course management system" OR "cms" OR "learning management system" OR "lms" OR "learning network" OR "ebook" OR "e-book" OR "flipped classrom" OR "electronic classrom" OR "individualized learning" OR "learning platform" OR "lifelong learning" OR "informal learning" OR "online lab" OR "open educational" OR "personalized learning" OR "online learning" OR "one-to-one" OR "assistive technology" OR "digital classrom" OR "information and comunications technology" OR "massive open" OR "personal learning network" OR "project based learning" OR "augmented reality" OR "stem" OR "Science Technology Engineering Mathematics" OR "Science Technology Engineering Art Math" OR "steam" OR "Digital Citizenship" OR "Digital Divide" OR "Digital Literacy" OR "computer based" OR "computer-based" OR "distance learning" OR "online learning" OR "learning object" OR "Game-based" OR "Game based" OR "Makers" OR "based learning" OR "technology integration" OR "Customized learning" OR "Virtual Laboratories" OR "Online Tutoring" OR "Cloud computing" OR "coding" OR "computational" OR "educational games" OR "colloborative learning" OR "e-portfolio" OR "eportfolio" OR "simulation" OR "social media" OR "teleconferencing" OR "mentoring" OR "podcasting" OR "webquest" OR "edtech" OR "internet-based" OR "internet based")) AND (LIMIT-TO (SRCTYPE , "j ")) AND (LIMIT-TO (DOCTYPE , "ar ") OR LIMIT-TO (DOCTYPE , "re ") OR LIMIT-TO (DOCTYPE , "ip ")) AND (LIMIT-TO (SUBJAREA , "SOCI ")) AND (LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013)) AND (LIMIT-TO (LANGUAGE , "English "))

As a result of this search, a total of 157 articles were listed. Among these articles, 138 full-text articles were reached, and 19 of them were not included in the study as they were not full-text articles. In total, 138 full-text articles were examined by the authors of the present study, two of whom were experts in the field of biology education. Based on this examined, a total of 83 articles were excluded for various reasons. Some of these reasons are listed below:

- Some articles were not related to technology though they were related to biology education,
- Although the keywords provided in some of the articles included technology, it was actually the name of the course (like Science and Technology), and some of these studies did not include any technological application,
- Some of the articles were not related to biology education though they included technology applications,
- Some of the articles including the keywords were published journals with the same keywords in their names.

1.step: Screening

Online Searching

2.step: Sampling

Document Analysis

Criterias:

- Published in a peer reviewed journal (2013-2017)
- Language: English
- Online full-text accessibility
- Subject area: Social Sciences

83 articles were excluded

55 Articles were included

3.step: Analyzing and Interpreting

Content Analysis & Text-mining

- **Thematic Analysis**
- **Coding and Counting**

4.step: Synthesis of the Findings

Reporting & Summary

Figure 2. The overall research flow

Consequently, in the present study, content analysis was conducted on a total of 55 full-text articles. For the purpose of finding answers to the research questions, content analysis was applied, and the related articles were examined in terms of certain variables. For the examination of the descriptive statistics regarding the variables, participants and data collection tools in the articles, percentages and frequencies were used. These statistics were then interpreted in comparison with the results of other related studies in literature.

3.1. Findings and Discussion

In this part, the findings related to the articles examined are presented under the headings of concept list, top journal list, Research methods and Models, participants, data collection tools and variables.

3.2. Concept list

The concept list in Table 1 and concept map in Figure 2 depicts the major topics covered in the selected articles published between 2013 and 2017.

Table 1. Ranked concept list

Concept	Count	Concept	Count
student	240	engineering	45
science	139	school	45
biology	110	process	44
teacher	104	skill	42
study	102	practice	42
research	71	mathematics	37
course	66	university	37
learning	59	use	33
model	55	problem	30

The thematic summary includes a connectivity score to show the relative importance of the themes. The results reveal that the thematic region of *student* has the most direct mentions within the text (i.e., titles and abstracts) with 240, followed by *science*, *biology*, *teacher*, and *study*. Figure 3 provides an overview of the concepts in terms of their relative relevance in the concept map.
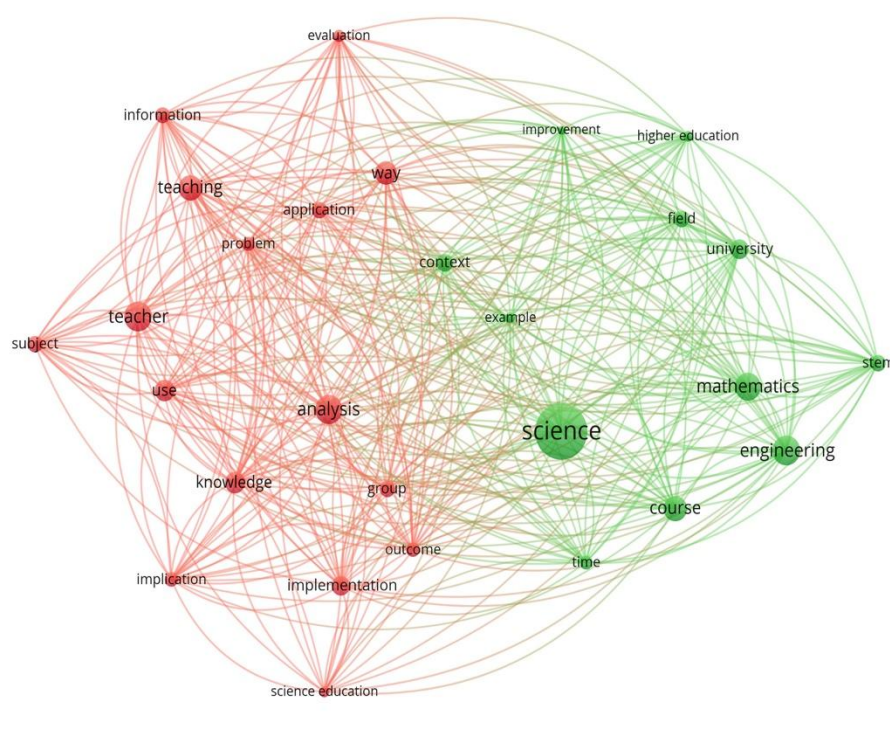
Figure 3.Concept map of research articles (N=55).

Figure 4 presents the distribution of the 55 articles by year.

The Number of Articles by Years

	2013	2014	2015	2016	2017
Article frequency	9	14	10	3	19
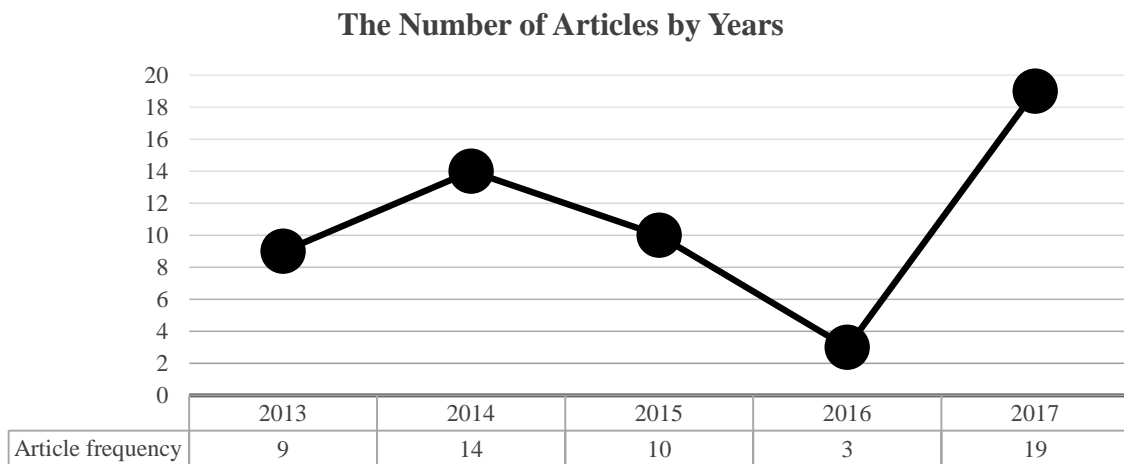
Figure 4. The Number of Articles by Years

According to the graph, the highest number of articles was in 2017, while there were only three articles in 2016. In the study, the journals where the articles were published were examined, and the related data can be seen in Figure 5.
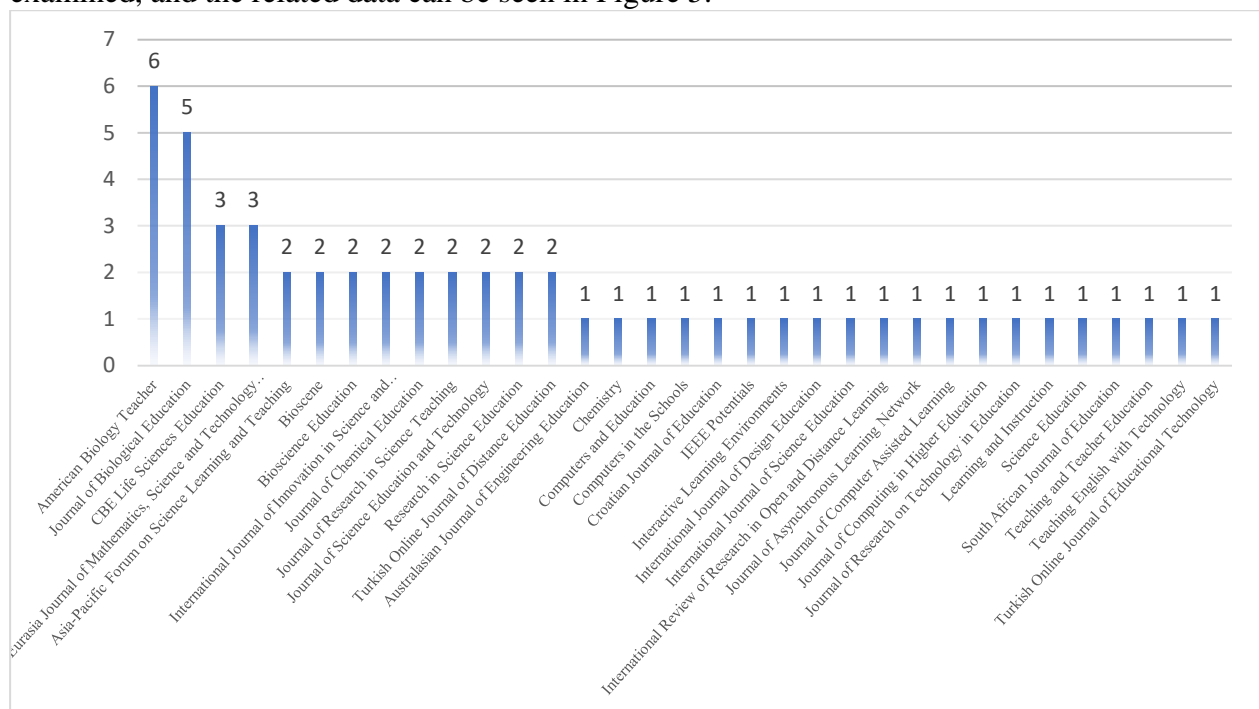
Figure 5. Top Journals

Accordingly, the first five journals where the articles were published most were American Biology Teacher, Journal of Biological Education (JBE), CBE Life Sciences Education, Eurasia Journal of Mathematics and Turkish Online Journal of Distance Education. The journal of JBE became prominent as a journal where a total of 1376 articles examined by Gül and Sözbilir (2016) were published.

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3.3. Research Methods & Models

An analysis of the findings presented in Table 2 reveals that researchers mostly preferred quantitative methods (57 %), while experimental studies (n=18), surveys (n=11), causal comparative studies (n=1) were the other research models used in quantitative research. Conceptual/Descriptive methods (20%) were the second most preferred research paradigm, and among these studies, report papers (n=9) and literature reviews (n=1) were the most common in these researches. Mixed method studies scored the next highest (16%), within which explanatory sequential (n=5), embedded (n=2) and convergent parallel (n=2) designs were almost equally distributed. Qualitative methods (5%) were the fourth most preferred research paradigm, within which case studies (n=3) were the leading research model. Finally, it was revealed that practice-based research methods (2%) following action research (n=1) approaches were the least preferred method. In the sampled publications, none of the studies used data mining or analytical methods.

In the study, the result that the most frequent methods were quantitative methods was consistent with the results of other studies in literature (Umdu-Topsakal, Çalık and Çavuş, 2012; Doğru, Gençosman, Ataalkın and Şeker, 2012; Gül and Sozbilir, 2015; Kula and Sadi, 2016), yet the related result differs from the result of another study carried out by Gül and Sözbilir (2016), who examined 1376 articles and reported that the most frequent methods were qualitative methods. In addition, the result that among the quantitative methods, the most popular models were experimental and survey models was also reported by various other studies in related literature (Umdu-Topsakal, Çalık and Çavuş, 2012; Doğru, Gençosman, Ataalkın and Şeker, 2012; Gül and Sozbilir, 2015; Gül and Sozbilir, 2016; Kula and Sadi, 2016). The fact that the case study method was used in all the studies conducted with qualitative methods is supported by the study carried out by Gül and Sozbilir (2015).

Table 1. Methods and Models/Designs

Method	f	%	Model/Design	f	%CUM	%TOTAL
Quantative	31	57	Survey	11	35	20
			Experimental	18	59	33
			Causal Comparative	1	3	2
			Correlational	1	3	2
			Meta-analysis	0	0	0
Qualitative	3	5	Case Study	3	100	5
			Content Analysis	0	0	0
			Etnography	0	0	0
			Descriptive	0	0	0
			Delphi	0	0	0
			Grounded Theory	0	0	0
			Meta-synthesis	0	0	0
			Historical	0	0	0
			Heuristic	0	0	0
Mixed	9	16	Explanatory sequential	4	45	7
			Embedded	2	22	4
			Convergent Parallel	2	22	4
			Exploratory Sequential	1	11	2
			Multiphase	0	0	0
			Transformative	0	0	0
Conceptual/Descriptive /Other	11	20	Opinion Paper	1	9	2
			Literature Review	1	9	2
			Report	9	82	15
			Reflection Paper	0	0	0
			Comparative	0	0	0
			Technical Paper	0	0	0
			Position Paper	0	0	0
			Field Notes	0	0	0
			Systematic Review	0	0	0
Practice Based	1	2	Design Based Research	0	0	0
			Action Research	1	100	2
Data Mining and Analysis	0	0	Learning Analytics	0	0	0
			Social Network Analysis	0	0	0
			Text Mining	0	0	0
			Log Analysis	0	0	0
			Internet and Traffic Ranks	0	0	0
			Sentiment Analysis	0	0	0

3.4. Participants

Table 2 presents the frequencies and percentages regarding the participants in the articles examined within the scope of the present study.

Table 2. Participants

Participants	Frequency	Percentage	Sample Size
Undergraduate Students	19	42,3	23-1975
K12-Students	18	40	17-2748
K12-Teachers	6	13,3	32-988
System/Program	1	2,2	97
Graduate student	1	2,2	36

*One study may employ more than one target group

When the data presented in Table x are examined, it is seen that undergraduate students (N=19), K-12 students (N=18) and K-12 teachers (N=6) were in the first three places and that these groups constituted approximately 96% of all the participants. When examined in terms of sample sizes, it was seen that there were at least 23 and at most 1975 students and that there were at least 17 and at most 2748 K-12 students. The fact that undergraduate students were mostly preferred as participants is parallel to the results of other studies in related literature (Umdu-Topsakal, Çalık and Çavuş, 2012; Kumandaş, 2015; Gül and Sözbilir, 2016; Kula and Sadi, 2016).

3.5. Data Collection Tools

Table 3 presents frequencies and percentages regarding the data collection tools used in the articles examined within the scope of the study.

Table 3. Data Collection Tools

Data Collection Tools	Frequency	Percentage
Pretest-posttest	21	32,81
Scale	16	25
Questionnaire	9	14,06
Academic Achievement Test	8	12,5
Interview	4	6,25
Observation	3	4,69
Log	1	1,56
App analysis	1	1,56
Audio record	1	1,56

*One study may employ more than one data collection tools

According to Table x, the most popular data collection tool was pre-test- post-test (32,81%), while scale (25%) and questionnaire (14,1%) were the most frequent ones used in quantitative studies. The fact that pre-test and post-test were among the most common data collection tools was also the case in many other studies in related literature (Doğru, Gençosman, Ataalkın and Şeker, 2012; Lee and Tsai, 2013; Kumandaş, 2015; Gül and Sozbilir, 2015; Kula and Sadi, 2016).

3.6. Variables/Research Interests

The articles were categorized with respect to the dependent variables. Table 4 presents the related frequencies and percentages.

Table 4. Variables / Research Interests

Dependent Variables	f	%	Dependent Variables	f	%
Academic-performance	26	37,68	Effectiveness	3	4,35
Opinion	7	10,14	Satisfaction	3	4,35
Attitude	6	8,7	Learners' Preferences	2	2,9
Engagement	4	5,8	Quality	2	2,9
Motivation	4	5,8	Experience	1	1,45
Perception	4	5,8	Interaction	1	1,45
Self-efficacy	4	5,8	Participation	1	1,45

According to Table 10, the most frequent dependent variable was "academic-performance" (37,7%) used in 26 studies. This variable was followed by "opinion" (10,1%) in 7 studies, "attitude" (8,7%) and "engagement" (5,8%). It was seen that the most frequent dependent variables used in the articles were academic performance and opinion, which constituted almost 50% of all the variables. This result is consistent with the findings of studies carried out by Lee and Tsai, (2013) and by Gül and Sözbilir (2016).

4. CONCLUSION

In the present study, content analysis was conducted on Scopus database not only to analyze the contents of the scientific articles in which education technologies were used in the field of biology education but also to reveal the related tendencies in this field. As a result of including all the possible concepts related to education technologies into the search criteria, a total of 157 articles published in the last five years were reached. However, among these articles, 19 of them were not reached as full texts, and 83 of them were excluded for various other reasons. Consequently, the remaining 55 articles were examined. The analyses conducted on the keywords used in the articles revealed that concepts like student, science, biology and teacher were prominent. As the present study focused on education technologies in the field of biology education, the fact that these concepts became prominent was quite natural. When these 55 articles were examined with respect to their research designs, it was seen that quantitative methods were quite common. The reasons for the popularity of quantitative methods could be the desire to see the practical consequences of use of educational technologies. Parallel to this, experimental design was the most popular methodology, and academic performance was the most common variable. When the studies were examined with respect to the participants, it was seen that undergraduate students were prominent. This result could be explained with the fact that undergraduate students constitute the most convenient and easy-to-reach sample group to see the applied consequences of use of education technologies. Similarly, the fact that pretest and posttest were the most common as data collection tools and that academic performance was the most popular dependent variable could be explained with the experimental research design favored in these studies.

As review of the related literature demonstrated that there is no study conducted to educational Technologies in biology education, the present study is expected to be a pioneering one. In the light of the findings obtained in the study, the following suggestions could be put forward:

- Researchers who plan to conduct Educational Technologies in biology education may benefit from the findings of the present study and make use of the dimensions examined in the present study.
- Conducting this study in an international scale and using multiple databases like "Web of Science" may yield further significant results by providing research sample diversity.
- With content analyses conducted on extensive sampling, various variables (country, language, article, thesis, etc.) can be compared.
- The results of the present study demonstrate that qualitative and mixed methods were least popular ones. Therefore, more qualitative research designs could be used to collect more in-depth data in the related field, and the mixed method, which takes advantages of the two methods (qualitative and quantitative methods) could be applied more.

Eğitim Teknolojileri ile İlgili Yapılan Çalışmaların İçerik Analizi: Biyoloji Eğitimi Örneği

Özet

Eğitim teknolojilerin kullanımının her alanında yaygınlaşmasıyla bu teknolojilerden ne şekilde yararlanıldığı ve ne gibi sonuçlar alındığı konusu da giderek önem kazanmaktadır. Bu bağlamda bu çalışmada 2013-2017 yılları arasında Scopus veritabanında yer alan biyoloji eğitiminde teknolojileri konusu ile ilgili yapılan çalışmaların içerik analizini yapmak amaçlanmıştır. Araştırmada toplam 55 makale araştırma yöntemi ve modelleri, katılımcılar, veri toplama araçları açısından analiz edilmiştir.　Biyoloji eğitiminde eğitim teknolojisi ile ilgili yapılan çalışmaları ortaya çıkarmayı amaçlayan bu araştırma önem arz etmektedir. Çalışma sonuçlarına göre, biyoloji eğitiminde eğitim teknolojilerinin kullanıldığı çalışmalarda özellikle 2017 yılında ciddi bir artışın olduğu gözlenmiştir. Çalışmalarda araştırma yöntemi olarak nicel araştırmaların daha çok tercih edildiği, katılımcılar açısından undergraduate student lerin önde olduğu, veri toplama araçlarında ise en çok ön-test, son-test ve ölçeklerin başı çektiği görülmüştür. Son olarak incelenen çalışmalarda bağımlı değişken olarak en fazla akademik performansın yer aldığı ortaya çıkmıştır.

Anahtar Kelimeler: Eğitim teknolojisi, Biyoloji eğitimi, İçerik analizi

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Examining Secondary School Teachers' Self-Efficacies in Interactive Whiteboard Use

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Article Info	Abstract
  Original Article	The present study aimed to determine secondary school teachers' self-efficacy levels regarding the use of interactive whiteboard and to examine whether their self-efficacy perceptions regarding the use of interactive whiteboard differed with respect to certain variables such as gender, field of teaching, training received on interactive whiteboard use, frequency of using the contents in Educational Informatics Network (EIN), frequency of interactive whiteboard use in lessons, suggesting interactive whiteboard use in lessons to other teachers and interactive whiteboard use time. The research sample included a total of 154 teachers from secondary schools in a district located in Western Anatolia. The study was carried out with the relational survey model, one of quantitative research methods, and as the data collection tool, "Self-Efficacy Scale for Teachers' Interactive Whiteboard Use" was used. The data collected in the study were analyzed using a package software for statistics. For the analysis of the data, the teachers' self-efficacy total and mean scores regarding interactive whiteboard use were examined. The research findings revealed that the teachers had high levels of self-efficacies regarding interactive whiteboard use; that their self-efficacy scores increased as the EIN content use increased; that their self-efficacy scores increased as their interactive whiteboard use time increased; and that the teachers who suggested using interactive whiteboard in lessons had higher levels of self-efficacy when compared to those who did not. In addition, it was found that the teachers' self-efficacy scores did not differ significantly depending on their gender and field of teaching. In the study, several suggestions were put forward for future related studies.

1. INTRODUCTION

The rapid changes in technology has influenced the field of education, and technology has become an indispensable part of in-class activities (Akbaba and Eryılmaz, 2013; Eryılmaz and Salman, 2014). One dimension of integrating technology into education in various areas ranging from the establishment of computer laboratories to students' tablet use has been the use of interactive whiteboard use in classes especially with the Movement of Enhancing Opportunities and Improving Technology [known as FATIH Project in Turkey]. In our country, interactive whiteboards were initially used at universities and then planned to be used in every classroom of all education institutions thanks to FATIH Project executed by the Ministry of National Education (Akıllı tahta, 2016).

Interactive whiteboard, different from the traditional board, presents visual learning activities to students in class as well as helps students structure information more easily by addressing their different learning domains with the help of both audio and visual activities (Ekici, 2008). In literature, there are several studies demonstrating that active use of interactive whiteboard in lessons facilities students' learning (Önder, 2015; Ayvacı, 2017).

In recent years, the number of studies on teachers' use of interactive whiteboard in class has increased. One study carried out by Altınçelik (2009) aimed to determine the effects of interactive whiteboard in the education process. The study was carried out with 132 teachers from 11 elementary schools where there were interactive whiteboards in Istanbul in the academic year of 2008–2009. The results revealed that interactive whiteboard played an important role in motivating students in terms of learning complex subjects difficult to learn and that younger teachers used the interactive whiteboard more effectively.

In another study, Koçak and Gülcü (2013) aimed to determine teachers' attitudes towards interactive whiteboard applications at schools within the scope of FATIH Project. The study was conducted with 121 teachers at schools where there were interactive whiteboards in Erzincan in the Fall Term of the academic year of 2012–2013. The results demonstrated that the teachers had positive attitudes towards interactive whiteboard. It was also found that the teachers' attitudes towards interactive whiteboard did not differ significantly depending on their years of teaching, gender and age. The results also revealed that the teachers demonstrated more positive attitudes towards interactive whiteboard as their interactive whiteboard use time increased.

In one other study carried out by Tatlı (2014), the researcher tried to determine the views of teachers at secondary schools about the interactive whiteboard and their views about the in-service training they received on interactive whiteboard. The study was carried out with 535 teachers from 10 cities in the academic year of 2012-2013. The results demonstrated that interactive whiteboard use considerably increased attitudes towards and motivation in lessons and that the students became more active in class.

Yalçınkaya and Özkan (2014), in their study, aimed to determine whether secondary school teachers' self-efficacy levels regarding interactive whiteboard use differed significantly with respect to their demographic backgrounds. The study was carried out with 382 teachers from different fields of teaching who worked at secondary schools. The results revealed that the secondary school teachers had high levels of self-efficacy perceptions regarding interactive whiteboard use; that the male teachers had higher levels of self-efficacy perceptions when compared to the female teachers; that there was a significant difference in the participants' self-efficacy perceptions in terms of their ages; that the teachers with more experience in teaching had lower levels of self-efficacy when compared to those with less experience in teaching; and that there was no significant difference in the participants' self-efficacy perceptions with respect to their school type and field of teaching.

In one other study, Çiçekli (2014) aimed to determine the views of secondary school teachers about the interactive whiteboard. The study was carried out with 110 teachers using the interactive whiteboard in their classes within the scope of FATIH Project in Istanbul. The teachers participating in the study reported that they used the interactive whiteboard to facilitate students' learning and to maintain permanent learning. The results revealed that use of interactive whiteboard in class increased students' motivation and participation in lessons and made the lessons more entertaining and that the students' motivation decreased in the

case of a technical problem with the interactive whiteboard. The results also demonstrated that the male teachers used the interactive whiteboard more frequently when compared to the female teachers.

In another study carried out by Altın and Kalelioğlu (2015), the researchers aimed to determine the views of high school teachers and students about FATIH Project. The study was conducted with 520 students and 65 teachers from five high schools in Ankara. The research data were collected using the mixed method. The results demonstrated that the students FATIH Project did not contribute to their learning; that there were certain restrictions in the whiteboard and in the tablets; that the contents were not efficient; that their tablets frequently broke down; and that the EIN contents were not appropriate to their ages. As for the teachers, they reported that they should receive training on technology use and that they experienced several problems regarding technical support.

Aslan (2015) conducted a study with 153 preservice teachers from various departments to determine their reasons for approval or rejection to use the interactive whiteboard in their classes. The results of the study revealed that there was a positive relationship between attitudes towards technology and use of the interactive whiteboard and that they used the interactive whiteboard for various purposes such as drawing students' attention to lessons, encouraging them to participate in the lesson and creating visuality. In the study, it was also found that the preservice teachers who did not want to use the interactive whiteboard were not efficient in technology use and in technical support.

In one experimental study carried out with 60 students taking associate-degree education in the department of Computer Programming, Dikmen (2015) aimed to determine the permanency of academic achievement and learning via interactive whiteboard. In the research process, the course of Fundamentals of Programing was taught to the students in the experimental group with the help of the interactive whiteboard, while the traditional teaching method was used for the students in the control group. In the study, a significant difference was found in the academic achievement scores of the students in favor of those in the experimental group. It was also revealed that teaching with the help of the interactive whiteboard was more effective in terms of increasing the students' academic achievement when compared to the education given using the traditional blackboard and that the interactive whiteboard increasing the students' enthusiasm for the course.

In another study carried out by Önder (2015), the researcher aimed to determine the influence of interactive whiteboard use in the 10th grade course of Biology on the students' academic achievements and on their attitudes towards the course. The study was conducted with 50 students from two public high schools. The students were divided into two: experimental group and control group, and their pretest and posttest achievement and attitude scores were compared. In the study, it was found that there was a statistically significant difference between the students taught with the interactive whiteboard and those taught with the traditional blackboard in terms of their academic achievements and their attitudes towards the course of Biology in favor of the interactive whiteboard group.

İdin and Dönmez (2016), in their study, tried to identify the problems regarding FATIH Project and to suggest solutions to these problems. The study was carried out with 12 science teachers from different districts of Ankara. The research data were gathered using the interview method. In the study, the teachers pointed out that the most important tool featured by FATIH Project was the interactive whiteboard and that the interactive whiteboard brought

about several advantages for teaching the Science course (students' motivation in the course, easiness for students to give meaning to the information, saving time and so on).

When the literature is examined, it is seen that thanks to the help of FATIH Project, almost all the secondary schools in our country have been equipped with interactive whiteboards. However, there is no research investigating secondary school teachers' self-efficacies regarding the use of interactive whiteboards. In order to overcome this gap in literature, the present study was conducted. It is thought that determining secondary school teachers' self-efficacies regarding the use of interactive whiteboards at schools as well as examining their self-efficacies will contribute to the field. In addition, the study is also thought to help determine the related problems and then to suggest solutions to these problems. Therefore, the purpose of the study was to determine secondary school teachers' levels of self-efficacy perceptions regarding interactive whiteboard use and to reveal whether their self-efficacies regarding interactive whiteboard use differed with respect to their gender, field of teaching, training received on interactive whiteboard use, frequency of using the contents in Educational Informatics Network, frequency of interactive whiteboard use in lessons, suggesting interactive whiteboard use in lessons to other teachers and interactive whiteboard use time. In line with these purposes, the following research questions were directed:

1.1. Research Questions

- What are teachers' levels of self-efficacy perceptions regarding interactive whiteboard use?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to their gender?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to their field of teaching?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to training they have received on interactive whiteboard use?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to the frequency of their use of the contents in Educational Informatics Network?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to frequency of their interactive whiteboard use in lessons?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to their suggesting interactive whiteboard use in lessons to other teachers?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to their interactive whiteboard use time?

2. METHOD

2.1. Research Model

The present study was carried out using the relational survey model, one of quantitative research methods. Relational survey models are used to determine whether there is a relationship between two or more variables and to identify the degree of the relationship, if any (Karasar,2012).

2.2. Participants

The study was conducted with 154 teachers (57 male and 97 female) from 10 secondary schools in Karacabey, a district of Bursa, in the academic year of 2016-2017. While determining the research sample, the convenience sampling method was used. This method of sampling is defined as selecting the research sample among participants based on their availability in terms of time, cost and human force (Büyüköztürk et.al., 2016). Table 1 presents the demographic information about the teachers participating in the study (gender and field of teaching).

Table 1. Distribution of the Teachers with Respect to their Gender and Field of Teaching

Field of Teaching	Male	Female	Total
Mathematics	9	17	26
Science	6	16	22
Turkish Language	6	15	21
Social Studies	11	4	15
English Language	3	13	16
Information Technologies	4	6	10
Technology and Design	1	2	3
Music	1	1	2
Visual Arts	2	2	4
Sports and Physical Activities	7	1	8
Guidance and Psychological Counselling	2	2	4
Religious Education and Ethics	3	8	11
Other	2	10	12
Total	**57**	**97**	**154**

2.3. Data Collection and Validity and Reliability of the Data

- In the study, "Interactive Board Use Self-Efficacy Scale" developed by Yalçınkaya and Özkan (2014) was used as the data collection tool. The scale, with its reliability and validity studies conducted, included 23 questions in five dimensions. In line with the items, the dimensions were named as "Usage", "Efficacy", "Problem Faced and Related Solutions" "Usage in Different Situations" and "Learning". In order to determine the extent to which the teachers agreed on the items in scale, five-point Likert-type rating was used: "I Completely agree (5)", "I Agree (4)", "I am Neutral (3)", "I Disagree (2)" and "I Completely Disagree". The highest score to be received from the scale was 115, and the lowest was 23. The Cronbach Alpha value for the scale was found to be 0,94 (Yalçınkaya and Özkan, 2014). As for the Cronbach Alpha value obtained via the data collected in the present study, it was calculated as 0,95. Büyüköztürk, Çakmak, Akgün, Demirel and Karadeniz (2016) point out that a scale with a Cronbach Alpha value of 0,70 and higher is important for a scale to be regarded as a reliable scale. Accordingly, the scale could be said to be highly reliable.

- In the study, the Interactive Whiteboard Use Self-Efficacy Scale also included a demographic background section with questions directed to the teachers to obtain such information about their gender, age, field of teaching, training received on interactive whiteboard use, frequency of using the contents in Educational Informatics Network, frequency of interactive whiteboard use in lessons, suggesting interactive whiteboard use in lessons to other teachers and interactive whiteboard use time.

In the present study, the research data collected via the Interactive Whiteboard Use Self-Efficacy Scale were coded and analyzed using the package software of SPSS 20. For the purpose of revealing whether the data were coded without any mistake, the appropriateness of the values typed into SPSS to those in the randomly selected survey papers was checked. For the analysis of the data, the teachers' total and mean self-efficacy scores regarding interactive whiteboard use were examined. In order to determine which parametric and non-parametric tests would be used in the analysis process, whether the participants' self-efficacy total scores regarding interactive whiteboard use had a normal distribution with respect to the independent variables in the study was examined. For the normality of the data, skewness and kurtosis values were examined. Table 2 presents these values in relation to the independent variables in the study. In order for data not to differ significantly from normal distribution, skewness should be in the range of -2 and +2 (Drezner, Turel, and Zerom, 2010).

Table 2. Skewness and Kurtosis Values in Relation to the Independent Variables

Independent Variable		Skewness	Kurtosis
Gender	Female	-,479	-,499
	Male	-,838	,679
In-service Training Received	Yes	-,812	,659
	No	-,438	-,459
Use of EIN Content	Always	-,815	-,171
	Often	-,935	-,024
	Sometimes	-,309	-,230
	Rarely	-,666	-,002
	Never	,165	-1,635
Use of Interactive Whiteboard	Every lesson	-,854	-,359
	When necessary	-,744	,571
	When there is an appropriate material	-,742	,238
	Only for certain lesson subjects	-,331	1,263
	Never	-,494	-1,308
Suggesting Interactive Whiteboard Use	I suggest it	-,691	,130
	I don't suggest it at all	,726	-,195
Interactive Whiteboard Use Time	1 Year	-,438	-,412
	2 Years	-,631	,152
	3 Years	-1,239	,932
	4 Years or Longer	-,803	-,245
Field of Teaching	Mathematics	-,030	-1,318
	Science	-,461	-,469
	Turkish Language	-,663	1,375
	Social Studies	-,741	,553
	English Language	-,353	-1,381
	Information Technologies	-,928	,603
	Technology Design	-,722	
	Music		
	Visual Arts	-1,735	2,997
	Sports and Physical Activities	-,339	-,608
	Guidance and Psychological Counselling	,631	-,964
	Religious Education and Ethics	-450	-1,245
	Other	,294	-1,199

When Table 2 is examined, it is seen that the skewness and kurtosis values for all the independent variables, except for one, were in the range of -2 and +2. Accordingly, the data could be said to demonstrate a normal distribution (Drezner, et.al., 2010). According to Table 2, the independent variable which did not have a normal distribution was visual arts. In order to compare the data which demonstrated a normal distribution, parametric tests (t-test and F test (Anova)) and non-parametric tests (Mann-Whitney U and Kruskal Wallis H) were applied (Büyüköztürk et.al., 2016).

3. FINDINGS

This part presents findings regarding the teachers' levels of self-efficacies in relation to interactive whiteboard use as well as findings regarding whether their self-efficacies differed depending on their gender, school type, field of teaching, in-service training received, EIN content use, interactive whiteboard use, suggesting interactive whiteboard use and on their interactive whiteboard use time.

When the research data collected in the study were examined, it was seen that the lowest self-efficacy score was 52, and the highest was self-efficacy score was 115. The teachers' interactive whiteboard self-efficacy mean score was 93,87. When this mean score was divided by 23, it was found that the teachers' levels of interactive whiteboard use self-efficacy were at the levels of "I Agree" ($\bar{X}$=4,08). In addition, when it was compared with 115, the highest to be produced by the scale, the teachers could be said to have high levels of self-efficacy.

In the study, the sub-dimensions of the scale applied to the teachers were "Usage", "Efficacy", "Problem Faced and Related Solutions" "Usage in Different Situations" and "Learning". When the teachers' scores for these dimensions were examined, it was seen that the lowest mean score was 3,91 for the dimension of "Usage in Different Situations", and the highest mean score was 4,29 for the dimension of "Efficacy". Based on this finding, it could be stated that the teachers did not use the printers connected to the interactive whiteboard at schools and that they were open to learning in all cases, though.

When the data collected in the study were examined, it was found that the male teachers' interactive whiteboard use self-efficacy mean score was 95,54, while it was 92,89 for the female teachers. When the groups regarding an independent variable are compared with the scores regarding a dependent variable, independent measurements t-test is used to determine whether there is a significant difference between the mean scores in the case of a normal distribution of the data (Büyüköztürk et.al., 2016). For the purpose of determining whether the difference between the male and female teachers' interactive whiteboard use self-efficacy scores was significant or not, t-test was applied. Table 3 presents the t-test results.

Table 3. T-test Results of Self-Efficacy Scores with Respect to Gender

Gender	N	$\bar{X}$	Ss	Sd	t	p
Male	57	95.54	15.089	152	1.091	.277
Female	97	92.89	14.290			

When Table 3 is examined, it is seen that the teachers' self-efficacy scores did not differ significantly depending on their gender ($t_{(152)}$=1.091, p>.05). Based on this finding, it could be stated that there was no relationship between the teachers' interactive whiteboard use self-efficacies and their gender.

Table 4 presents the descriptive statistics regarding the distribution of the teachers' interactive whiteboard use self-efficacy scores with respect to their fields of teaching.

Table 4. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to Field of Teaching

Field of Teaching	N	$\bar{X}$	Ss
Mathematics	26	91.96	14.287
Science	22	100.27	9.009
Turkish Language	21	92.62	13.507
Social Studies	15	87.33	17.859
English Language	16	95.19	12.325
Information Technologies	10	111.30	3.974
Technology Design	3	99.33	4.041
Music	2	62.50	9.192
Visual Arts	4	99.50	7.853
Sports and Physical Activities	8	89.63	17.880
Guidance and Psychological Counselling	4	83.75	19.755
Religious Education and Ethics	11	90.27	14.464
Other	12	91.83	12.777
Total	**154**	**93.87**	**14,59**

When Table 4 is examined, it is seen that the field of teaching with the lowest self-efficacy mean score was "music" ($\bar{X}$=62.50) and that the one with the highest self-efficacy mean score was "information technologies" ($\bar{X}$=111.30). In order to reveal whether the teachers' self-efficacy scores differed significantly in terms of their field of teaching, Kruskal Wallis H test was applied. Table 5 presents the results of this test.

Table 5. Kruskal Wallis H Test Results Regarding Self-Efficacy Scores with Respect to Field of Teaching

Field of Teaching	N	Mean Rank	sd	x^2	p
Mathematics	26	70,31	12	33,93	0,001
Science	22	95,73			
Turkish Language	21	73,05			
Social Studies	15	62,20			
English Language	16	79,25			
Information Technologies	10	137,45			
Technology Design	3	89,83			
Music	2	5,75			
Visual Arts	4	91,75			
Sports and Physical Activities	8	66,06			
Guidance and Psychological Counselling	4	50,38			
Religious Education and Ethics	11	62,95			
Other	12	68,42			
Total	**154**				

The analysis results presented in Table 5 demonstrate that the teachers' interactive whiteboard self-efficacy scores differed significantly depending on their field of teaching [($\chi^2_{(12)}$=33,93, p<05]. In order to determine which groups caused the difference in the teachers' interactive whiteboard self-efficacy scores, Mann-Whitney U test was applied for every two groups. The results revealed a statistically significant difference between the interactive whiteboard self-efficacy scores of the information technologies teachers and those of the music teachers (p<0,05).

Table 6 presents the descriptive statistics regarding the distribution of the teachers' interactive whiteboard self-efficacy scores with respect to receiving in-service training on interactive whiteboard use.

Table 6. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to Receiving In-Service Training

Receiving In-Service Training	N	$\overline{X}$	Ss
Yes	68	9*5.93	13.607
No	86	92.24	15.219
Total	**154**	**93.87**	**14,59**

When Table 6 is examined, it is seen that the teachers receiving in-service training ($\overline{X}$=95.93) had higher scores than those who did not receive any in-service training ($\overline{X}$=92.24). in order to determine whether the difference between the teachers' interactive whiteboard self-efficacy scores with respect to receiving in-service training was significant or not, independent samples t-test was applied. Table 7 shows the t-test results.

Table 7. T-test Results Regarding Self-Efficacy Scores with Respect to Receiving In-Service Training

Receiving In-Service Training	N	$\overline{X}$	Ss	Sd	t	p
Yes	68	95.93	13.607	152	1.562	.120
No	86	92.24	15.219			
TOTAL	**154**	**93.87**	**14.59**			

When Table 7 is examined, it is seen that there was no significant difference between the teachers' interactive whiteboard self-efficacy scores with respect to receiving in-service training ($t_{(152)}$=1.562, p>.05). Depending on this finding, it could be stated that the teachers' self-efficacy scores did not statistically significantly differ in terms of receiving in-service training.

Table 8 presents the descriptive statistics regarding the distribution of the teachers' interactive whiteboard self-efficacy scores with respect to using EIN contents.

Table 8. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to EIN Content Use

EIN Content Use	N	$\overline{X}$	Ss
Never	13	89.85	13.508
Rarely	33	89.55	16.925
Sometimes	58	91.59	13.691
Often	37	100.22	12.820
Always	13	101.00	10.685
Total	**154**	**93.87**	**14,59**

When Table 8 is examined, it is seen that when grouped in accordance with EIN content use, the lowest self-efficacy mean score belonged to "Rarely" ($\overline{X}$=89.55) while the highest self-efficacy mean score belonged to "Always" ($\overline{X}$=111.00). For the purpose of determining whether the difference between the teachers' self-efficacy scores was significant with respect to EIN content use, independent samples ANOVA test was used. The results can be seen in Table 9.

Table 9. ANOVA results Regarding Self-Efficacy Scores with Respect to EIN Content Use

	Sum of Squares	Sd	Mean Squares	F	p
Between Groups	3281.189	4	820.297	4.168	.003
Within Groups	29326.213	149	196.820		
Total	32607.403	**153**			

According to the analysis results presented in Table 9, there was a significant difference between the teachers' interactive whiteboard self-efficacy mean scores with respect to EIN content use ($[F_{4-149)}$=4.168, p<.05]. In order to which groups caused the significant difference between the teachers' interactive whiteboard self-efficacy scores, Scheffe test was applied. The results demonstrated that there was a statistically significant difference between the teachers who "Rarely" used EIN contents and those who "Often" used EIN contents (p<0,05).

Table 10 presents the descriptive statistics regarding the distribution of the teachers' interactive whiteboard self-efficacy scores with respect to interactive whiteboard use.

Table 10. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to Interactive Whiteboard Use

Interactive Whiteboard Use	N	$\overline{X}$	Ss
Never	7	81.86	20.161
Only for certain lesson subjects	17	80.47	10.654
When there is an appropriate material	19	91.63	14.580
When necessary	70	94.89	12.577
Every lesson	41	100.78	13.623
Total	**154**	**93.87**	**14,59**

When Table 10 is examined, it is seen that when the teachers were grouped with respect to their interactive whiteboard use in lessons, the lowest self-efficacy mean score belonged to "Only for certain lessons subjects" ($\overline{X}$=80.47) while the highest self-efficacy mean scores belonged to "Every lesson" ($\overline{X}$=100.78). In order to determine whether the difference between

the difference between the teachers' self-efficacy scores was significant with respect to their interactive whiteboard use, ANOVA test for independent measures was used. The results can be seen in Table 11.

Table 11. ANOVA Results Regarding Self-Efficacy Scores with Respect to Interactive Whiteboard Use

	Sum of Squares	Sd	Mean Squares	F	p
Between Groups	6187.779	4	1546.945	8.724	,000
Within Groups	26419.624	149	177.313		
Total	32607.403	**153**			

The analysis results presented in Table 11 demonstrated that there was a significant difference between the teachers' interactive whiteboard self-efficacy mean scores with respect to their interactive whiteboard use ($[F_{(4-149)}=8.724$, $p<.05]$. For the purpose of determining which groups caused the difference between the teachers' interactive whiteboard self-efficacy scores, Scheffe test was used. The results revealed significant differences between the teachers who "Never" used the interactive whiteboard and those who used it in "Every lesson"; between the teachers who used the interactive whiteboard "Only for certain lesson subjects" and those who used it "When necessary"; and between the teachers who used the interactive whiteboard "Only for certain lesson subjects" and those who used it in "Every lesson" ($p>0,05$).

Table 12 shows the descriptive statistics regarding the distribution of the teachers' interactive whiteboard self-efficacy scores with respect to suggesting other teachers to use interactive whiteboard in lessons.

Table 12. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to Suggesting Other Teachers to Use Interactive Whiteboard in Lessons

Suggesting Interactive Whiteboard Use	N	$\overline{X}$	Ss
Does not suggest it	10	86.60	14.879
Suggests it	144	94.51	14.411
Total	154	93.87	14,59

When Table 12 is examined, it is seen that the teachers who suggested Interactive whiteboard use had higher scores $\overline{X}$=94.51) than those of the teachers who did not suggest interactive whiteboard use in lessons ($\overline{X}$=86.60). In order to determine whether the difference between the teachers' interactive whiteboard self-efficacy scores was significant with respect to suggesting other teachers to use interactive whiteboard in lessons, independent samples t-test was applied. The results can be seen in Table 13.

Table 13. T-test Results Regarding Self-Efficacy Scores with Respect to Suggesting Interactive Whiteboard Use in Lessons

Suggesting Interactive Whiteboard Use in Lessons	N	$\overline{X}$	Ss	Sd	t	p
Does not suggest	10	86.60	14.879	152	-2.100	.037
Suggests	144	94.51	14.411			
TOTAL	154	93.87	14.59			

When Table 13 is examined, it is seen that there was a significant difference between the teachers' self-efficacy mean scores with respect to suggesting other teachers to use interactive whiteboard in lessons [$t_{(152)}$=-2.100, p<.05]. Depending on this finding, it could be stated that the teachers' self-efficacy scores differed statistically significantly with respect to suggesting other teachers to use interactive whiteboard in lessons.

Table 14 presents the descriptive statistics regarding the distribution of the teachers' interactive whiteboard self-efficacy scores with respect to their interactive whiteboard use time.

Table 14. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to Interactive Whiteboard Use Time

Interactive Whiteboard Use Time	N	$\bar{X}$	Ss
1 Year	39	88.72	14.677
2 Years	90	93.74	14.236
3 Years or longer	25	102.36	12.155
Total	**154**	**93.87**	**14,59**

When Table 14 is examined, it is seen that when the teachers' self-efficacy scores were grouped with respect to their interactive whiteboard use time, the lowest self-efficacy mean score belonged to "1 year" ($\bar{X}$=88.72) while the highest self-efficacy mean score belonged to "3 years or longer" ($\bar{X}$=102.36). In order to determine whether the difference between the teachers' self-efficacy scores was statistically significant with respect to their interactive whiteboard use time, independent samples ANOVA test was applied. The results can be seen in Table 15.

Table 15. ANOVA Results Regarding Self-Efficacy Scores with Respect to Interactive Whiteboard Use Time

	Sum of Squares	Sd	Mean Squares	F	p
Between Groups	2838.623	2	1419.311	7.199	.001
Within Groups	29768.780	151	198.144		
Total	32607.403	**153**			

According to the analysis results presented in Table 15, there was a significant difference between the teachers' interactive whiteboard self-efficacy mean scores with respect to their interactive whiteboard use time ([F_{2-151}]=7.199, p<.05). For the purpose of determining which groups caused the difference between the teachers' interactive whiteboard self-efficacy scores, Scheffe test was used. The results revealed a significant difference between the teachers who used interactive whiteboard for "1 year" and those who used interactive whiteboard for "3 years or longer" (p>0,05).

4. DISCUSSION, CONCLUSION AND SUGGESTIONS

The present study aimed to determine secondary school teachers' levels of self-efficacy perceptions regarding interactive whiteboard use and to investigate whether their interactive whiteboard self-efficacies differed in accordance with their gender, field of teaching, receiving training on interactive whiteboard use, their frequencies of using EIN contents, their frequencies of using interactive whiteboard in lessons, suggesting other teachers to use interactive whiteboard in lessons and in accordance with their interactive whiteboard use

time. In the study, it was found that the secondary school teachers' self-efficacies regarding interactive whiteboard use were at the level of "I Agree" ($\overline{X}$=4,08). Based on this finding, the teachers could be said to have high levels of self-confidence and desire to use interactive whiteboard. This result is consistent with the results of another study carried out with secondary school teachers by Yalçınkaya and Özkan (2014). The fact that the secondary teachers' self-efficacies regarding interactive whiteboard use within the scope of FATIH Project at secondary schools were at the level of "I Agree" could be considered to be a positive result.

In the study, it was found that there was no significant difference found between the participants' interactive whiteboard self-efficacies with respect to their gender. In one study, Şensoy (2004) revealed that teachers' computer self-efficacy beliefs did not differ depending on their gender. Studies conducted by Çiçekli (2014) and by Koçak and Gülcü (2013) reported similar findings in their studies. However, Yalçınkaya and Özkan (2014) found that male secondary school teachers had higher levels of interactive whiteboard self-efficacies when compared to female secondary school teachers. Accordingly, it could be stated that there is a need for further research to investigate whether there is a relationship between gender and interactive whiteboard use in lessons.

In the study, it was found that the teachers' interactive whiteboard self-efficacies did not significantly differ depending on their field of teaching except for the fields of music and information technologies. Yalçınkaya and Özkan (2014) reported similar results in their study. The fact that the teachers' interactive whiteboard self-efficacies did not differ with respect to their fields of teaching and that especially the information technologies teachers' self-efficacies did not differ from the self-efficacies of the teachers from other fields of teaching could be said to be an interesting finding, which could be investigated in future studies.

In the study, it was found that the teachers' interactive whiteboard self-efficacies did not significantly differ with respect to receiving in-service training on interactive whiteboard use. In one study, Tatlı (2004) reported similar results. In another study carried out by Altın and Kalelioğlu (2015), the teachers stated that they wanted to receive in-service training on interactive whiteboard use. When these results are compared to the related results obtained in the present study, it could be stated that teachers' technology efficacies gradually increase in line with technology integration experienced in all areas of life.

In the study, when the teachers' interactive whiteboard self-efficacies were examined with respect to whether their self-efficacies differed with respect to EIN content use, it was found that there was a significant difference in favor of the teachers who "often" used EIN contents. In this respect, teachers could be encouraged to use EIN so that they can increase their self-efficacies regarding interactive whiteboard use. In related literature, there is no research comparing teachers' interactive whiteboard self-efficacies with respect to using EIN contents.

When the teachers' interactive whiteboard self-efficacies were examined with respect to whether their self-efficacies differed with respect to suggesting interactive whiteboard use in lessons, it was seen that there was a significant difference in favor of the teachers who suggested using interactive whiteboard. In one study carried out by Altınçelik (2009), the teachers suggested interactive whiteboard use to increase motivation and permanency in learning at elementary school level (Altınçelik, 2009). Accordingly, it could be stated that

teachers with high levels of interactive whiteboard use self-efficacy suggested using interactive whiteboard in lessons.

When the teachers' interactive whiteboard use self-efficacies were examined with respect to their frequency of using interactive whiteboard in lessons, no significant related difference was found. This result was consistent with the findings reported by Tatlı (2014). In another study, Çiçekli (2014) pointed out that teachers' self-efficacies did not differ depending on their frequency of using interactive whiteboard in lessons. In this respect, further in-depth research could be conducted to identify the reasons why the teachers' interactive whiteboard use self-efficacies did not significantly differ with respect to their frequency of using interactive whiteboard in lessons.

In the present study, the research sample did not include any teachers from elementary school and high school levels. Future studies could be conducted with teachers from other different teaching levels. In the study, some of the teachers were given in-service training on interactive whiteboard use. In future studies, which could be conducted using the experimental research design, all the participating teachers could be provided such training, and their self-efficacies before and after the in-service training could be compared. The present study was carried out using the quantitative research method, and future studies could be conducted using the mixed method research design to determine the related views of participating teachers.

Ortaokullarda Görev Yapan Öğretmenlerin Etkileşimli Tahta Kullanımı Konusundaki Öz Yeterliklerinin İncelenmesi

ÖZET

Bu çalışmada, ortaokullarda görev yapan öğretmenlerin etkileşimli tahta kullanımı konusundaki öz yeterliklerinin hangi düzeyde olduğunun belirlenmesi ve etkileşimli tahta kullanımına yönelik öz yeterlik algılarının cinsiyet, branş, etkileşimli tahta kullanımı ile ilgili eğitim alma durumu, Eğitim Bilişim Ağında yer alan içerikleri kullanma sıklığı, derslerde etkileşimli tahta kullanma sıklığı, derslerde etkileşimli tahta kullanmayı diğer öğretmenlere önerme durumu, etkileşimli tahta kullanma süresi değişkenleri açısından farklılık gösterip göstermediğinin incelenmesi amaçlanmıştır. Araştırmanın örneklemini, Batı Anadolu'da bulunan bir ilçedeki ortaokullarda görev yapan 154 öğretmen oluşturmuştur. Örneklem, uygun örnekleme yöntemi kullanılarak belirlenmiştir. Araştırma nicel araştırma yöntemlerinden ilişkisel tarama modeline uygun olarak yürütülmüş; veri toplama aracı olarak da "Öğretmenlerin Etkileşimli Tahta Kullanımına Yönelik Öz Yeterlikleri Ölçeği" kullanılmıştır. Verilerin analizinde öğretmenlerin etkileşimli tahta kullanımına yönelik öz yeterlik puanlarının toplamları ve ortalamaları incelenmiştir. Araştırma sonucunda elde edilen bulgulara göre öğretmenlerin etkileşimli tahta kullanımına yönelik öz yeterliklerinin yüksek olduğu; EBA içerik kullanımını artıkça öz yeterlik puanlarının arttığı; etkileşimli tahta kullanım süresi artış gösterdikçe öz yeterlik puanlarının da buna yönelik artış gösterdiği; derslerde etkileşimli tahta kullanımını öneren öğretmenlerin öz yeterliklerinin, etkileşimli tahta kullanımını önermeyen öğretmenlere göre daha yüksek olduğu sonucuna varılmıştır. Öğretmenlerin öz yeterlik puanlarının cinsiyet ve branşlara göre anlamlı farklılık göstermediği de araştırmada elde edilen bulgular arasındadır. Araştırma sonucunda öğretmenlerin etkileşimli tahta kullanımına yönelik öz yeterliklerinin artırılmasına ve gelecek araştırmalara yönelik önerilerde bulunulmuştur.

Anahtar Kelimeler: etkileşimli tahta, öz yeterlik, ortaokul öğretmenleri

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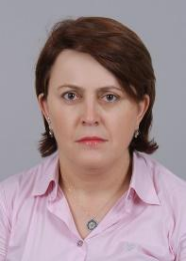
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Book Review: Recent Advances in Assistive Technologies to Support Children with Developmental Disorders

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Article Info	Abstract
	Recent Advances in Assistive Technologies to Support Children with Developmental Disorders is edited by Nava R. Silton. The editor of the book, Nava R. Silton, a developmental psychologist, received her B.S. from Cornell University in 2002 and her M.A. and Ph.D. from Fordham University in 2009. The book was published in 2015 by IGI Global. The book has xxvi+424 pages. The ISBNs of the book for different versions are; ISBN13: 9781466683952, ISBN10: 1466683953, EISBN13: 9781466683969. DOI number of the book is 10.4018/978-1-4666-8395-2.
Book Review	

1. INTRODUCTION

Recent Advances in Assistive Technologies to Support Children with Developmental Disorders is edited by Nava R. Silton. The editor of the book, Nava R. Silton, a developmental psychologist, received her B.S. from Cornell University in 2002 and her M.A. and Ph.D. from Fordham University in 2009. The book was published in 2015 by IGI Global. The book has xxvi+424 pages. The ISBNs of the book for different versions are; ISBN13: 9781466683952, ISBN10: 1466683953, EISBN13: 9781466683969. DOI number of the book is 10.4018/978-1-4666-8395-2.

Technology has been a main driver for many developments in different fields including special education. The term, assistive technology, is a broad concept and it is defined in *The Individuals with Disabilities Education Improvement Act of 2004* (Pub. L. No. 108-446, Part A, Sec 602, pp. 11–12) as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain or improve the functional capabilities of a child with a disability." The recent developments in digital technologies resulted with increase in capacity and the reflections of these developments were seen in assistive technologies with learners with special needs. A many of publications covered assistive technologies from different aspects for learners with special needs (Bryant & Bryant, 2011; Bozkurt et al., 2015; Caliskan et al., 2016; Green, 2014), and this edited book by Silton (2015) contributes to the field with a special focus on mobile devices and technologies.

2. REVIEW OF THE BOOK

Chapter 1, *iPods and iPads as AAC Devices for Children with Developmental Disorders*, by Larah van der Meer, discusses the potential of the instructional strategies of using iPods and iPads.

Chapter 2, *Implementing iPad and Mobile Technologies for Students with Intellectual Disabilities*, by Cathi Draper Rodríguez, Iva Strnadová, and Therese M Cumming deals with issues about how to use mobile technologies from the perspective of Universal Design for Learning (UDL).

Chapter 3, *Using iPads and Mobile Technology for Children with Developmental Disabilities: Facilitating Language and Literacy Development*, by Lisa A. Proctor and Ye Wang is about mobile technologies and, through a comprehensive review of the literature, it provides challenges and opportunities of using such technologies.

Chapter 4, *Early Literacy and AAC for Learners with Complex Communication Needs*, by Janis Doneski-Nicol and Jody Marie Bartz focuses on Augmentative and Alternative Communication (AAC) systems.

Chapter 5, *The Use of Mobile Technologies for Students At-Risk or Identified with Behavioral Disorders within School-Based Contexts*, by Frank J. Sansosti and Peña L. Bedesem explains benefits and challenges of using mobile technologies, present current state of the art and offers suggestions in this regard.

Chapter 6, *Recent Advances in Augmentative and Alternative Communication: The Advantages and Challenges of Technology Applications for Communicative Purposes*, by Toby B. Mehl-Schneider examines mobile technologies and provides suggestions on how to use for augmentative and alternative communication (AAC) purposes.

Chapter 7, *Selecting Computer-Mediated Interventions to Support the Social and Emotional Development of Individuals with Autism Spectrum Disorder*, by Kristen Gillespie-Lynch, Patricia J. Brooks, Christina Shane-Simpson, Naomi Love Gaggi, Deborah Sturm, and Bertram O. Ploog designed to provide parents, professionals, and individuals with Autism Spectrum Disorder (ASD) with tools to help them evaluate the effectiveness of computer-mediated interventions to support the social and emotional development of individuals with ASD.

Chapter 8, *Avatars, Humanoids, and the Changing Landscape of Assessment and Intervention for Individuals with Disabilities across the Lifespan*, by Emily Hotez is about virtual reality and robots. The chapter provides suggestions for future research directions.

Chapter 9, *Microswitch-Based Programs (MBP) to Promote Communication, Occupation, and Leisure Skills for Children with Multiple Disabilities: A Literature Overview*, by Fabrizio Stasolla and Viviana Perilli presents the overall outlook of microswitch-based programs (MBP) through a comprehensive literature review.

Chapter 10, *Improving Students' Academic Learning by Helping Them Access Text*, by Michael Ben-Avie, Régine Randall, Diane Weaver Dunne, and Chris Kelly reports findings of 3-year pilot of CRISKids projects.

Chapter 11, *Video Modeling for Learners with Developmental Disabilities*, by Peggy J. S. Whitby, Christine R. Ogilvie, and Krista Vince Garland covers issues on video modeling for learners with autism spectrum disorders (ASD).

Chapter 12, *Assistive Technologies at the Edge of Language and Speech Science for Children with Communication Disorders: VocalID, Free Speech, and SmartPalate*, by Joséphine Anne Genèvieve Ancelle explains recent developments on augmentative and alternative communication (AAC) devices with text-to-speech (TTS) by introducing specific systems.

Chapter 13, *Telehealth Technology and Pediatric Feeding Disorders*, by Taylor A. Luke and Rebecca R. Ruchlin discusses the prevalence of feeding disorders among infants, toddlers and children with developmental disorders.

Chapter 14, *Music and Developmental Disabilities*, by Michelle Renee Blumstein presents a compilation of research about various types of technology that are employed by music therapists to benefit children with developmental delays.

Chapter 15, *Dissemination of Assistive Technology Devices for Children with Disabilities through Realabilities*, by Senada Arucevic reviews a variety of technologies that have been used to improve the quality of life of individuals with varying disabilities

Chapter 16, *Using Technology to Support Social Competence*, by Brenda Smith Myles, Jan Rogers, Amy Bixler Coffin, Wendy Szakacs, and Theresa Earles-Vollrath reviews the concept known as social competence and offers a variety of practices to support its development.

3. CONCLUSION

In conclusion, this book offers up-to-date knowledge on assistive technologies and serve as a reliable source for researchers from the field of special education. On the other hand, considering that technology-oriented practices subject to constant changes, other researchers should work on similar books that examine assistive technologies from different aspects of the fields and learners with special needs.

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Sunagul Sani-Bozkurt holds an MA and a Ph.D. degree in Special Education. Sani-Bozkurt is an assistant professor in the Department of Special Education at Anadolu University, Turkey. Her research interests are topics related to universal design, inclusive learning environment, evidence-based practices, assistive technology, technology-supported practices, and use of ICT in special education.

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Book Review: Mobile Technologies and Augmented Reality in Open Education

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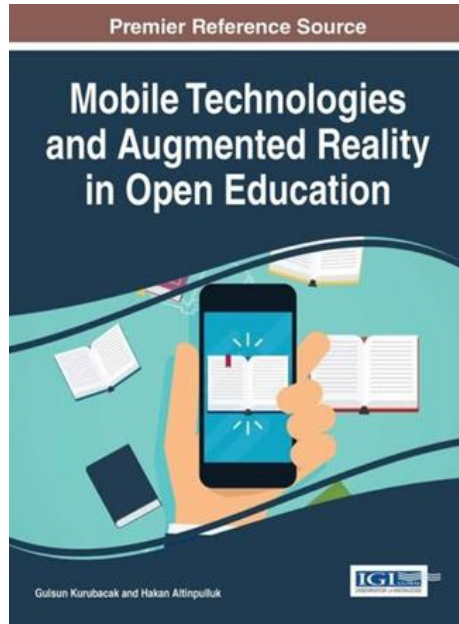| Article Info	Abstract
	Mobile Technologies and Augmented Reality in Open Education is edited by Gülsün Kurubacak and Hakan Altınpulluk. The book was published by IGI Global in 2017. The book is 366 pages. The ISBNs of the book are as following: ISBN13: 9781522521105, ISBN10: 1522521100, and EISBN13: 9781522521112. DOI number of the book is: 10.4018/978-1-5225-2110-5
Book Review	

1. INTRODUCTION

Mobile Technologies and Augmented Reality in Open Education is edited by Gülsün Kurubacak and Hakan Altınpulluk. The book was published by IGI Global in 2017. The book is 366 pages. The ISBNs of the book are as following: ISBN13: 9781522521105, ISBN10: 1522521100, and EISBN13: 9781522521112. DOI number of the book is: 10.4018/978-1-5225-2110-5

Augmented Reality is a system that blend augmentation with reality to enrich learning environments. In an online environment supported by Augmented Reality technologies, learners can enhance their learning visions actively. This book, in this regard, aims to provide some insights and samples on Augmented Reality. Concisely, the book designates interactive, interesting and entertaining applications of Augmented Reality and Mobile Technologies within open and distance learning.

2. REVIEW of the BOOK

The topics addressed by the authors of 16 chapters are as follow:

Chapter 1: Are Wearables Good or Bad for Society? An Exploration of Societal Benefits, Risks, and Consequences of Augmented Reality Smart Glasses by Daniel W. E. Hein, Jennah L. Jodoin, Philipp A. Rauschnabel and Björn S. Ivens. In Chapter 1, the authors depict the new form of wearable devices like Augmented Reality Smart Glasses and how these devices have become crucial potentials with their personal and professional settings. The authors of the chapter also illustrate the good and bad factors of the mentioned devices in terms of societal benefits and risks.

Chapter 2: Educational Augmented Reality (AR) Applications and Development Process by Muzaffer Özdemir. Chapter 2 highlights the contribution that Augmented Reality technologies provide for the learners. In this connection, several empirical studies in the literature are revisited. Moreover, Unity and Vuforia, as the development tools are presented and how these applications could be used by mobile or desktop PCs are examined in detail.

Chapter 3: Augmented Reality: Opportunity for Developing Spatial Visualization and Learning Calculus by Patricia Salinas. Chapter 3 embraces Augmented Reality technology for Mathematics. In this chapter, some calculus topics, being designed upon graphical representation and digital design, are given as samples which are also regarded as the part of the modern culture.

Chapter 4. The Impact of Augmented Reality and Virtual Reality Study Material in the Future of Learning: A Teamwork Experience by Giuliana Guazzaroni. Chapter 4 guides readers to a discussion of Augmented Reality implementation and its potential usage. To reach this aim, a high school class of 23 students from Italy are invited to use Augmented Reality and Virtual Reality tools to utilize from the materials created by them. The future learning tools are digital ones.

Chapter 5: Use of Augmented Reality in Mobile Devices for Educational Purposes by Bülent Gürsel Emiroğlu and Adile Aşkım Kurt. In Chapter 5, the use of technology is perused in relation with the current developments and improvements in information and communication technologies. The authors of this chapter underline the importance of mobile devices and how they could be implemented on both Augmented Reality (AR) and Mobile Augmented Reality (MAR) technologies.

Chapter 6: Existing Standards and Programs for Use in Mobile Augmented Reality by Gülay Ekren and Nilgün Özdamar Keskin. Chapter 6 deliberates Augmented Reality (AR) with respect to its dimensions regarding educational use. The current trends, issues, and developments of AR technologies and their possible applications within mobile learning are all discussed in detail.

Chapter 7: In Search for a "Good Fit" Between Augmented Reality and Mobile Learning Ecosystem by Miraç Banu Gündoğan: In Chapter 7 "ecosystem" term, used both in scientific and social contexts, is scrutinized by the author. Augmented Reality and its possible potentials of integration in mobile learning are also discussed. All those above mentioned aspects and definitions are derived from a Delphi study carried out in 2016 in Turkey.

Chapter 8: An Augmented-Reality-Based Intelligent Mobile Application for Open Computer Education by Utku Köse. In Chapter 8, the author probes Augmented Reality based intelligent mobile application (M-Learning application) to support courses of Computer Education. In this part of the book, the author elaborates Artificial Intelligence based approaches and their dynamic learning parameters in relation with course materials.

Chapter 9: Learning in a Virtual Environment: Implementation and Evaluation of a VR Math-Game by Christof Sternig, Michael Spitzer and Martin Ebner. The authors of this chapter address various approaches on Virtual Reality (VR) by giving samples of different applications. In this regard, a math-game prototype that was implemented in a school by pupils aged 12-13 is proposed accordingly. It is observed that the pupils were highly motivated to be involved in a virtual world.

Chapter 10: Mobile Augmented Reality Applications in Education by İrfan Süral. Chapter 10 provides possible insights on how Augmented Reality applications are used for training in various fields such as trade, military, entertainment and health. Therefore, it could also be regarded as a vivid educational tool that might take learners' attention.

Chapter 11: Design Principles for an Intelligent-Augmented-Reality-Based M-Learning Application to Improve Engineering Students' English Language Skills by Derya Bozdoğan, Buket Kasap and Utku Köse. The authors of this chapter display an effective learning flow designed upon Elias' four design principles namely "fair use, flexible use, fault tolerance and educational climate". By combining real and virtual environments, the authors suggest a frame of a possible application that could be used for improving engineering students' English language skills.

Chapter 12: Integration of Augmented Reality and Virtual Reality in Building Information Modeling: The Next Frontier in Civil Engineering Education by Sai Rohit Chenchu Boga, Bhargav Kansagara and Ramesh Kannan. The authors of Chapter 12 highlight the importance of both Virtual Reality (VR) and Augmented Reality (AR) in education. In this regard, the authors offer an entertaining platform on which students could be more active. The chapter proposes a game-based device called "Unity3D" that could be specifically used for civil engineering.

Chapter 13: Augmented Reality Implementations, Requirements, and Limitations in the Flipped-Learning Approach by Nilgün Tosun. Chapter 13 examines flipped learning with its dimensions related to innovative, efficient and active learning. As connoted by the author of this chapter, the students should be supported with stronger learning materials and implementations designed upon Augmented Reality.

Chapter 14: Augmented Reality in K-12 Education by Lisabeth J. Leighton and Helen Crompton. Chapter 14 disputes how Augmented Reality could be used in an educational context. The chapter particularly focuses on the related literature and research supporting the Augmented Reality affordances K-12 Education.

Chapter 15: The Importance of Mobile Augmented Reality in Online Nursing Education by Belgin Boz Yüksekdağ. The author of Chapter 15 guides readers to a discussion of the utilization of mobile augmented reality in online nursing education. In the first part, nursing education is discussed in general and in the second part, theoretical and practical areas of online nursing are broadly tackled.

Chapter 16: Design, Development, and Marketing Process of Video Games by Devkan Kaleci and Tansel Tepe. Chapter 16 provides insights on video game sector in general. For this purpose, video game concept and game categories are basically described in detail. Thus, it is thought to raise awareness on video game development.

3. CONCLUDING THOUGHTS

This book sheds light on Mobile Technologies and Augmented Reality and their possible applications within Open Education. In this connection, the book stands as a must have resource for researchers, educators and stakeholders who deeply concern technology integration with conventional and online learning milieus. Considering the wide effects of Mobile Technologies and Augmented Reality in recent decades, different authors who took part in this book give timely responses towards questions regarding the integration of virtual and real implementations in open learning.

About the Author

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Nil Göksel currently works as an English language instructor at Anadolu University. She received her MA Degree in Distance Education with "Learner -Instructor Interaction within University-Community Partnerships by Giving Samples from Second Life (SL)" in 2009. To pursue her PhD degree, she then completed a research study entitled "Utilizing the Personal Learning Environment for English as a Foreign Language within the Scope of Open and Distance Learning" in 2018. Her research interests lie broadly in online-immersive learning, new learning technologies, Personal Learning Environments (PLEs), educational social networks, virtual interaction, Augmented Reality, Web 2.0 tools used for foreign language teaching and learning, Artificial Intelligence and Intelligent Personal Assistants (IPAs).

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