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- Yabancı Dil Eğitimi / Derleme -

In Between Reality and Virtuality: Augmented Reality in Teaching English to Young Learners

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ABSTRACT

Technology has exerted its effects in almost all areas of human life including education. The constant developments in technology have offered new designs to the field of education. The incorporation of Web 2.0 technology and electronic devices has paved the way for the development of such specific technology-based designs as computer-assisted learning and mobile-assisted learning. As a concept gaining momentum especially in the last two decades, Augmented Reality (AR) is also involved in the continuum of technological developments which can be adopted in the educational arena in general and language education in particular. This technology presents the incorporation of reality and virtuality and; therefore, combines the advantageous sides of both spheres. Considering in language education, AR technology can be utilized in all educational levels involving the primary level where the issue of teaching language/s to young learners holds significance. Set on AR and TEYL literature, this study is intended to handle the AR technology in teaching English to young learners. The study presents related AR literature offering existing definitions of the concept. The possible advantages and disadvantages of AR integrated in TEYL are also presented. These possible advantages involve the reference of multiple intelligences; the possibility of learning the language by observing and exploring; enhancement in language performance and achievement; interaction with language, teachers and peers; self-learning and motivation. The disadvantages are about its usability and practicality; technical problems; lack of training and the risk of isolation. The study concludes with some pedagogical suggestions for the effective implementation of AR technology in young learner language classes referring to the characteristics of the particular profile.

Keywords: Augmented reality, Teaching English to young learners, Language education

Gerçeklik ve Sanallik Arasında: Çocuklara İngilizce Öğretiminde Artırılmış Gerçeklik

ÖZ

Teknoloji, insan yaşamının eğitim dâhil her alanında etkisini göstermektedir. Teknolojide meydana gelen sürekli değişimler eğitim alanına yenilikler sunmaktadır. Web 2.0 teknolojisinin ve elektronik araçların entegre edilmesi bilgisayar destekli eğitim ve mobil destekli eğitim gibi teknoloji tabanlı tasarımlarını gelişmesine katkı sağlamıştır. Özellikle son yirmi senede ivme kazanan bir kavram olan Artırılmış Gerçeklik (AG), genel olarak eğitimde ve özellikle de dil eğitiminde kullanılacak teknolojik gelişmelerden biri olmuştur. Bu teknoloji gerçekliğin ve sanallığın bir birleşimini sunmakta ve dolayısıyla her iki ögenin de avantajlı yanlarını sunmaktadır. Dil eğitimi göz önüne bulundurulduğunda, AG çocuklara dil öğretiminin önemli bir konu olduğu ilkokul seviyesi de dâhil her eğitim seviyesinde kullanılabilir. Bu çalışma, Artırılmış Gerçeklik ve çocuklara İngilizce öğretimi alan yazınına bağlı kalarak, AG teknolojisinin çocuklara yabancı dil öğretiminde kullanılması konusunu ele almayı amaçlamaktadır. Çalışma, AG kavramının mevcut tanımlarını verirken ilgili alan yazını da sunmaktadır. AG teknolojisinin çocuklara yabancı dil öğretimindeki muhtemel avantaj ve dezavantajlarından da bahsedilmiştir. Muhtemel avantajlar, çoklu zekânın içerilmesi; dili gözlemleyerek ve deneyimleyerek öğrenme; dil performansı ve başarısındaki artış; dille, öğretmenle ve diğer öğrencilerle iletişim; bireysel öğrenme ve motivasyon. Dezavantajlar, kullanılırlık ve uygulanabilirlik; teknik sorunlar; eğitim yetersizliği ve yalnızlaşma riskini içermektedir. Çalışma, çocuk yaştaki öğrencilerin özelliklerini değerlendirerek AG teknolojisinin dil sınıflarında etkili bir şekilde uygulanması yönünde bazı pedagojik önerilerle sonuçlandırılmıştır.

Anahtar kelimeler: Artırılmış gerçeklik, Çocuklara İngilizce öğretimi, Dil eğitimi

1. Introduction

The advancements in technology at an unprecedented pace have exerted their effects on a number of different areas of human life and education is not an exception for this (Kessler, 2017). The constant developments in technology have contributed to the field of education bringing the concept of technology-enhanced learning to the notice of both teachers and learners introducing novelty that to be followed (Bacca et al., 2014). Among the contributions of technology-enhanced learning to language education are the computer-assisted learning (Wang and Liao, 2017), mobile-assisted learning (Liu and Chen, 2015) and ubiquitous learning (Pimmer et al., 2016). As a novel form of technology which can be

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grounded on computer and mobile technologies, Augmented Reality has also been involved in the service of education.

Augmented Reality (AR) has become, especially in the last two decades, a topic of investigation as a tool promoting teaching and learning process in such different fields as engineering (Bezhadan et al., 2015); computer science (Sungkur et al., 2016); visual arts education (Di Serio vd., 2013); mathematics education (Sommerauer and Müller, 2014); biology education (Hung et al, 2016); and eco-education (Huang et al, 2016). Since AR can be integrated in language education, it has also been particularly studied in language education (Ho et al., 2017; Palaigeorgiou et al., 2017; Richardson, 2016).

Since AR technology can be integrated in language teaching in all educational levels involving primary education (Chiang et al., 2011), this study aims to present: a) a definition of AR, b) a review of literature on AR studies in language education, c) advantages and disadvantages of integrating Augmented Reality in teaching English to young learner (TEYL) classes and d) some pedagogical suggestions regarding the effective integration of AR designs in TEYL classes.

1.1. Definition of Augmented Reality

As a current popular technology AR was first introduced in 1990s as a training design into the field of medicine (Bajura et al., 1992), airways (Caudell and Mizell, 1992), and computing (Feiner et al., 1993). In time, with the developments in Web 2.0 technology and the advents in computer and mobile tools, AR has become a novel field supporting teaching and learning in a variety of fields and has received many definitions pointing at its technology-based nature which lies between the real and the virtual.

AR is defined as a technology combining real-life experience with digital perceptions (Azuma, 1997). Referring to its transitive nature between real and virtual, Billinghurst, et al. (2001) regard AR as a form of oject manipulation for the creation of novel educational experiences while Cuendet et al. (2013) consider AR as "technologies that project digital materials onto real world objects" (p. 554). Cabero (2016) explains that AR is the "real-time combination of digital and physical information through different technological devices; in other words, it consists in utilizing a set of technological devices that add virtual information to the physical one" (p. 44). Akçayır and Akçayır (2017) define AR as a technology incorporating virtual objects with augmented components into real world. An overall definition of AR is proposed by Kapp and Balkun (2011) as follows:

"Augmented reality fits on what we call the virtuality continuum, which describes all manner of computer/human interactions. On one end we have reality, and on the other, virtual reality, where we re-map as many senses as possible through the use of communication technology to present an alternate interface to the world around us. Augmented reality sits in the middle of these two extremes in a space called "mixed reality." At its core, augmented reality is a predominantly real-world space in which virtual elements are inserted in real time." (p. 101)

Taking the aspects of AR into account, Azuma, et al. (2001) suggest that AR is the combination of real and virtual objects integrated into reality and it offers real-time experience between reality and virtuality. Sharing a similar stance, Di Serio et al (2013) also consider AR designs as a way of combining real and virtual objects in a timely interaction. Considering the definitions of AR, one can infer that it is a technology promoting live interaction in an augmented environment combining real and virtual aspects.

1.2. Review of Literature

The perusal of literature on Augmented Reality presents review studies and research studies on AR. Review studies on AR dwell mainly on the advantages and disadvantages of the AR systems and their effectiveness in teaching and learning process (Akçayır and Akçayır, 2017; Bacca et al., 2014; Fotaris et al., 2017; Radu, 2014; Wu et al., 2013). The research studies handle the concept of Augmented Reality focusing on different factors affecting the adoption of AR-based designs (Han et al., 2015; Ho et al., 2017; Yılmaz and Göktaş, 2017) and the effectiveness of AR in promoting language teaching and learning process (Liu and Tsai, 2013; Palaigeorgiou et al., 2017; Safar et al., 2017).

As this study places emphasis on the integration of AR technology into TEYL classes, this review section basically covers those studies examining AR in language education. Some of these studies took the

factors of attitudes and perceptions into consideration in examining AR designs in language education. In a dissertation study, Shea (2014) examined the effectiveness of an AR mobile game in language learning in terms of its use and design quality. The results of the survey, observations and interviews showed that the AR game was practical in enabling learning outside the classroom and increased the participants' willingness to communicate. The attitudes of learners towards AR designs were also examined in young learner profiles. Working with 122 fifth-graders, Küçük et al. (2014) studied the participants' attitudes towards learning English through AR as well as their cognitive load levels in the process. The results revealed the positive attitudes of the participants towards AR as a learning system. In addition, low levels of anxiety and cognitive load were reported in the process of self-directed learning through AR. In an exploratory design to evaluate the effectiveness of an AR-instilled robot system in promoting satisfaction and sensory development through drama activities in children's classes, Han et al. (2015) investigated 81 Korean kindergarten learners' perceptions of the AR robot system. The participants either received computer-mediated or robot-mediated AR treatment. The results showed that the robot-mediated treatment increased sensory perceptions more than the computer mediated version in terms of interest in drama activities, interactive environment and engagement in the media. Adopting a location-based AR game, Richardson (2016) examined the effectiveness of the program in teaching and learning English as a foreign language. The observations through the program adoption and participant feedback pointed at the potential of the AR game in facilitating teaching and learning process as a reliable and user-friendly tool.

Learning styles and strategies were also among the factors examined in AR research. To examine the effects of learning styles and strategies in ubiquitous learning systems, Ho et al. (2017) developed a U-learning system with AR characteristics to support EFL learning. The participants were 90 people who were students, teachers and medical care workers. The results revealed that the participants' cognitive styles and learning strategies affected their performance in the U-learning system. Holding a similar perspective regarding young learners, Hsu (2017) aimed to explore the effects of learning styles, learning anxiety and cognitive load on the language learning process of 38 third-graders in AR game systems through self-directed or situated learning. Suggesting that certain levels of learning anxiety and mental effort may stimulates learning, the researcher reported that the participants with serial learning styles showed less mental effort and had less foreign language learning anxiety.

Several studies were also conducted with an emphasis on the efficiency of AR game-based designs in promoting language development. Specifically focusing on the writing development in EFL, Liu and Tsai (2013) developed an AR-instilled mobile learning tool to improve descriptive essay writing. The adoption of this tool revealed that the AR material offered the participants linguistic and content knowledge which helped them improve their descriptive writings through the scenic information provided by the tool. The AR game-based designs were also investigated in young learner contexts. Based on gamification and text recognition, Dita (2016) offered a mobile augmented reality tool for foreign language learning. The application was observed to promote language learning by increasing learner motivation. Safar et al. (2017) focused on the efficiency of AR applications in teaching the English alphabet to children in kindergarten. The results of the experimental design showed that the experimental group learned the alphabet better than the control group as the former group were exposed to the alphabet in a more interactive way which positively influenced their retention. From a similar standpoint centering on the effectiveness of an AR game-based design in vocabulary acquisition, Palaigeorgiou et al. (2017) developed an AR game-based tool in which a 3D miniature house where a robbery scene was designed. 37 students actively participated in the game as detectives through their fingers. The results showed that the design was effective in familiarizing with and learning new vocabulary. Another study examining the effectiveness of AR tools in teaching basic English vocabulary belongs to Dalim et al. (2016). Developing an AR tool to teach colors, shapes and prepositions to children aged 4 to 6 years, the researchers reported that the learning process through the AR tool yielded better learning outcomes compared to the traditional system.

Research on the integration of AR in language education reveals that AR has been shown as an effective and promising technology in promoting effective language learning and teaching since it enables a sense of timely interaction between real and virtual environments. Based on related literature on AR and

TEYL studies, the next section presents possible advantages and disadvantages of AR technology in young learner language classes.

2. Discussion

In the light of relevant literature, this section is presented under two main sub-sections (advantages and disadvantages) which are also divided into several sub-headings. The advantages of AR integration involve such benefits as referring to multiple intelligences, the possibility of observing and exploring; enhancing performance and achievement, interacting, self-learning and being motivated. The disadvantages are related with usability and practicality; technical problems; lack of training and the risk of isolation.

Research on AR technology has shown that it brings many advantages, one of which is its nature covering multiple intelligences, into the learning environment. Unlike the traditional education style in which language is presented in a two-dimensional format, AR design does not present the content only in the visual format; it also involves such other senses as hearing, touching and smelling (Azuma, et al., 2001; Dalim et al., 2016). As regards the inclusion of multi-senses in AR design, Fernandez (2017) notes that it enables learners to "perceive, touch, and interact with the real world helped by all the digital information" (p. 3). The presentation of language materials through multiple senses promotes multi-sensory learning (Lu and Liu, 2015). This multi-sensory learning is essential for young learners since, as Gardner (1983) proposes, every learner possesses different intelligence types. Therefore, while referring to different intelligence types, this multi-sensory development contributes to young learners' language development by presenting the same content through different sources and senses for effective learning (Shin, 2006). Referring to multiple intelligences in young learner classes is also essential since young learners, based on their cognitive development, experience some difficulties in understanding abstract concepts (Graves et al., 2014; Tsou et al., 2002). AR materials, in this sense, concretize the abstract language content by presenting it through multi-senses. Exposed to the language through multi-sensory presentation, young learners can be more encouraged to be engaged in the process of learning. Covering multiple intelligences, AR materials also bring another advantage to the scene, observing and exploring the language.

The possibility of observing and exploring in the learning process is available in AR designs (Behzadan et al., 2015; Dede, 2009; Di Siero et al., 2013; Dunleaacy et al., 2009). Taking the young learner profile into consideration, it can be concluded that AR applications offer young learners a great chance to observe language presented in an attention-grabbing way compared to the traditional teaching tools. The provision of new language with a design following current technology is expected to increase the sense of exploration in young learners to learn more about the language. Emphasizing the significance of offering chances for discovery to young learners in learning the target language, Engel and Groot-Wilken (2007) maintain that "in order to keep the joy, enthusiasm and ambition of young learners alive, it is important to provide them with more opportunities to discover and experiment with the language" (p. 27). In this sense, AR designs can promote active and inquiry-based learning (Chieng et al., 2014) in TEYL classes and offer young learners the opportunity to experiment with the language, which is reported to be an essential condition for young learner language development (Becker and Ross, 2016) in an augmented format. The chance of experimenting with the language by observing it through a 3D channel takes us to another advantage of AR technology; enhancing learner performance and achievement.

As AR tools present language content in a 3D form combining the characteristics of real and virtual representations (Bezhadan et al., 2015), they serve as materials to grab young learners' attention who are more interested in information coming from different senses (Moon, 2000; Shin, 2006). Being exposed to the language content through different channels and having the chance of experimenting with the language, young learners can be more actively involved in the process of learning the target language. This voluntary involvement positively influences their performance and, therefore, learning achievement. Research on young learners' language learning also suggests that active involvement of young learners can be facilitated with materials encouraging them to practice the language for development (Bekleyen, 2011; Shin, 2006). The enhancement in young learner performances and achievement can be accomplished mainly in two ways: interactions available in the learning environment and self-learning.

As to the first way to enhance performance and achievement, AR designs have been shown to stimulate three types of interaction in the learning context: interaction with the material (Cabero, 2016; Wojciechowski and Cellary, 2013); interaction among the students (Kamarainen et al., 2013) and interaction between teacher and student (Zarraonandia, Adeo, Diaz & Montero, 2013). From the social constructivist perspective proposed by Vygotsky (1978), it is essential for young learners to interact with people and their environment to learn in an effective way. Developing different types of interaction is a necessary phase in young learner language classes in two aspects; first, young learners need to develop their communicative skills and second, their awareness should be raised in considering language as a medium of interaction. Therefore, taking all into consideration, AR designs can be considered as helpful tools to support interaction between learners and their surroundings.

The second way of performance development and achievement is through self-learning. Kamarainen et al. (2013) and Cabero (2016) state that AR designs enable individualized training facilitating self-learning. Since young learners are at the beginning of their journey to learn the target language, they should be encouraged to understand how to take the control of their future learning in general (Lee and Hannafin, 2016) and language learning in particular. With the help of their interactions with people around and available chances of exploring the language, young learners can better engage themselves in the process of developing self-directed learning on which they can base their future learning experiences. Based on this stance, as Bryan (2015) suggests the integration of technology into education as a way to support self-directed learning, AR designs can also stimulate self-directed learning.

The final item commonly mentioned among the advantages of AR technology is the concept of motivation (Cabero, 2016; Chiang et al., 2015). The combination of the advantages of multi-sensory exposure, exploring the language, interaction with the material and people, and self-learning can all contribute to visible increase in the motivational levels of young learners. As noted by Prosic-Santovac (2016), maintaining motivation is crucial in young learner classes. Since their attention is easily distracted (Shin, 2006) which may cause them to get lost in the process, the issue of motivation in is especially important and needs consideration in teaching foreign language to young learners. AR designs can serve for the purposes of motivating young learners through their rich presentation of language content.

Although it holds a number of advantages, AR technology also brings some disadvantages into the learning context. One of the possible problems with AR designs is the issue of usability and practicality (Chang, et al., 2014). Evaluating the integration of AR technology into education, Cheng and Tsai (2013) state that since the technology necessitates high user engagement and interaction, the issue of usability and practicality must be well-addressed in the design process. Otherwise, the difficulties in using the design would result in time loss for teachers and students. Technical problems are the second set of challenges in AR technology (Wu et al., 2013). Like the drawbacks in usability, they are possibly to cause loss of time in the language education process. Another challenge is related with the readiness of users to utilize the AR technology (Cabero, 2016). Language teachers and students may not have enough training in using the AR technology in their classes. The system may seem complicated to the users who are not provided with necessary information (Cheng and Tsai, 2013). All these three factors may cause waste of time which could be compensated when AR design is carefully planned in the light of user characteristics.

The final challenge which can be experienced with the adoption of AR technologies is the risk of isolation (Fernandez, 2017). The advantage of AR technology providing young learners with the chance of learning language content by exploring it through multi-senses may turn into a disadvantage when young learners are too much directed for self-learning with limited interaction with others. Therefore, while adopting AR technology, language teachers should be careful and conscious about the engagement levels of young learners with the design.

To sum, AR technology can be said to have an engaging and attention-grabbing nature when cautiously adopted in language classes for young learners. Presenting a combination of the real and virtual, AR technology offers young learners a chance to broaden their horizons with the virtual side while still keeping in touch with the reality. It is true that the design has peculiar advantages and disadvantages. What is important in benefitting from the advantages while alleviating the possible challenges is to effectively design the process of language education process taking the young learner characteristics into account.

3. Conclusion

Language is learned best when learners can learn it through real experiences situated in the learning environment (Shea, 2014). AR technology makes this process possible as it introduces dimensionality into language classroom through which learners can have a real sense of experiencing the language. This new perspective is to encourage young learners to develop the sense of motivation while they can learn by experiencing and by doing (Sungkur et al., 2016).

This technological system can better operate when the characteristics of the young learner profile are taken into account. The following suggestions can be made for the effective integration of AR technology in young learner language classes:

- Keeping the interest and attention of young learners is an important issue in language classes (Shin, 2006). AR designs can be effective in maintaining learner attention and interest. However, the content presented through AR should be designed considering the cognitive, social, emotional and physical development of the profile. Otherwise, the material may turn into a source of confusion for young learners. In such a case, they can lose interest and motivation in learning.
- Safety is another significant point in young learner classes. AR technology presents a rich content through multi-senses but it is essential that the content should be determined keeping the physical and psychological safety of young learners in mind. Young minds should not be exposed to information which triggers their psychological and physical safety.
- Since language is for communication, enabling young learners to establish and maintain interactions with other people through the target language should be among the main concerns. AR technology has been shown to promote interaction with people; however, it is also reported that it may result in isolation in some cases. Therefore, while integrating AR technology into language education, teachers should monitor the interactional patterns of their learners and encourage student-student and student-teacher interaction.
- The simultaneous existence of reality and virtuality is an advantage of AR technology. However, while adopting this technology in language classes, teachers should be alert that young learners are not too much fascinated by the virtual presentations. Otherwise, young learners may physically engage themselves in risky acts without analytically thinking of the consequences in real life. Thus, teachers should be careful observers when using this technology and remind young learners that the AR only serves as a material for language education.

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