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A Review of Studies on the Use of Digital Reality Technologies in Teaching Language Skills

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Abstract

Technological developments that manifest themselves in all areas of life have had serious effects on education. Digital reality technologies, which are type of technologies that progresses cumulatively day by day, is the main subject of this research. Digital reality technologies are subdivided into virtual, augmented, mixed and extended reality. Language teaching, which is an indispensable element from the first to the last stage of education, is one of the basic concepts addressed in this research. In this study, studies on the use of digital reality technologies in language teaching were examined. Document analysis, one of the qualitative research methods, was used in the study. The data were analysed by content analysis. The study puts under the scope the theses and articles regarding the effect of digital reality types on language teaching, which are found in YÖK Thesis, Dergipark, Google Scholar, ERIC, ResearchGate, Academia, TR Index, Web of Science databases. In the research, the problem and the findings related to the subheadings of this problem were included.

Keywords

Digital reality technologies, language teaching, language skills.

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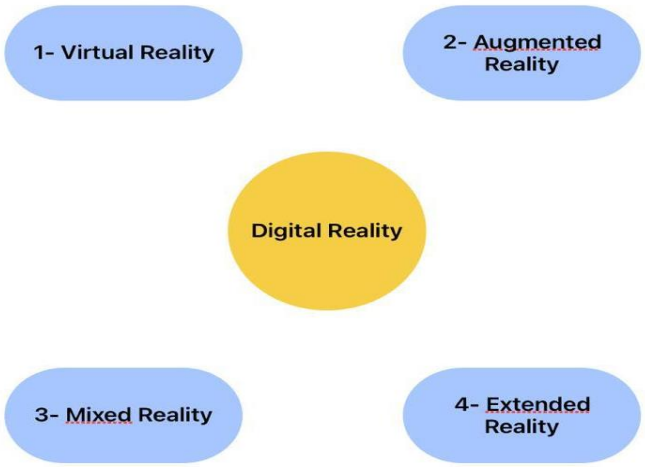
INTRODUCTION

Education remains important today, as it has in every era, but now this education appears not with traditional methods and tools, but with technology integrated into the education process, depending on the developments in the world. Developments in technology and the widespread use of technology provide individuals with easy and fast access to information. (Tekin, Polat, 2014). It would be a wrong perspective to consider education independent of technological developments and not to include them in the process. As a matter of fact, according to Curacı (2022), the walkers used to learn to walk in basic education from the first periods of life are also a product of technology, and the abacuses used in primary school are also a product of technology. Therefore, technology has always had an important place in education within the scope of the conditions of its time. In order to make education effective, attractive and efficient, it is a necessity of our age to make use of different teaching methods and to support these methods with computer technologies (Küçük Avcı, Çoklar, İstanbullu, 2019). The use of technology in education ensures effective and permanent learning. As technological tools can appeal to more than one sense of individuals. Seeing technology as a tool in the education process and making effective use of these tools will make it easier for both students and teachers to achieve the expected educational attainments from students. Considering the level of technology today, it is seen that the process of integration of education and technology is not limited to the use of tools such as computers, smart phones and tablet computers in education. In addition to the tools used in the integration process, new concepts have started to take place in our mental world, as well. The point reached has enabled people to discover the details of the virtual world and get to know new concepts. Virtual worlds are systems that can be accessed online through a multi-user interface, allowing users to interact both with each other and with the environment and allowing them to perform various operations (Dinçer, 2008). Concepts such as virtual reality, augmented reality, mixed reality, extended reality are expressions of reality that virtual worlds bring to us. When we consider these concepts as a whole, we come across "digital reality", which is another umbrella term. Digital reality is used a hyperynm covering concepts such as virtual reality (VR), augmented reality (AR), mixed reality (MR), etc. (Künüçen & Samur, 2021). The concepts under the title of digital reality show differences within themselves.

Figure 1

Types of Digital Reality



The first stage of digital reality is virtual reality. Virtual reality is a technology that allows people to interact with the objects in the environment, as well as giving people the feeling of being in a real environment through technological tools, using computer-generated 3D images and animations (Kayabaşı, 2005). It is thought that this technology will have an impact on permanent learning, especially in the field of education. Although augmented reality, which is considered as the advanced stage of virtual reality, fails under the same category as virtual reality in the literature, augmented reality is actually a variation and modified version of virtual reality (Azuma,1997). Contrary to the views in the literature, they are reality types with different characteristics. Augmented reality (AR) is a technology that allows computer graphics to be transferred to the real world. Unlike virtual reality, it allows to see the real world at the same time with virtual images (Gutierrez, Contero, Alcaniz, 2010). While these virtual reality types are becoming an indispensable part of our lives research enables people have come up with different definitions of them over time. Babur (2016) defined it as "Augmented reality provides a more qualified and deeper perception of reality by adding additional information, explanations, visuals with the support of technology on the existing reality.". İpek (2020) described augmented reality as the work of experiencing computer-aided data with perceptions by raising the reality with visual, auditory, tactile, olfactory senses. Including the somatic nervous system with sensory processing. It is a common situation in studies that augmented reality, one of the types of digital reality, can be more easily integrated and used in education. The increasing popularity of mobile devices global, the widespread use of augmented reality on mobile devices such as smartphones and tablets has become a growing curiosity, and augmented reality-based applications have started to be used in the field of education (Aydoğdu, 2021). With the help of ongoing studies, the applications of augmented reality systems in educational environments have been accepted by education stakeholders (Garzon, Pavon, Baldiris, 2017). Studies conducted on these practices during the education process have shown that they will give positive messages for the future. Since augmented reality applications can improve perceptions about the real world, it is one of the promising technologies in education and technology integration (İbili, 2013). Another variant of digital reality is mixed reality. Mixed reality is a process that includes virtual reality and augmented reality. As a matter of fact, Panagiotidis (2021) defines mixed reality as a term that does not have a clear definition covering virtual and augmented reality. According to Künüçen and Samur (2021) mixed reality as "It creates a new environment from virtual and physical environments using virtual and augmented reality.". It is also stated in the literature that mixed reality does not have a clear definition and is rather an inclusive expression. Extended reality, another type of digital reality, is the one that integrates virtual, augmented and mixed reality. These types of reality are suitable for use in many areas such as health, military, education, etc. Especially with the integration of technology into education in recent years, the adaptability of these reality types to education is emphasised. Language teaching has become essential for individuals to attain effective, permanent learning and the requirements of 21st century skills in the education process. Another issue as important as the integration of technology into education is the integration and widespread use of technology in language teaching. Looking at the language teaching practices in the world, digitalisation and the use of technology have become quite common (Sallabaş, Polat, 2022). As in the world, positive steps are taken in this direction in Turkey. Teaching language skills, which is the most basic aim of language teaching, is facilitated by various mobile applications, smart phones, tablets, computers, etc. technology tools. The fact that 21st century students are born and raised in technology provides positive feedback from the studies carried out in this direction.

Research Question

The 21st century witnesses a historical process in which technology is included in every aspect of life and digitalisation is increasing day by day. With the integration of developing technology into education, education and technology have become inseparable. Technology is not static and different findings are emerging day by day. Especially digital reality types and the adaptability of these types to education serve as an important output function. It is thought that there may be serious improvements in the acquisition and development of language skills with the integration of digital reality types into language education. In the world and in our country, studies on the effect of digital reality on the development of language skills are carried out based on sub-headings. However, these studies are progressing through virtual reality and augmented reality titles. There is a lack of comparative studies covering digital reality technology completely. It is important to draw a general framework by revealing the similarities and differences of the studies on the effect of digital reality technologies on language teaching. In other words, it is essential to provide a general picture about the tendency of the studies in the field and to enable researchers to see the current situation in the field. In light of this need in the research papers, the main research question was determined as follows: "What are the characteristics of studies on digital reality technologies in language teaching?"

Sub Questions

a) What is the distribution of studies on the use of digital reality technologies in language teaching over the years?

b) What is the distribution of studies on the use of digital reality technologies in language teaching according to language skills?

c) In which type of digital reality are the studies on the use of digital reality technologies in language teaching concentrated?

d) What is the distribution of studies on the use of digital reality technologies in language teaching according to their methods?

e) What is the distribution of studies on the use of digital reality technologies in language teaching according to study group/universe and sample?

f) What is the distribution of studies on the use of digital reality technologies in language teaching according to data collection tools?

g) What is the frequency of use of keywords in studies on the use of digital reality technologies in language teaching?

Purpose of the research

The aim of the research is to examine the studies on digital reality technologies in language teaching based on the research questions. It is aimed to predict the direction of the studies on the use of digital reality technologies in the teaching of language skills and the directions in which they can go in the future.

METHOD

Methodology of the Research

In this study, document analysis method, one of the qualitative research methods, was used. Document review involves the analysis of written sources containing information about the phenomenon or phenomena targeted to be investigated (Yıldırım & Şimşek, 2018:189). During document review research, the researcher can obtain the data he needs without observation or interview (Yıldırım & Şimşek, 2018: 190). Since the theses and articles to be examined in this research are accepted as documents, this method was preferred.

Data Collection

National Thesis Centre Database, ERIC, Web of Science and TR Index databases were used to access the documents examined within the scope of the research. Theses and articles on digital reality (virtual reality, extended reality, mixed reality, augmented reality) and language teaching and language skills in these databases were analysed. While conducting research in the relevant databases, the concepts of "digital reality, digital reality technologies, virtual reality, augmented reality, mixed reality and extended reality, digital technology" were used and theses and articles related to language skills were examined within the scope of the research. In the research, especially the studies conducted in 2015 and after were included in the scope. A total of 40 studies on digital reality technologies and language skills teaching, which is the subject of the research, were accessed. 30 of these studies were articles and 10 of them were theses.

Study Group of the Research

The study group of the research consists of 40 studies on digital reality and language teaching published in Turkey and abroad. 30 of the studies are articles and 10 of them were theses 1. Of these studies, 23 were conducted in Turkey and 17 were conducted abroad.

Data Analysis

Content analysis was used to analyse the data related to the studies identified within the scope of the research. The main purpose of content analysis is to reach concepts and relationships that can explain the data obtained. The basic process in content analysis is to bring together similar data within the framework of certain themes and to interpret them by arranging them in a way that the reader can understand (Yıldırım & Şimşek, 2018: 242). The findings of the study were attained using categorical content analysis, one of the types of content analysis. In the relevant framework, first the data were coded, then the categories explaining the codes at a general level were determined and the findings were interpreted.

During the analysis of the data, the opinions of 2 experts in teaching Turkish as a foreign language were used. In the relevant direction, Miles and Huberman (2015) consensus formula was used to calculate the reliability of the study. As a result of the calculation made by using the formula Reliability = Number of Consensus/Total Consensus + Number of Disagreement, The reliability of this article was calculated as 91 percent. A reliability result above 70% is considered sufficient for the study (Miles and Huberman 2015). Based on this level, the study was considered reliable.

FINDINGS

The findings regarding the distribution of the studies examined within the scope of the research according to years, language skills, digital reality type, methods, study group and population/sample, data collection tools, and frequency of keywords are given in the form of titles and tables. Information about the studies examined is given below.

Table 1

Studies Analysed

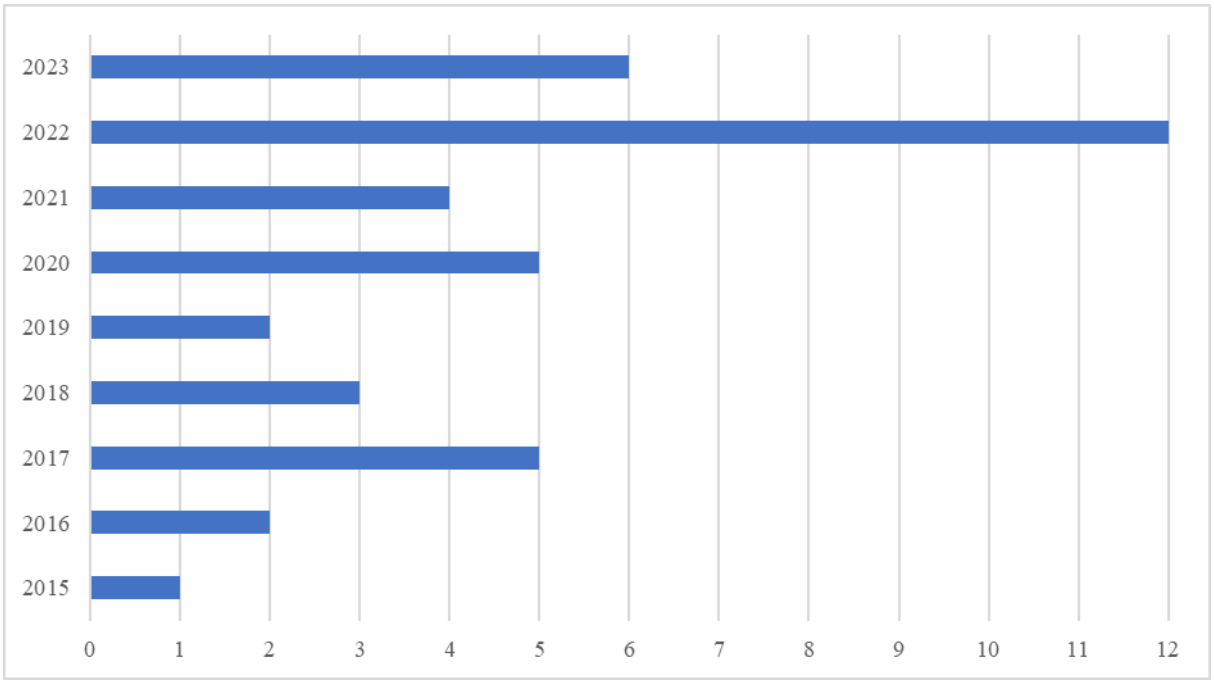
Type of work	Frequency
Thesis	10
Article	30
Total	40

When Table 1 is analysed, it is seen that 10 of the studies are theses and 30 of them are articles. In other word, it can be understood that more theses were published than the articles with regards to the research topic over the years.

Findings Related to the Distribution of Studies on the Use of Digital Reality Technologies in Language Teaching by Years

Figure 1

Distribution of Studies Conducted by Years



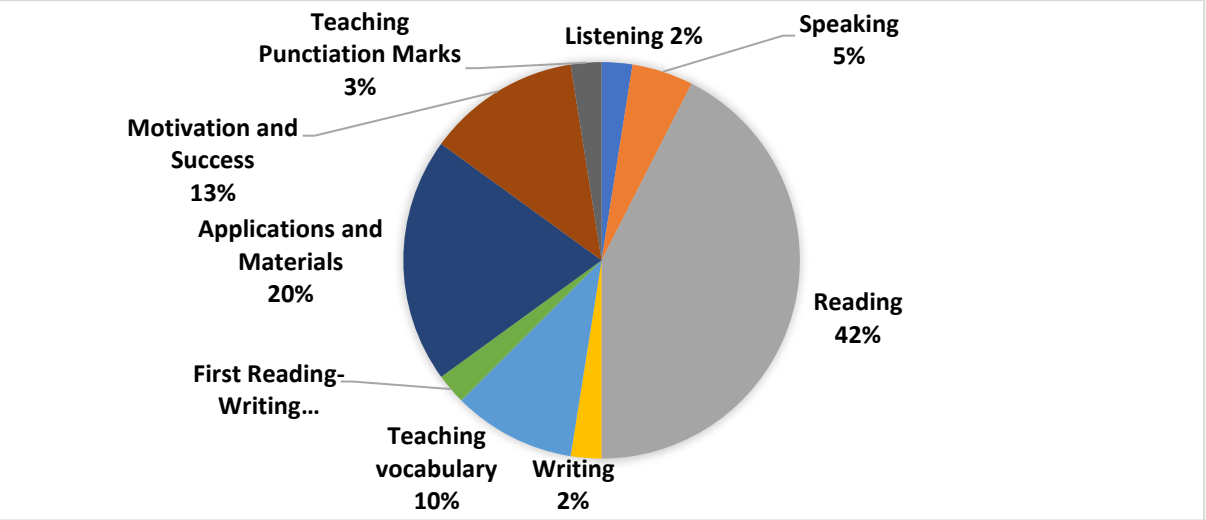
Based on Figure 1, it is seen that the first study analysed belongs to 2015. Since 2015, it can be said that more studies have been conducted on the use of digital technology in language teaching.

Especially in 2020 and later, there is an observable in quantity. It is seen that 2022 was the year with the most publications related to the study focus.

Findings Related to the Distribution of Studies on the Use of Digital Reality Technologies in Language Teaching According to Language Skills

Figure 2

Distribution According to Language Skills

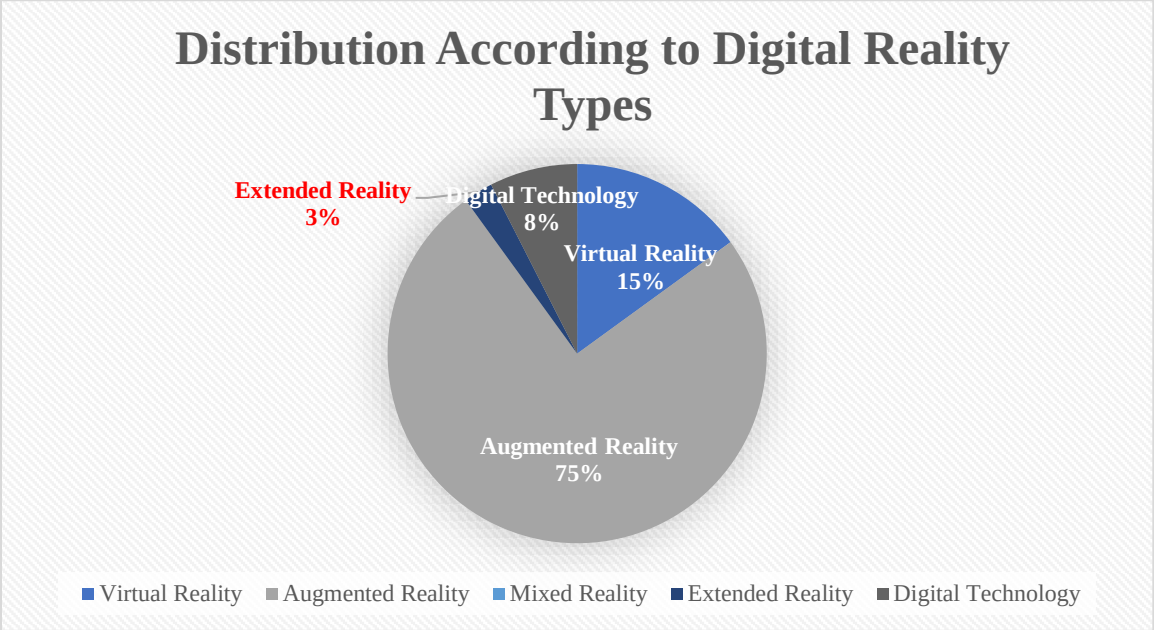


In the studies examined, particular emphasis was placed on reading skills. Reading skill was included in 17 studies. Apart from reading skills, studies have also been conducted under headings that directly or indirectly affect the development of language skills, such as "vocabulary teaching, vocabulary learning". Vocabulary teaching was included in 4 studies. The listening skill, which is among the language skills and comprehension skills, was included in a study. Two studies were found regarding the speaking skill, which is one of the narration skills. Apart from language skills, a study was found on the use of augmented reality technology in teaching punctuation marks in Turkish lessons. Within the scope of the research, 1 study on first reading and writing, 5 on motivation and success, and 8 on applications and materials were identified.

Findings on Which Type of Digital Reality Concentrates on the Studies on the Use of Digital Reality Technologies in Language Teaching

Figure 3

Distribution of Studies According to Digital Reality Types

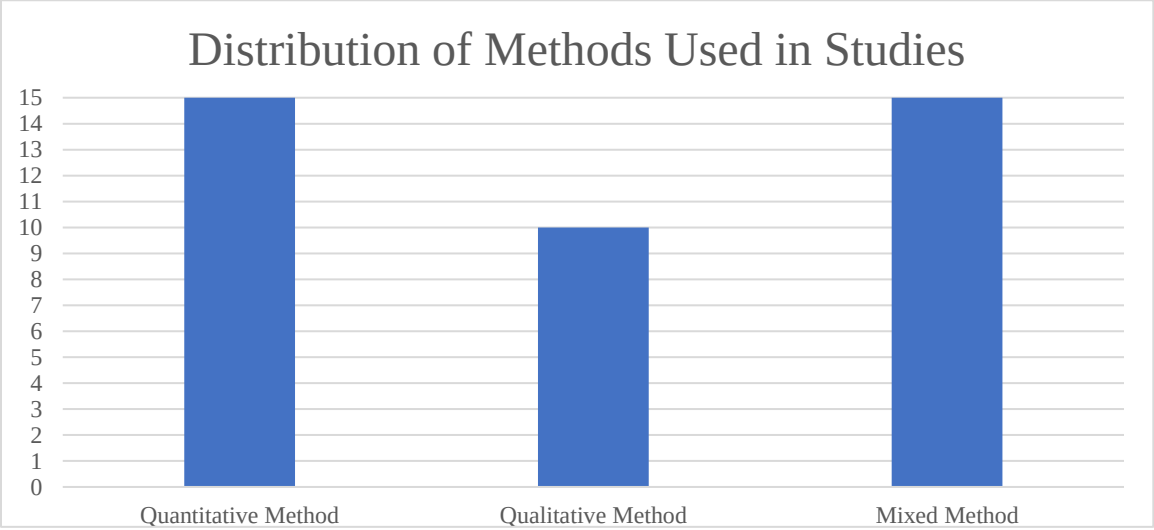


Based on Figure 3, it is seen that the use of digital reality technologies in language teaching is especially concentrated in the sub-heading of augmented reality. It can be said that this situation is due to the fact that augmented reality is more easily integrated into educational environments. Virtual reality comes right after augmented reality. 30 of the analysed studies are related to augmented reality and 6 of them are related to virtual reality. 1 study handled virtual and augmented reality together. 1 study is related to augmented reality. 3 studies are not directly related to digital reality types. These studies were classified under the titles of digital technology and language teaching. No study related to mixed reality was found in the analysed studies.

Findings Related to the Methods Used in Studies on the Use of Digital Reality Technologies in Language Teaching

Figure 4

Distribution of Studies According to Methods

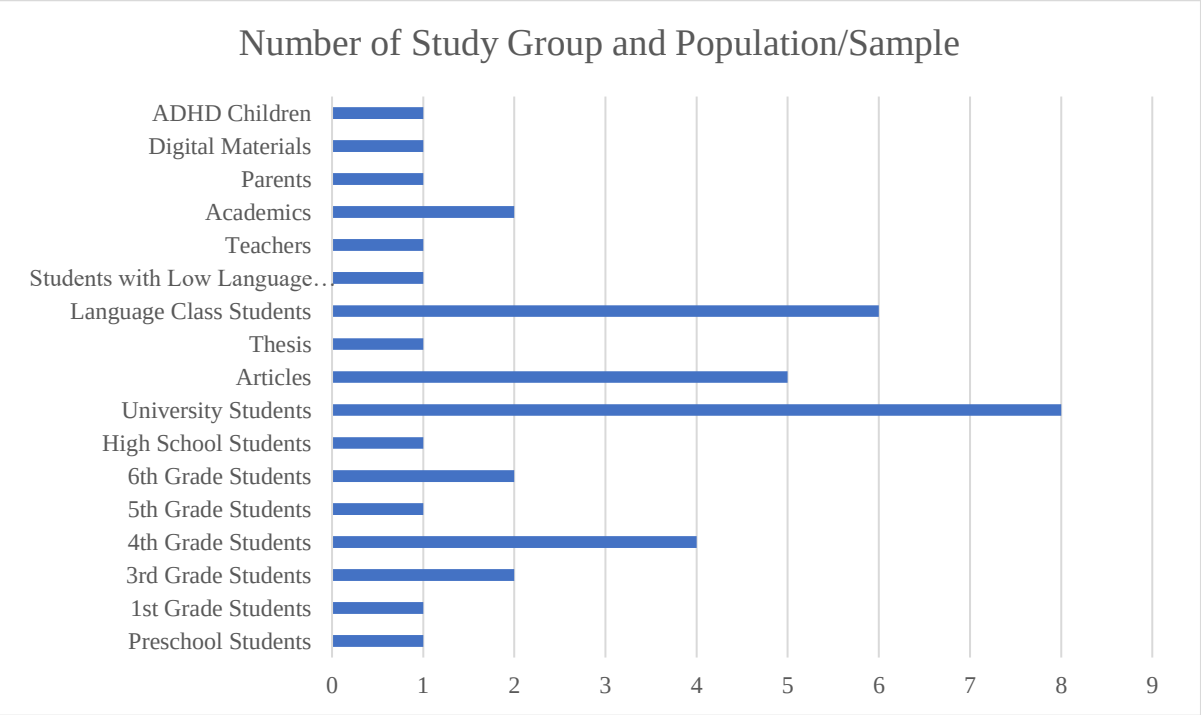


Based on Figure 4, it is seen that the methods used in the analysed studies are close to each other in terms of the times they have been used. There are no remarkable differences. In particular, it is noteworthy that mixed and quantitative research methods were used more in the studies. 15 of the studies were conducted with mixed methods. 15 studies were conducted with quantitative method and 10 studies were conducted with qualitative method. Based on these findings, it can be stated that different methods can be used in studies on the use of digital reality technologies in the context of language teaching.

Findings Related to the Distribution of Studies on the Use of Digital Reality Technologies in Language Teaching According to the Study Group and Population/Sample

Figure 5

Findings on the Study Group and Population/Sample of the Studies

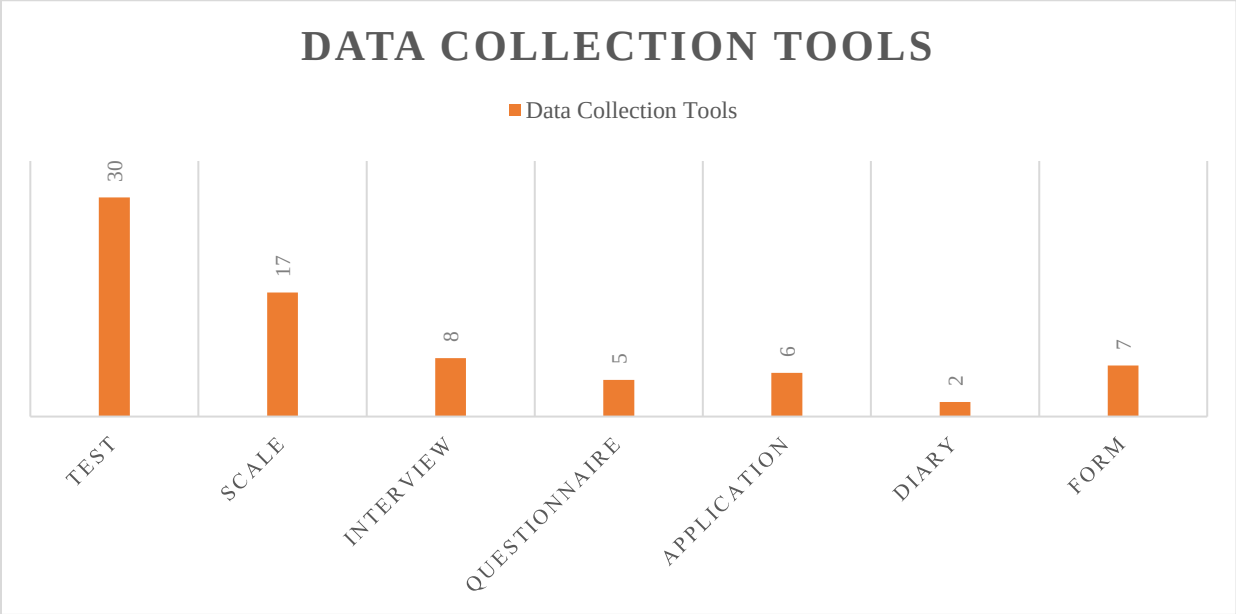


Based on Figure 5, it is seen that the sample/universe and study groups of the analysed studies show diversity. This is an important finding showing that the use of digital reality technologies in language teaching can be applied to different groups. In particular, it is one of the other important issues determined that the studies are concentrated on students at the basic education level and students at the higher education level. Academics, parents, and teachers are also included in the analysed studies. This situation allows digital reality technologies to be known and evaluated by all stakeholders of education. It was determined as a result of the examinations of studies were carried out in language teaching. Based on the table, it can be interpreted that language class students are frequently included in the study groups.

Findings Related to the Distribution of Studies on the Use of Digital Reality Technologies in Language Teaching According to Data Collection Tools

Figure 6

Data Collection Tools of the Studies



Based on Figure 6, it is seen that tests are widely used as data collection tools in the analysed studies. Tests are followed by scales. At the scale level, attitude forms stand out notably. This situation indicates that the development of students' affective skills is emphasised in the studies. Interview forms, forms, applications, questionnaires and diaries are frequently used data collection tools respectively. Diaries stand out as the least used data collection tool. It was detected that more than one data collection tool was used in the studies. The use of more than one tool also makes it easier for researchers to reach the right data.

Findings Related to the Distribution of Studies on the Use of Digital Reality Technologies in Language Teaching According to the Frequency of Key Words

The data on the distribution of the analysed studies according to their keywords are given below together with the frequency of use.

Figure 7

Key words of the studies

Based on the studies, it is seen that the most frequently used keywords are "augmented reality, reading comprehension, reading motivation, virtual reality and attitude". Augmented reality was used as a keyword 24 times in total, reading comprehension 9 times, virtual reality 5 times, reading motivation 4 times and attitude 4 times. The fact that the concepts such as attitude, motivation, reaction etc. are frequently mentioned in the studies on digital reality technologies for language teaching shows that affective skills are not ignored. Another important point is that reading skill is emphasised in the studies and listening, speaking and writing, which are other language skills, are given less focus in the studies. This situation is also reflected in the frequency of keywords.

CONCLUSIONS, DISCUSSIONS AND RECOMMENDATIONS

In today's world where technological developments are intensified in every field, it is frequently accentuated in the studies that developments in the field of education cannot be ignored. The biggest breakthrough of technology, which progresses in a cumulative way, is digital reality technologies. These technologies have been widely used in fields such as medicine, engineering, military, etc. from past to present, but studies in the field of education have increased especially in the 21st century. It can be said that the competitive environment in education also affects the technology dimension. Today, education systems in many countries are not considered independent from technological developments. Language education, which is the most important issue in advancing the education process effectively, is affected by these developments. This influence brings new perspectives to language education. It can be said that studies on the use of digital reality technologies in language teaching have been carried out every year from 2015 to 2023. The reason for the increase in the number of studies in this field, especially in 2022, can be attributed to the fact that the Covid-19 epidemic, which started in Wuhan, China and affected the whole world, it has also affected education seriously affected education, as in many areas of life. The main reason for this may be that training

continued with technological tools and mostly online during the pandemic. Many researchers have drawn attention to the integration of education and technology in the distance education process. This attention has caused the researchers to expand their research focus and tend towards other areas of technological development. In this way, the studies on digital reality one of the developing areas of technology, increased in quantity.

According to the research results, it is seen that the studies on digital reality technologies are especially in the form of articles. It is a striking point that there are fewer theses than articles in the studies. If the researchers also focus on theses in their studies, it will enable the applicability of these studies and make them more systematic.

Digital reality technologies appear in 4 sub-headings. When these titles are analysed, it can be seen that virtual reality and augmented reality are used more frequently in studies. However, in the analyses conducted within the scope of the research, there were no studies on the effects of mixed and extended reality, which are the other subheadings of digital reality technologies, on language teaching. Only one study is related to extended reality and this study presents ideas on the use of extended reality in language teaching. The overall content of the researches examined draws attention to a deficiency of the study on the use of. Another deficiency can be detected in the studies on the effect of virtual and augmented reality on language teaching. In those studies, only the reading and writing skills are emphasised in the development of language skills. Which is the most basic aim of languange education. It can be said that listening and speaking skills, which are other language skills, are neglected.

Especially with the integration of digital reality technologies into language teaching, we see that studies in the world and in our country continue in this course. The training of language skills, which is the most basic aim of language education, has been accepted as the field of use of digital reality technologies. Although the reviewed studies have tried to focus on this issue, studies on the effects of digital reality technologies on language education and the acquisition of language skills are very few in terms of quantity. Considering that digital reality technologies are used especially to concretise abstract concepts, it is seen that studies in the field of education are frequently used in areas such as mathematics, geometry and physics (İbili & Şahin, 2013; Addüsselam & Karal, 2012). However, these studies are not yet at the desired level in language teaching.

When the methods of the studies are examined, it is noteworthy that the numbers of qualitative, quantitative and mixed methods are very close to each other. This prevents research from evolving in a single direction. Many different data collection tools were used in the studies. The variety of data collection tools chosen, especially based on research methods, has enabled researchers to access clearer and more accurate data. When the analysed data collection tools are examined, it is seen that not only cognitive skills but also affective skills of individuals are taken into consideration. When the studies are analysed, it is seen that almost every educational level, starting from pre-school education level to university level, constitutes the study groups of the studies. Teachers and parents, who are other stakeholders of education, were included in the study groups in these studies. However, it is seen that the most preferred group in the studies is university students. The reason for this is explained by Çetinkaya-Özdemir (2023) as the ease of application in terms of technology use by university level individuals.

In the distribution of the examined studies according to their keywords, it was determined that augmented reality was repeated 24 times. The concept of augmented reality is followed by reading

comprehension, reading motivation and virtual reality. The use of augmented reality, which is more functional than other types of digital reality in terms of adaptability to education, and the fact that the researches conducted are especially within the scope of reading skills, it reveals that the most frequently repeated keywords are the concepts mentioned. The lack of studies on the effects of digital reality types expressed as mixed and extended reality on language skills shows that these concepts are not encountered. The fact that listening and speaking skills, which are included in language skills, are not sufficiently subject to studies makes it difficult for these concepts to appear as keywords.

The reflections of digitalisation on education is quite visible in todays world as it can be percieved in every aspects of our daily lives. The development of today's educational technologies and the continuation of this development with the advanced dimensions of technology, followed by the demand of digital natives born today for technology in education are the reasons for this undeniable fact. The integration of digital reality and its types, which are a variation of advanced technologies, into education is a must. Effective educational environments can be created thanks to this advanced technology. It is thought that this technology will have drastic effects on the learning process in the field of education, since the individuals of the current century have mastered technology. Proper care should be taken to ensure that studies are not limited to virtual and augmented reality only. Especially mixed and extended reality subheadings of digital reality should be integrated into educational environments and studies in this field should be increased. Students, teachers and parents should be informed about these developments and researchers should focus on these issues.

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