

**BAŞKENT UNIVERSITY
INSTITUTE OF EDUCATION SCIENCES
DEPARTMENT OF ENGLISH LANGUAGE TEACHING
ENGLISH LANGUAGE EDUCATION MASTER PROGRAM**

**THE EFFECTS OF AUGMENTED REALITY TECHNOLOGY IN
SITUATED ENGLISH LANGUAGE LEARNING**

**PREPARED BY
BÜŞRA PARLAR**

MASTER THESIS

ANKARA – 2022

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**ADVISOR
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Danışman adı soyadı

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To my dearest family...

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Büşra PARLAR

July, 2022

ÖZET

Büşra PARLAR

Artırılmış Gerçeklik Teknolojisinin Durumlu İngilizce Öğrenimindeki Etkileri

**Başkent Üniversitesi Eğitim Bilimleri Enstitüsü
Yabancı Diller Eğitimi Anabilim Dalı
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Teknolojinin gelişmesiyle birlikte öğretmenlerin kullandığı eğitim materyalleri de değişmiştir. Geleneksel teknolojilerin yerini yeni teknolojiler almaya başladı. Yeni teknolojilerden biri olan Artırılmış Gerçeklik (AG) de eğitimcilerin kafasında büyük yankı uyandırmış ve İngilizce derslerine entegre edilmeye başlamıştır. Bu yeni eğitim teknolojilerine paralel olarak, bu yeni teknolojileri kullanmaya ve öğretme-öğrenme süreçlerini şekillendirmeye yönelik yeni öğrenme teorileri ve yaklaşımları da geliştirilmiştir. Durumlu Öğrenme öğrencilerin gerçek hayat deneyimleri kazanmalarını sağladığı için öğrenciler aktif olarak gerçek dünya aktivitelerine dahil olabilmektedirler. AG araçları, Durumlu Öğrenme kullanımının faydalarını en üst düzeye çıkarmak için uygun araçlardır. Bu çalışmanın amacı, AG' in İngilizceyi yabancı dil olarak öğrenen öğrencilerin dinleme becerileri üzerindeki etkilerini keşfetmektir. Bu araştırmanın katılımcılarını Ankara ilindeki 3 özel ortaokulda öğrenim gören 84 beşinci sınıf öğrencileri oluşturmuştur. Bu çalışma 3 kontrol grubu ve 3 deney grubundan oluşan yarı deneysel bir çalışmadır. Bu çalışmanın sonuçları, tüm deney gruplarının İngilizce dinleme sınavında önemli başarı gösterdiğini ve öğrencilerin derslerde AG kullanımına karşı olumlu bir tutum sergilediklerini göstermiştir.

Anahtar Kelimeler: Artırılmış Gerçeklik, İngilizce Öğretimi, Durumlu Dil Öğrenimi

ABSTRACT

Büşra PARLAR

The Effects of Augmented Reality Technology in Situated English Language Learning

**Başkent University
Institute of Educational Sciences
Department of Foreign Language Education
Master's Degree Program in English Language Teaching with Thesis**

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The educational materials used by teachers have changed with the development of technology. New technologies have started to replace the traditional ones. As one of the new technology, Augmented Reality (AR) has made a splash in the minds of educators and started to be integrated into English Language Teaching (ELT). In parallel with these new educational technologies, new learning theories and approaches to utilize these new technologies and shape the teaching and learning processes have been developed. Since Situational Learning Theory (SLT) puts students in authentic situations, the students can be actively immersed in real-world activities, AR tools are very precise tools to maximize the benefits of usage of SLT. The purpose of this study was to discover the effects of AR on EFL students' listening skills. The participants of this study were 84 fifth-grade students in 3 private secondary schools in Ankara, Turkey. It was a quasi-experimental study with 3 control groups and 3 experimental groups. Results of this study indicated that all the experimental groups indicated significant success in English listening tests and the students had a positive attitude towards the use of AR in courses.

Keywords: Augmented Reality, English Language Teaching, Situated Language Learning

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LIST OF ABBREVIATIONS

AR	Augmented Reality
SLT	Situated Learning Theory
SL	Situated Learning
ELT	English Language Teaching
EFL	English as Foreign Language
CA	Constructivist Approach

CHAPTER I

INTRODUCTION

This study has been designed to discover the effectiveness of using AR in EFL courses and determine the attitudes of young learners towards the usage of AR in English courses. This part of the study indicates the problem and the purpose of the study. This part conclusively presents the research questions, the importance of the study, and the limitations of the study.

1.1. Background of the Study

The traditional materials used by teachers have changed with the development of technology. According to some studies, integrating technology in education promotes a more interactive and innovative way of teaching (Bursali & Yilmaz, 2019; Ebenezer et al, 2018; Fuchsova & Korenova, 2019; Shapley et al., 2011), enhancing technology in courses also increases efficacy level of students' real world (Wei, Kuah, Ng, & Lau, 2021). Web 1.0 and Web 2.0 tools are actively used in classroom environments in English Language Teaching (ELT) (Motteram & Sharma, 2009). According to the studies, the use of technology in EFL classrooms motivates students, creates new learning opportunities, provides a more enjoyable learning environment, promotes communication among students, and improves the learning process (Sun & Yang, 2013). Post COVID 19 outbreak provided the learners and teachers to get more comfortable with the usage of Web tools because of the compulsory online English courses (Kaufman Petkova, Bhui, & Schulze, 2020). Recently, the usage of the Web 3.0 tools has started to be integrated into EFL courses since technology develops rapidly. As Azuma (1997) stated AR technology closes the gap between the real world and the virtual world by expanding the real world with the use of integration of virtual objects in the physical world. The usage of AR technology expanded in many areas like entertainment, navigation, games, and education (Kipper & Rampolla, 2012). AR technology has started to be used in the field of education, chemistry, geography, biology, and math (Okumuş, 2021, p.12). In the field of English Language Teaching (ELT), AR technology has also become popular and many studies about the effect of AR technology on the motivation level of students and the efficiency of AR technology, the usage of AR technology for vocabulary

teaching have been conducted (Akçayır & Akçayır, 2016; Chou & Chanlin, 2014). Most of the studies have shown that Web 3.0 tools, especially AR, have a lot of potential in language teaching (Lin, Hsieh, Wang, Sie, & Chang, 2011). Additionally, AR tools also increase students' motivation level in learning English (Chen et al., 2015; Lu et al., 2011). Furthermore, the usage of the AR tools in the courses makes the courses interactive and interesting (Lin, Duh, Wang, Li, & Tsai, 2013) and Alizadeh (2019) also states that the integration of AR in courses helps to increase the learners' autonomy.

One of the theoretical frameworks that is well aligned with AR technology is Situated Learning (Bower et al., 2014; Wang et al., 2018). Lave and Wenger (1991) define Situated Learning (SL) as learning that occurs in real-life situations and experiences. Abdallah (2015) states that since SL creates opportunities to practice constantly, SL is beneficial to use in English language learning. It was stated that in SL, learning is a social process in which knowledge is co-constructed, rather than simply decontextualized knowledge and the information transferred from one individual to another (Lave & Wenger, 1991). In SL, learners engage with real-life activities and they participate actively in the courses rather than just being the listener in the courses (Lave & Wenger, 1991). Some studies about SL in ELT concluded that SL provides meaningful understanding in the courses (Barab & Duffy, 2000). In another study, it was also stated that SL creates a collaborative environment for learners and their motivation level has increased in the courses (Terrenghi et al., 2019).

According to Wang (2017), AR technology creates situational learning by providing a learning space that compounds digital materials and real tools or items. Moreover, Wang (2018) states that AR technology ensures overcoming the limitations of time and place. In addition, since AR technology creates a real-life learning context, it can be useful to use in SL (Bower, Howe, McCredie, Robinson, & Grover, 2014, p.7).

The usage of AR in English language learning has become more beneficial since it is well aligned with SL (Wang, 2012). In Tandoğan (2019, p.23)'s study, it was also highlighted that AR technology enables learners to learn new structures in authentic/real-life contexts creating situational learning. Thus, the learners can have a deep understanding of the lesson and the learning will be permanent. Additionally, Safar, Al-Jafar and Al-Yousefi (2016) explained that using AR in English Language Teaching is convenient and creates a collaborative environment, which is one of the components of SL. They also stated that AR has increased the interest level of kindergarten children who learn English as a Second Language (Safar et al., 2016). Wang (2012) indicated that situating AR in classes is important for learners to solve a real-life problem and express themselves in a real-life

situation. In the same way, Liu (2009) stated in the study that the AR technology created real-life contexts, and the success level of the students increased. Although there are so many studies about the usage of AR technology in the EFL setting, there is still a need for an AR study that should promote SL in EFL (Azmi, 2017).

Accordingly, this study is essential because it focuses more on situational learning theory using AR and assesses learners' listening skills, and paves a way for the teachers to use AR technology in their courses in a systematic way based on a theoretical framework.

1.2. Statement of the Problem

The usage of technology has become widespread in various fields globally (Ritz & Fan, 2015) and the education field has been one of these fields (Puentedura, 2006). As one of the subfields of education, technology usage has also become popular in ELT (Hubbard & Levy, 2016). Due to the emergency distance education after the COVID 19 outbreak, the importance of technology in education has been understood (Hodges, Moore, Lockee, Trust, & Bond, 2020). Although in online education, lectures were given as in face-to-face learning, online education has been very challenging for teachers, students and parents as it was a very different concept during the pandemic (Atmojo & Nughoru, 2020). English wasn't an exception during the online learning period and EFL courses were also carried out online (Atmojo & Nughoru, 2020). The studies conducted on online EFL teaching showed that EFL teachers have used unique online materials to assess students and monitor students' progress as they cannot assess students as they could in face-to-face teaching (Famularsih, 2020). Studies indicated that although the usage of Web 2.0 tools in online education or face-to-face education motivated the students, these tools were not enough to keep students' attention always during the courses (Chagas & Pedro, 2021). It was stated that since the students are digital natives, they get bored of the usage of the same kind of tool after some time in the courses (Chagas & Pedro, 2021). Nonetheless, in one of the studies, it was also suggested that as the technology keeps evolving, the teachers also should update the technological materials they use, keep track of the new technology and they should integrate it into their lessons (Kazu & Issaku, 2021) and it should be integrated into the courses based on a right pedagogy according to the students' needs (Munir & Nur, 2018).

As one of the latest technology and one of the Web 3.0 tools, AR has become popular in many fields around the world recently (Bahadır, 2019, p.38). Since AR technology provides a way to close the gap between the real world and the virtual world using

applications (Azuma, 1997), it has been used in fields like entertainment and games, advertising, education, and translation (Okumuş, 2021, p.39). In educational fields like chemistry, biology, mathematics, and geography, it has also become widespread and has been used as an instructional tool (Garzón, 2017). AR has become well known in the ELT field day by day (Sun & Yang, 2013). Teachers and lecturers have started to integrate that innovative technology into their courses (Wang, 2012). Therefore, researchers have focused on the different aspects of the integration of AR in EFL courses (Wen & Looi, 2019). There have been many national and international studies conducted about the usage of AR in ELT (English Language Teaching). Most of the studies focused on the effect of AR technology on receptive skills and vocabulary knowledge (Akçayır & Akçayır, 2016; Liu, 2009) while other studies focused on the retention, and motivation levels of almost all grades, of students (Bacca et al., 2014; Bahadır, 2019; Jamrus, & Razali, 2019; Tandoğan, 2019) and pre-service English teachers (Okumuş, 2021; Tandoğan, 2021). Additionally, in Parmaxi and Demetriou's (2020) deep literature review about AR technology in education, it was stated that although some studies integrated certain pedagogical approaches/ theories with AR in ELT, there is still a need for evidence on how to integrate AR technology in language classrooms successfully with a certain theoretical framework.

From this perspective, this study integrated AR technology providing situational context in English language teaching to reveal its effects on students' listening skills. Hence, the materials used in the lesson were designed to provide SLT in this study. Furthermore, the study was aligned with the standard curriculum of 5th grade English prepared by the Ministry of National Education of Turkey.

1.3. Purpose of the Study

This study's purpose was to discover the effects of the usage of AR technology on students' listening skills in EFL courses with the usage of the materials that were designed according to SLT. This study was also designed to learn about the attitudes of the students towards AR-integrated EFL courses.

1.3.1. Research questions

This study was conducted to discover the effects of the usage of AR technology on students' listening skills in EFL courses with the usage of materials that were designed

according to SLT together with their attitudes of the students towards AR-integrated EFL courses.

To achieve the aim, the following research questions were investigated:

1. Does the integration of AR technology in EFL courses have any effects on students' listening skills?
2. What are the attitudes of elementary-level students towards the usage of AR technology in EFL courses?

1.4. Significance of the Study

Technology has an important role in the ELT world. As technology evolves, the integration of technological materials changes as well. It is substantial to see the effects of the integration of these technologies in courses. Although there have been many studies that highlighted the advantages of AR technology, the studies have also shown the challenges and disadvantages of the usage of AR technology. In many studies, it is stated that thanks to AR, students learn better and its usage of it increases students' motivation level. Even though some of these studies integrated context-aware learning (Chou & Chanlin, 2014; Laine et al., 2016), location-based learning (Hmelo-silver & Barrows, 2006), and game-based learning (Hwang et al., 2016; Tobar et al., 2017), most of these studies did not include concrete pedagogical approaches or theoretical frameworks and designed the AR materials according to that (Garzon et al., 2020).

In terms of language skills, there is still a need for studies that focus on AR technology integration in listening courses (Wen & Looi, 2019). Hence, this study aims to learn the effects of the usage of AR that is integrated with Situational Learning Theory on the students' skills in specific listening skills and provide the teachers with an example of how to integrate AR technology into the concrete pedagogy.

1.5. Limitations of the Study

There were limitations to this study. In this study, the data were collected from a limited number of individuals, which may affect the generalizability of the study (42 participants in the experimental groups, and 42 participants in the control groups). Another limitation was that the data were collected using a limited number of instruments, which may reduce the validity and reliability of the study. Finally, the results of the study were limited to secondary school students.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

This section presents the evolution of Web tools in education and emphasizes Web 3.0. Then it continues with the definition of Augmented Reality, its components, and the studies that were conducted about the usage of AR technology. Following Situational Learning Theory with AR is discussed.

2.1. The Evolution of Web Tools

Web can be defined as sharing information between users thanks to the internet (Jacksi & Abass, 2019). The term “Web” was created by Tim Berners-Lee who was a scientist (Bahadır, 2019, p.19). Tim Berners-Lee formed a programming language which is called HTML (Hypertext Markup Language) and developed World Wide Web. It was designed to provide information sharing between scientists from universities and institutes (Jacksi & Abass, 2019). It was also mentioned that there were three objectives with the development of the Web (Berners-Lee, 1998). Buchanan and Smith (1999) stated that as the first model of the World Wide Web, Web 1.0 was designed. In Web 1.0, the users were limited, they could only search for information, and they were unable to post anything or comment on a site (Hussain, 2012, p.14). As Hussain (2012) stated there was only reading involved in Web 1.0. It is also stated that Web 1.0 tools worked slowly, the users needed to update their page all the time and in Web 1.0 the users were limited (Jacksi & Abass, 2019). To unveil these limitations, Web 2.0 tools were presented in 2014 (Cormode & Krishnamurthy, 2008).

Web 2.0 is defined as the second generation of the web (Toledano, 2013). Unlike Web 1.0, users could write or comment on anything on the Internet (Jacksi & Abass, 2019). Furthermore, it enabled the users to communicate with each other and provided them to be socially active (Chagas & Pedro, 2021). In addition to that, it was also announced that Web 2.0 creates a social environment where users could interact with each other and be involved in the conversation (Yağcı 2009, p.140). The users were also able to create their web pages and easily update their pages (Bahadır, 2021, p.22). It was stated that being only the consumer in Web 1.0 is the main difference between Web 1.0 and Web 2.0 (Cormode &

Krishnamurthy, 2008). Furthermore, in Web 2.0, the users were both consumers and creators (Cormode & Krishnamurthy, 2008). For this reason, when Web 1.0 and Web 2.0 are compared, it can be said that Web 2.0 is more dynamic (Berners-Lee, 1998).

As the Web grows day by day, high numbers of pages occur on the Web (Jacksi & Abass, 2019). It is underlined that it is important to know how to use and organize the data which were caused by Web 2.0 (Hussain, 2012). Due to that reason, it is asserted that there is a need for control over what is published on the Web (Berners- Lee, 1996). That control is defined as a help for the user to find the right data in a short time (Rego, Moreira, Morales, & Garcia, 2010). In addition to that, Berners - Lee (1996) also claimed that although Web 2.0 tools are very practical to search the information quickly, they only recognize the vocabulary, not the content and the quality of the information. Additively, it was highlighted that we can reach all kinds of information that we need in a short time on the web, but the ways and the tools we use to search, organize and share the information are non-functional today (Yağcı, 2009, pp.138-139). To solve all of these problems, Web 3.0 has emerged (Jacksi & Abass, 2019).

Web 3.0 is defined as a global database by the inventor (Berners- Lee, 1998). Jacksi and Abass (2019) also commented on Web 3.0 as the third version of the web. Thanks to Web 3.0, computers can make significant connections between data (Jacksi & Abass, 2019). This makes it also easier to reach the aspired data in a short time (Berners – Lee, 1996). The machines that are created by Web 3.0 will have the capacity to think and interpret and the data will be understandable, so it is highlighted that Web 3.0 will make our lives easier by providing innovations (Gökçearsan, 2011, p.10). Considering these features, it can be claimed that, Web 3.0 saves time for users. One of the advantages of Web 3.0 is its' mobility. In terms of time and place, the users need to be independent. It is stated that Web 3.0 allows users to connect at any time and from any location (Anderson & Whitelock, 2004, p.4).

In sum, Web 1.0 was the beginning of the evolution of the web and had some limitations. To remove these limitations, Web 2.0 has emerged. The users could interact with each other through Web 2.0 and even create their websites without the need to update constantly. After Web 2.0, there were high numbers of data on the web, so the control to filter is needed on the Web. Then Web 3.0 is presented to provide that control and provided a huge database. Moreover, Web 3.0 also helped to the restrictions of time and place for people because of its' mobility.

2.2. Web Tools and Education

As the technology field develops constantly, the tools that are used in the courses also develop as well. Firstly, the usage of Web 1.0 tools in education was few because of the limitations of Web 1.0 that have been mentioned above. In the courses, only teachers could present information. The teachers had control all the time and there was no interaction between teachers and students (Bahadır, 2019, p.44).

However, there has been a big difference with the emergence of Web 2.0 tools. Web 2.0 tools enabled students to interact and cooperate throughout courses (Rajiv & Sridhar, 2011, p.338). According to the studies, Web 2.0 tools like web, wikis, and blogs increased the involvement of students in the class (Sun & Yang, 2013; Kırıkkaya & Yıldırım, 2021; Chagas & Pedro, 2021). The students have become active learners thanks to Web 2.0 tools (Gonzalez & Louis, 2018). In addition, they stated that since the Web 2.0 tools are enjoyable, they increase the students' motivation (Gonzalez & Louis, 2018). Web 2.0 tools have many advantages when they are used in language classrooms since they provide instructors with instructional design, course delivery, and student learning for education (Balbay & Erkan, 2018). According to Balbay and Erkan (2018), instructors prefer integrating Web 2.0 technology in their classes because it provides collaborative and student-centered learning. Since it creates an interactive and communicative setting for learners, Web 2.0 technology is an alternative to traditional lecture-based language classes (Gonzales & Louis, 2018). The usage of Web 2.0 tools has become widespread in almost every educational field after studies that have been conducted in that area (Bahadır, 2019, p.55).

After the increase in the integration of Web 2.0 tools, an advanced version of Web 2.0 which is called Web 3.0 has started to attract instructors' attention. As education is not only about teaching a topic but also providing students to develop their higher-order thinking skills, it is claimed that if Web 3.0 tools support students' critical thinking, analysis, and reasoning during courses will be a huge achievement (Poore, 2014, pp.168-178). It is stated that Web 3.0 tools are qualified tools because they make the courses entertaining and reduce the teacher's work (Koper, 2004, pp.5-6). Additionally, as it was mentioned above, Web 3.0 tools can help to save time, so when students need to find information, they can find it easily at a reasonable time (Poore, 2014, p.17). Moreover, Web 3.0 tools also have a feature to personalize according to the user's desires. It is asserted that Web 3.0 tools provide personalized learning for learners (Gökçearslan, 2011, p.8). Halimi, Seridi-Bouchelaghem, and Faron-Zucker (2014) mentioned that Web 3.0 tools can help to attract learners' attention

to the class and make them involved in the courses. In short, with the usage of Web 3.0 tools in courses, the learners can set goals and design their learning (Chisega-Negrilă, 2013). Even though there are studies that show the advantages of integrating technology in education, it cannot be said that it is useful for every user (Bahadır, 2019, p.57). It was stressed that while integrating technology, designing the courses with suitable and various activities is important (Wojciechowski & Cellary, 2013, p. 584).

2.3. Augmented Reality

As technology evolves rapidly, the technological materials that have been used in classes have improved. After the successful integration of Web 2.0 tools in classes, researchers and educators started to integrate the Web 3.0 tools which are the advanced versions of the Web 2.0 tools. Augmented Reality, Virtual Reality, and Mixed Reality have emerged under the headings of Web 3.0 tools. These platforms started to be used in many fields around the world (Altınpulluk, Kesim & Kurubacak, 2020). 2020). Among the three of them, AR has become popular recently (Altınpulluk et al., 2020). Azuma (1997) stated that AR links virtual objects to the physical world (pp.355-356).

Figure 2.1. An example of Augmented Reality

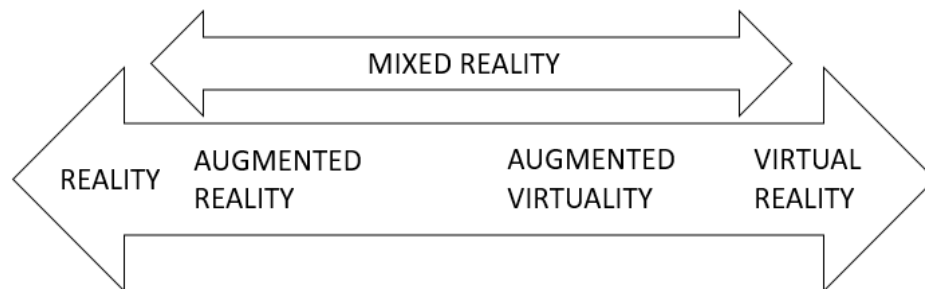


As can be seen in Figure 2.1., the word 'cat' is scanned by a smartphone using an AR application and a colorful and 3D version of the cat shows up.

Kipper & Rampolla (2012) define that AR takes the digital form of pictures, audio, or video, and overlays them into the real environment. With Augmented Reality, the new information is presented through pictures, voice, or video (Baykara, Gürtürk, Atasoy, &

Perçin, 2017, pp.72-74). AR studies have first begun with Ivan Sutherland and his student when they created the first AR head-mounted display system in the 1960s and after that, there have been huge improvements in the field (Bahadır, 2019, p.45). One of the differences between AR and VR is that AR unites the real and virtual world and you can interact in real-time with AR (Azuma, 1997). According to Kesim and Ozarslan (2012), another difference between AR and VR is that VR replaces the real world while AR integrates the real world with digital objects. Kipper & Rampolla (2012) also define that AR takes the digital form of pictures, audio, or video, and overlays them into the real environment. The differences between AR and VR are AR unites the real and virtual world and you can interact in real-time in AR (Azuma, 1997). The third platform is Mixed Reality, which includes these two platforms. In mixed reality, both real and digital objects can exist at the same time (Pan, Cheok, Yang, Zhu, & Shi, 2006). The difference between the three platforms is while VR happens in the virtual world; in AR virtual materials are linked to real-life experiences. MR provides users with interaction by linking visual materials during real-life experiences (Pan et al., 2006).

Figure 1.2. Virtuality continuum



Note. From Virtuality continuum by Milgram and Kishino (1994, p.3)

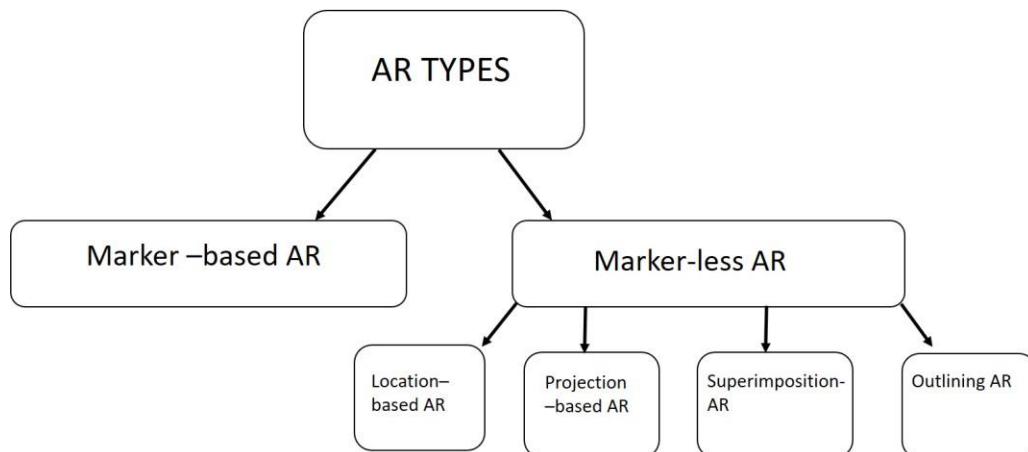
Figure 2.2. indicates that Augmented Reality includes more virtual elements than Augmented Reality. Milgram and Kishino (1994) categorized the three platforms and presented Augmented and Virtual Reality under the heading of Mixed Reality.

2.4. Evolution of Augmented Reality

The characteristics of AR technology have changed to a large extent as technology develops constantly. The first versions of AR technologies were the head-mounted display system which Ivan Sutherland and his student discovered (Agarwal & Thakur, 2014). It was stated that there are two types of head-mounted display systems; Video-see through the system and the Optic-see system (Kesim & Ozarslan, 2012). Rolland, Holloway, & Fuchs (1994) defined the first type of head-mounted display system as the Video-see through system which shows the videos through the camera that is placed inside of the head-mounted device. Optic-see through system presents digital images with real-life objects thanks to the glasses (Rolland et al, 1994). When these two types of head-mounted display systems were compared, it was stated that they were equally practical and useful for the users (Rolland et al, 1994).

AR technology has evolved over years and it became more convenient and useful (Kesim & Ozarslan, 2012). Currently, the users can easily download the AR applications to their smartphones or tablets and create their own content. There are two main types of AR technology that are used by users currently.

Figure 2.3. Augmented Reality Types



Note. Types of augmented reality (Estrada et al., 2022)

Marker-based AR and Marker-less based AR are the two main kinds of AR technology (Wojciechowski & Cellary, 2013). In Marker-based AR, there should be a picture or object

to use as a trigger. For example, the users scan the trigger that is an object by the cameras of their phones or tablets, then the phone identifies the trigger and a video starts playing. Unlike the marker-based AR, the trigger is not used in the marker-less-based AR. The marker-less AR includes four variations (Estrada, Sidike, Yang, & Niyaz, 2022). The first one is location-based AR in which the trigger is the location (Peddie, 2017). When people scan the location or a map, they can see the directions of the map and the virtual objects show up when the camera of a phone or tablet is turned on (Peddie, 2017). The AR mobile game called “Pokémon Go” can be given as an example of this type of marker-less-based AR. The second variation is projection-based AR which reflects the 3D images or graphics on a real-life object (Mine, Van Baar, Grundhofer, Rose, & Yang, 2012). The last variation is superimposition-based AR. This variation makes changes to already existing real-life objects with the virtual elements through object recognition instead of creating a new digital object (Estrada et al., 2022). The last variation is outlining-based AR which outlines the real life objects using cameras (Estrada et al., 2022). As one of the latest Web 3.0 tools, AR has become popular in various education fields recently (Altınpulluk et al., 2020). AR as one of the latest Web 3.0 tools, has become popular in various education fields recently (Altınpulluk et al., 2020). The learners can use the AR whenever they need it practically (Bahadır, 2019, p.56). Since it is practical and it doesn’t limit the learners with time and place, AR technology is used in many educational fields (Kipper & Rampolla, 2012).

2.5. AR and Language Skills

There are four main language skills: reading, writing, speaking, and listening (Hasan & Hoon, 2013). Reading and listening skills are receptive skills while speaking and writing are productive skills (Davies, 1976). The researchers started to conduct studies about AR integration in courses to find out the effects on English language skills.

The listening skill is considered an important skill to build communicative competence and it includes other skills too (Schmitt, 2010). The listening process includes receiving the input, understanding it, evaluating the whole message, and answering the question (Schmit, 2010, p180). Hence, the listeners think of listening as a complex skill (Pangariban, Sinaga, & Sipayung, 2017). As listening skill is an active skill, English teachers need to help students to build their listening skills and to understand the difference between listening and hearing (Kirana, 2016). The teachers should design and use suitable materials for listening courses for learners to comprehend the target language easily, make meaningful connections with

the already existing knowledge and respond to the questions easily (Schmitt, 2010). Since AR can provide real-life situations, 3D objects, and audio-visuals, it can be one of the tools that can encourage students to listen actively (Schmitt, 2010). Buck (2001) indicates that AR provides a better understanding of the language ensuring a relation between listening to audio and the visual content. Additively, Kirana (2016) also stressed that AR technology can help students to be exposed to real-life conversations and situations in related real-life places. Thus, the students can understand the overall meaning of the input (Kirana, 2016).

Among those four skills, the speaking skill has been picked the least for the studies about AR (Hasbi & Yunus, 2021). Dalim (2020)'s study was one of those few studies. In the study, Dalim et al. (2020) focused on the speaking skill-developing an AR prototype which was called TeachAR. In that study, the aim was to investigate the effects of AR in learning the English names of colors and shapes. The participants were four young learners (aged between 3-6). As a dependent variable, they concentrated on the learners' feedback and behavioral cues, and to understand whether the learners obtain the new knowledge, they did a post-test since the pre-test was conducted through a questionnaire. Dalim et al. (2020) concluded their study by stating that it improved young learners' speaking skills. Dalim et al. (2020) also added that AR technology made the learning process faster and easier for young learners.

There have been many studies, which focused on the reading skill in the literature (Bursalı & Yılmaz, 2019; Danaei et al., 2020; Safar et al., 2016; Tobar-Munoz et al., 2017; Yeh & Tseng, 2020). In Tobar-Munoz et al. (2017)'s study, an AR integrated game was designed to find out whether AR technology has a role in learners' reading comprehension or not. The data were collected through both qualitative and quantitative tools (Tobar-Munoz et al., 2016). At the end of the study, it was stated that although using AR games showed no effect on the participants' reading comprehension, the participants' motivation level increased. Unlike the previous study, Safar et al. (2016)'s results of the study showed that the participants reading comprehension increased thanks to the AR technology. In that study, AR technology was integrated to teach the English alphabet to kindergarten students (Safar et al., 2016). There were experimental and control groups in the study and Safar et al. (2016) stated that there was a difference between these two groups according to reading comprehension tests. Similarly, Bursalı and Yılmaz's (2019) quasi-experimental study also showed the same results. In the study, the participants were 89 5th-grade students. While the experimental group did the reading activities through AR, the control group used traditional

methods (Bursalı & Yılmaz, 2019). At the end of the study, Bursalı and Yılmaz (2019) stated that the experimental group became more successful in reading comprehension tests.

According to the literature, there have also been some studies about AR integration in which the focus was on the English writing skill (Allagui, 2021; Helwa, 2019; Koç et al., 2022; Soo et al., 2019) In Soo et al. (2019)'s study, AR was integrated into an English report writing book. After the implementation period, the perceptions of the lecturers and the students were examined. Accordingly, the examination of perceptions showed that AR integration in writing reports had many advantages (Soo et al., 2019). In addition, Helwa (2019)'s was about the effects of AR technology in EFL descriptive writing and the participants were 35 university students from the Faculty of Education. As a research design, mixed-method was chosen in the study, the data collection tools were writing skills test and motivation towards English Language scale. The results of that study revealed that the participants' writing skills test scores were higher after the implementation and their motivation level has increased thanks to the integration of AR. Similarly, Allagui (2021) has also conducted a study to discover the effects of AR technology in descriptive writing. The participants of this study consisted of 32 university students whose writing levels varied as good, average, and weak. Before the implementation, the students were evaluated according to the writing activities that they completed traditionally. After the experiment, the focus interviews were done to get the opinions about the usage of AR in the writing class from the participants, and AR integrated writing activities were evaluated. The results of this study indicated that the scores of the participants who were on average and weak level increased and according to their perceptions, AR technology was an effective tool to use in writing courses. Additively, the aim was also to explore the effects of AR in high school writing courses in Koç et al. (2022). The compositions of the students and the questionnaire were used as data collection tools in this quasi-experimental study. Both experimental groups included 24 high school students, the control group also included the same number of high school students. Although the results of that study showed that AR technology's effect was medium on students' writing comprehension, their perceptions of the use of AR in writing classes were positive.

2.6. Theoretical Framework

Choosing the right pedagogy while integrating AR technology in the educational field is important (Munir & Nur, 2018). Along the same line, Dunleavy and Dede (2014) stated

that since AR enables learners to learn in a real-life context, to participate, and encourage pair/group works, it is well aligned with Constructivist Learning Theory (CLT) as a theoretical framework. Well-known psychologists Vygotsky, Piaget, and Dewey have worked to develop the CLT (Alzahrani, 2013). The constructivist approach (CA) points out that the learners can build their knowledge on their previous knowledge (Fernando & Marikar, 2017). CA supports learners to make meaningful learning by themselves (Narayan et al., 2013). In the constructivist classroom environment, the teacher's role is limited; the teacher needs to let the students build new knowledge (Fernando & Marikar, 2017). In addition to that, the teacher creates an environment and prepares a constructivist classroom where the learners are always active (Alzahrani, 2013). It was also stressed that there should be authentic and collaborative problem-solving activities in which the teacher's role is to be a facilitator (Narayan et al., 2013). Thus, CLT enables learners to increase their problem-solving and critical thinking skills. In the class, the teacher exposes learners to activities and materials that are related to real-life situations; while learning, the learners are expected to make a connection between the content of the activities and daily context (Bustami et al., 2018). CA also emphasizes the importance of context in learning, the students learn when they have a real-life experience (Santos et al., 2014). As it was stated above, the characteristics of CLT compromise AR technology's features. It was also emphasized that when CLT-based courses are supported by AR technology, it will be a beneficial lesson (Dunleavy & Dede, 2014). According to Shen and Suwenthep (2011), CA is one of the theoretical frameworks that is applied in EFL classes since its principles support the aspects of English Language Learning and Teaching. Aljohani (2017) also stated that when CA is applied in EFL classes, the learners will be autonomous learners and the learners will have the chance to practice target language in-group and pair work activities in real-life contexts.

2.7. Situated Learning Theory

One of the most popular theories that suit AR technology's features is the Situated Learning Theory (SLT). SLT is based on the constructivist approach since the students are in control of their learning and build their knowledge (Lave & Wegner, 1991). SLT was first proposed by Lave and Wegner (1991). It is believed that learners learn when they have a chance to participate in a community of practice (Lave & Wegner, 1991). It was also stressed by many theorists such as Lev Vygotsky, Jean Lave, John Dewey, and Étienne Wenger that learning occurs in situational contexts (Cobb & Bowers, 1999). In this approach, the

knowledge should be about the culture and the context of what is learned (Brown et al., 1989). Moreover, it connects the students to the real world and makes the learning meaningful (Thamrin & Agustin, 2019). By delivering the knowledge in an authentic context with collaborative activities, SLT provides learners to be involved in daily practice (Norainna, 2018). Accordingly, the students can transfer new knowledge or skills in real-life situations (Huang et al., 2016). The students also solve real-life problems with their gained knowledge, thus it also improves the students' higher thinking skills (Hwang & Chen, 2013). In addition to that, SLT requires interactive and collaborative work and connections to real-life contexts (Huang et al., 2016). It was emphasized when learning takes place in social and physical contexts, it becomes more effective than non-situated learning (Contu & Willmott, 2003). Because of that reason, learning in situational contexts has become an important approach to teaching (Contu & Willmott, 2003).

Overall, according to Anderson et al. (1996), the characteristics of SLT are; that knowledge is acquired through real-life actions, acquired knowledge can be transferred to similar situations, and learning occurs through the social process. The characteristics of SLT mentioned above stress the differences between SLT and the other learning theories (Stein, 1998).

There are four key components of SLT, which are; content, context, the community of practice, and participation (Brown et al., 1989 & Lave, 1991). SLT emphasizes the importance of the content (Lave, 1991). The content needs to be connected to real-life and direct learners to reflective thinking. The teacher disposes of the daily life content in the activities and provides opportunities for learners to solve problems and negotiate with their peers (Stein, 1998). The content also should be applicable in real-life environments (Choi & Hannafin, 1995). The second element of SLT is the context (Stein, 1998). It was stated that learning in a proper context makes learners practice effectively (Wilson, 2006). Context integrates the interaction between the learner and culture, values, family, norms, and organization (Lave & Wegner, 1991). In context, the learners experience real-life situations (Wilson, 2006). The third component of SLT is the community of practice (Stein, 1998). The community provides learners to interact socially, reflect, and interpret (Brown, 1989). The learners also have a chance to think about a subject from different perspectives (Lave & Wegner, 1991). The last element of SLT is participation (Stein, 1998). The participation element refers to exchanging of ideas and the learners engage with each other and try to solve a problem (Stein, 1998). According to Lave (1991), when learners interact with each other and participate in a community, learning occurs.

According to Efe et al. (2011), employing SLT in the English Language Learning field has benefits since language learning occurs best when the learners interact with each other in a real-life environment. The learners can construct their knowledge when they practice during activities in a real-life community (Ünal & Yelken, 2020). It was also mentioned that in vocabulary teaching, it is important for instructors to create a social and real-life context where the learners are first introduced to the new words (Liaw & Susan, 2010). Thus, the learners understand the meaning of the words while interacting with each other (Yang, 2011). Several studies also showed that employing SLT in vocabulary teaching made the learning process easy and the learners also had positive feedback towards the interactive learning environment which increased the learners' motivation and success in vocabulary tests (Huang et al., 2016; Wicha & Temdee, 2013; Yang, 2011). In addition to vocabulary learning, employing SLT in EFL courses also helps students to improve their writing skills. Hwang et al. (2014) concluded the study about SLT in learning English that the learners showed significant success in writing and the learners stated that they were eager to participate in activities that are based on real-life scenarios. It was also stressed that it can help the students to be exposed to the cultural elements of the English language (Hwang et al., 2014). Munir and Nur (2018) also mentioned that with carefully planned SLT courses enhancing AR technology could provide a deeper understanding for the students. Hence, it was highlighted that as a pedagogical approach the characteristics of the SLT are well aligned with the AR technology (Garzon et al., 2020).

2.8. Related Studies

AR technology has started to be noticed in ELT like in every other educational field (Kipper & Rampolla, 2012). It was stated that when integrated into the EFL courses, AR technology provides the students with a better understanding of the topic by presenting visuals (Gadelha, 2018). Another advantage of AR technology is that it creates an environment where the students can build their knowledge and helps them to participate actively in the lesson in English learning (Bonner & Reinders, 2018). Additively, when it is used with mobile devices, the learners can use it without the limitation of time and place (Lin et al., 2013, p.315). It is also stated that it provides learning outside the classroom when it is used with mobile devices (Billinghurst & Duenser, 2012, p.58). Moreover, integrating AR technology into the EFL courses increases the students' motivation and makes the lesson entertaining without the limitation of time and place of English learning (Gündoğmuş,

Orhan, & Şahin, 2016). According to Liu, Tan and Chu (2010), AR technology improves the students' English skills, specifically listening and speaking skills. It is highlighted that the AR technology provides the students to acquire English listening skills by creating authentic environments and giving them the chance to discover different pronunciations and accents (Gündoğmuş et al., 2016). Hence AR technology enables students to become more successful in listening skills (Liu et al., 2010). Some studies have been conducted about the usage of AR in EFL in listening skills.

First of all, Gündoğmuş et al. (2016) conducted a study about the attitudes of the students toward the use of AR technology in listening classes. The participants were 60 middle school students who used AR applications with their smartphones and tablets to listen to the audio from the course book. In the study, 'Aurasma' was used as an AR application to improve the students' listening skills. Alongside the listening skill, this study's goals were to create an enjoyable learning environment and to improve the students' self-confidence. Data were collected through the AR applications attitude scale. The results of this study showed that alongside the students' motivation level, the students' success level in listening also increased (Gündoğmuş et al., 2016). According to Gündoğmuş et al. (2016), the students also showed positive attitudes toward the integration of AR in listening classes, and the students also were more eager for AR tools to be integrated into the other courses and subjects. Similarly, Chen, Wang, Zou, Lin, Xie and Tsai (2020) also conducted a study to discover the effects of captions in AR-enhanced- contextualized EFL learning and the attitudes of the students towards it. The participants consisted of six classes of ninth-grade students and they used tablets during the experiment period (Chen et al., 2020). The students had a positive attitude towards learning through AR (Chen et al., 2020).

Additively, Liu (2009) also did research supporting an AR learning environment called HELLO and observed both the participants' listening and speaking skills. The participants were both a combination of three high school teachers and 64 seventh-grade students. Data were collected through formal assessment and a questionnaire. At the end of the study, it is stated that the participants' speaking and listening skills also highly improved (Liu, 2009). According to Liu (2009), they were also motivated through the AR integrated courses. In another study which was conducted by Barreira, Bessa, Pereira, Adao, Peres and Magalhaes (2012), an AR game called MOW (Matching Objects and Words) was developed with the help of elementary school teachers to teach new English vocabulary. The participants of that study consisted of 26 children whose ages ranged from 7 to 9. While the AR game (MOW) was integrated during the English courses in the experimental group, the traditional methods

and materials were used in the control group's courses (Barreira et al., 2012). At the end of the study, it has been seen that the experimental group showed greater progress in English learning when compared to the control group (Barreira et al., 2012).

Vate U-lan (2012) has conducted a study about the integration of AR as a tool in English teaching to young learners. In the study, the AR integrated 3D pop-up book called 'The Seed Shooting Game' was created by the researcher and the book was used in English courses. The participants were ninety-nine 3rd-grade students in Bangkok. At the end of the study, it has been stressed that the results of the participants' post-tests were higher than pre-test scores and the participants' motivation level has increased. Similarly, Mahadzir and Phung (2013) also developed an AR pop-up book using an application called ZooBurst for primary school students, they found out that the participants were motivated and were more confident in ELT courses.

Additively, Martinez, Benito, Gonzales and Ajuria (2017) have emphasized teaching vocabulary and grammar structures through AR technology using the CLIL approach in Infant Education. The materials were designed to provide content learning. In that study, the songs and narrations were used through AR to teach English to infants. The participants of this study were 150 students who were five years old. The study was implemented for 3 months and the activities were mainly TPR-based activities. At the end of the study, although AR technology helped the participants to learn the vocabulary easily, many problems occurred at that educational level. One of the problems was the usage of the devices' applications in the classroom environment was challenging for the participants, the other one was that the application didn't recognize the trigger images during the process. Martinez et al. (2017) have concluded the study by stating, that AR has potential in English teaching to young learners but advanced technologies will never be able to replace the teachers.

Solak and Çakır (2015) carried out research with 130 undergraduate students from a run-state university in Turkey. That study aimed to find out the correlation between the students' academic achievement and the AR materials used in the classes. Materials were designed to support AR technology to present the new vocabulary. 'Material Motivational Survey' has been used as the data collection tool. According to the findings of that study, the student's motivation level has increased towards the use of AR in vocabulary courses, and there was a positive correlation between academic achievement and the AR materials. Moreover, there wasn't a significant difference between the two genders in terms of motivation level. In addition to that study, Vedadi, Abdullah, Kolivand, Cheok and Aris (2018) studied the impact of gender roles on vocabulary learning using AR. The participants

of the study consisted of 100 male students and 100 female seventh-grade students (Vedadi et al., 2017). The results of the vocabulary test showed that female students became more successful than male students.

Tsai (2020) also conducted a study about AR's effects on the motivation and performance of EFL learners. Forty-two (42) fifth-grade students were recruited as participants. The proficiency level of experimental and control groups was equal generally, they were taught by the same teacher (Tsai, 2020). During the implementation, the participants in the experimental group colored the pictures and scanned them to see the 3D visuals. The first data collection tool was the "Instructional Materials Motivation Survey" and the second tool was "The English Vocabulary Competence Test" (Tsai, 2020). At the end of the study, the participants had significant success in competence tests.

Furthermore, Ismayatim, Yunus, Zamri, Nazri and Hashim (2019) developed a listening practices model called MyEVO which is the integration of AR and mobile applications. This model was designed to enhance the learners' listening skills. Through an AR application called HP to reveal, the learners scanned various images and the related MyEVO page showed up. Then the learners could listen to the videos on that page. 177 college students who were the participants of this study filled out a survey about their experiences. In addition to that, their listening comprehension levels were assessed by questions about the videos that were presented in MyEVO. The results of that study indicated that the students had also positive attitudes toward that model and the student's comprehension in listening skills improved. Moreover, the students also stated that the AR technology should be integrated into listening courses more since it is entertaining and practical.

Similarly, Chang, Chen and Liao (2020) conducted a study to examine the motivation of learners in AR integrated classes alongside the effects of AR on speaking and listening skills focusing on the ARCS motivation model. They also use "Aurasma" as an AR application since it is practical to use in the class. In their study, the researcher who is also the teacher of the experimental and control group used situational airport videos for situational learning (Chang et al., 2020). The participants of this study were 40 junior high school students. After the study, it was indicated that the students were highly motivated in speaking and listening courses (Chang et al., 2020).

Additively, Chen et al., (2017)'s study was about the effects of AR technology on kindergarten students' English. An AR application was developed to teach English vocabulary to kindergarten students. The students could scan the flashcards and the 3D

version of that word appeared with the pronunciation of that word. At the end of the study, it was stated that the students were more eager to participate in the courses, and their vocabulary knowledge improved. Moreover, Taşkıran (2019) also conducted a study about AR games' effects on the motivation level of EFL students. The participants were 1590 university students. According to questionnaire results, it was indicated that the students enjoyed the implementation period. After the implementation, the students found the usage of AR applications in ELT courses motivating. The AR applications attracted the students' attention to the class.

In her Master's thesis, Bahadır (2019) conducted a study about the AR integration in teaching English to primary-level students, the participants were 4th-grade students. The focus in this study was the four main skills the duration of this study was nine weeks and the study was conducted on the experimental and control groups. Various AR applications have been used in the different sections of the courses. The data were collected through a pre-test and a post-test. The results also indicated that AR technology attracted the attention of students to the courses and the students enjoyed the courses. However, the participants in the experimental groups' success weren't higher than the control group's success in terms of listening skills contrary to the previous studies.

In conclusion, there have been studies about the usage of AR technology in enhancing listening and speaking skills. However, it has been stated in Karacan and Akoğlu's (2021) a deep literature review that most AR studies are not based on a theoretical framework. In addition to that, the AR studies focusing on listening and speaking skills are limited (Karacan & Akoğlu, 2021). Hence, this study will be about the integration of AR technology in English listening skills focusing on SL as the theoretical framework.

CHAPTER III

METHODOLOGY

This section firstly presents the study's design, the participants, and data collection instruments and finishes with data analysis.

3.1. The Overall Design of the Study

For this study, the quasi-experimental research design was used to discover the effects of AR technology. The study was conducted with six groups from three different secondary schools that have an equal number of students whose proficiency levels are the same. In this study, the English teacher of the first school was also the researcher herself. All three teachers covered the second unit of the fifth grade according to the curriculum, As for skills, the researcher focused on listening. Since the first unit of fifth grade is Nationalities and Countries, the researcher designed 20 different characters who are from different countries and dressed traditionally using a character design application. In every lesson, 5 characters were introduced to the participants. The designed characters also introduced themselves and presented the new language structure by speaking in their countries' accents. As a trigger for AR, 20 different country flag images and symbols were used, then the designed characters' videos linked to these flags' triggers. The participants used their smartphones and tablets to scan the flags, listened to the video, and talked about themselves and their country. The study took 4 weeks as suggested in the curriculum. After the implementation, the data were collected from listening comprehension tests (Appendix 1) and AR Applications Attitude Scale (Küçük, Yılmaz, Baydas, Göktas, 2014) (Appendix 2).

3.2. Participants

In this study, convenience sampling which is a kind of non-probability sampling was applied. Convenience sampling is defined as selecting the target population according to their willingness, availability, and easy accessibility (Dörnyei, 2007). Acharya et al. (2013) stated that convenience sampling is the most commonly used in the studies because it is affordable and time-saving. Since the researcher was also the teacher of the first group, and the researcher could easily contact and direct the other two teachers and the two groups,

convenience sampling was used in this study. The total participants were 84 fifth-grade students in three private schools that are located in Ankara. The participants were from three different private secondary schools, which are affiliated with a private institution that is located in Ankara. 30 of the participants were from the private secondary school that is located in the Keçiören district in which the researcher was also the teacher, 26 of the participants were from the private secondary school in Pursaklar district and the last 28 participants were from the private secondary school in Eryaman. In each school, two different classes (5/A-5/B) were picked for the study. These two classes had the same number of participants, which were fifteen to fifteen, thirteen to thirteen, and fourteen to fourteen. In each school, the 5/A classes were the experimental groups while the 5/B classes were the control groups. In total there was an equal number of participants in both the experimental and the control groups and there were 42 participants in the experimental groups and 42 participants in the control groups in total. Because the researcher was also the teacher of the first school, she explained the details of the study and presented the AR app to the other two teachers in the other two schools. The researcher also prepared and sent the lesson plans and materials to the other teachers. The English proficiency level of the participants was elementary. The participants learned English as a foreign language and they had not used any Web 3.0 tools in the classes. The participants were informed about the general topic of the study and parental consent was obtained for each student.

3.3. Data Collection Instruments

This chapter explains the preparation of AR course materials and the data collection instruments.

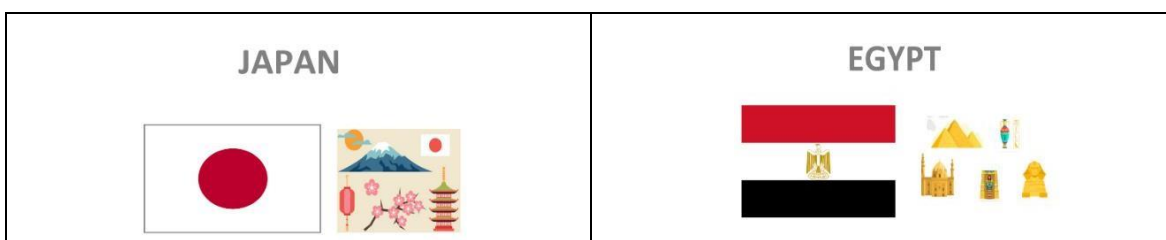
3.3.1. Preparation of AR Course materials

Since the topic was ‘‘Nationalities and Countries’’, as the theme of this study visiting countries' situational contexts were used. Therefore, the researcher created and designed 20 characters who are from different countries to provide situational contexts for students. For that study, the characters were designed to wear the traditional clothes of that country and in the background of the characters, photographs of the countries' most famous symbolic attractions have been placed. The researcher also made characters speak English according

to their countries' accents and talk about themselves. Thus, provided the learners to learn situationally.

As an AR application "Roar" was used. Roar is an application that users can create their AR easily and share or use them. The application included three kinds of AR (Marker-based, Marker-less, Location- Based), so the users can create their AR materials however they want. Although this application requires an internet connection, it is easy to create AR in comparison to the other applications. Once the user created the AR, any other user can see it by scanning the trigger that the creator used.

Figure 3.1. Examples of the triggers



As seen in Figure 3.1., the researcher chose the marker-based as the AR-type for the study and designed 20 countries' flags and their symbols as triggers. The videos were added to these triggers one by one.

The videos were designed and created using a character creation and vocalization application by the researcher and they included 20 characters from 20 countries. To create a situational context, the characters were designed to introduce themselves and ask the students' names and nationalities with their accents in front of their country's most popular attractions. Some of the characters had their country's traditional clothes. After getting positive feedback from an expert, the videos were added to the triggers. Thus, when the students scanned one country's trigger, that country's video showed up.

3.3.2. Listening Comprehension Test

The comprehension test was first prepared by the researcher according to the topic of the unit "Nationalities and Countries". The first draft of the test consisted of 29 questions. The test was applied to 17 students as a demo to assess item discrimination.

Table 3.1. Item Discrimination Indexes of Listening Comprehension Test

<i>Item Number</i>	<i>Subgroup (n=8)</i>		<i>Supergroup (n=9)</i>		r
	<i>False</i>	<i>True</i>	<i>False</i>	<i>True</i>	
	<i>N</i>	<i>N</i>	<i>N</i>	<i>n</i>	
<i>Q1</i>	1	7	1	8	0,125
<i>Q2</i>	0	8	1	8	0,000
Q3	4	4	1	8	0,500
Q4	6	2	1	8	0,750
Q5	5	3	2	7	0,500
Q6	4	4	1	8	0,500
<i>Q7</i>	0	8	1	8	0,000
<i>Q8</i>	0	8	0	9	0,125
Q9	2	6	0	9	0,375
<i>Q10</i>	1	7	0	9	0,250
Q11	4	4	1	8	0,500
Q12	4	4	0	9	0,625
Q13	2	6	1	8	0,250
Q14	4	4	0	9	0,625
Q15	3	5	0	9	0,500
Q16	3	5	0	9	0,500
Q17	2	6	0	9	0,375
<i>Q18</i>	1	7	0	9	0,250
Q19	3	5	0	9	0,500
Q20	3	5	1	8	0,375
Q21	2	6	0	9	0,375
Q22	6	2	1	8	0,750
Q23	5	3	0	9	0,750
Q24	5	3	0	9	0,750
Q25	3	5	0	9	0,500
Q26	5	3	0	9	0,750
Q27	6	2	0	9	0,875
Q28	4	4	1	8	0,500
Q29	5	3	1	8	0,625

According to the results of the item analysis, four questions (Q1, Q2, Q7, Q8) were taken out from the test due to the low item discrimination power index ($r < 0.19$). Then two questions were edited (Q10 and Q18). The final version of the test consisted of 25 questions. There were 5 different sections in the test, the first, the fifth and the fourth section included fill-in-the-blank questions while the second and the third section included multiple-choice questions.

3.3.3. Augmented Reality Applications Attitude Scale

This questionnaire was designed as a five-point Likert-type scale (ranging from “strongly disagree” to “strongly agree” 1 means strongly disagree while 5 means strongly agree) to measure the students’ attitudes towards the use of AR technology in the courses. According to Küçük et al. (2014), the validity and the reliability of this scale are high ($\alpha=.835$) and user satisfaction, use anxiety, and the use aim are the factors that formed the attitude scale. The legal permission is taken to use that attitude scale from the researchers. That scale has 15 items to determine the attitudes of the secondary school students toward AR integration in classes. This scale has consisted of three factors, which were “the use satisfaction”, “the use anxiety”, and “the use willingness” (Küçük et al., 2014). Additively, the use satisfaction included 7 items and the use anxiety included 6 items while the use willingness included 2 items (Küçük et al., 2014).

3.4. Data Collection Procedure

The study was implemented during the 2021-2022 academic year. Before the implementation, legal permission was obtained from The Ministry of National Education of Turkey. Then, the students and the parents were informed about the details of the study before the implementation. They were also informed that all the data were used only for research study and the results were kept confidential. The parents’ consent was taken.

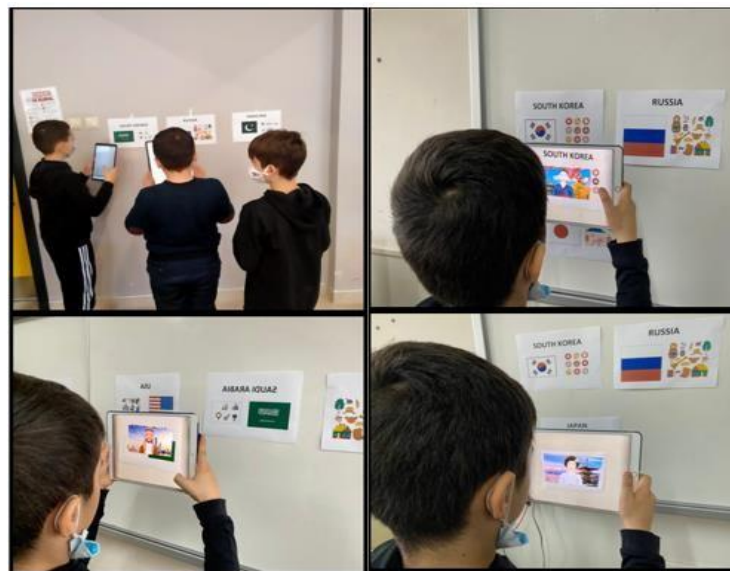
Firstly, the participants were divided into experimental and control groups. The pre-test which was a listening comprehension test was applied to all of the groups to assess the students’ knowledge of the topic. In the first week, the pre-test was applied and the courses started to be taught by the teachers. The topic “Nationalities and Countries” which was covered by the first unit (Hello) of the 5th Grade English Language Syllabus was picked to teach. The objectives of this unit were to let students understand simple information about other people and introduce themselves and exchange simple personal information, the focus was on listening skills. During the implementation period, the experimental groups used AR applications in English listening courses and the control group used their books in English listening courses.

For the implementation, the students brought their tablets and smartphones with the consent of their parents. 2 tablets and 3 smartphones were used in each experimental group. Since the schools did not have an internet connection, the researcher and the other two teachers supplied the internet connection by using mobile Wi-Fi. For the activities, the

participants of the experimental group were presented with the first five countries and nationalities and then structures about introducing themselves. The pictures of these five countries' flags and symbols were hung on the classroom walls and whiteboards. After that, the students were divided into groups of 4 or 5, every group started to scan the pictures and listen to the video one by one. At the end of the video, they answered the characters' questions in English. After every student scanned the flags and symbols, they answered the listening for gist questions about these videos. The students scanned and listened to the videos again with the tablets and smartphones, answered the fill-in-the-blank questions (Listening for details), then compared their answers with their groups.

After the implementation of the study, the post-test was applied to all the groups to see the students' listening improvement. The pre-test and post-test scores of experimental and control groups were compared to see the effects of AR integration and the situated learning that AR provided on the students' listening success. AR attitude scale also has been applied to only experimental groups to determine their attitudes towards the use of AR in English courses.

Figure 3.2. Students using AR application



In Figure 3.2., the students use tablets and smartphones to scan the triggers, then watch and listen to the characters talking about their country and their nationalities.

CHAPTER IV

FINDINGS AND DISCUSSION

This section includes the results of listening comprehension tests (Pre-tests and post-tests) that were applied to the participants from both control and experiment groups and the AR Applications Attitude Scale that was answered by only the participants of the experimental groups. Findings are presented under each research question with tables and figures.

RQ1 Does the integration of AR technology in EFL courses have any effects on students' listening skills?

The data consisted of a total of 84 participants, 42 of whom are experimental and 42 are control groups. Analysis was made using the IBM SPSS Statistics 28 package program. For analyzing the data, frequencies (number, percentage) for categorical variables and descriptive statistics (mean, standard deviation, minimum, maximum) are given for numerical variables.

The normality assumption of numerical variables was examined with the Kolmogorov Smirnov test of normality and it was found that they were normally distributed. For this reason, parametric statistical methods were used in the study. The differences between the two dependent numerical variables were examined with the Dependent Sample T-Test. The differences between the two independent groups were examined with the Independent Sample T-Test. The relationship between two independent numerical variables was interpreted with the Pearson Correlation coefficient.

In the study, statistical significance was taken as 0.05. The power of the study was found with the G Power package program. From the results of the study, the effect width was calculated as 1.99. Accordingly, the power of the study, which was completed with a total of 84 participants, 42 of which were experimental and 42 of whom were controlled, at a significance level of 0.05 and an effect width of 1.99, was found to be 99.9%.

Table 4.1. Comparison of Pre-Test Post-Test Success of Experimental and Control Groups

	<i>Experimental (n=42)</i>		<i>Control (n=42)</i>		<i>Comparison between the groups</i>	
	<i>Mean±SD</i>	<i>Min-Max</i>	<i>Mean±SD</i>	<i>Min-Max</i>	<i>t^a</i>	<i>P</i>
Pre-test Success	9,86±5,11	0-20	9,00±4,02	0-18	0,854	0,198
Post-test Success	21,62±2,44	17-25	16,02±3,14	8-24	9,115	<0,001*
Comparison between the groups	<i>t^b=-19,736</i> <i>p<0,001*</i>		<i>t^b=-16,218</i> <i>p<0,001*</i>			

t^a: Independent Sample T-Test t^b: Dependent Sample T- Test *:p<0,05 (Statistically significant)

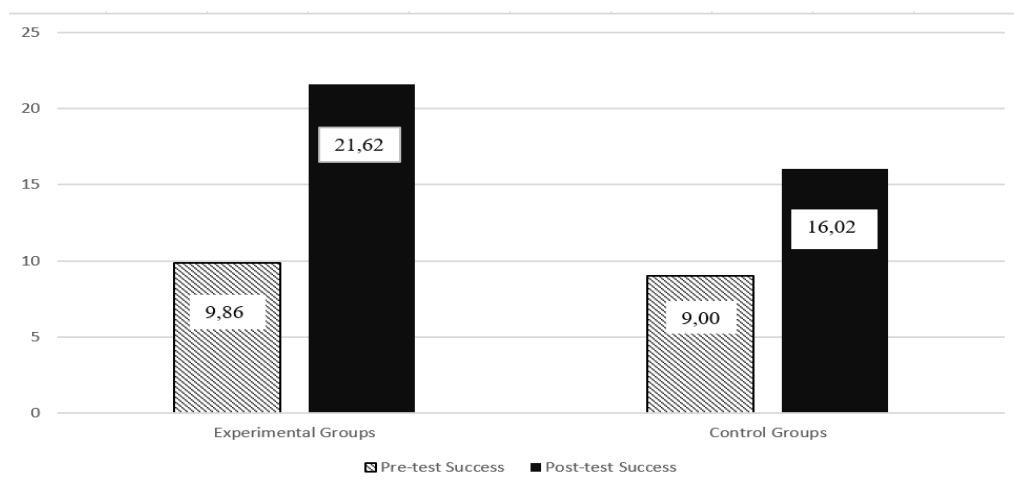
As can be seen in the table, the mean and standard deviation of the pre-test achievement scores of the experimental group is 9.86±5.11, while the mean and standard deviation of the pre-test achievement scores of the control group is 9.00±4.02. The mean and standard deviation of the experimental group's post-test achievement scores were 21.62±2.44, while the control group's average and standard deviation were 16.02±3.14.

There was no statistically significant difference between the experimental and control groups in terms of pre-test success scores as a result of the independent sample t-test was applied (p=0.198) according to the table. This result suggests that control groups and experimental groups had equal prior knowledge about the unit 'Nationalities and Countries'.

Moreover, as a result of the dependent sample t-test, there was also a significant difference between the scores of the participants in the experimental groups (p<0.001) in pre-test and post-test. According to this, the post-test (M=21,62) achievement scores of the experimental group increased significantly compared to the pre-test success scores (M=9,86).

In addition, the scores of the control groups were also significantly different according to the results and the scores of the participants in the control groups (M=9,00) increased significantly compared to their pre-test success scores (M=16,02).

Figure 4.1. The Mean of Pre-Test and Post-Test Success Scores of Groups



As it is shown in Figure 4.1., after the independent sample t-test was applied, there was a statistically significant difference between the experimental and control groups in terms of post-test achievement scores ($p < 0.001$). According to that, the post-test achievement scores of the experimental groups ($M = 21,62$) in which AR technology was integrated were significantly higher than the post-test success scores of the control groups ($M = 16,02$).

Table 4.2. Comparison of Pre-Test and Post-Test Success Scores of Participants in the Experimental Group by Gender

	Female (n=21)		Male (n=21)		Comparison between groups	
	M±SS	Min-Max	M±SD	Min-Max	t ^a	P
Pre-test Success	9,57±5,40	0-19	10,14±4,92	0-20	-0,358	0,722
Post-test Success	21,86±2,26	18-25	21,38±2,64	17-25	0,628	0,534
Comparison between the groups	t ^b =-13,265 p<0,001*		t ^b =-14,873 p<0,001*			

t^a: Independent Sample T-test t^b: Dependent Sample T-Test *:p<0,05 (Statistically Significant)

Results of the table indicates that the mean and standard deviation of the pre-test achievement scores of the female students in the experimental groups were 9.57±5.40, while the mean and standard deviation of the pre-test success scores of male students were 10.14±4.92. While the mean and standard deviation of the post-test achievement scores of the female students in the experimental groups were 21.86±2.26, it was 21.38±2.64 for the male students.

As a result of the independent sample t-test applied, there was no statistically significant difference between male students and female students in the experimental groups in terms of pre-test success scores ($p=0.722$) and there was no statistically significant difference between male students and female students in the experimental groups in terms of post-test success scores ($p=0.534$).

Table 4.3. Distribution of Pre-test and Post-test Answers to Questions in The Listening Comprehension Test by Groups

		Experimental (n=42)				Control(n=42)			
		False		True		False		True	
		n	%	n	%	n	%	n	%
Question 1	Pre-test	28	66,7	14	33,3	25	59,5	17	40,5
	Post-test	3	7,1	39	92,9	13	31,0	29	69,0
Question 2	Pre-test	19	45,2	23	54,8	18	42,9	24	57,1
	Post-test	1	2,4	41	97,6	10	23,8	32	76,2
Question 3	Pre-test	25	59,5	17	40,5	24	57,1	18	42,9
	Post-test	3	7,1	39	92,9	11	26,2	31	73,8
Question 4	Pre-test	15	35,7	27	64,3	14	33,3	28	66,7
	Post-test	3	7,1	39	92,9	6	14,3	36	85,7
Question 5	Pre-test	18	42,9	24	57,1	22	52,4	20	47,6
	Post-test	2	4,8	40	95,2	13	31,0	29	69,0
Question 6	Pre-test	18	42,9	24	57,1	27	64,3	15	35,7
	Post-test	4	9,5	38	90,5	14	33,3	28	66,7
Question 7	Pre-test	26	61,9	16	38,1	33	78,6	9	21,4
	Post-test	4	9,5	38	90,5	17	40,5	25	59,5
Question 8	Pre-test	28	66,7	14	33,3	30	71,4	12	28,6
	Post-test	8	19,0	34	81,0	14	33,3	28	66,7
Question 9	Pre-test	27	64,3	15	35,7	30	71,4	12	28,6
	Post-test	10	23,8	32	76,2	19	45,2	23	54,8
Question 10	Pre-test	29	69,0	13	31,0	27	64,3	15	35,7
	Post-test	8	19,0	34	81,0	18	42,9	24	57,1
Question 11	Pre-test	32	76,2	10	23,8	31	73,8	11	26,2
	Post-test	6	14,3	36	85,7	20	47,6	22	52,4
Question 12	Pre-test	20	47,6	22	52,4	20	47,6	22	52,4
	Post-test	4	9,5	38	90,5	14	33,3	28	66,7
Question 13	Pre-test	15	35,7	27	64,3	19	45,2	23	54,8
	Post-test	6	14,3	36	85,7	9	21,4	33	78,6
Question 14	Pre-test	24	57,1	18	42,9	18	42,9	24	57,1
	Post-test	10	23,8	32	76,2	9	21,4	33	78,6
Question 15	Pre-test	17	40,5	25	59,5	19	45,2	23	54,8
	Post-test	4	9,5	38	90,5	13	31,0	29	69,0
Question 16	Pre-test	19	45,2	23	54,8	21	50,0	21	50,0
	Post-test	4	9,5	38	90,5	13	31,0	29	69,0
Question 17	Pre-test	20	47,6	22	52,4	19	45,2	23	54,8
	Post-test	5	11,9	37	88,1	9	21,4	33	78,6
Question 18	Pre-test	31	73,8	11	26,2	28	66,7	14	33,3
	Post-test	9	21,4	33	78,6	17	40,5	25	59,5
Question 19	Pre-test	31	73,8	11	26,2	31	73,8	11	26,2
	Post-test	6	14,3	36	85,7	24	57,1	18	42,9
Question 20	Pre-test	34	81,0	8	19,0	35	83,3	7	16,7
	Post-test	7	16,7	35	83,3	20	47,6	22	52,4
Question 21	Pre-test	29	69,0	13	31,0	32	76,2	10	23,8
	Post-test	8	19,0	34	81,0	14	33,3	28	66,7
Question 22	Pre-test	32	76,2	10	23,8	39	92,9	3	7,1
	Post-test	7	16,7	35	83,3	15	35,7	27	64,3
Question 23	Pre-test	35	83,3	7	16,7	35	83,3	7	16,7
	Post-test	8	19,0	34	81,0	17	40,5	25	59,5
Question 24	Pre-test	32	76,2	10	23,8	39	92,9	3	7,1
	Post-test	8	19,0	34	81,0	24	57,1	18	42,9
Question 25	Pre-test	32	76,2	10	23,8	36	85,7	6	14,3
	Post-test	4	9,5	38	90,5	24	57,1	18	42,9

As can be seen in table 4.3.;

While the rate of the participants who answered Question 1 correctly in the pre-test was 33.3% in experimental groups, this rate reached 92.9% in the post-test, and Question 1 was answered correctly by the participants from control groups at the rate of 40.5%. Control groups' post-test results increased to 69%. The pre-test rate of the participants of the experimental groups who answered Question 2 correctly was 54.8%, and their rate improved to 97.6% in the post-test. Moreover, the rate of those who answered Question 2 correctly in the pre-test was 57.1% in the control group, this rate increased to 76.2% in the post-test. According to the results, the rate of those who answered Question 3 correctly in the pre-test was 40.5% in the experimental groups, this rate increased to 92.9% in the post-test. While the rate of those who answered Question 3 correctly in the pre-test was 42.9% in the control groups, this rate increased to 73.8% in the post-test. While the pre-test rate of experimental groups who answered Question 4 correctly in the pre-test was 64.3%, their post-test rate was 92.9% in the post-test. The pre-test rate of the control groups who answered Question 4 correctly was 66.7%, and their post-test rate changed to 85.7% based on the results. Additively, the rate of the participants who answered Question 5 correctly in the pre-test was 57.1% in the experimental groups, this rate increased to 95.2% in the post-test and the rate of those who answered Question 5 correctly in the pre-test was 47.6% in the control group, this rate increased to 69% in the post-test.

According to the results, the rate of those who answered Question 6 correctly in the pre-test was 57.1% in the experimental groups, this rate reached 90.5% in the post-test and the rate of those who answered Question 6 correctly in the pre-test was 35.7% in the control group, this rate increased to 66.7% in the post-test. Further to that, the rate of those who answered Question 7 correctly in the pre-test was 38.1% in the experimental group and this rate increased to 90.5% in the post-test. Based on the results, the rate of those who answered Question 7 correctly in the pre-test was 21.4% in the control group, this rate increased to 59.5% in the post-test. Furthermore, the rate of those who answered Question 8 correctly in the pre-test was 33.3% in the experimental group, this rate increased to 81% in the post-test. According to the item analysis, the rate of those who answered Question 8 correctly in the pre-test was 28.6% in the control group, this rate increased to 66.7% in the post-test.

Additively, the rate of those who answered Question 9 correctly in the pre-test was 35.7% in the experimental group, this rate increased to 76.2% in the post-test and the rate of those who answered Question 9 correctly in the pre-test was 28.6% in the control group, this rate increased to 54.8% in the post-test. In addition to that, the rate of those who answered

Question 10 correctly in the pre-test was 31% in the experimental group, this rate increased to 81% in the post-test and while the rate of those who answered Question 10 correctly in the pre-test was 35.7% in the control group, this rate increased to 57.1% in the post-test. The results showed that the rate of those who answered Question 11 correctly in the pre-test was 23.8% in the experimental group, this rate increased to 85.7% in the post-test. On the other hand, the rate of those who answered Question 11 correctly in the pre-test was 26.2% in the control group, this rate increased to 52.4% in the post-test. Additively, while the rate of those who answered Question 12 correctly in the pre-test was 52.4% in the experimental group, this rate increased to 90.5% in the post-test and the rate of those who answered Question 12 correctly in the pre-test was 52.4% in the control group, this rate increased to 66.7% in the post-test. Results also indicated that the rate of those who answered Question 13 correctly in the pre-test was 64.3% in the experimental group, this rate increased to 85.7% in the post-test and the rate of those who answered Question 13 correctly in the pre-test was 54.8% in the control group, this rate increased to 78.6% in the post-test.

In addition, the rate of those who answered Question 14 correctly in the pre-test was 42.9% in the experimental group, this rate increased to 76.2% in the post-test and the rate of those who answered Question 14 correctly in the pre-test was 57.1% in the control group, this rate increased to 78.6% in the post-test. the rate of those who answered Question 15 correctly in the pre-test was 59.5% in the experimental group whereas this rate increased to 90.5% in the post-test. According to the results, the rate of those who answered Question 15 correctly in the pre-test was 54.8% in the control group, this rate increased to 69% in the post-test. Moreover, the rate of those who answered Question 16 correctly in the pre-test was 54.8% in the experimental group, this rate increased to 90.5% in the post-test. The rate of those who answered Question 16 correctly in the pre-test was 50% in the control group, this rate also increased to 69% in the post-test. The results of the listening comprehension test showed that the rate of those who answered Question 17 correctly in the pre-test was 52.4% in the experimental group, this rate increased to 88.1% in the post-test and the rate of those who answered Question 17 correctly in the pre-test was 54.8% in the control group, this rate increased to 78.6% in the post-test. In addition to that, the rate of those who answered Question 18 correctly in the pre-test was 26.2% in the experimental group, this rate increased to 78.6% in the post-test and the rate of those who answered Question 18 correctly in the pre-test was 33.3% in the control group, this rate increased to 59.5% in the post-test. Moreover, the rate of those who answered Question 19 correctly in the pre-test was 26.2% in the experimental group, this rate increased to 85.7% in the post-test. The rate of those who

answered Question 19 correctly in the pre-test was 26.2% in the control group, this rate increased to 42.9% in the post-test. While the rate of those who answered Question 20 correctly in the pre-test was 19% in the experimental group, this rate increased to 83.3% in the post-test. Furthermore, the rate of those who answered Question 20 correctly in the pre-test was 16.7% in the control group, this rate increased to 52.4% in the post-test. The rate of those who answered Question 21 correctly in the pre-test was 31% in the experimental group, this rate increased to 81% in the post-test whereas the rate of those who answered Question 21 correctly in the pre-test was 23.8% in the control group, this rate increased to 66.7% in the post-test. According to the results, Question 22 was answered correctly by the participants of the experimental groups with a rate of 23.8% in the pre-test, this rate got higher with the rate of 83.3% when the post-test was applied. While Question 22 was answered correctly in the pre-test by the control groups with a rate of 7.1%, the control groups answered Question 22 correctly with the rate of 64.3% in the post-test. The rate of those who answered Question 23 correctly in the pre-test was 16.7% in the experimental group, this rate increased to 81% in the post-test. While the rate of those who answered Question 23 correctly in the pre-test was 16.7% in the control group, their rate improved to 59.5% in the post-test. Based on the results, Question 24 was answered correctly in the pre-test with the rate of 23.8% in the experimental group, their rate increased to 81%, and the control groups rate of answered Question 24 correctly in the pre-test with the rate of 7.1%, in the post-test, the rate of participants of control groups was 42.9%. Question 25 was answered correctly in the pre-test with the rate of 23.8% by the participants of the experimental group, this rate improved with the rate of 90.5% in the post-test. The rate of the control groups who answered Question 25 also increased in the post-test. The rate increased from 14.3% to 42.9%.

In conclusion, the participants of experimental groups' pre-tests and post-tests results indicated that they showed significant improvement in Q1 (pre-test= 33,3 post-test= 92,9), Q20 (pre-test= 19,0 post-test= 83,3), Q24 (pre-test= 16,7 post-test= 81,0) and Q25(pre-test= 23,8 post-test= 90,5) according to the Table 4.3.

RQ2 What are the attitudes of elementary level students towards the usage of AR technology in EFL courses?

Table 4.4. Descriptive Statistics for Augmented Reality Applications Attitude Scale's Sub-Dimensions

	Mean	Standart Deviation	Minimum	Maximum
The Use Satisfaction	34,64	0,73	32	35
The Use Anxiety	6,43	0,89	6	11
The Use Willingness	9,95	0,22	9	10

According to the table, the mean and standard deviation of the Augmented Reality Applications Attitude Scale scores of the experimental groups were 74.17 ± 1.23 , while the use satisfaction sub-dimension was 34.64 ± 0.73 , the use anxiety sub-dimension was 6.43 ± 0.89 and the use willingness sub-dimension was 74.17 ± 1.23 . and its dimension is 9.95 ± 0.22 .

As can be seen in the table, the sub-dimension called the use satisfaction which was composed of 7 items' mean was high ($M=36,64$, $SD=0,73$). The mean of the sub-dimension the use willingness which included 2 items was also high ($M=9,95$, $SD=0,22$). However, the mean of the use of anxiety which consisted of 6 items was low ($M=6,43$, $SD=0,89$).

Table 4.5. shows the distribution of items in the Augmented Reality Applications Attitude Scale.

Table 4.5. Distribution of Responses to the Augmented Reality Applications Attitude Scale Items

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%	N	%
Item 1	0	0,0	0	0,0	0	0,0	0	0,0	42	100,0
Item 2	31	73,8	11	26,2	0	0,0	0	0,0	0	0,0
Item 3	38	90,5	4	9,5	0	0,0	0	0,0	0	0,0
Item 4	0	0,0	0	0,0	0	0,0	1	2,4	41	97,6
Item 5	0	0,0	0	0,0	0	0,0	3	7,1	39	92,9
Item 6	41	97,6	1	2,4	0	0,0	0	0,0	0	0,0
Item 7	0	0,0	0	0,0	2	4,8	3	7,1	37	88,1
Item 8	41	97,6	1	2,4	0	0,0	0	0,0	0	0,0
Item 9	0	0,0	0	0,0	1	2,4	2	4,8	39	92,9
Item10	42	100,0	0	0,0	0	0,0	0	0,0	0	0,0
Item11	0	0,0	0	0,0	0	0,0	0	0,0	42	100,0
Item12	0	0,0	0	0,0	0	0,0	0	0,0	42	100,0
Item13	0	0,0	0	0,0	0	0,0	2	4,8	40	95,2
Item14	41	97,6	1	2,4	0	0,0	0	0,0	0	0,0
Item15	0	0,0	0	0,0	0	0,0	0	0,0	42	100,0

As seen in Table 4.5., all of the participants in the study answered that they agree with the statement "I enjoy the courses taught with AR applications" (The Use Satisfaction). 73.8% of them answered that they strongly disagree with the statement "I get bored while using AR applications" (The Use Anxiety). 90.5% of them answered that they strongly disagree with the statement "It is difficult to use AR applications"(The Use Anxiety). 97.6% of them answered that they agree with the statement "I can pay my attention better to the lesson when AR applications are used" (The Use Satisfaction). 92.9% of them answered that they agree with the statement "I study harder thanks to AR applications" (The Use Satisfaction). 97.6% of them answered that they strongly disagree with the statement "As AR applications confuse me, they make it difficult for me to learn" (The Use Anxiety). 88.1% of them answered that they agree with the statement "I will come to the lesson more willingly when AR applications are used" (The Use Satisfaction). 97.6% of them answered that they strongly disagree with the statement "There is no need to use AR applications in the courses"(The Use Anxiety). 92.9% of them answered that they strongly agree with the statement "3D objects in AR applications give a sense of reality in the environment" (The Use Satisfaction). All of them gave the answer that I strongly disagree with the statement "AR applications do not interest me" (The Use Anxiety). All of them answered that I agree with the statement "Displaying 3D objects, videos, and animations on the book in AR applications increases my interest in the subject" (The Use Satisfaction). All of them answered that I agree with the statement "I would like AR applications to be included in the textbooks in the future" (The Use Willingness). 95.2% of them answered that they agree with the statement "I would like to use AR applications in other courses" (The Use Willingness). 97.6% of them answered that they strongly disagree with the statement "Using AR applications in course causes a waste of time"(The Use Anxiety). All of them answered that I agree with the statement "I enjoy studying at home with AR applications" (The Use Satisfaction).

Table 4.6. shows the statistics of the experimental groups' answers to the Augmented Reality Applications Attitude Scale.

Table 4.6. Comparison of Attitude Scale and Sub-Dimension Scores by Gender of Participants in Experimental Groups

	Female (n=21)		Male (n=21)		t	p
	M±SD	Min-Max	M±SD	Min-Max		
Augmented Reality Attitude Scale	74,24±1,37	70-75	74,1±1,09	71-75	0,37 3	0,711
The Use Satisfaction	34,86±0,48	33-35	34,43±0,87	32-35	1,97 8	0,057
The Use Anxiety	6,57±1,16	6-11	6,29±0,46	6-7	1,04 4	0,303
The Use Willingness	9,95±0,22	9-10	9,95±0,22	9-10	0,00 0	1,000

t: independent sample t-tests *:p<0,05 (Statistically Significant)

When the table is examined, as a result of the independent sample t-tests, there was no statistically significant difference between the male and female students in the experimental group in terms of the Augmented Reality Applications Attitude Scale and sub-dimension scores ($p>0.05$).

The purpose of this study was to discover the effects of AR on situational English language learning and the results of the study will be discussed in this chapter.

To shed a light on the main aim of the study two research questions were asked. The first research question of this study was about AR's effects on the students' English listening skills. As the skill, the focus of this study was on the listening skill. The triggers and the videos were carefully designed for students to experience real-life situations, so it was provided AR applications encourage the situational side of learning. While the AR application was integrated into experimental groups to provide situational learning, the traditional materials (audios and pictures from the book) were used in the control groups' courses to provide situational learning. Both experimental and control groups from three schools had the same number of participants. The first data collection tool, which was a listening comprehension test was used to find out about the effects of AR applications on students' success in their listening skills. The results of listening tests that were applied before the implementation showed that all the participants had equal prior knowledge about the unit 'Nationalities and Countries'. After the implementation period, the results of listening comprehension tests showed that the participants in experimental groups became more successful than the participants of the control groups in listening tests.

According to the results, the students who used AR in courses showed higher success in two challenging questions; question 20 and question 25. These two questions were the fill-in-the-blank type of questions and these questions also listening for detail type of

questions which required a higher level of listening. Although most of the students from both groups could not answer these questions correctly before the implementation, most of the students who used AR technology answered these questions correctly after the study. Thus, it could be commented that the integration of AR provided the students to practice listening in a situational context and helped the students to improve their English listening skills.

Similarly, Chang (2020) stated that the usage of AR technology could increase learning effectiveness by providing situational contexts. Chen et al., (2017) also stressed that thanks to the situational learning that AR technology provided, the students became more successful in learning English vocabulary. Additively, Ismayatim et al. (2019) also indicated that the students' listening comprehension level has improved thanks to the AR applications that were used in classes. Solak and Çakır (2015) also concluded their research about AR integrated classes by stating that there was a positive correlation between the students' academic achievement and the AR materials used in the classes. In addition to that, the results of Liu (2009)'s research about creating a learning environment called HELLO through AR also indicated that AR helped students to improve their speaking and listening skills. When these results are taken together, it can be inferred that when AR applications are integrated into English courses with the right teaching theory or method, they can help students to improve their English skills.

Moreover, the results of the study indicated that there was also no difference between the male and female participants in terms of the success of the students who used AR at the end of the study. This finding also shows that AR technology was useful to both female and male students in English listening courses. This finding is also in line with Küçük et al. (2014)'s findings. It was stated that there was no success difference between female and male students who use AR in classes. However, Vedadi et al. (2018) stated that female students became more successful in vocabulary knowledge tests than male students at the end of the study.

Although results of the most of the studies and the current study showed that there is a positive correlation between AR and English success, Bahadır (2019, p.96)'s findings of the study may not be in line with these results. The study was about the usage of Web 3.0 technologies for teaching English. According to the study, although the students enjoyed using AR technology in the English courses, their success did not increase compared to the students who did not use AR in the courses. The difference between these two studies might be derived from the design of the courses or the usage of different theories, methods, plans, or the usage of different AR applications.

The purpose of the second research question of this study was to discover the attitudes of the students towards the use of AR in English classes. ‘‘The AR Applications Attitude Scale’’ (Küçük et al., 2014) was used to find out the attitudes of the students who used AR in English courses. The scale consisted of 15 items which were under 3 sub-dimensions (the use satisfaction-the use anxiety-the use willingness) in total. The number of participants in experimental groups was 42 participants from three different secondary schools. At the end of the implementation, the participants answered the questions. The findings of the scale showed that the scores of the 7 items that belonged to ‘‘the use satisfaction’’ were high. Moreover, the scores of ‘‘ the use willingness’’ which consisted of 2 items were high too. Furthermore, there were some items under the sub-dimensions ‘‘ the use satisfaction’’ and ‘‘ the use willingness’’ that were answered positively by all of the participants from the experimental groups. Unlike the scores of two sub-dimensions (the use willingness – the use satisfaction) that were stated previously, the scores of the sub-dimension ‘‘ the use anxiety’’ were low according to the results. This sub-dimension included 6 items and one of the items were answered negatively by all the participants.

According to those results, the students who used AR technology were satisfied with the integration of AR in English courses. All of the students enjoyed using AR in English courses during the implementation period. Since AR was unique to them, the students had fun during the courses. These findings are aligned with most of the studies in the literature (Barreira, 2012; ; Gündoğmuş et al., 2016; Ismayatim et al. 2019; Vate U-lan, 2012). Those studies stated that the integration of AR technology makes courses enjoyable and increases the motivation level of students and the students concentrate on the courses better. Taşkıran (2019) also concluded her study by stating that the motivation level of students increased and the students found the AR applications enjoyable. Mahadzir & Phun (2013) also stated that the AR technology both helped students to be more confident in English courses and increased the students’ motivation level. According to the findings of most studies in literature, it can be considered that the students feel comfortable using AR technology in English courses, and the integration of AR as a new advanced technology in the courses attracts students’ attention to the class.

The videos, which were designed to create a visiting country situational context and included characters who were from various countries and had their country’s traditional dresses increased all of the students’ curiosity. Furthermore, listening to these characters speaking English in their countries and answering their questions was enjoyable for the participants. Therefore, it can be said from the results that the AR application gave the

students a sense of real-life environment and situation. Thus, it helped the students to concentrate on listening to the characters in the videos. Chang et al. (2020) also stated that the usage of AR in situational English learning increased the students' interest in courses and gave the students a chance to experience a real-life-like experience as in the current study. According to Chang et al. (2020), the integration of AR technology in English classes provided a real-life situational context (airport scenario) that students need and the students were more concentrated on the courses. It was stated that the usage of technology in the courses affects the pedagogies that the teachers choose to teach with (Chang et al., 2020).

Moreover, the students came to the class more eagerly when the AR application was integrated into English courses because the courses were enjoyable. Chen et al., (2017) also concluded the study by stating that the students participated in the class willingly because of the integration of AR technology. Thus, the students who used AR technology in courses were also willing to use AR technology in future English courses and other courses as well. Additively, all the participants wanted AR applications to be included in the books in the future. Similarly, Gündoğmuş et al., (2016) also had the same finding as to the current study. Since the students used multiple tablets and smartphones by themselves to use the AR application and listen to the video, it was convenient for them not to wait for the teacher to start to video like in the traditional listening courses. In addition, the students also felt comfortable with using the AR application because it was so easy to use. Similarly, Dalim et al., (2016) indicated that it was comfortable to use AR technology in class. According to the current study's results, the students who used AR applications in the courses were not anxious during the integration of AR in the courses. Unlike these findings, Martinez et al. (2017) stated that using AR in the classroom environment was challenging for the students. Since the students in Martinez et al. (2017)'s study were five years old, the reason for this difference between the findings of these studies might be derived from the age of the students.

All in all, it can be said that AR technology helped students to listen to people in real-life situations by providing situational contexts. The students found it convenient and comfortable to use AR technology. The AR integration in English listening courses was both enjoyable and useful for the experimental groups. The AR technology also helped to increase their interest in the courses, so their success in listening tests became higher. Thus, it can be stated that the usage of AR technology had a positive impact on the students' listening skills in English classes and the attitude of the students towards it was also positive.

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

This section includes the summarized version of this study's results and suggestions for further research.

6.1. Conclusion

This quasi-experimental study aimed to discover the effects of AR in situated English language learning. Concerning this aim, two research questions were asked.

The purpose of the first research question was to learn the effects of AR on students' listening skills. The data were collected through a listening comprehension test. The listening comprehension test was applied to all the groups before the implementation, the results showed that the level of the students from both groups was the same. After the implementation of the study, the listening comprehension test was applied again to discover the effects of AR technology on English listening skills. The findings indicated that the AR technology which provided situational learning helped the students to get higher scores than the students who didn't use AR technology.

Moreover, the rate of the students who used AR technology in the English classes answering the fill-in-the-blank type of questions increased the most compared to the students who did not use AR in the classes. Experiencing real-life situations through AR application helped elementary-level students to improve their English listening skills. Additively, the success of both male and female students who used AR in the courses increased equally according to the results. Thus, the results revealed that the AR integration in listening courses had a positive effect on the students' success and increased their listening comprehension.

The second research question aimed to learn about the students' attitudes towards the use of AR technology is situated in English courses. To get the data for this research question 'AR Applications Attitude Scale' (Küçük et al., 2014) was applied to the students who used AR in the classes. The findings revealed that the courses were enjoyable thanks to the AR application providing real-life-like situations, the students did not get bored during the implementation of the study. Furthermore, the videos that were designed to maximize the situational side of AR integrated into the AR triggers helped students to concentrate on

listening courses more and attracted the students' attention to the class. Thus, the students were eager to the classes during the implementation period. The results also indicated that the students found it easy to use the AR application with smartphones and tablets and they felt comfortable while using the AR application in the courses. In addition, the attitudes of both female and male students were positive towards the use of AR in English listening classes. Thus, there was no gender difference in attitudes towards the integration of AR technology in English listening courses.

Additively, the students were satisfied with the way the AR technology was integrated into the English listening courses and the students' anxiety level was low during the implementation period. The students also were willing to use AR technology in future English and other courses. All in all, the results of the attitude scale showed that the attitudes of students towards the use of AR technology in English listening courses were positive.

When these results are combined, it can be concluded that AR technology can help students to experience real-life situations and listen to people talking. In addition, the integration of AR technology makes English courses interesting. Thus, the students become interested in the courses and they can concentrate on the courses better. They also participate in the courses actively thanks to the integration of AR technology. Moreover, the students can improve their English listening skills by listening to people talking in a situational context through AR technology. Furthermore, it can be said that the usage of the right pedagogy and designing the lesson materials accordingly with the integration of AR technology can increase the effects of the AR technology in EFL courses.

6.2. Recommendations

The main focus of this study was the effects of AR on only the students' listening success. Other skills can be searched in future studies. In this study, the participants were fifth-grade students, so their level was elementary. In the future, high school students or participants with different levels can be studied. The motivation level of the students can be studied to contribute to the literature. The materials were designed specifically to provide situational learning in that study. In future studies, the materials and the courses can be designed according to contextualized learning.

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APPENDICES

APPENDIX 1: 5TH GRADE LISTENING EXAM

A) Listen to the recording and complete the missing letters. (4X4 =16pts)

COUNTRY	NATIONALITY
France	Fr_n_ _
Russia	R_ss_ _n
Japan	J_pa_es_
Germany	_e_ma_

B) Listen to the conversation and choose the right answer. (4X2=8pts)

1) What is Mehrnoush's nationality?

- A) Iraqi
- B) Iranian
- C) Indian
- D) American

2) Where is Mehrnoush from?

- A) Iranish
- B) Iranian
- C) Iarn
- D) Iran

C) Listen to the conversation and choose the right answer. (4X5=20pts)

- 1) What is Dan's nationality?
 - A) Italian
 - B) American
 - C) English
 - D) Turkish

- 2) What is William's nationality?
 - A) English
 - B) Italian
 - C) Russian
 - D) American

- 3) Is Bill Canadian?
 - A) Yes
 - B) No

- 4) Where does Bill live?
 - A) England
 - B) Germany
 - C) Iran
 - D) Canada

- 5) What is Amanda's father's nationality?
 - A) Russian
 - B) English
 - C) German
 - D) Canadian

D) Listen and choose the right answer. (4X6=24pts)

1.



2.



3.



4.



5.



6.



E) Listen to the people and complete the speech bubbles. Every blank is 4pts
(4X8=32pts)

1



Hello! I'm Antonio.
I'm from.....
I am.....
I speak.....and.....

2



Hi! I'm Diane and this is Susan.
We're from.....
We're.....
We
speak.....and.....

APPENDIX 2: AUGMENTED REALITY APPLICATIONS ATTITUDE SCALE

Dear students, below there are items to determine your attitude towards the use of AR technology in education. It is expected from you to answer these questions frankly and sincerely. Please do not leave any questions empty. Thank you for your interest and contributions.

1. Gender: Female Male

2. Class :

3. Read the statements below and choose the best option that suits you the most.

(1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree)

		1	2	3	4	5
1.	I enjoy the lessons instructed with AR applications.					
2.	I get bored while I am using AR applications.*					
3.	It is difficult to use AR applications. *					
4.	I can concentrate better on the lesson when AR applications are used.					
5.	I study harder for the lesson thanks to AR applications.					
6.	AR applications make my learning difficult because they confuse my mind.*					
7.	I come to the class more eagerly when AR applications are used.					
8.	There is no need to use AR applications in the classes.*					
9.	3D objects in AR applications give sense of reality in the environment.					
10.	AR applications do not attract my attention.*					
11.	Demonstration of 3D objects, videos, and animations on the book in AR applications increases my curiosity.					
12.	I want AR applications to take place in course books in the future.					
13.	I want AR applications to be used in other lessons, as well.					
14.	Using AR applications in the classes causes waste of time.*					
15.	I enjoy studying lesson at home with AR applications.					

(AR: Augmented Reality, 3B: 3 dimensional, * Negative attitude statements towards AR applications)

APPENDIX 3: PARENTAL CONSENT FORM

Sayın Veli;

Çocuğunuzun katılacağı bu çalışma Büşra PARLAR tarafından yürütülen “Artırılmış Gerçeklik Teknolojisinin Durumlu İngilizce Öğrenimi” adıyla, 22 Nisan 2022 - 13 Mayıs 2022 tarihleri arasında yapılacak bir araştırma uygulamasıdır.

Araştırmanın Hedefi: Web 3.0 araçlarından biri olan Artırılmış Gerçeklik teknolojisinin ortaokul düzeyinde İngilizce öğrenimindeki etkilerini gözlemlemektir.

Araştırma Uygulaması: Anket / Görüşme / Gözlem / Başarı Testi şeklindedir. Araştırmada belirlenen sınıflardaki öğrencilere artırılmış gerçeklik uygulaması ile dinleme dersleri yapılacaktır. Derslerin başında ve sonunda yapılacak Başarı Testi ile başarıları ölçülecektir. Aynı uygulama artırılmış gerçeklik kullanmadan anlatılan dersler için de yapılacaktır. Araştırma sonunda ise artırılmış gerçeklik uygulanan sınıfa artırılmış gerçeklik uygulamaları hakkındaki düşünceleri ile ilgili anket uygulanacaktır.

Araştırma T.C. Milli Eğitim Bakanlığı'nın ve okul yönetiminin de izni ile gerçekleştirilmektedir. Araştırma uygulamasına katılım tamamıyla gönüllülük esasına dayalı olmaktadır. Çocuğunuz çalışmaya katılıp katılmamakta özgürdür. Araştırma çocuğunuz için herhangi bir istenmeyen etki ya da risk taşımamaktadır. Çocuğunuzun katılımı **tamamen sizin isteğinize bağlıdır**, reddedebilir ya da herhangi bir aşamasında ayrılabilirsiniz. Araştırmaya katılmama veya araştırmadan ayrılma durumunda öğrencilerin akademik başarıları, okul ve öğretmenleriyle olan ilişkileri etkilemeyecektir.

Çalışmada öğrencilerden kimlik belirleyici hiçbir bilgi istenmemektedir. Cevaplar tamamıyla gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir.

Uygulamalar, genel olarak kişisel rahatsızlık verecek sorular ve durumlar içermemektedir. Ancak, katılım sırasında sorulardan ya da herhangi başka bir nedenden çocuğunuz kendisini rahatsız hissederse cevaplama işini yarıda bırakıp çıkmakta özgürdür. Bu durumda rahatsızlığın giderilmesi için gereken yardım sağlanacaktır. Çocuğunuz çalışmaya katıldıktan sonra istediği an vazgeçebilir. Böyle bir durumda veri toplama aracını uygulayan kişiye, çalışmayı tamamlamayacağını söylemesi yeterli olacaktır. Anket çalışmasına katılmamak ya da katıldıktan sonra vazgeçmek çocuğunuza hiçbir sorumluluk getirmeyecektir.

Onay vermeden önce sormak istediğiniz herhangi bir konu varsa sormaktan çekinmeyiniz. Çalışma bittikten sonra bizlere telefon veya e-posta ile ulaşarak soru sorabilir, sonuçlar hakkında bilgi isteyebilirsiniz. Saygılarımızla,

Araştırmacı : Büşra PARLAR

İletişim Bilgileri:

*Velisi bulunduğum sınıfı numaralı öğrencisi
.....'in yukarıda açıklanan araştırmaya katılmasına izin
veriyorum. (Lütfen formu imzaladıktan sonra çocuğunuzla okula geri gönderiniz*).*

Veli Adı-Soyadı :

.../.../.....

Telefon Numarası :

...

APPENDIX 4: RESEARCH CONSENT



T.C.
ANKARA VALİLİĞİ
Millî Eğitim Müdürlüğü

Sayı : E-14588481-605.99-47125372
Konu : Araştırma İzni

04.04.2022

BAŞKENT ÜNİVERSİTESİ REKTÖRLÜĞÜNE

- İlgi: a) 23.03.2022 tarihli ve 114022 sayılı yazınız.
b) MEB Yenilik ve Eğitim Teknolojileri Genel Müdürlüğü'nün 2020/2 nolu Genelgesi.

Üniversiteniz Eğitim Bilimleri Enstitüsü Yüksek Lisans Öğrencisi Büşra PARLAR'ın "Artırılmış Gerçeklik Teknolojisinin Durumlu İngilizce Öğrenimindeki Etkileri" konulu tezi kapsamında Merkez ilçelere bağlı ortaokullarda uygulanacak olan veri toplama araçları ilgi (b) Genelge çerçevesinde incelenmiştir.

Yapılan inceleme sonucunda, söz konusu araştırmanın Müdürlüğümüzde muhafaza edilen ölçme araçlarının; Türkiye Cumhuriyeti Anayasası, Millî Eğitim Temel Kanunu ile Türk Millî Eğitiminin genel amaçlarına uygun olarak, ilgili yasal düzenlemelerde belirtilen ilke, esas ve amaçlara aykırılık teşkil etmeyecek, eğitim-öğretim faaliyetlerini aksatmayacak şekilde okul ve kurum yöneticilerinin sorumluluğunda gönüllülük esasına göre uygulanması Müdürlüğümüzce uygun görülmüştür.

Bilgilerinizi ve gereğini rica ederim.

Harun FATSA
Vali a.
Millî Eğitim Müdürü

Ek:
Uygulama araçları (6 sayfa)
Dağıtım:
Gereği:
Başkent Üniversitesi
Bilgi:
9 Merkez İlçe MEM

APPENDIX 5: ETHICS COMMITTEE APPROVAL



Sayı : E-62310886-302.14.01-96880
Konu : Tez Önerisi (Büşra Parlar)

22.01.2022

EĞİTİM BİLİMLERİ ENSTİTÜSÜ MÜDÜRLÜĞÜNE

İlgi : 06.01.2022 tarih ve 92248 sayılı yazınız.

Enstitünüz İngiliz Dili Öğretimi Tezli Yüksek Lisans Programı öğrencisi Büşra Parlar'ın, Dr. Öğretim Üyesi Selim Soner Sütçü danışmanlığında yürütmeyi planladığı, "Artırılmış Gerçeklik Teknolojisinin Durumlu İngilizce Öğrenimindeki Etkileri" adlı tez önerisi değerlendirilmiş ve bilgilerinize ekte sunulmuştur.

Prof. Dr. M. Abdülkadir VAROĞLU
Kurul Başkanı

Ek: Değerlendirme Formu

Sayı : 17162298.600-10
Konu : Tez Önerisi

12 OCAK 2022

İlgili Makama

Üniversitemiz Eğitim Bilimleri Enstitüsü İngiliz Dili Öğretimi Tezli Yüksek Lisans Programı öğrencisi Büşra Parlar'ın, Dr. Öğretim Üyesi Selim Soner Sütçü danışmanlığında yürütmeyi planladığı, "Artırılmış Gerçeklik Teknolojisinin Durumlu İngilizce Öğrenimindeki Etkileri" adlı tez önerisi değerlendirilmiş ve yapılmasında bir sakınca olmadığı tespit edilmiştir.
Bilgilerinize saygılarımızla sunarız.

Başkent Üniversitesi Sosyal ve Beşeri Bilimler ve Sanat Araştırma Kurulu

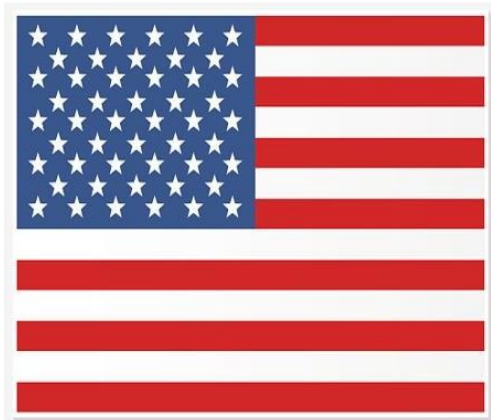
Ad, Soyad	Değerlendirme	İmza
Prof. Dr. M. Abdülkadir Varoğlu	Olumlu/Olumsuz	
Prof. Dr. Kudret Güven	Olumlu/Olumsuz	
Prof. Ali Sevgi	Olumlu/Olumsuz	
Prof. Dr. Işıl Bulut	Olumlu/Olumsuz	
Prof. Dr. Sadegül Akbaba Altun	Olumlu/Olumsuz	
Prof. Dr. Can Mehmet Hersek	Olumlu/Olumsuz	
Prof. Dr. Özcan Yağcı	Olumlu/Olumsuz	

APPENDIX 5: TRIGGERS

CHINA



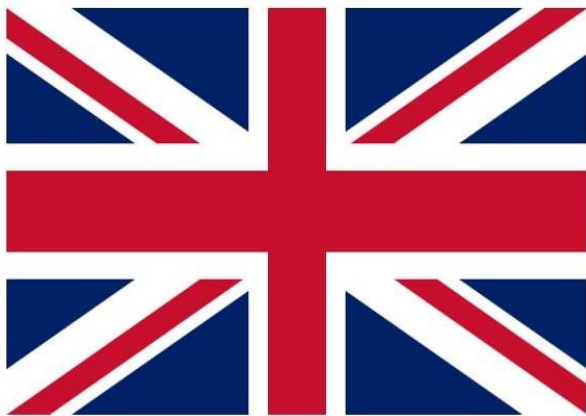
USA



BRAZIL



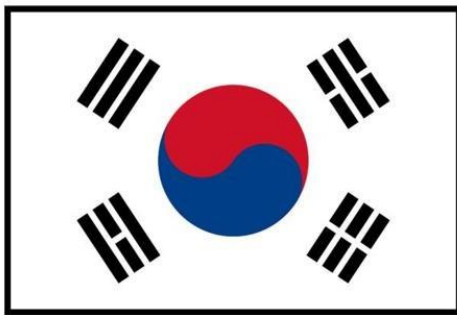
ENGLAND



RUSSIA



SOUTH KOREA



EGYPT



FRANCE



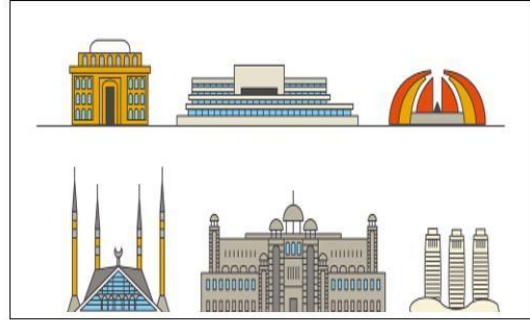
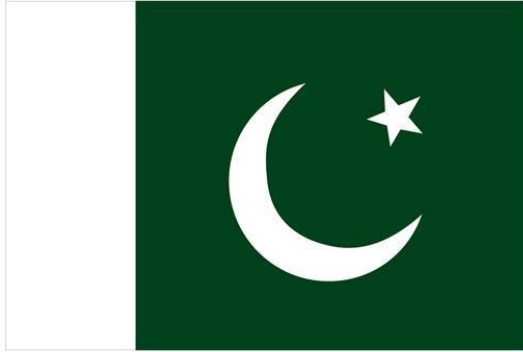
GREECE



MEXICO



PAKISTAN



ITALY



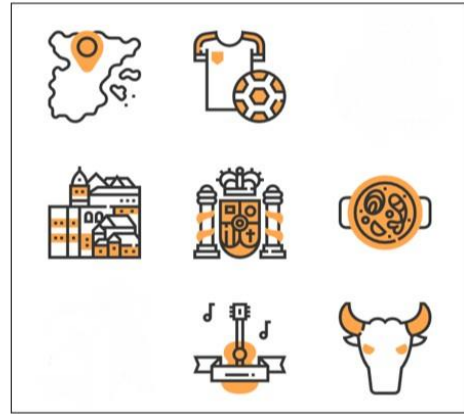
IRAQ



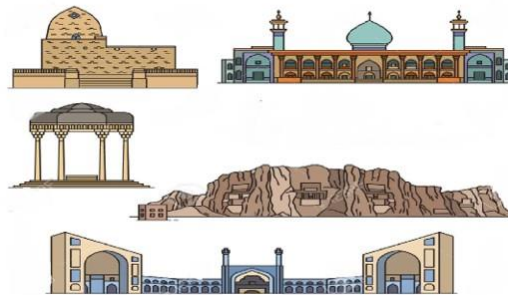
CANADA



SPAIN



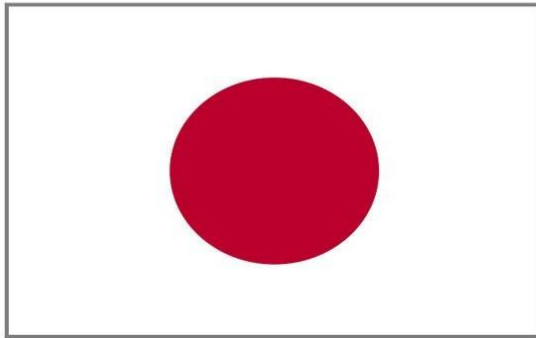
IRAN



GERMANY



JAPAN



SAUDI ARABIA



INDIA



APPENDIX 6 :LISTENING LESSON PLAN

Warm-up: The teacher hangs the world map on the board and asks students which countries they want to visit.

Pre-listening: The teacher tries to elicit the target vocabulary by showing the five countries' flags and giving examples. To introduce the structure, the teacher asks the question 'Where are you from?'/Where is he/she from? /Where are they from' by showing pictures of the people from the five countries and the teacher waits for the students' answers After that, the teacher tells the right answer and explains. To elicit the 'nationality' and point out the differences between 'Where is he/ she from?' and What nationality is she/he? The teacher draws a man/woman who holds a country's flag on the board and asks them 'What nationality is he' waits for the answers of students and reveals the correct answer. After the students answer the question, the teacher. Then, the teacher gives fill in the blank activity about the new vocabulary. The students do the activities by themselves and check their answers in pairs, lastly, the teacher shows the answers.

While-listening (Listening for gist) : The teacher sticks five sets of five pictures which includes countries' flags and symbols on the classroom wall, divides students into four groups, and gives every group a tablet or smartphone. One student from each group scanned the 5 pictures and listen to the people who are from that countries at these countries. The ss match the people's names with their countries. When the first person finished scanning from each group, he/she gives the tablet/ smartphone to the next person. At the end of listening, the students check their answers with their group.

While-listening (Listening for details) : The teacher wants the students to scan the pictures and answer to the question of these people. Answer the open-ended question and fill in the blank questions and check their answers with their partners.

Post-listening : The teacher distributes the students a country name and wants them to act like they are from that country. The teacher asks everybody to walk around the class and find the five people from five different countries by asking questions.