Takvim-i Vekayi

Dil Öğrenme Aracı Olarak Sanal Gerçeklik Uygulamalarının İncelenmesi

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Araştırma Makalesi

Takvim-i Vekayi
ISSN: 2148-0087

Basım (Published): 30.06.2020
Kabul (Acceptance): 18.05.2020
Gönderi (Submitting): 05.05.2020

Cilt (Vol): 8
No (Issue): 1
Sayfa (Pages): 80-95

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Anahtar Kelimeler: Sanal gerçeklik, Sanal gerçeklik uygulamaları, Dil öğreniminde sanal gerçeklik, Yabancı dil öğrenimi.

TELHİS (ÖZ)

Teknolojide kaydedilen gelişmelerle birlikte, kullanıcılara sanal ortamlarda gerçek ortam deneyimi yaşatan sanal gerçeklik uygulamaları, dil öğreniminde kullanılan teknolojilere bir yenisi olarak eklenmiştir. Bu doğrultuda, bu araştırmada dil öğrenimine yönelik olarak geliştirilen sanal gerçeklik uygulamalarının genel özelliklerinin belirlenmesi yoluyla bu uygulamalara ilişkin derinlemesine bir bakış açısının geliştirilmesi amaçlanmıştır. Doküman inceleme yöntemiyle gerçekleştirilen bu araştırmada, dil öğrenimine yönelik olarak geliştirilmiş ve Steam, Google Play Store, App Store, Oculus Store mağazalarında yer alan 15 sanal gerçeklik uygulamalası, amaçsal örnekleme yöntemiyle belirlenerek araştırma kapsamına dahil edilmiştir. Araştırmada ele alınan uygulamalar, genel özellikleri (uyumluluk, erişim, öğrenilen diller, ücret), geliştirmeyi hedefledikleri dil becerileri ve bu becerilerin kazandırılmasına ilişkin olarak sundukları dil etkinlikleri açısından incelenmiştir. Araştırmadan elde edilen sonuçlara göre, ilgili uygulamalara uygulama mağazalarının yanı sıra kendi web sayfalarından erişilebilmekte ve uygulamaların birçoğu hem mobil hem de bilgisayara uyumlu bir şekilde çalışabilmektedir. Uygulamalarda İngilizce, Fransızca, Almanca ve İspanyolca başta olmak üzere 33'e varan dil seçeneğiyle eğitim sunulmaktadır. Uygulamaların bir kısmı ücretsiz, bir kısmının tanıtım versiyonları ücretsiz, bir kısmı ise ücretlidir. Uygulamalarda genellikle konuşma ve dinleme becerilerinin geliştirilmesine odaklanılmıştır. Bu kapsamda uygulamalarda özellikle anadilini konuşan kişilerle konuşma ve dinleme pratiği yapmaya dayalı farklı kazanımları amaçlayan çeşitli etkinliklere yer verildiği tespit edilmiştir. Sonuç olarak, dil öğrenimine yönelik olarak geliştirilen sanal gerçeklik uygulamalarının genel özellikleri incelendiğinde, farklı dil becerilerin kazanılmasına yönelik olarak sunmuş oldukları etkileşimli etkinlikler sayesinde öğrencilere eğlenceli bir öğrenme deneyimi sağlayabilecekleri söylenebilir. Ancak her bir uygulamanın dil becerilerinin kazanılması üzerindeki gerçek etkisinin belirlenebilmesi için araştırmacılar tarafından yapılacak uygulamalı araştırmalara ihtiyaç vardır.

Investigation of Virtual Reality Applications as a Tool in Language Learning

Research Article

ABSTRACT

Along with the advances in technology, virtual reality applications that provide users with a real environment experience in virtual environments have been added to the technologies used in language learning. In this context, this research aimed to develop an in-depth perspective on the virtual reality applications developed for language learning by determining the general features of these applications. In this research carried out with the document analysis method, 15 virtual reality applications that were developed for language learning and that are available in such stores as Steam, Google Play Store, App Store, Oculus Store were determined by the purposive sampling method and included in the scope of the research. The applications discussed in the study were examined in terms of their general features (compatibility, accessibility, languages learned, price), the language skills they aim to develop and the language activities they offer in order to improve these skills. According to the results obtained from the research, related applications can be accessed from their own web pages as well as application stores, and most of the applications can work both on mobile devices and computer. In the applications, up to 33 languages can be learned, particularly English, French, German and Spanish. Some of the full and demo versions of the applications are free, and some of them are paid. The applications generally focused on improving speaking and listening skills. In this regard, it has been determined that there are various activities aimed at different acquisitions based on speaking and listening practices with native speakers. As a result, when the general features of virtual reality applications developed for language learning are examined, it can be said that they can provide students with a fun learning experience thanks to the interactive activities they offer to acquire different language skills. However, in order to determine the effectiveness of each application on the development of language skills, applied research by researchers is needed.

KEYWORDS

Virtual reality, Virtual reality applications, Virtual reality in language learning, Foreign language learning.

Introduction

In today's modern world, with the rapid advancements, technology has started to affect many fields as well as language learning and teaching. Its effects on language learning process have been proven by various studies. For example; Harmer (2007), in his study, asserts that using computer-based tools/activities affect language learning process in a positive way. Supporting his results, Parvin and Salam (2015) found that using audio and visual materials in language classes greatly promotes and enhances language learning. Similarly, Andresen and Brink (2013), in their study, asserts that the use of multimedia tools such as videos, sounds and images in education is considered to be very effective. With the advancements in technology, it can be seen that language tutors have started to use different technological tools (Klimov, 2012). It can also be seen that these tools can be used for improving four language skills; listening, speaking, reading and writing (Bahadorfar & Omidvar, 2014; Warschauer, 2010).

Recently, virtual reality (VR), has started to be used as a tool for learning and teaching a language as it allows users to experience 360-degree immersive environment. VR is described as a technology that allows the user to feel immersed in a real-life environment and interact with objects, characters thus promote communication and interaction (Bayraktar & Kaleli, 2007). It is also defined as an immersed and interactive multimedia environment which creates the sense of presence in the virtual environment (Kim, Park, Yuk & Lee, 2000; Onyesolu & Akpado, 2016).

Described as a simulated immersive environment, VR is a technology in which multimedia tools are incorporated and can be interacted by users in a real life or similar to real life environment (Machover & Tice, 1994). Learners can benefit from real-life simulation environments with rich interactive and immersive context where they can improve their language skills (Dalgamo & Lee, 2010). Moreover, as VR provides immersion, interaction and authenticity, the person who uses VR believes as if she is in the immersive environment (Alqahtani, Daghestani & Ibrahim, 2017). Therefore, it helps the users understand complex or abstract concepts in a more effective way (Christou, 2010).

VR is a technology that is mostly used for gaming on computers or mobile devices. However, besides its entertaining side, it also has various benefits for its application in education, especially in language learning as proven by various studies in the literature. Chen, Smith, York, & Mayall (2020) found that VR can make learning more entertaining and improve motivation and interest by offering immersive real-life scenes such as; exploring planets, discovering inside the human body and many other virtual experiences. They also found that VR can be very effective in language teaching and learning as it can provide a new dimension and perspective to language teaching that has positive effect on learning and also increase motivation. Supporting their results, Godwin-Jones (2016) and Lloyd, Rogerson and Stead (2017) also found similar results. In a study conducted by Chen (2016), it was claimed that using VR supported learners both visually and linguistically, thus facilitating their learning process. Gadelha (2018), also revealed that using VR helped students get a better understanding of classroom topics.

In addition to the general benefits of VR to language learning, further analysis of studies on VR revealed its effects on the development of the basic four language skills. For example, Berns et al. (2013), indicated that using VR makes learning easier and faster as students can interact with the environment and get immediate feedback. He also states that students learn the vocabulary presented in the virtual environment better. In their study, Chen et al. (2020) discovered that incorporating VR into writing experiences of English learners improved their writing skills. The students were also more motivated and engaged with the help of VR. Similarly, Lloyd et al. (2017) found that providing learners with immersive and real-life experiences, VR played a significant role by creating a connection between inside and outside the learning environment. Damio and Ibrahim (2019), in their study to investigate student perceptions on using VR to improve speaking skills, concluded that using VR increased students' motivation and therefore their speaking performances. Similarly, Hassani, Nahvi and Ahmadi (2016) identified that learners improved their speaking proficiency while they decreased the number of grammatical mistakes they made. Pilgrim and Pilgrim (2016), on the other hand, claimed that using VR tools may support reading arts students visually and allows them to learn

by experiencing and develop reading comprehension in the immersed virtual environment.

There is a vast number of VR applications available for language learning. These applications can be found in application stores such as; Oculus, Steam, Google Play store, App store. However, they are not easy to find as they are available in application stores that are independent of each other. In addition, which application is suitable for which language skill is not known. There are also no studies in the literature where all of these are compiled and examined in terms of language learning, while in other fields there are some studies that compile all VR applications relevant to their fields. For example, Pilgrim and Pilgrim (2016), in their study, presented the available applications for "reading language-arts" and their general features. On the other hand, in his study, Guttenberg (2010) examined and presented the features of available VR applications for tourism and tourism management. Because of the lack of such study in the field of language learning, the purpose of the study is to give an in-depth overview of VR applications that were developed for language learning. With this study, it is thought that educators and students can easily access VR applications developed for language education. On the other hand, the results obtained from the study may provide convenience to both educators and students in the selection of VR applications to be used in language learning. Because in the applications discussed in the study, the languages learned, language skills targeted to be developed and the activities used in this context will be included in the study. Thus, educators will be able to choose the most suitable VR applications that they can use in their teaching processes, and students can easily choose the VR applications that they can use in line with their needs. In addition, it is anticipated that this study will give new research ideas for the effectiveness of VR applications in language learning to the researchers who make academic studies on language learning.

Purpose of the Study

The purpose of this study is to develop an in-depth perspective on the virtual reality applications developed for language learning by determining the general features of these applications. For this purpose, the following questions will be answered.

VR applications that were developed to teach and learn a language;

1. What are the general features (compatibility, accessibility, languages learned, price) of the VR applications that were developed for language teaching?

2. Which language skills can be developed and what kind of language activities can be performed within the VR applications that were developed for language teaching?

Method

In this study, document analysis method, one of the qualitative research methods, was used. Document analysis involves the in-depth examination and analysis of written and visual materials that contain information about the facts and cases that are intended to be investigated (Yıldırım & Şimşek, 2008). In this study, as it was aimed to examine VR applications developed for language teaching in different aspects, document analysis method was used. Purposive sampling method, one of the non-random sampling methods, was used to determine the VR applications that constitute the sample of the research. Purposive sampling method is a sampling method based on the selection and in-depth investigation of information-rich situations depending on the purpose of the research (Büyüköztürk et al., 2008). Accordingly, search was made in Steam, Google Play Store, App Store, Oculus Store with the keywords "vr language learning" and "vr language teaching". 15 mobile and / or computer-based VR applications developed for language teaching were included in the research. All these applications were downloaded and tested in line with the purpose of the research. For the paid applications, some of them were purchased and some of their trial or demo versions were examined. The applications included in the sample were examined in detail in terms of their general features (compatibility, accessibility, languages learned, price), the language skills they aimed to develop and related language activities. In the analysis conducted within the scope of the study, firstly, 3 VR applications were analyzed together by the researchers. Other applications were then analyzed individually by both researchers. Finally, the data obtained as a result of the analysis of the researchers were compared and the final form was given. The

results obtained were presented by grouping according to the research questions.

Findings

The findings obtained from the analyzes conducted in line with the purpose of the research were associated with each research question and presented under separate titles below.

General Features of the VR Applications

General features (compatibility, accessibility, languages learned, price) of VR applications for language education discussed in the study are presented in Table 1.

Table 1 shows the general features (compatibility, accessibility, languages learned, price) of the identified 15 VR applications developed for language learning. Each application can be accessed from the web page addresses given in Table 1.

When Table 1 is examined, 5 of the applications are only compatible with mobile VR headsets, 3 of them are only compatible with PC headsets and 7 of them are compatible with both mobile and PC headsets. Mobile VR headsets are Google Cardboard headset that can be used on both android and ios phones. These headsets are compatible with all android and ios phones with gyroscope censor and the cheapest option for virtual reality experience. GearVr headset is on the other hand a VR headset developed by Samsung to work with only specific Samsung mobile phones (Note 4/5, S6/S6 Edge and higher models). For PC, there are many headsets available; Oculus, HTC Vive, Windows Mixed Reality headsets and many other brand headsets.

Again, when Table 1 is examined, it is seen that the languages learned in the VR applications, discussed in the study, are predominantly English. In addition, French, German and Spanish are also among the languages that can be learned in most of these applications. Turkish, on the other hand, can be learned in two applications; AltspaceVR and Mondly. As one of the applications (Vr Chat) is structured on socialized chat system, it is suitable for learning

almost every language. On the other hand, according to the table, Mondly is the application with the highest number of languages a learner can learn.

Table 1. General Futures of the VR Applications

VR Application	Application Website	Compatibility	Languages Learned	Price
AltspaceVR	https://altvr.com/	Mobile (GearVr-Oculus Go) & Pc	English, German, Turkish and 24+	Free
Argotian	https://www.argotian.com/	Mobile (GearVr-Oculus Go)	English	N/A (Still in development)
Brocca	https://www.mollyvierhile.com/brocca.html	Mobile (Oculus Go) & Pc	Chinese, English, French, Spanish	N/A (Still in development)
Busuu	https://www.busuu.com/	Mobile (GearVr-Oculus Go)	Spanish	Free
Dinamic Spanish	https://www.vrlanguages.co.uk/	Mobile (GearVr-Oculus Go) & Pc	Spanish	250$
House of Languages	http://fox3d.com/vr	Mobile (GearVr) & Pc	English, German, Spanish	4.99$
ImmerseME	https://immerseme.co/	Mobile (Android-GearVr) & Pc	English, French, German and 6+	7.5$ to 40$
Mondly	https://www.mondly.com/	Mobile (Android) & Pc	English, French, Turkish and 30+	3.49$ (Mobile), 7.99$ (Pc)
PanoLingo	http://panolingo.com/	Mobile (Android)	English	Free
The Secret of Puffin Cove	http://play2speak.com/	Pc	English	N/A (Free demo is available)
Unimersiv	https://unimersiv.com/	Mobile (GearVr-Oculus Go) & Pc	All available	Free
Vr Chat	https://vrchat.com/	Pc	All available	Free
Vr Speech	https://www.vrspeech.app/	Mobile (Android-Ios)	English	Free (In-app purchases)
VR Word Chase	https://www.fluentworlds.com/vr/	Mobile (Android-Ios-GearVr)	English	Free
Witly-Language Tutoring in Vr	http://store.steampowered.com/app/566130/Witly__language_tutoring_in_VR/	Pc	English-Spanish-Russian-Latin-Japanese	Free (In-app purchases)

In addition, in Table 1, it can also be seen that most of the VR applications are free of charge while some of them are charged between 3.49$ and 250$. Some of the free applications offer in-app purchases so that users can unlock some premium features.

Language Skills and Activities Included in VR Applications

The language skills that are aimed to be developed in each VR application and the related language activities included in this study were analyzed and presented in Table 2. Then, explanations were made regarding the language activity provided for each language skill and the development of that skill.

Table 2. *Language Skills and Activities Included in VR Applications*

VR Application	Language Skills	Language Activities
AltspaceVR	Speaking Listening	• Speaking with native speakers around the world • Attending daily & monthly vr classes/meetups/live shows where users can discuss and share information with other users around the world • Improving pronunciation with native speakers • Creating your own meetup session
Argotian	Speaking Listening	• Practicing speaking and listening with native speaker virtual characters • Overcoming speaking anxiety with interactive conversations • Improving pronunciation with native speakers • Learning new words by playing immersive games
Brocca	Speaking Listening	• Practicing speaking and listening with native speaker virtual characters in virtual tours • Repeating phrases aloud with virtual characters for pronunciation • Learning new words by playing immersive games
Busuu	Speaking Listening	• Practicing speaking and listening with native speakers • Practicing pronunciation with virtual native speakers • Learning vocabulary and some basic phrases in immersive gamified context • Answering the questions and improving pronunciation with voice recognition
Dinamic Spanish	Speaking Listening	• Practicing speaking and listening with native speakers by transporting to Spain in VR • Listening to podcasts and learning new words • Improving pronunciation with native speakers • Speaking with confidence to overcome speaking anxiety • Learning basic phrases with daily tasks (Introducing yourself, learning alphabet, numbers, likes & dislikes, etc.)
House of Languages	Speaking Listening	• Learning words in the virtual environment by interacting with them • Hearing and repeating the name of the objects to improve pronunciation • Learning new words by playing immersive games • Learning phrases through experiences in the virtual environment
ImmerseME	Speaking Listening Reading	• Practicing speaking and listening with native speaker • Improving fluency and accuracy in a real-life scenario • Overcoming speaking anxiety by speaking without stress

VR Application	Language Skills	Language Activities
	Writing	• Improving pronunciation with native speakers • Developing reading and writing skills with typing and translation activities • Learning basic words and phrases in real-life scenarios (e.g. ordering a baguette in Paris)
Mondly	Speaking Listening	• Practicing speaking and listening with native speaker • Improving pronunciation with feedback provided by speech recognition system • Making friends and practicing what is learned with people around the world • Learning basic words and phrases in real-life scenarios (e.g. ordering dinner, check into hotel)
PanoLingo	Speaking Listening	• Learning pronunciation and grammar in real-life environments • Learning new words and some basic phrases by playing games in real-life environments (house, office, bus, shop, street, etc.) • Enhancing listening skills in real-life environments
The Secret of Puffin Cove	Speaking Listening	• Practicing speaking and listening with native speaker • Developing fluency and accuracy with virtual character • Improving pronunciation with native speaker (with the help of the virtual character) • Overcoming speaking anxiety and the fear of mispronunciation by speaking without stress • Learning new words by playing games within the contextualized environment
Unimersiv	Speaking Listening	• Practicing speaking and listening with native speakers • Learning new words and phrases by playing games with people all around the world • Overcoming speaking anxiety and the fear of mispronunciation by speaking without stress • Improving pronunciation with native speakers
Vr Chat	Speaking Listening	• Practicing speaking and listening with native/non-native speakers all around the world • Practicing speaking by playing games and having fun • Improving pronunciation with native speakers • Overcoming speaking anxiety and the fear of mispronunciation by speaking without stress • Learning new words and phrases by playing games with people all around the world
VR Word Chase	Speaking Listening	• Learning new words in various immersive scenarios (in a movie theater, Las Vegas, stores) • Improving pronunciation with feedback provided by speech recognition system • Learning basic words and phrases in real-life scenarios (e.g. ordering something, buying something in a store, etc.)
Vr Speech	Speaking Listening Reading	• Practicing speaking and listening with native speakers • Overcoming speaking anxiety with real-life scenarios (Job interview, making presentation, etc.) • Improving pronunciation with feedback provided by speech recognition system • Learning basic words and phrases in real-life scenarios (e.g. meeting with a virtual character to have meal, etc.)
Witly-Language	Speaking Listening	• Practicing speaking and listening with native speakers

VR Application	Language Skills	Language Activities
Tutoring in Vr		• Learning basic words and phrases in real-life scenarios (e.g. learn how to get on the metro learn where someone lives, how to greet/meet people, etc.) • Improving pronunciation with feedback provided by native speakers

It can be seen in Table 2 that all of these VR applications were developed for improving speaking and listening skills. However, two of these applications were developed for improving other language skills alongside with speaking and listening. One of these applications (ImmerseMe) was designed to improve four language skills whereas the other application (Vr Speech) was designed for reading skill alongside with speaking and listening skills.

It can also be understood that the majority of the applications provide users with the opportunity to practice speaking and listening with native speakers. According to the Table 2, all of the applications focused on improving the pronunciation of the learners. Some applications provided this with repetition of the words by the learner, while some applications used voice recognition system to improve learners' pronunciation by giving him feedback. Moreover, another feature of these applications is that learners can learn new words or basic phrases by experiencing in real-life scenarios such as; how to greet/meet people, buying something in a store, ordering dinner, checking into a hotel, etc. Applications mostly used games or fun activities so that the learners would enjoy while learning new words.

In addition, some of the applications were found to be helping learners to overcome their speaking anxiety and fear of mispronunciation by offering them the opportunity to practice speaking in front of real or virtual people in various scenarios such as job interview, making a presentation or speaking with a native speaker. Also, Table 2 showes that, ImmerseMe, found to be the only application that aims to teach all four language skills. It provides typing and translation activities to develop reading and writing skills of the users.

Discussion and Conclusion

The purpose of this study is to develop an in-depth perspective on the virtual reality applications developed for language learning by determining the

general features of these applications. For this purpose, 15 VR applications, which were discussed within the scope of the study, were examined in terms of their general features (compatibility, accessibility, languages learned, price), the basic language skills they aim to develop and the language activities they offer to develop these skills. The results obtained from the research are interpreted in the light of the literature and presented in this section.

In addition to being included in the application stores, VR applications discussed within the scope of the research were accessible through their own web pages and on these pages, it was seen that there was detailed information about the general features of the applications. It was seen that the applications were mostly developed compatible with both computer and mobile devices. This is very important for applications to be used by a wider target audience. Because today's developments in technology have prepared an environment for individuals to use their smart phones instead of computers (Chartrand, 2016). In addition, the fact that VR applications can be run on mobile is important in terms of that user can experience the feeling of presence in the environment provided by VR technology much easier thanks to the possibilities provided by portability (Radianti, Majchrzak, Fromm & Wohlgenannt, 2019).

It was observed that the VR applications examined in the study frequently included trainings and activities for languages such as English, French and German. The reason for this may be related to the acceptance of languages such as English and French in international platforms, as well as the geography in which the applications studied were developed. In addition, it can be thought that the prevalence of VR technology in countries where related languages are spoken and the tendency of educators to use these technologies is also determinative. When applications are evaluated in terms of language, applications with up to 33 language options were found. This means that VR applications can be used in a wide range of language education. When the applications were evaluated in terms of price, it was found that some of them were free and some of them had a wide price range from 3 dollars to 250 dollars. This may be related to the graphic quality of the applications, the content quality, the technology it uses, etc. In addition, was observed that some of the VR applications, especially some of the paid ones, included personalized

activities for the user. In other words, it was seen that in these applications, students were offered content suitable for their own level and needs. It can be thought that the features that increase the quality of learning process such as adaptive learning might have an effect on the prices of the applications. It may also be related to the profit policies (in-app advertising, in-app purchases, etc.) of VR application developers.

When the VR applications discussed within the scope of the research were examined in terms of the basic language skills they aim to develop, it was seen that mostly speaking and listening skills were focused. This was a predicted result considering the general characteristics and potential of VR technology. Because VR has a great potential on developing speaking and listening skills as it offers various features such as; immersive learning environments where learners learn new words and basic phrases in the real-life context, engaging with native speakers that helps learner to practice speaking and listening skills as well as overcome speaking anxiety, and practices on pronunciation with native speakers (Alizadeh, 2018). In the applications discussed, it was seen that there were various activities for the development of speaking and listening skills. In this context, it was observed that the activities focused on the development of pronunciation skills by speaking with native speakers, word repetition and pronunciation practice with voice recognition system etc. When the studies in the literature were analyzed, similarly, it was concluded that the fact that VR technologies offer the opportunity to speak with native speakers based on various activities might have a positive effect on students' speaking and listening comprehension skills (Bahadorfar & Omidvar, 2014; Schoeffler, Gernert, Neumayer, Westphal & Herre, 2015; Warschauer, 2010). In addition to these activities, it was observed that there were activities for developing speaking skills based on real life experiences such as ordering dinner, shopping, checking in a hotel, etc. VR technology offers feeling of presence, immersion and interaction in the virtual environment (Gutiérrez, Vexo & Thalmann, 2008). Therefore, including such activities in the applications discussed is very important in revealing the educational potential of VR technology. For example, Damio and Ibrahim (2019) found that VR played a significant role in improving speaking and oral presentation skills by providing the opportunity for learners to learn in real-life

scenario through the immersed virtual environment. In addition to these, Liao, Jincho and Kikuchi (2018) claimed that using VR helped learners to decrease their speaking anxiety as it allowed learners to practice speaking without the fear of making any mistakes.

In the research, it was observed that some VR applications also focused on writing and reading skills. For example, the application ImmerseMe used some typing and translation activities to develop reading and writing skills. Although VR applications have more serious potential in developing speaking and listening skills, they can also have positive effects on the development of other language skills. Chen et al. (2020) discovered that using VR in writing experiences of English learners significantly improved their writing skills and also learners felt more motivated. On the other hand, Pilgrim and Pilgrim (2016), indicated that VR tools might support reading comprehension of students and it also allows them to learn through experiencing in the virtual environment.

When the results obtained from the research are evaluated in general, it can be said that VR applications developed for language education are suitable to be used in language learning processes as they are both mobile and pc compatible, they offer learning many languages and can be accessed with an affordable price. When the applications were evaluated in terms of content, it was thought that the advantages stated in the literature regarding VR technology were also included in the VR applications discussed in this study and thus, if these applications are used in appropriate technical and pedagogical approaches, they can contribute significantly to the language learning processes. In addition, it can be said that thanks to the interactive and gamified scenarios introduced by virtual reality technology, all applications have the potential to enable learners to learn by entertaining and gaining experience. However, it is necessary to investigate the effectiveness of these applications, especially for the acquisition of language skills, by the academic researchers in further research.

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