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Examination of Postgraduate Theses on Virtual Reality in the Field of Social Sciences in Turkey

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Abstract: The aim of this study is to examine the open access theses in the Social Sciences group with virtual reality in the title of the review results made in the Council of Higher Education Thesis Center, through systematic review and content analysis method. It is thought that this study will narrow the wide scope of the notion of virtual reality and can describe the change and development over the years in the context of the field of social sciences. In the research, 54 postgraduate theses were examined and the distribution of the theses with virtual reality in their title were analyzed according to the years they were published, by type, by languages, by universities, by departments, according to the purpose of theses, by type of virtual reality software used, by type of virtual reality hardware, by the names of software and hardware. Since theses on educational sciences were intense, analysis was also carried out according to research methods, data collection tools and samples. In addition, the distribution of keywords in theses was also determined. Based on the obtained data, the highest number of theses was reached in 2019, while most of the theses were completed as master's thesis. While theses on virtual reality are mostly completed at Bahçeşehir University, they intensify on the Department of Computer Education and Instructional Technology in terms of department type. In the theses, especially virtual reality game experiences are aimed. 360^0 Video and 3D Games are the most used software types, while the Virtual Reality Headsets are the most used hardware. Oculus Rift is the most used virtual reality hardware brand. Beside these, it is found that quantitative method is mostly preferred, the most used data collection tool is questionnaire, and the most used sample group is undergraduate students.

Keywords: Virtual reality, three dimensional technologies, educational technology, systematic review, content analysis

Highlights

What is already known about this topic:

- Various content analysis and systematic review studies on virtual reality indicate that the studies in this field have drawn considerable interest and popularity in recent years.
- Although the concept of virtual reality has become more important in education in Turkey, it is safe to say that there is confusion regarding its use, and the tendency towards this concept in social sciences is relatively limited.

What this paper contributes:

- In Turkey, the most objective subject for graduate dissertations/theses on virtual reality has been determined to be obtaining virtual reality game experiences.
- While virtual reality glasses and smartphones are the most commonly used hardware in thesis/dissertations, 360^0 videos and 3D games are the most preferred software.

Implications for theory, practice and/or policy:

- Given that the dissertations/theses on virtual reality in social sciences should be distributed to only 27 universities out of a total of 209 in Turkey, more universities should support the output of postgraduate dissertations/theses on virtual reality.
- Virtual reality studies should be encouraged in different departments other than computer and instructional technology education, game design or disciplines with technological dimensions such as Radio, Television and Cinema Department.

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Introduction

Although virtual reality applications, which are one of the innovations brought about by technological developments, have gained traction in all areas in recent years, their history dates back much further (Hasancebi et al., 2018). The story The World the Children Made, first published by Ray Bradbury in 1950, about a system that features children's 3D Images of Africa as well as senses such as sound and smell, and then the sci-fi novel Neuromancer, written by William Gibson in 1984, is thought to have inspired virtual reality practices (Ferhat, 2016; Oppenheim, 1993). It is true that literature has a significant impact on technological developments and many technological innovations were fictionalized years ago (Kurbanoglu, 1996). Since the 1960s, the term virtual reality was first used when the Sensorama Simulator (Heilig, 1962) was invented. Later, this term was used to describe a large number of different technologies, including both software and hardware dimensions, such as online virtual worlds (Second Life), massive multiplayer online role-playing games, head mounted displays, and surgery simulators (Jensen & Konradsen, 2018). The term of virtual reality has spawned a variety of definitions. According to Tepe, Kaleci and Tuzun (2016); virtual reality is a three-dimensional simulation environment in which users interact with other objects and create a sense of being in the environment in order to have real-life experiences in an artificial world made by the computer with imaging equipment that users wear on their bodies or enter into various devices. Looking at the definitions suggested by literature, it is safe to say that the most important advantage of virtual reality is that it provides experiences similar to real life while giving the feeling of being in a real environment.

As innovative technologies such as virtual reality emerge, ideas for incorporating them into classrooms and other educational settings to improve and enrich student's learning are emerging (Parong and Mayer, 2018). Since the first examples of virtual reality applications (virtual cockpits) have produced effective educational results. Today, it is possible to come across numerous examples of the use of virtual reality technologies for educational purposes. Virtual reality technologies can be used safely to teach emergency measures such as earthquakes, fires and various other natural disasters (Gokoglu et al., 2017; Simsek & Can, 2019). Virtual reality technologies, on the other hand, that provide near-real-life experiences with the feeling of being in a real environment are widely used in foreign language learning. A virtual reality platform called ImmersMe, created by Scott Cardwell in 2015, provides learners with an environment where they can interact with people in a 360º simulated real-life environment (Soto et al., 2020), supporting the development of speaking skills in nine different languages (He & Smith, 2019).

There are frequently encountered findings in literature that virtual reality has positive effects on learning outcomes (Hu-Au & Lee, 2017; Huang et al., 2019; Liu et al., 2017). Activities in the teaching content can be offered line with the needs and individual characteristics of the students due to the flexible structures of the environments created with virtual reality technologies (Ozdemir et al., 2019). Accordingly, virtual reality applications that enhance learning environments can provide students with a variety of experiences while also making their learning experiences permanent (Simsek & Can, 2019). Another advantage of these technologies is that students, who are physically distant, have the chance to interact and communicate in virtual environments (Coruh, 2011). Furthermore, using virtual reality technologies, students can explore macro environments (such as the Moon or the Martian surface), microstructures and environments at the molecular level (such as viruses) or scenarios that are not normally real (such as the ice age) (Cavas et al., 2004). In addition to these benefits, virtual reality applications facilitate learning by enabling students to be active, supporting learning by doing, facilitating the transfer of learning to real life and increasing students' the creativity and interest through to the fun environments they provide (Cavas et al., 2004; Kandemir & Atmaca-Demir, 2020; Simsek & Can, 2019; Hill, 2016). On the other hand, although it has advantage of reducing costs in education, cost can be an important factor in providing virtual reality technologies. Moreover, problems such as systemic errors, inadequacy of reality, software availability or lack of feedback are thought to have an impact on the use of these technologies in educational settings (Kavanagh et al., 2017). Nonetheless, the cost of virtual reality technologies has been falling in recent years (Yildirim & Yildirim, 2020).

Related Literature

There are 4 open-access articles in the Web of Science database that use a systematic literature review method to examine studies relevant to virtual reality in the fields of education and social sciences. In these studies, Radianti et al. (2020) analyzed articles on virtual reality at the higher education level; Parmaxi (2020) analyzed articles on virtual reality as an emerging technology in language teaching and learning; Huttar and Brintzenhofeszoc (2020) analyzed articles on the use of virtual reality in social work trainings; Lin and Lan (2015) analyzed articles on virtual reality applications in journals that published on computer-aided language learning.

Also in the context of Turkey, there are 4 articles that use content analysis to examine virtual reality studies in the fields of education and social sciences. In these studies, Cankaya (2019) analyzed articles on the use of virtual reality headsets (VR headsets) in education; Budak et al. (2019) analyzed articles using virtual reality applications; Simsek and Can (2019) analyzed articles on the use of virtual reality at the higher education level; Emre et al. (2019) analyzed articles containing devices that provide immersion effect in virtual reality applications for educational purposes.

The Google Scholar database includes 1 paper that examines virtual reality studies in the fields of education and social sciences using content analysis. An abstract study on virtual reality was conducted by Hasancebi et al. (2018). The following classification is shown in Table 1.

Table 1. Literature review on virtual reality

Years	Title	Author(s)	The Content of the Study	Databases/ Indexes	Number of Article
2014-2019	Use of VR Headsets in Education: A Systematıc Review Study	Serkan Çankaya	Content analysis of articles related to the use of virtual reality headsets in education was conducted in this research, which was patterned with systematic literature review model. In the study, articles were analyzed in terms of subject areas, research methods, most cited articles, data collection tools, participants and variables.	Scopus	49 articles
2016-2018	A Systematic Review of İmmersive Virtual Reality Applications for Higher Education: Design Elements, Lessons Learned, and Research Agenda	Jaziar Radianti Tim A. Majchrzak Jennifer Fromm Isabell Wohlgenannt	It is aimed to examine the virtual reality studies conducted at the higher education level with a systematic literature review model. In the research, virtual reality technologies used in articles, research topics of articles, research patterns, data collection tools, analysis methods, theoretical basis and keywords were analyzed.	IEEE Xplore Digital Library ProQuest Scopus Web of Science	38 articles
2015-2018	Virtual Reality in Language Learning: A Systematic Review and Implications for Research and Practice	Antigoni Parmaxi	In this research patterned with systematic literature review model, qualitative analysis of articles on virtual reality was carried out as a technology emerging in language teaching and learning. In the study, the technologies used in the articles, the duration of language learning environments and educational activities, the benefits and limitations of using virtual reality as an educational tool in the language class, recommendations on the educational use of virtual reality were analyzed.	Google Scholar	26 articles

2014-2018	Developed Software and Used Platforms in Virtual Reality Applications in Education Field	Mehmet Bütün Veli Özcan Budak Murat Selçuk Ilkim Ecem Emre Irfan Şimşek	It is aimed to examine the studies using virtual reality applications with content analysis. In the research, the platforms on which the articles were developed, the software languages used, the supported operating system and the virtual stores where they can be accessed were analyzed.	ERIC SCOPUS	62 articles
2013-2018	Examination of Virtual Reality Usage in Higher Education in Terms of Different Variables	Irfan Şimşek Tuncer Can	It is aimed to examine the studies on the use of virtual reality at the higher education level using content analysis. In the research, virtual reality studies were analyzed in terms of which areas, which platforms were developed, which software language was developed and which devices were used in virtual reality studies.	EBSCOhost ERIC SCOPUS ULAKBİM Web of Science	30 articles
2013-2017	Investigation of Devices Used in Virtual Reality Applications for Education Purposes in Terms of Immersion	Ilkim Ecem Emre Murat Selçuk Veli Özcan Budak Mehmet Bütün Irfan Şimşek	Content analysis of articles containing devices that offer immersion effect in virtual reality applications for educational purposes was carried out. In the study, workspaces where virtual reality applications were used and related immersion levels; system types; devices used; use cases of motion sensors; whether users have the ability to move freely and which sensory organs it appeals to were all analyzed.	Scopus	30 articles
1996-2017	Investigation of Virtual Reality Thesis in Turkey	Mehmet Hasançebi Mehmet Yavuz Ali Gündüz Sabri Serkan Tan Yüksel Göktaş	The postgraduate theses on virtual reality were examined in this study, which used the content analysis method, which is one of the qualitative research analysis techniques. In the research, the distribution of the dissertations/theses according to the institutes, the scientific research methods used, sampling distribution, data collection tools, application times, dependent variables used and virtual reality environments used were analyzed.	YÖK thesis center	38 master's theses 22 Doctoral Dissertations
2000-2016	Virtual Reality and Computer Simulation in Social Work Education: A Systematic Review	Carol M. Huttar Karlynn Brintzenhofeszoc	An analysis of research on the use of virtual reality in social work education was conducted in this research, which was patterned with the systematic literature review model. In the study, the research objectives of the articles, research patterns (methods), participants, virtual reality technologies used were analyzed.	PsycINFO Social Work Abstracts ProQuest Social Services Abstracts ProQuest: Social Sciences Medline ProQuest Dissertations & Theses Global Web of Science	7 articles

2004-2013	Language Learning in Virtual Reality Environments: Past, Present, and Future	Tsun-Ju Lin Yu-Ju Lan	In this research s, studies on virtual reality were examined in the top four computer aided language learning journals using the content analysis method, which is one of the qualitative research analysis techniques. The research subjects of the articles, the technologies used, language learning environments, study groups (participants), research methods, and data collection tools were all analyzed in the study.	Language Learning and Technology (LLT), CALICO Journal, Computer Assisted Language Learning, (CALL), ReCALL.	29 articles

Problem Statement

The analysis studies conducted related to virtual reality demonstrate that the studies carried out in this field have drawn considerable interest in recent years. While the studies analyzing the articles published internationally and in the context of Turkey of virtual reality technology, which has begun to gain considerable interest in education technologies in recent years, were reviewed, only one paper study analyzing postgraduate theses was found. In this study, an analysis of the theses between 1996 and 2017 was conducted and a review of all fields was examined. The most significant difference in this study was that while the theses was accessed in the database, only the Social Sciences group was chosen and other fields were not. Theses completed in the context of Science and particularly engineering include virtual reality hardware and software developed whereas the theses in the field of Social Sciences focuses on the effects of these technologies. It is critical to ascertain the current status of postgraduate theses carried out in social sciences and especially in the fields of education in Turkey. Although the concept of virtual reality has started to gain importance in education in Turkey, it can be said that there is some confusion regarding the use of this concept (Simsek and Can, 2019) and the tendency towards this concept is relatively less in social sciences. In this context, postgraduate theses on virtual reality in the field of social sciences should be determined and analyzed by 2020 in order to reduce/eliminate the current confusion about the use of the concept, and to guide researchers planning to conduct a virtual reality study for the future.

Based on this requirement, the concept of virtual reality was investigated in this study through 54 dissertations/theses using content analyses, including 13 doctorates and 2 proficiency of art dissertations, 39 master's theses published between 2008 and 2020. The type of theses/dissertations, the university and department in which it was completed, the year of publication, its general purpose, the software and hardware used in virtual reality, the name, method, data source, keywords of these software and hardware, thesis completed in Turkey on virtual reality in the Social Sciences group were all examined within the scope of the study.

Aim of the Research and Research Questions

The purpose of this study is to determine the usage trends in virtual reality technologies especially in terms of Social Sciences and Educational Sciences by means of examining with the content analysis of 54 doctoral dissertations, master's theses and proficiency of arts theses with access permission, of which ''virtual reality'' notion is included in the title and prepared in Social Sciences Group in Turkey between 2008-2020. It is seen that the first study in the Database of National Thesis Center of the Turkish Higher Education Council was published in 2008 within the scope of the search criteria determined within the scope of this study. Thereby, this study includes theses that were published since 2008. In order to depict the methodological and technological trends in the postgraduate studies that have been conducted about virtual reality in the field of social sciences and to create a guide for people who want to work on virtual reality, the following research questions are being sought for answers in order to achieve the research aim:

In the context of the general distributions of dissertations:

1. How have the numbers of theses/dissertations changed over the years?
2. How are theses/dissertations distributed according to type?
3. How are theses/dissertations distributed based on the languages in which they were written?
4. In which universities are the theses/dissertations being prepared?
5. Which departments are responsible for thesis/dissertation preparation?
6. What are the objectives that theses/dissertations are attempting to achieve?

In the context of virtual reality's technological dimension:

7. What are the types of virtual reality software used in theses/dissertations?
8. What are the types of virtual reality hardware used in theses/dissertations?
9. What are the names of the virtual reality software used in theses/dissertations?
10. What are the names of the virtual reality hardware used in theses/dissertations?

In the context of research methodology:

11. What research methods are used in theses/dissertations?
12. What data collection tools are used in theses/dissertations?
13. Which sample groups are preferred in theses/dissertations?
14. Which keywords are used the most in theses/dissertations?

The questions created within the scope of the research aim are developed by the dimensions that absence to be felt in the literature. Examining the distribution of postgraduate theses by year reveals the overall trend in the field. It is thought that examining the distributions of the year, dissertations/theses types and languages written will provide a critical indicator of conceptual dominance and again symbolize the overall trend. The aim of examining the distribution of thesis types is to determine the depth of the framework studied in the field. It is thought that the examination of the framework of purpose created in the dissertations/theses will represent the general perception and saturation of the concept of virtual reality. In particular, the types of software and hardware used in the dimensions investigated in the concept of virtual reality and their names are thought to help shape future studies as a distinct dimension. The clear classification of virtual reality-related devices and software based on their intended use has been helpful in shaping research questions as dimensions specific to virtual reality. It is therefore foreseen to increase the dominance of the concept of virtual reality, the unity of definition and the level of knowledge for the purpose of use. Through questioning of research methods, data collection tools, samples and keywords within the scope of this research is thought to support researchers planning to conduct future research to create a broad perspective of understanding, view the methodical trend in the field and to formulate ideas about conceptual gaps.

Methodology

In this study, systematic review model was used. The systematic review is the systematic synthesis and presentation of the findings by bringing together the studies published on the research question within the framework of certain criteria in order to find an answer to a specific research question (Bellibaş and Gümüş, 2018). This study, in which the review of documents was conducted, was carried out by examining the virtual reality thesis and dissertation documents from the Social Sciences group. The data collection tool and data analysis processes are explained within the scope of this section.

Data Collecting Process

In this research, the Database of National Thesis Center of the Turkish Council of Higher Education was used as raw data and the dissertations/theses with “virtual reality” were included as keywords in the name of the dissertations/theses were listed. The “Advanced Search” module was used in this database on October 15th, 2020, with dissertations/theses permitted as “Social” and “Permission Status” were filtered in the “Group” section. A total of 54 dissertations/theses were examined in the search dated October 15, 2020. The data was edited using Microsoft Excel and divided into columns and shared online in a Google Drive environment for use by all researchers.

Data Analysis

Virtual reality dissertations/theses were examined using content analysis within the scope of this study. Many scientific definitions of content analysis, which is a research analysis technique, can be found in the literature. Essentially, content analysis is a method used to study by reviewing the literature of a scientific field (Falkingham and Reeves, 1998). Weber (1990) describes content analysis from a broader perspective as “the method by which inferences are made to analyze the message itself, its sender and the effect it creates”. According to Krippendorff (2004), content analysis is a research technique used to make repetitive and valid inferences, from texts to usage contexts. Researchers can use content analysis to systematically sift through large quantity of data and simplify it (Stemler, 2001). The content analysis in this study was conducted online in Google Drive Excel, where all researchers can work collaboratively. In the study, 14 researchers analyzed 54 theses themselves in Google Drive. After these individual analyzes, the researchers evaluated each other's analyzes with the peer review method. As a result of the latest analyzes by the field experts, the final state of the findings has emerged. In the context of validity and reliability, the articles reviewed were reanalyzed in the 2nd round by different researchers. The analyses were finally filtered by the field specialist in this study, which also used peer review.

Limitations

There are some limitations of this research. The research is limited to 54 postgraduate dissertations/theses from the Social Sciences group. It is also limited to postgraduate studies in Turkish context. The dissertations/theses made openly available and published until October 15, 2020 are included in the analysis. Dissertations/theses with only the term virtual reality in the title were filtered and limited in the study. Furthermore, the research is limited to the Council of Higher Education’s Thesis Center, which is the database from which the theses are publicly available.

Findings

Changes in Dissertation/Thesis Numbers Completed by Year

When the numerical distribution (Figure 1) of postgraduate thesis on virtual reality completed in Turkey in the field of Social Sciences is examined, it is clear that the first thesis study (master’s thesis) was published in 2008. There was a seven-year period of productivity stagnation between 2008 and 2015. Since 2016, the studies have begun to reach saturation and 2019 has seen a significant increase. İt is clear that the total number of dissertations/theses completed in 2019 (25 theses) is greater than the total number of dissertations/theses completed between 2008 and 2018 (23 theses). Productivity peaked with an increase of about 300% in 2019 and is not maintaining its continuity in 2020 (6 theses). This may be because 2020 has not yet been completed at the time the dissertations/theses are accessed.

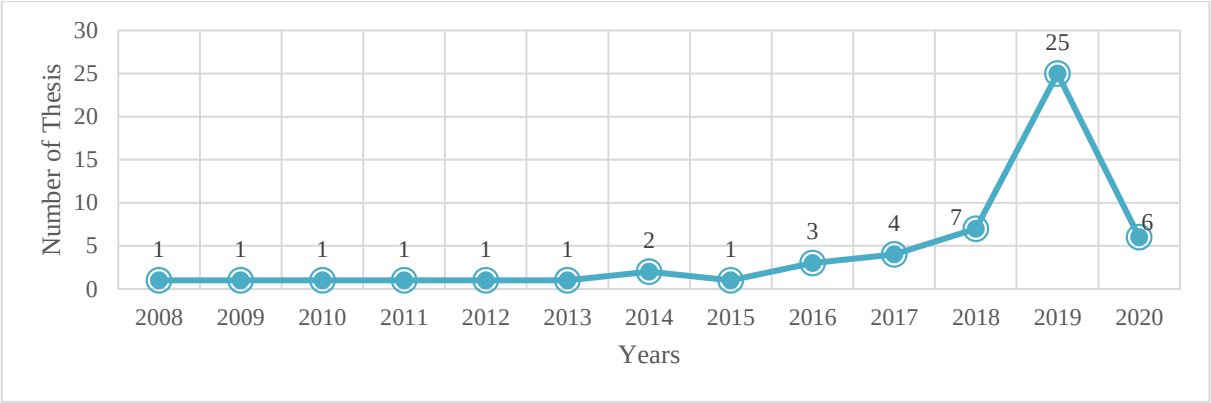

Figure 1. Changes in dissertation/thesis numbers completed by year

Distribution of Dissertations/Theses by Type

As shown in Figure 2, when the postgraduate dissertations/theses on virtual reality completed in the Social Sciences group is examined, it is clear that the majority of them are master's theses (f=39), followed by doctoral dissertation (f=13), and a small number of proficiency of art dissertation (f=2) are published. When the master's thesis was examined, it was found that the majority of the studies were carried out in the fields of Education (f=14) and Game Design (f=7). These are followed by Radio, Television and Cinema, Public Relations, Marketing and Psychology. It was seen that researches were conducted primarily in the field of Education (f=8) in doctoral dissertations. Two theses have been written in the arts as mentioned above. It has been determined that studies have been published in the fields of Sculpture and Graphic Design.

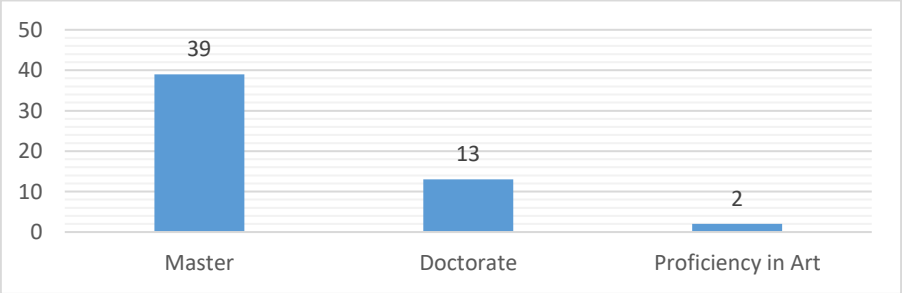

Figure 2. Distribution of dissertations/theses by type

Language Used in Dissertations/Theses

When the doctoral, proficiency of art dissertations and master's theses on virtual reality in Turkey are examined, it is found that the theses/dissertations are primarily written in Turkish as shown in Figure 3. 30 of the master's thesis, 12 doctoral dissertations and two proficiency of art dissertations have been prepared in Turkish. 9 of the theses prepared in English are master's thesis, while 1 is a doctoral dissertation.

Figure 3. Language used in dissertations/theses

Universities where Dissertations/Theses are Prepared

Table 2 shows the universities where the virtual reality theses/dissertations prepared in the Social Sciences group were completed. In this context, the universities with the highest number of dissertations/theses completed are ranked as Bahcesehir University, Anadolu University, Marmara University, Istanbul University and Gazi University.

Table 2. Universities where dissertations/theses are prepared

University	f
Bahçeşehir University	9
Anadolu University	8
Marmara University	6
İstanbul University	4
Gazi University	3
Hacettepe University	2
Trabzon University	2
Amasya University	1
Ankara Hacı Bayram Veli University	1
Beykent University	1
Biruni University	1
Bolu Abant İzzet Baysal University	1
Çanakkale Onsekiz Mart University	1
Dokuz Eylül University	1
Fatih University	1
İstanbul Arel University	1
İstanbul Aydın University	1
İstanbul Okan University	1
İstanbul University -Cerrahpaşa	1
Kadir Has University	1
KTO Karatay University	1
Maltepe University	1
Mersin University	1
Muğla Sıtkı Koçman University	1
Sakarya University	1
Üsküdar University	1
Yaşar University	1
Total	**54**

Departments which Dissertations/Theses are Prepared

As shown in Table 3, dissertations/theses on virtual reality in Turkey are conducted in a variety of fields, particularly Design, Communication Sciences and Education. When the findings are analyzed, the Department of Computer Education and Instructional Technologies (f=9) comes out on top. The Department of Game Design (f=6) in the field of design is ranked second. The Department of Radio, Television and Cinema (f=4) in the field of Communication Sciences is ranked third. When the 54 dissertations/theses discussed within the scope of the review are investigated, the fact that the relevant subject is the subject of research in various departments indicates that the subject of virtual reality will be viewed as effective in all areas of life in the near future.

Table 3. Departments which Dissertations/Theses are Prepared

Departments	f
Computer Education and Instructional Technologies	9
Game Design	6
Radio, Television and Cinema	4
Tourism Management	3
Business	3
Media and Publications	2
Educational Technology	2
Graphic Design	2
Fine Arts Education	2
Public Relations and Publicity	2
Mathematics and Science Education	2
Special Education	2

Psychology	1
Midwifery	1
Education Programs and Instruction	1
Graphic Education	1
Public Relations and Advertising	1
Sculpture	1
Communication Design	1
Clinical Psychology	1
Media Design	1
Marketing	1
Sociology	1
Basic Education	1
Sports Management and Recreation	1
Turkish Education	1
Foreign Language Education	1
Total	**54**

Dissertations'/Theses' Objectives

As shown in Table 4, the dissertations/theses on virtual reality are conducted for various purposes. The intensity of the dissertations/theses performed for virtual reality gaming experiences (f=6) is particularly notable. Dissertations/Theses on virtual reality, on the other hand, are conducted to determine the effectiveness of virtual reality applications in marketing (f=4), effectiveness in the field of cinema (f=4), presence perception (f=4), language teaching (f=3) and opinions on the use of virtual reality in education (f=3).

Table 4. Dissertations'/Theses' Objectives

Dissertations'/Theses' Objectives	**f**
Virtual Reality Gaming Experiences	6
The Effectiveness of Virtual Reality Applications in Marketing	4
The Effectiveness of Virtual Reality Applications in the Field of Cinema	4
Presence Perception	4
Language Teaching	3
Views on the Use of Virtual Reality in Education	3
The Impact of Virtual Reality Applications on Cognitive Load and Success	2
The Effectiveness of Virtual Reality Applications in Physical Sciences	2
The impact of Virtual Reality Applications on Students with Autism Spectrum Disorder	2
The Effectiveness of Virtual Reality Applications in Advertising	2
The Effectiveness of Virtual Reality Applications in the Tourism Industry	2
The Effectiveness of Virtual Reality Applications in Journalism	2
The Effectiveness of Virtual Reality Applications in the Field of Art	2
Using Virtual Reality in Psychology	2
The Effectiveness of Virtual Reality Applications in Math Courses	1
The Effectiveness of Virtual Reality Applications in the Field of Art History	1
The Impact of Virtual Reality Applications on Learning	1
Creating Design Principles	1
The Effectiveness of Virtual Reality Applications in Photography	1
Impact of Virtual Reality Applications on Consumption Behaviors	1
The Effectiveness of Virtual Reality Applications in Nursing	1
The Effectiveness of Virtual Reality Applications in Programming Training	1
The Effectiveness of Virtual Reality Applications in The Field of Basic Fire Safety Training	1
The Effectiveness of Virtual Reality Applications in Midwifery	1
The Impact of Virtual Reality Applications on Attitude	1
Use of Virtual Reality Applications in the Field of Cultural Heritage	1
The Effectiveness of Virtual Reality Laboratories	1
Virtual Reality Museum Experiences	1
Total	**54**

Type of Virtual Reality Software

When the findings of which software type was used in the dissertations/theses are examined (Table 5) the type of software used in a significant part of the theses is "not specified" (f = 40); i.e. no information about the type of software is included. Looking at the theses in which the software type is specified, "360^0 Video" software was used in 5 theses, "3D Game" software in 5 theses, "Mobile Applications" in 3 theses, "Web-based Virtual Reality" software in 3 theses, "3D Animation" software in 2 theses and "Video Based Applications" in 1 thesis.

Table 5. Type of Virtual Reality Software

Type of Virtual Reality Software	F
360^0 Videos	5
3D Games	5
Mobile Applications	3
Web Based Virtual Reality	3
3D Animation	2
Video Based Applications	1
Unspecified	40
Total	**59**

**In some dissertations/theses, more than one type of software was used.*

When the findings concerning the number of software used in the dissertations/theses and the type of software are examined, it is found that a significant number of theses (f = 11) are used only one software. Furthermore, 1 thesis used two software (Mobile Applications and Web-based Virtual Reality) and 2 theses used three software (360^0 Video, 3D Game and 3D Animation).

Types of Virtual Reality Hardware

The types of virtual reality hardware used in dissertations/theses are shown in Table 6. İt is clear that VR headsets are the most commonly used type of hardware (f=32). Following that smartphone use (f=5), barco vision (f=1), screen-based video surveillance viewer (f=1), hand scanning system (f=1), flash card (f=1), projection (f=1), simulator (f=1) are some of the other types of hardware used. These statistics show that VR headsets are widely used in the theses on virtual reality in the field of social sciences.

Table 6. Type of Virtual Reality Hardware

Type of Virtual Reality Hardware	*F*
Virtual Reality Headsets	32
Smartphone	5
Barco Vision	1
Screen-Based Video Surveillance Viewer	1
Hand Scanning System	1
Flash Card	1
Projection	1
Simulator	1
Unspecified	20
Total	63

** More than one type of hardware has been used in some theses/dissertations.*

It was observed that some of the dissertations/theses examined, used more than one type of hardware. All smartphone, flash card, simulator and hand scanning system equipment used in these theses, as well as VR headsets were included. Only two of the theses mentioned in hardware type did not use VR headset. The study was conducted in 2014, and one example is the combination of barco vision and projection. In the other example is the study conducted in 2008, only the screen-based display was used. Two of the three earliest dated studies in which a hardware type is specified are represented by these examples.

The Names of Virtual Reality Software Used in Dissertations/Theses

When the findings of the virtual reality software used in the dissertations/theses are examined (Table 7), Quicktime VR (f=2), Second Life (f=2) and Unity 3D (f=2) software are found to be more commonly

used than others. In addition to these software, the dissertations/theses include 17 different types of software. Each of these software names has only been found once. On the other hand, 42 dissertations/theses did not include the name of the virtual reality software used.

Table 7. The Names of Virtual Reality Software

Software Name/Brand	***F***
QuickTime VR	2
Second Life	2
Unity 3D	2
VR Authoring Studio	1
Maya	1
SolidWorks	1
Pokémon Go	1
Google Expeditions	1
Psious	1
The Apartment View VR	1
Safari Tour Adventure VR	1
VR Travel	1
Supermarket VR Cardboard	1
LG 360 Cam Viewer	1
Adobe Premiere	1
Adobe Audition CS6	1
Adobe Audition 1.5	1
Cyberlink Power Director 17	1
Sony Vegas 15.0	1
360^0 Module Injecting	1
Unspecified	42
Total	**65**

** More than one software brand has been used in some dissertations/theses*

The Name of Virtual Reality Hardware

When the virtual reality hardware used in 54 dissertations/theses are examined (Table 8), it is clear that the hardware name is not specified in the majority of the dissertations/theses (f=29). Upon examination the findings, it can be seen that the most used hardware is Oculus Rift (f=9), Samsung Gear VR (f=8), Google Cardboard (f=6) and HTC Vive (f=6). Leap Motion, Microsoft Kinect, Oculus Quest, OSVR HDK2, Playstation VR, Bobo VR Z4, eMagin Z800, Shinecon, VR Box 3D, Xiaomi Mi VR Play 2 hardware are also used in one each dissertation/thesis.

Table 8. Type of Virtual Reality Hardware

Hardware Name/Brand	***f***
Oculus Rift	9
Samsung Gear VR	8
Google Cardboard	6
HTC Vive	6
Leap Motion	1
Microsoft Kinect	1
Oculus Quest	1
OSVR HDK2	1
Playstation VR	1
Bobo VR Z4	1
eMagin Z800	1
Shinecon	1
VR Box 3D	1
Xiaomi Mi VR Play 2	1
Unspecified	29
Total	**68**

**In some dissertations/theses, more than one type of hardware was used.*

The Method Used

As shown in Table 9, the quantitative research method was preferred the most in the published theses/dissertations. Following that, qualitative and mixed methods were used. One of the theses was design-based. The method information used in 1 thesis could not be obtained. Mixed methods were used in 7 of the 13 theses published in the scope of PhD, quantitative methods were used in 4 and

qualitative methods were used in 2 studies. Quantitative methods were used in 17 of the 39 theses published in the postgraduate scope, qualitative in 14, mixed in 6 and design-based methods in 1 thesis. There is no method specified in 1 master's thesis. Qualitative method was used in both proficiency of art dissertations. While the mixed method is the most used method in doctoral dissertations, it is preferred at a much lower rate in master's thesis.

Table 9. The Method Used

Method	f
Quantitative	21
Qualitative	18
Mixed	13
Design Based	1
Unspecified	1
Total	**54**

Data Collection Tools Used in Theses/Dissertations

The findings in Table 10 are obtained after taking into account the data collection tools. Accordingly, the survey is the most commonly used data collection tool, and it has been used in 25 of the theses/dissertations. Interviews are the second most commonly used data collection tool. The tests and documents share the 3rd place. Then comes scale (f=10), observation (f=6), experiment (f=3), video camera recordings (f=2), respectively. The other tools were used only once and in two of the theses, the data collection tool was not specified.

Table 10. Data Collection Tools Used in Theses/Dissertations

Tools	*f*
Survey	25
Interview	20
Test	15
Document	15
Scale	10
Observation	6
Experiment	3
Video Camera Recordings	2
Unspecified	2
Virtual Reality Application	1
Log Records	1
Follow-up Form	1
Web Page	1
Student Notes	1
Diary	1
Total	**104**

** More than one data collection tool was used in some Theses/dissertation.*

Samples

When the sample groups in Table 11 are examined, it is found that the sampling of undergraduate students is included the most. Individuals with various demographic characteristics as well as middle school students are listed as the most frequently used data sources.

Table 11. Preferred Samples

Samples	F
Undergraduate students	13
Individuals with different demographic characteristics	11
Secondary school students	6
Language course students	2
Primary school students	2
Game players	2
Managers	1
High school students	1
Expectant mothers	1
Museum visitors	1
Teachers	1

Recreation business employees	1
Mental health workers	1
Participants with aviophobia	1
Unspecified	1
Total	**54**

**In some dissertations/theses, more than one type of software was used.*

Keyword Analysis in Dissertations/Theses on Virtual Reality

Table 12 shows that the virtual reality keyword (f = 50) is the most commonly used in dissertations/theses. The other keywords used in dissertations/theses are listed in order of decreasing frequency as Google Cardboard (f = 7), virtual environment (f = 5), augmented reality (f = 4), virtual reality games (f = 3), mixed reality (f = 2), virtual reality experience (f = 2), virtual reality technology (f = 2), social media (f = 2), cognitive load (f = 2), motivation (f = 2), news (f = 2), academic achievement (f = 2), three-dimensional (f = 2), existence (f = 2), word learning (f = 2), journalism (f = 2), digital marketing (f = 2), marketing (f = 2) , vision (f = 2), autism spectrum disorder (f = 2). In Table 12, 133 words given under the title of others are different from each other and used once.

Table 12. Keyword Analysis

Keywords	***F***
Virtual reality	50
Google Cardboard	7
Virtual environment	5
Augmented reality	4
Virtual reality games	3
Mixed reality	2
Virtual reality experience	2
Virtual reality technology	2
New media (Social media)	2
Cognitive load	2
Motivation	2
News	2
Academic achievement	2
Three dimensional	2
Existence	2
Word learning	2
Journalism	2
Digital marketing	2
Marketing	2
Vision	2
Autism spectrum disorder	2
Others	133
Total	**234**

Discussion and Conclusion

When the distribution of the dissertations/theses related to virtual reality by year is examined, it is understood that the first study is a master's thesis and was completed in 2008. The interest in virtual reality has been on the rise since 2016 following seven years of stagnation between 2008 and 2015, and with 2019 that interest has reached a high level. In the Gartner Hype Cycle published by Gartner company in 2016, which is one of the sources providing information on the process of change of interest in technologies, it is seen that virtual reality reached the stage of mass recognition (Gartner, 2016). In 2018, virtual reality took place on the productivity plateau, which is the last stage and became mainstream in the context of technology and its production accelerated (Gartner, 2018). Indeed, the distribution of the dissertations/theses by years corresponds to the process of changing interest in virtual reality technologies and shows similarities with Gartner Hype Cycles. A similar study analyzed virtual reality theses in Turkey; however, the distribution of theses by years was not included (Hasancebi et al., 2018). In this study, the distribution of the theses by years is examined and the general tendency towards concept, the course followed by dominance and saturation are described in this manner. According to the studies analyzing virtual reality research, the peak in productivity occurred in 2017, with a significant decline in the number of research in the following years (Butun et al., 2019; Emre et al., 2019; Muñoz-Saavedra et al., 2020; Simsek and Can, 2019). In this case, while interest in virtual reality in academic research peaked in 2017, the highest level of interest in theses is observed in 2019. Given the thesis

studies cover a long period, it is safe to say that the interest in virtual reality in the theses completed has continued from previous years.

When the distribution of types of dissertations/theses related to virtual reality in Turkey is examined, it is clear that master's thesis is most prevalent and predominant. Hasancebi et al. (2018), in similar to his study on the examination of virtual reality dissertations/theses in Turkey,stated that the number of master's thesis is approximately three times that of PhD dissertations. In Altinpulluk's (2018) study of the dissertations/theses in higher education using augmented reality in the field of education, it was similarly concluded that master's thesis is more than doctoral dissertation and attributed this to the need to reveal doctoral dissertation as high quality over a longer period than master's thesis. This is demonstrated by the fact that doctoral dissertation is a type of study that covers a longer process and is carried out in more depth than master's thesis, and the number of master students graduating each year is greater than the number of PhD students.

It is thought that one of the factors affecting the national coverage of a study is the language in which the study was written. Therefore, it can be said that it is important to analyze the languages in which the studies are written. When the distribution of dissertation/theses languages was examined, it was found that 44 dissertations/theses were written in Turkish and 10 dissertations/theses were written in English. Dissertations/theses written in Turkish consist of 30 master's degrees, 12 PhD and 2 art proficiency dissertations. On the other hand, nearly all English theses are master's theses. The use of the English language in these theses stems from the fact that English is the graduated program language. The dissertations/theses, however, were written in 27 different universities with the majority of them belonging to Bahçeşehir University, Anadolu University and Marmara University. When the departments that prepare the dissertations are examined, Computer and Instructional Technology Education, Game Design and Radio, Television and Cinema departments are in the top three places. Virtual reality is expected to be thesis topic in technology and game-related departments. Furthermore, one of the theses was written in the Department of Midwifery. Despite the fact that virtual reality is widely used in the field of medicine (Emre et al., 2019; Kayabasi, 2005), diversity in the field suggests that these technologies can be used as effective tools for a variety of purposes.

The purposes of the dissertations/theses differ depending on the fields in which they are written. In comparison to other purposes, it can be seen that the studies conducted to investigate virtual reality game experiences are in majority. It is not surprising that the vast majority of dissertations/theses serve a particular purpose in this field. The development process of virtual reality technologies is closely related to the gaming industry (Muñoz-Saavedra et al., 2020). Many games and virtual environments have been created as a result of these technologies, and users can now enjoy a variety of experiences (Petrovic, 2018). According to the literature, virtual reality is an effective tool in marketing applications for new generations, particularly those who are growing up with technology, in terms of the convenience it provides to consumers (Kaleci et al., 2017; Kose & Yengin, 2018; Tepe et al., 2016). Virtual reality is frequently preferred in areas such as cinema, gaming and distance education because it allows people to feel as if they are in a virtual environment created by this technology (Baydaş Sayilgan and Sayilgan, 2013; Girvan, 2018; Sunal, 2016).

When the types and names of software used in the dissertations/theses are examined, it is noticeable that these elements are not specified in a significant portion of the theses. It is clear that 360^0 Videos and 3D Games are mostly used in theses where the software type is specified. In this context, it is safe to say that these types of software are mostly preferred in academic applications related to virtual reality. In some dissertations/theses, however, it was determined that several software are used in tandem. It is thought that the diversification of software types in virtual reality applications will enhance the effectiveness of the user experiences. On the other hand, the names of the software used in the theses are vary and dispersed (no clustering on single software). While some software such as VR Authoring Studio and Maya SolidWorks are included only once, QuickTime VR is used twice in Second Life and Unity thesis studies. This variety could be attributed to the different software's preferences in terms of meeting the needs. Butun et al. (2019) investigated the software used in the studies on virtual reality applications in education in terms of accessibility and compatibility and found that Unity and Maya platforms were mostly used in the studies. Second Life was one of the platforms that came after these software. Similarly, Simsek and Can (2019) stated that Unity software was used in most of the studies

in their study on the use of virtual reality in higher education. Therefore, it can be said that the software used in academic studies related to virtual reality is similar and Unity software is generally preferred.

According to the findings for hardware types, VR headsets were used in more than half of the dissertation/thesis studies. When the findings regarding the names of the hardware were examined, it was seen that the name of the hardware was not included in most studies, and Oculus Rift was the most commonly used in the studies mentioned. A study conducted by Radianti et al. (2020) examined 6 studies that analyzed content for virtual reality research and concluded that VR headsets such as the Oculus Rift and HTC Vive were the most commonly used hardware. Likewise, Simsek and Can (2019) and Emre et al. (2019) both stated that Oculus Rift VR headsets are mostly used in their studies. These findings in the literature support the findings obtained within the scope of the research regarding the type and name of the hardware. In this context, it can be said that Oculus Rift v VR headsets are often preferred hardware in academic applications.

It is clear that quantitative methods are mostly used in the thesis/dissertation studies that have been examined. Quantitative method is followed by qualitative and mixed methods. When the findings are scrutinized in depth, it is observed that quantitative methods are preferred in master's thesis whereas mixed methods are typically used in doctoral dissertations. At this point, it is worth noting that doctoral dissertations point to a wider study in terms of process and quality. The mixed method is a research method in which quantitative and qualitative data are used together, which has a research process that is born, interpreted and spread with a broad philosophy (Creswell, 2019). Hence, it can be said that the comprehensive research process in doctoral dissertation allows the use of mixed method. When the literature was examined, according to the study conducted by Hasancebi et al. (2018), the quantitative method is the most intensively used research method in the theses on virtual reality in the field of education. Also, among the findings obtained from Cankaya's (2019) study, it was stated that quantitative methods were mostly used in studies. The studies mentioned support the finding obtained from this research. On the other hand, the design-based research method was used only in one thesis within the scope of the research. Considering the design of open source virtual reality software and applications that serve many purposes, it is noteworthy that the design-based research method is not preferred in the theses prepared in the field of social sciences.

Depending on the use of quantitative research method, it is clear that the most preferred data collection tool is the survey. Interviews, document analysis, and tests are other data collection tools that are frequently used. In the relevant literature, Hasancebi et al. (2018) using survey and scale data collection tools in almost half of the theses related to virtual reality supports this finding. On the other hand, Cankaya (2019) stated that experimental methods were mostly used in academic studies related to virtual reality; following the experiments, it was observed that the surveys were preferred. Based on Cankaya's (2019) review of studies using VR headsets, it can be said that experimental studies are in the majority. Although the types of publications examined vary, surveys are also frequently used in academic research as well as experimental studies.

The samples in the thesis studies examined are mainly comprised of undergraduate students. Individuals with various demographic characteristics in theses are also included in the other frequently selected sample groups. When the relevant studies are examined, the samples are mostly undergraduate students and documents in the studies conducted by Cankaya (2019) and Hasancebi et al. (2018).

As expected, it is clear that the keyword "virtual reality" is used the most in the thesis studies. In addition, the theses include keywords such as "augmented reality" and "mixed reality". The reason for the increased and mixed reality in the studies related to virtual reality may be due to the fact that these concepts are closely related to each other. Similarly, Cankaya (2019) stated that the keywords "virtual reality" and "augmented reality" are widely used in academic research. As a matter of fact, these terms are often used together and are discussed together in studies to prevent confusion of meaning.

Suggestions

In this study, doctoral and proficiency of arts dissertations as well as master's theses prepared in the field of Social Sciences in universities in Turkey were examined in various contexts. Determining the role of virtual reality in postgraduate studies in Turkey is crucial for demonstrating interest and inclination towards this subject. In this context, some recommendations can be presented by evaluating the findings obtained as a result of the study.

- While an increase in the distribution of theses/dissertations numbers by year is observed, researchers and advisers may be advised to complete more postgraduate thesis on the subject of virtual reality in Social Sciences and particularly in Educational Sciences.
- The preparation of more PhD and proficiency of arts dissertations in the field of Social Sciences can be encouraged.
- It may be suggested that English theses/dissertation on virtual reality should be studied more thoroughly in terms of international dissemination and impact.
- According to the study's findings, it is clear that postgraduate theses on virtual reality in the field of Social Sciences are distributed to 27 universities. Given that Turkey has a total of 209 universities, including 131 state and 78 foundation universities, it may be recommended that more universities encourage the production of postgraduate thesis on this subject.
- Technological advances are no longer used only in specific areas and they affect each other. In addition to fields such as medicine and engineering, new technological applications have emerged in the field of education (Altınpulluk, 2019). It is critical to conduct studies on the subject in various departments related to virtual reality. Virtual reality studies can be conducted in different departments other than in departments that have a technological dimension, such as the Department of Computer Education and Instructional Technologies, the Department of Game Design or the Department of Radio, Television and Cinema.
- It may be recommended that the theses should be designed to include different purposes other than virtual reality gaming experiences, marketing and cinematic effectiveness.
- Although it is seen that 360^0 videos and 3D games have been shown to be intense in the context of software in theses, it may be suggested to spread mobile applications, web-based systems, animations, and video-based applications.
- The use of barco vision, screen-based video monitoring, hand scanning system, flash card, projection, and simulators other than VR Headsets should be expanded.
- It may be suggested to develop applications with software such as Adobe Premiere, Maya other than QuickTime VR, Second Life, Unity 3D.
- It may be suggested to expand and integrate motion-based systems such as Microsoft Kinect, in addition to head-mounted viewers such as Oculus Rift, Samsung Gear VR, Google Cardboard, HTC Vive.
- Although the quantitative method is commonly used in theses/dissertations, theses containing qualitative and mixed methods can also be encouraged.
- Although questionnaires are frequently used in theses/dissertations, it may be suggested to use other data collection tools such as tests and observations.
- The future theses on virtual reality can be conducted by choosing samples from different segments of society, other than undergraduate students.

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Appendix A. Publications that were included to the research corpus.

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Akan, E. (2019). *Examining presence scales under the influence of increasing virtual reality experience in physiologically arousing virtual environments* [Unpublished master thesis]. Bahçeşehir University.

Akbıyık, M. (2020). *Otizm spektrum bozukluğu olan öğrencilere iletişim başlatma-sürdürme becerisinin kazandirilmasinda sanal gerçeklik teknolojisinin etkililiği.* [Unpublished master thesis]. Bolu İzzet Baysal University.

Akbulut, U. (2009). *Dijital ortamda sanal gerçeklik fotoğraf tekniğinin yeri ve önemi.* [Unpublished master thesis]. Marmara University.

Akifoğlu, U. B. (2016). *Exploring the experiential marketing and virtual reality: Research on experiential marketing applications utilized by service sector in Turkey.* [Unpublished master thesis]. Bahçeşehir University.

Akman, E. (2019). *İlkokul matematik dersi kesirler konusunda geliştirilen sanal gerçeklik uygulamasinin farkli değişkenler açısından etkisinin incelenmesi.* [Unpublished doctoral dissertation]. Amasya University.

Aksayım, A. (2019). *Effects of physical interactions on user experience in virtual reality games.* [Unpublished master thesis]. Bahçeşehir University.

Altun, D. (2019). *The effect of virtual reality experiential marketing on purchase intent: An experimental study.* [Unpublished doctoral dissertation]. İstanbul Okan University.

Arıcı, A. (2019). *Yeni medya çağında reklam iletişimi: sanal gerçeklik teknolojisinin reklama yönelik tutumlar ve satin alma niyeti üzerindeki etkisini ölçmeye yönelik bir çalişma.* [Unpublished doctoral dissertation]. Anadolu University.

Azap, Ö. (2014). *Dijital çağda kimlik oluşturmak: Sanal gerçeklik yanilsama ve gözetim "suret" kisa film çalişmasi örneği.* [Unpublished master thesis]. Kadir Has University.

Başaran, F. (2010). *Öğretmen adaylarinin eğitimde sanal gerçeklik kullanimina ilişkin görüşleri (Sakarya Üniversitesi BÖTE örneği).* [Unpublished master thesis]. Sakarya University.

Bayram, E. C. (2012). *Sanal gerçeklik ortaminda üç boyutlu plastik arayışlar.* [Unpublished master thesis]. Hacettepe University.

Bingöl, H. O. (2008). *Fotoğrafta sanal gerçeklik ve müzeler yolu ile sanat eğitimine katkilari (Anitkabir, Anadolu Medeniyetleri Müzesi uygulamasi.* [Unpublished master thesis]. Gazi University.

Çelik, İ. T. (2019). *Gelecek gazeteciliği örneği olarak sanal gerçeklik ve artirilmiş gerçeklik uygulamaları.* [Unpublished master thesis]. Anadolu University.

Çevik, I. E. (2019). *Üç boyutlu tasarim ve sanal gerçeklik kullanimi (Göbeklitepe çalişmasi).* [Unpublished master thesis]. İstanbul Arel University.

Çoruh, L. (2011). *Sanat tarihi dersinde bir öğrenme modeli olarak sanal gerçeklik uygulamasinin etkinliğinin değerlendirilmesi (Erciyes Üniversitesi Mimarlik ve Güzel Sanatlar Fakülteleri örneği uygulamasi).* [Unpublished doctoral dissertation]. Gazi University.

Demir, D. (2018). *Algoritma öğretiminde sanal gerçeklik kullanimina yönelik öğrenci görüşlerinin öğrenme stilleri bağlaminda incelenmesi.* [Unpublished master thesis]. Çanakkale Onsekiz Mart University.

Demir, M. C. (2019). S*inemada sanal gerçeklik ve sanal gerçekliğin dönüşümü.* [Unpublished doctoral dissertation]. Marmara University.

Dutucu, N. (2019). *Sanal gerçeklik gözlüğünün kadının algıladığı doğum ağrısına etkisi.* [Unpublished doctoral dissertation]. İstanbul University.

Dülgar, A. O. (2017). *Guidance cue differences between screen based and virtual reality games.* [Unpublished master thesis]. Bahçeşehir University.

Ekmekçi, G. (2019). *Sanal gerçeklik teknolojisinin günümüz reklamciliğina etkisi ve bir tasarim uygulama önerisi.* [Unpublished master thesis]. Ankara Hacı Bayram University.

Emen, S. (2020). *Sanal gerçeklik oyunlarinda teknoloji kabulü, bağ kurma, tatmin ve oynama niyet ilişkisi.* [Unpublished master thesis]. Anadolu University.

Erken, F. (2019). *Sanal gerçeklik teknolojileri ile izlenen haberlerin bellek ve anlama üzerine etkisi.* [Unpublished doctoral dissertation]. Anadolu University.

Gökaoğlu, S. (2019). S*anal gerçeklik temelli öğrenme ortaminin yangin güvenliğine yönelik davranişsal becerilerin gelişimine etkisi.* [Unpublished doctoral dissertation]. Trabzon University.

Gül, E. (2018). *Ruh sağlığı çalışanlarının psikiyatrik hastalıklarda sanal gerçeklik yönteminin kullanımı hakkında tutum çalışması.* [Unpublished master thesis]. Üsküdar University.

Güleç, U. T. (2019). *Pazarlamada artirilmiş gerçeklik ve sanal gerçeklik uygulamalarinin kullanimi: Türkiye ve dünyadaki örnekler çerçevesinde bir değerlendirme*. [Unpublished master thesis]. KTO Karatay University.

Kal, O. (2017). *Designing a virtual reality educational game for cinematic storytelling education.* [Unpublished master thesis]. Bahçeşehir University.

Kaya, F. B. (2019). *Öğretmenlerin eğitimde sanal gerçeklik uygulamalarinin kullanimina ilişkin görüşleri.* [Unpublished master thesis]. Bahçeşehir University.

Koçbuh, R. (2018). *The effectiveness of virtual reality tools on vocabulary learning and retention.* [Unpublished master thesis]. İstanbul University.

Köse, N. (2017). *Dijital pazarlamadan fijital pazarlamaya geçişe örnek olarak artirilmiş gerçeklik ve sanal gerçeklik uygulamalarinin pazarlama üzerindeki katkilarinin incelenmesi*. [Unpublished master thesis]. İstanbul Aydın University.

Kulakoğlu, Dilek, N. (2020). *Turizm sektöründe sanal gerçeklik teknolojisinin kullanimina ve etkisine yönelik keşifsel bir araştirma.* [Unpublished doctoral dissertation]. İstanbul University.

Maksetbekova, A. (2019). *Sanal gerçeklik oyunlarinin dayanilmaz çekiciliği: Zihnen, bedenen ve ruhen.* [Unpublished master thesis]. Anadolu University.

Masalcı, S. Z. (2020). *A guideline study for designing virtual reality games*. [Unpublished master thesis]. Bahçeşehir University.

Öngen, Y. (2014). *Kişilerarasi iletişim açisindan sanal gerçeklik olarak bilgisayar oyunlari: World of Warcraft örneği.* [Unpublished master thesis]. Marmara University.

Öngider, M. U. (2019). *Sanal gerçeklik gözlüğü deneyiminin seyahat motivasyonuna ve satin alma davranişina etkisi.* [Unpublished master thesis]. Muğla Sıtkı Koçman University.

Özkan, O. (2016). T*he compatibility of widely used presence questionnaires with current virtual reality technology.* [Unpublished master thesis]. Bahçeşehir University.

Özköylü, Ö. (2018). *Sanal gerçeklik ve kullanim alanlari: sayisal oyun örneği.* [Unpublished master thesis]. Anadolu University.

Özonur, M. (2013). *Sanal gerçeklik ortami olarak ikincil yaşam (second life) uygulamalarinin tasarlanmasi ve bu uygulamalarin internet tabanli uzaktan eğitim öğrencilerinin öğrenmeleri üzerindeki etkilerinin farkli değişkenler açisindan incelenmesi.* [Unpublished doctoral dissertation]. Mersin University.

Sağdıç, Z. A. (2019). *Otizm spektrum bozukluğu olan öğrencilere yüz ifadelerini tanimanin öğretiminde ayrik denemelerle öğretim ile sanal gerçeklik gözlüğü ile öğretiminin etkililiğinin karşilaştirilmasi.* [Unpublished master thesis]. Biruni University.

Saka, E. (2019). E*ğitsel amaçlı sanal gerçeklik uygulamalarına yönelik araştırmaların incelenmesi: Bir meta-sentez çalışması.* [Unpublished master thesis]. Trabzon University.

Samurkaş, N. D. (2016). *Sanal gerçeklik algisinin tüketim davranişlarina etkisi üzerine İstanbul'da yapilan niteliksel bir araştirma.* [Unpublished master thesis]. Maltepe University.

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Tarhan, Z. (2020). *Sanal gerçeklik araçlarinin yabanci dil olarak türkçe öğretiminde sözcük öğrenimine etkisi ve akilda tutmadaki verimliliği.* [Unpublished master thesis]. İstanbul University.

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Tepe, T. (2019). *Başa takilan görüntüleyiciler için geliştirilmiş sanal gerçeklik ortamlarinin öğrenme ve buradalik algisi üzerine etkilerinin incelenmesi.* [Unpublished doctoral dissertation]. Hacettepe University.

Topuz, Y. (2018). *Anatomi eğitiminde sanal gerçeklik ve üç boyutlu masaüstü materyallerin akademik başarı ve bilişsel yük açısından karşılaştırılması.* [Unpublished master thesis]. Marmara University.

Tuğtekin, U. (2019). *Çoklu ortamla öğrenmede konu dışı işlemleri azaltma ilkelerinin artirilmiş gerçeklik ve sanal gerçeklik ortamlarinda bilişsel yük ve başariya etkisi.* [Unpublished doctoral dissertation]. Anadolu University.

Uçgun, O. B. (2019). *Uçak fobisinin giderilmesinde "hipnotik yaklaşim" ve "sanal gerçeklik" uygulamalarinin etkililiğinin karşilaştirmali olarak incelenmesi* [Unpublished master thesis]. Beykent University.

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Yaman, H. (2019). *Eğitimde sanal gerçeklik laboratuvarlari kullanimi ve bir grafik çözümleme çalişmasi.* [Unpublished master thesis]. Yaşar University.

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