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Research Article

Acceptance and use of smartphones: AR-enhanced EFL reading practices

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Abstract

The increasing technological practices in educational settings have boosted up a wide variety of mobile tools use. One of the most recent tools is Augmented Reality (AR). As this newest technology whets many educators' appetite in various fields, EFL learning has taken its place among the recent research related with AR enhanced practices. Although AR is a novel and promising tool for educational objectives, little is known about EFL learners' perceptions towards AR-enhanced reading practices and the effect of these practices on EFL learners' smartphone acceptance levels in EFL learning. Herewith, the aim of this study is to investigate EFL learners' perceptions regarding AR-enhanced reading practices and these practices' effect on EFL learners' smartphone acceptance levels in EFL learning. A total of 32 second year vocational school students studying in the department of culinary at a state university participated in this study. This present study adopted a quasi-experimental mixed methods research design. The participants were introduced reading passages in the target language enhanced with AR technologies to increase the comprehension of these texts. Survey of Acceptance and Use of Smartphone Applications for English Language Learning was used to gather quantitative data and a semi-structured focus-group interview was conducted to understand their perceptions on using AR and acceptance of smartphones in EFL learning. The results of this study revealed that these EFL learners have positive attitudes towards using smartphones in their English reading practices and have moderate levels of smartphone acceptance in EFL learning. They found these practices motivating and helpful for understanding the reading passages. Taken together, this study will contribute to the EFL education and technology-enhanced language learning research field.

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Introduction

Smartphones have globally become the most widely used mobile technologies (Jamrus & Razali, 2019). Apart from daily activities, they have started to be used in educational contexts. Implementing Augmented Reality (AR) in EFL learning is one of the latest trends in EFL learning/teaching (Chang et al., 2020; Lee, 2020; Fan et al., 2020; Larchen Costuchen et al., 2020; Parmaxi & Demetriou, 2020). AR offers its users a huge spectrum of modalities such as texts, visuals, animations and videos that are embedded in their environment (Schmalstieg & Hollerer, 2016). These embedded realities provide more engaged learning and motivation and positive attitudes towards learning the target language (Taskiran, 2018; Vedadi et al., 2019). Recent studies reveal numerous advantages of using AR for foreign language learning from increased motivation, authentic language tasks, context-awareness to situated language learning experience (Fan et al., 2020; Lee, 2019; Parmaxi & Demetriou, 2020).

Chang et al. (2010)'s study found that the reading motivation in foreign language learning can be improved with AR integration. As a highly complex process, reading comprehension requires many variables such as previous knowledge, strategy use interest in text and understanding of text types (Klinger et al., 2015). Furthermore, readers need to possess various complex abilities which may be affected by language abilities, motivation and tasks (Grabe & Stoller, 2013). Skimming/scanning problems, poor mastery in vocabulary, lack of skills for prediction and inference, poor comprehension and lack of interest are also considered among the major problems that EFL learners face in reading (Iqbal et al., 2015; Nezami, 2012). Researchers agree that a mere solution for such problems in EFL reading is using mobile technologies to break down the barriers in terms of place and time and allow learners to reach original sources to enhance comprehension during reading (Gilgen, 2005; Miangah & Nezarat, 2012). At this point, AR boosts all human senses by reinforcing the real world (Kipper, 2013) and promotes reading abilities (Rau et al., 2018).

Several limitations of AR in EFL reading have also been underlined in the literature. For instance, learners can be frustrated to use such technologies since an AR application may not work properly or they may consider using AR as a burden to access information (Bacca et al., 2014). Furthermore, extra cognitive load can be imposed to EFL learners (Radu, 2014) and as a result -considering the cognitive capacities of these learners- it may be difficult for less proficient learners to make full use of AR (Brooks & Kempe, 2019). Learners may get distracted by AR and technology use (Kesim & Ozarslan, 2012). Finally, the natural classroom interaction among learners and between their teachers can be interrupted by AR technologies as it may provide an individualized learning experience (Zarraonandia et al., 2013). Despite all these drawbacks, previous research still highly endorses EFL learners' positive attitudes towards AR technologies (Bacca et al., 2014; Tobar-Muñoz, et al., 2017; Vata-U-Lan, 2012; Yılmaz, 2014).

In this light, the current study aims to investigate the perceptions of EFL learners regarding AR-enhanced reading practices and the effects of these practices on EFL learners' smartphone acceptance levels in EFL learning based on a series of reading sessions enhanced with AR. In the context of this study, EFL learners studying in a vocational school have been included. Using smartphones to learn English might offer them a whole new vision, considering that students enrolled into the vocational schools are generally considered to have low motivation and negative attitudes towards language learning (Şevik et al., 2018). There are

several studies that reveal positive learner attitudes towards AR use in EFL learning (Chen & Wang, 2018; Han et al., 2015; Küçük et al., 2014; Majid et al., 2018; Rau et al., 2018; Wojciechowski & Cellary, 2013; Yang & Mei, 2018) and particularly in EFL reading (Tobar-Muñoz et al., 2017; Vate-U-Lan, 2012; Wu et al., 2013). However, the scarcity of research on technology acceptance –especially smartphones– through AR enhanced practices in EFL reading stands out in the literature. Therefore, this study aims to investigate ELF learners' acceptance towards using smartphones in EFL learning. Additionally, this study seeks to find out the perceptions of EFL learners on AR-enhanced reading practices. In this line, the following research questions were posed:

1. What is the effect of Augmented Reality (AR)-enhanced reading practices on EFL learners' smartphone acceptance levels?
2. What are the EFL learners' perceptions on Augmented Reality (AR)-enhanced reading practices?

The use of smartphones in conceptual understanding of English reading

Mobile technologies have been implemented from primary to higher education all over the world (Fleischer, 2012) and involves both the mobility of devices and the users' time and experiences (Lai & Zheng, 2018). Mobile devices offer opportunities like ubiquity in learning environments and inspire many researchers for the investigation of attitudes of teachers and learners towards using these technologies (Lai & Zheng, 2018; Papadokostaki, 2018; Pegrum, 2016; Read et al., 2016; Yaman et al., 2015). In higher education contexts, mobiles have attracted many university students and teachers (Gimeno-Sanz et al., 2020) and various studies have been conducted in higher education contexts to find out the ways of implementation, acceptance and perceptions of mobile device users (Edmunds et al., 2012; Gikas & Grant, 2018;). Studies have revealed positive effects of mobile devices for enhancing foreign language proficiency (Andujar, 2016; Foomani & Hedayati, 2016; Majid et al., 2018; Tobar-Muñoz et al., 2017). Furthermore, these studies also pinpointed the benefits of Mobile Assisted Language Learning (MALL) for sub-skills like collaborative learning (Roschelle et al., 2010), problem-solving and communication skills (Warschauer, 2007). In terms of foreign language vocabulary achievement, mobile devices were found as helpful in enhancing EFL learners' vocabulary (Li & Cummins, 2019; Stockwell & Liu, 2015), motivation and academic success especially in the field specific EFL learning environments (Alkhezzi & Al-Dousari, 2016; Valeeva et al., 2019). Foreign language learners and teachers mostly stated positive attitudes towards integrating mobile devices in language learning (Bradley et al., 2017; Wrigglesworth, 2019). Moreover, mobile devices were found to be helpful in accessing information quickly, experiencing contextualized and multimodal learning, enabling communication and collaboration with peers (Gikas & Grant, 2013; Stockwell & Hubbard, 2013).

The use of augmented reality in EFL

AR is described as “human-computer interaction, which adds virtual objects to real senses” (Ludwig & Reimann, 2005, p. 4). Studies have put forward many advantages of integrating AR into EFL learning in terms of increasing users' motivation and attention (Kim et al., 2013; Kwon, 2013; Lakarnchua & Reinders, 2014; Mahadzir & Phung, 2013; Santos et al.,

2016; Solak & Cakir, 2015; Steel, 2013), optimizing learners' performances (Liu & Tsai, 2013; Santos, et al., 2016; Solak & Cakir, 2015) and creating meaningful and compelling learning (Lara-Prieto et al., 2015). AR is also claimed to meet diverse needs and learning styles of learners through the multimodalities it provides such as audio, text, 2D and 3D illustrations (McNair & Green, 2016). With this multimodal aspect, AR offers learners a richer and meaningful learning content (Billinghurst et al., 2001; Klopfer & Squire, 2008).

In the reading context, findings of studies revealed that AR contributes to learner-satisfaction (Liu et al., 2010; Santos et al., 2016), cultural understanding (Holden & Skyes, 2011; Liu et al., 2016), English vocabulary knowledge (Barreira et al., 2012; Solak & Cakir, 2015), active engagement both inside and outside the classroom (Billinghurst & Dunser, 2012; Kenema & Waller, 2016), language performance (Liu et al., 2016; Mahadzir & Phung, 2013), writing skills (Liu, & Tsai, 2013), interaction for knowledge construction (Chiang et al., 2014) and positive attitudes towards English (Küçük et al., 2014).

Acceptance and use of smartphones

Technology acceptance is defined as the willingness of a user to use technology in tasks for which that specific technology is designed (Teo, 2011). The recent advancements in technology and its widespread use stimulated many researchers in various areas to investigate users' technology acceptance (Venkatesh et al., 2003). As a result of this motivation, several theoretical models on technology acceptance have been proposed and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) has been considered as the most recent and valid among all the other theories and believed to propose more comprehensive and highly predictive variables for the behaviors of technology users (Ahn, 2018; Venkatesh et al., 2012). Recent studies on MALL, which especially focus on smartphones as tools, have adapted the constructs of the UTAUT model as predictors for learners' attitude towards the use of MALL. Ahn (2018) developed a model of technology acceptance in order to find out specifically the EFL learners' intentions to use smartphones apps for English language learning (SAELL) in his study.

According to this model, perceived usefulness (PU), perceived convenience (PC), social influence (SI), perceived enjoyment (PE) and self-management of learning (SL) are considered as the predictors of learners' intention to use SAELL. PU is the degree to which learners believe that using a particular technology system would enhance their academic performance. PC is the degree of convenience regarding time, place, and execution, while learners are participating in m-learning. SI is the degree to which learners perceive that important others believe they should use a new technology system. SL is the degree to which learners perceive that they are self-disciplined and able to engage in autonomous learning. Finally, PE is an individual's state of mind including concentration, curiosity, and enjoyment while participating in smartphone language learning (Ahn, 2018). The results of his study revealed that PU was the strongest predictor of the students' intention to use SAELL which was followed by SL.

In a recent study, researchers investigated EFL learners' acceptance towards the use of mobile applications in EFL learning and found out that the major influence for the positive acceptance of learners' intention to use mobile applications is the ease of use offered by them (Deris & Shukor, 2019). EFL learners also found these mobile tools convenient and practical.

Performance Expectancy, which is the construct of the UTAUT model and is a similar concept to 'perceived usefulness' in this study, was found to be the most important predictor for learner attitude in MALL (García Botero et al., 2018; Hoi, 2020). Moreover, a research conducted in a similar context to the current study revealed that vocational school students had positive perceptions towards mobile technologies and both PU and PE were found to be highly predictive in regard to explaining their attitudes (Azli et al., 2018).

Even though there are a number of studies focusing on explaining learner acceptance to use mobile technologies in EFL learning, the limited empirical evidence to explain the intentions of EFL learners' use of smartphone applications, especially through AR enhanced reading activities stands out and has driven the current study (Kuru Gönen & Zeybek, 2021). Therefore, with this study, it is aimed to understand the effect of AR-enhanced reading activities on EFL learners' smartphone acceptance levels.

Methodology

This mixed method quasi-experimental study adopts a one-group pretest-posttest design, in which the researchers collect both qualitative and quantitative data before and after the manipulation of dependent variable of a group of participants in order to answer different research questions directed for the study (Allen, 2017; Creswell & Creswell, 2018). In this way, the various angles of a phenomenon can be investigated thoroughly. Quantitative data were collected through a scale to answer the first research question and qualitative data were collected through a one-hour long focus group interview to answer the second research question to gain more insight in the topic being investigated.

Participants and context

Participants consist of 32 vocational school EFL learners studying at the Department of Culinary in 2-year vocational schools at a state university in Turkey. Convenience sampling method, which is a nonprobability sampling method that involves participants available for the researcher (Allen, 2017), was used in the selection of participants. At the time of this study, they were enrolled to Vocational English I course. All of the students took A1-A2 level English courses (according to Common European Framework of Reference for Languages) in their first year of study and were successfully completed these courses. Thus, it is assumed that the participants have at least A2 level English level prior to Vocational English I course. The participants' age ranged from 18 to 25.

During Vocational English I, the participants were trained on field specific English in Culinary context. In this lesson, the course book *Flash on English for Cooking, Catering and Reception* (Morris, 2012) was recommended for students as a reference book. This book includes language activities mainly focused on vocabulary and reading comprehension skills. There are various vocabulary practices for recycling newly learned vocabulary items and these new words related with cooking and kitchen are introduced to learners with reading texts.

AR-enhanced reading texts

Each week the activities in the course book were implemented during the lessons. However, six of the reading texts were introduced in an AR-enhanced way to the participants.

The aim of using AR with these texts was to make them more comprehensible to the readers and activate schemata for the unknown vocabulary. These reading texts were transformed into AR enhanced texts by embedding multimodal sources to explain some field specific concepts/words. The target items from the reading texts were selected by the two researchers based on the following criteria:

- Vocabulary that are hard to be understood from the context.
- Field specific words and concepts that are hard to be understood by a dictionary definition.
- Culture-specific terms that cannot be understood by a dictionary definition.
- Things that need to be presented through multiple modes to be able to be understood.

Texts that were comprehensible, brief and suitable for participants' level; images and videos that are high in quality, visible and to-the-point; and animated gifs that are comprehensible enough for the participants and high in quality were chosen as multimodal sources to embed in these AR-icons. The distribution of AR-enhanced target vocabulary items according to the reading texts is presented in Table 1.

Table 1. Distribution of AR-enhanced target vocabulary items according to reading texts

The name of the text	N*	Distribution of content type
Kitchen Areas with Their Uses	4	2 images (image + text), 2 videos (video + text)
Different Types of Food	1	1 video
Menu	4	3 images, 1 video
Service Techniques	3	3 videos
International Cooking	9	7 images, 2 videos
Recipes from Different Cuisines	3	3 images

N* Number of selected items

The selected target items in these texts were introduced to the students with AR icons located in an appropriate place next to the text. The participants were expected to scan the icons to enhance the comprehension of the reading text.

HP Reveal as an AR tool

In this process, researchers used the HP Reveal application to incorporate the learners into the AR experience. In HP Reveal application, predefined images are scanned by the smartphone, and the user is automatically guided to the pre-defined 2D or 3D image, animation, video, website or text. An example of using HP Reveal is shown in Figure 1.



Figure 1. Demonstration of using HP Reveal

Data collection instruments

Survey of acceptance and usage of smartphone applications in EFL learning

The Survey of Acceptance and Usage of Smartphone Applications in EFL Learning developed by Ahn (2018), which is a scale in its nature, was used in order to find out whether AR-enhanced reading practices effect EFL learners' attitudes towards using smartphones in learning English. This scale includes six subsections: perceived usefulness (PU), perceived convenience (PC), social influence (SI), perceived enjoyment (PE), self-management learning (SL), and intention to use (IU). The scale consists of 24 items in total. The participants were expected to choose from a 5-point Likert scale (5-strongly agree, 1-strongly disagree) to indicate their level of agreement to the given statements. The scale was translated into Turkish and back-translation was done in order to eliminate any misunderstandings that can arouse from the translation. This study was conducted in a vocational school and the number of participants was limited. Therefore, this study did not reach the sufficient sample size required for CFA (DiStefano, 2005). Additionally, the back translation method was preferred to minimize the misunderstandings that may occur due to translation. The scale was also piloted with 69 EFL learners within a similar learning context in the same university. Stratified Alpha Coefficient was chosen to estimate the reliability of the scale due to the scale's multi-dimensional nature, and reliability coefficient was found as .95 which indicates a high level of reliability for the scale items. This scale was implemented as a pre-test and a post-test.

Semi-structured focus group interview

Focus group interviews are conducted with a small group to explore their attitudes and views on a particular subject (Denscombe, 2010). In the semi-structured interview, the interviewer has certain topics on hand, but the focus is on the interviewee's elaboration on the topic, making the topic flexible by changing according to the answers of the interview (Denscombe, 2010). Accordingly, in the interview conducted in the study, the interviewees were allowed to elaborate on the topic flexibly and the new topics that emerged while elaborating the topic were observed. Questions directed to the interviewees were prepared by both researchers and checked by an expert from an English Language Teaching Department of

a state university. The aim of these questions was to gain a deeper understanding on the views and experiences of the participants. The interview took an hour and was conducted in participants' native language and the questions were directed to the randomly chosen seven participants at the end of the AR-enhanced reading sessions. The interview questions were:

1. How would you evaluate the English reading activities you experienced with HP Reveal application in general?
2. Would you like to continue using this application in your further field specific EFL courses? Why? /Why not?

Data analysis

Data collected through pre- and post-tests were analyzed with statistical tests. Before the data analysis began, preliminary data analysis process was conducted. No missing data was found. The assumptions of the parametric tests were checked and it was concluded that data met the assumptions of parametric tests; therefore, Paired Samples T-test was performed on the data. After the analysis, effect sizes of the significantly different results were examined with Cohen's d. The effect size was interpreted according to Cohen's suggestion, $d = .2$ is small, $d = .5$ is medium, $d = .8$ is large (Cohen, 1992).

Data collected through the semi-structured focus-group interview were analyzed qualitatively using Constant Comparative Method (CCM). In this method, the researcher uses the data to form categories instead of referring to preexisting categories (Corbin & Strauss, 2015). The analyst in this study started with coding. Next, similar coded ideas are gathered together into categories by constantly comparing and contrasting. Then, the analyst pared off irrelevant properties, merging similar details of properties into major inter-related categories. In the end, the original set of categories occurred to the analyst. Two researchers experienced in qualitative analysis analyzed the data separately and by using the formula suggested by Miles and Huberman (1994) inter-rater reliability was found as .96, which ensures high inter-rater reliability.

Procedure

The study was conducted in the fall term of 2019-2020 academic year. EFL learners took "Survey of Acceptance and Usage of Smartphone Applications" prior to the AR-enhanced reading sessions and at the end of these sessions. These reading sessions lasted six weeks and each week one AR enhanced reading text was distributed to the learners during the EFL lesson. The learners read the texts on their own using their smartphones to scan AR icons. After reading the texts, the learners were expected to finish the related post reading tasks such as comprehension questions, matching activities, etc. When learners finished their tasks, a whole class discussion to check the post-reading tasks were held. After learners completed the scale at the end of the whole process, a semi-structured focus group interview was conducted.

Results and Discussion

The aim of this study was to investigate the effect of AR-enhanced reading sessions on EFL learners' smartphone acceptance levels in EFL learning. Also, this study tried to understand the perceptions and experiences of EFL learners on using AR in EFL reading. The

study results are presented and discussed in sub-sections under the titles of each related research question.

R.Q.1. The effect of Augmented Reality (AR)-enhanced reading practices on EFL learners' smartphone acceptance levels in learning English

Paired Samples T-test results for pre- and post-tests for the general attitudes towards acceptance and use of smartphone applications in EFL learning are presented below in Table 2.

Table 2. Paired samples t-test results for general attitudes of participants towards acceptance and use of smartphone applications in EFL learning

		Mean	Sd	t	df	Sig (2-tailed)	Cohen's d
General	Pretest	80.12	16.30				
Attitude				-2.74	31	.010*	.635
	Posttest	90.75	17.16				

* $p < .05$

Table 2 indicates that the post-test score (*avg. 90.75*) is significantly higher ($p < .05$) than the pre-test score (*avg. 80.15*). These results can be interpreted as the participants' attitudes towards acceptance and use of smartphones have increased. When the effect size is examined (*d. .635*), it can be said that the effect of AR-enhanced reading practices on the participants' attitudes towards acceptance and use of smartphones is meaningful and on a medium size. This shows that EFL learners' mobile application acceptance levels in learning English increased after AR enhanced reading sessions. Previous studies on mobile technology acceptance also found out similar results concerning positive attitudes towards MALL (Azli et al., 2018; Deris & Shukor, 2019). One of the reasons for this finding can be the motivating nature of MALL tools in the EFL learning process (Salman, 2014; Wang & Smith, 2013). Another reason for this result can be the effect of positive learning experiences of students on the attitude towards technology use (Ting, 2012). Furthermore, as proposed by Ahn (2018), there are other predictors of this smartphone acceptance in learning English. In order to understand the difference in the participants' attitudes according to the sub-dimensions of the scale, Paired Samples T-Test was conducted and the results are presented in Table 3 below.

Table 3. Paired samples t-test results for sub-dimensions of acceptance and use of smartphone applications in EFL learning

	Mean Difference	t	df	Sig (2-tailed)	Cohen's d
Pair 1 (Perceived Usefulness) Pretest-Posttest	-2.12	-2.80	31	.009*	.544
Pair 2 (Perceived Convenience) Pretest-Posttest	-1.25	-1.45	31	.156	
Pair 3 (Social Influence) Pretest-Posttest	-1.12	-1.68	31	.102	

Pair 4 (Perceived Enjoyment) Pretest-Posttest	-2.90	-3.69	31	.001*	.844
Pair 5 (Perceived Self-Management of Learning) Pretest-Posttest	-1.71	-2.44	31	.020*	.710
Pair 6 (Intention to Use) Pretest-Posttest	-1.50	-1.53	31	.135	

* $p < .05$

According to the results presented in Table 3, the participants perceived using AR technology and their mobile phones useful for learning English vocabulary related to their profession. When the results of the sub-dimensions in pre- and post-test are examined, it is observed that the mean differences between post-test and pre-test scores of the perceived usefulness (*MD. -2.12*) (PU), perceived enjoyment (*MD. -2.90*) (PE), and perceived self-management of learning (*MD. -1.71*) (PSML) sub-dimensions are significantly different, post-test scores being higher. According to effect size, it can be said that the PE sub-dimension has the highest effect size and has a large-size effect (*d. .844*), PSML sub-dimension has an effect between the medium and large-size (*d. .710*), and the PU sub-dimension has a medium-size effect (*d. .544*) on acceptance and use of smartphone applications in EFL learning. According to the results, EFL learners were found to enjoy their experience with mobile technologies during their reading activities. According to Venkatesh et al. (2003), when users of a specific technology are motivated, they accept and use that technology more. Besides, mobile technology integration is found to contribute learners' feelings positively and motivate them to use those technologies in EFL learning (Rau et al., 2008; Salman, 2014; Wang & Smith, 2013). Thus, the results found in this study may signify a positive impact of AR enhanced reading sessions on using smartphones in EFL learning.

Furthermore, these results also demonstrate that AR helped learners manage their learning speed and method pursuant to their needs and pace. The ubiquity of mobile technologies enables EFL learning to be anytime and anywhere (Cheng et al., 2010; Demmans Epp, 2016; Hung, 2011; Kukulska-Hulme, 2013; Liu, 2016). By providing limitless education beyond the classroom and school hours, these technologies offer autonomy for students' learning process (Kacetyl & Klímová, 2019; Leis et al., 2015). Also, another reason for this result may be that the use of mobile technologies in the classroom has increased students' use of mobile technologies for educational purposes in their free time (Leis et al., 2015). Bearing this feature of mobile technologies and AR in mind, the results of the current study may have highlighted that EFL learners could fine-tune their own learning according to their learning speeds. As AR-enhanced reading texts were available for these learners outside the classroom, the scaffolding feature of these texts still helped them when they were on their own. Thus, this may have yielded to an increase in EFL learners' perceived self-management of learning levels. Another meaningful result has been observed in learners' perceived usefulness. This finding is in line with the previous research results (Azli et al., 2018; Botero et al., 2018; Deris & Shukor, 2019; Hoi, 2020) which also revealed PU as the most powerful predictor for learner acceptance in EFL learning with mobiles. As Brandtzæg et al. (2011) assert, when users consider a

technology useful, more beneficial outcomes are obtained. Thus, the significant difference in participant's perceptions of the usefulness of the AR technology after the intervention may signify that EFL learners comprehended the texts better, and AR integration were considered as useful. Another interpretation can be made according to Teo and Noyes (2011)'s assertions who indicate that the reason for the increase in PU sub-dimension may be the result of the observable increase in the PE sub-dimension. That is, when learners enjoy the process with smartphones, they also find it useful for their learning. Therefore, as the most significant result was observed in EFL learners' PE levels in this study, it can be stated that their enjoyment may have effected how useful they perceived the smartphone technologies for EFL learning.

The dimensions perceived convenience, social influence and intention to use showed no significant difference between pre- and post-tests. Considering that the students were enrolled in this course and participated in this study with the convenient sampling method, the intention to use a smart phone in English learning, the social impact and its usefulness may have been provided by the researcher who gave the course, as the EFL learners were expected to do the AR-enhanced reading activities during the courses. Apart from this, considering the age range of the EFL learners, it can be thought that they already have the intention to use smartphones as a generation that lives with technology. Also, many applications such as social media that have penetrated our daily lives may suggest that students might have already been under social influence outside the classroom. Therefore, the absence of significant differences in these three dimensions can be considered as an expected situation.

R.Q.2. EFL learners' perceptions towards Augmented Reality (AR)-enhanced reading practices

A focus group interview was conducted in order to better understand the views of participants on using AR-enhanced texts. The interview was transcribed and coded using CCM to find out the main categories that emerged from their views. One main category '*Contributions of AR-enhanced reading practices*' and two sub-categories have emerged as a result of this process. According to the participants, AR-enhanced reading practices contributed to their '*comprehension*' (n=37) and '*positive feelings towards learning English*' (n=8). The distribution of sub-categories is presented in Table 4 below.

Table 4. Distributions of sub-categories according to the main category: the contributions of AR-enhanced reading sessions

Sub-categories according to the contributions of AR-enhanced reading practices	N*
<i>AR-enhanced reading practices increase...</i>	
comprehension	37
positive feelings	8
Total	45

N*: Number of codes

The EFL learners stated that AR-enhanced reading sessions increased their '*comprehension*' (n=37) of the reading texts. According to them the visualization of the concepts and the processes helped them understand the field-specific texts better. One of the students stated her view as:

Since it has pictures and videos, it gets more place in the mind, it is more easily engraved in our mind.’ (participant 6)

As uttered by *participant 6*, the AR-enhanced reading texts made it possible for them to see the unknown field specific items through videos, pictures and gifs. Lee et al. (2019) assert that language limitations can be overcome through multimodal resources since they offer a variety of possible modes for the process of meaning-making. Thus, in this situation it could be argued that AR enhancement for the target vocabulary provided multimodality which is a necessary component in meaning-making in the language being used. Along with this multimodality, these texts were found to be helpful for preventing misunderstanding of the concepts. One of the participants stated her views as:

In one of the words embedded here, there was a word called plated. There are plates we use in the kitchen. There are plates used for grilling. I can describe it as flat or grill stoves. For example, when I saw the plate here, I could think of it. I might have thought it was something close to it, but when we look at it with HP reveal, augmented reality, I learned today that plated are plates that are prepared for presentation, more visually colored plates. If it just had passed in a sentence or if I had seen it on the exam, I would probably be wrong. I could have misunderstood, but I think it also improved my English in terms of vocabulary.’ (participant 1)

As echoed by *participant 1*, some concepts can be understood and interpreted differently by different users of the language. Researchers state that reading is an active process of creating meaning and new knowledge through negotiation with the text (Armbruster et al., 2001). In this situation, it is possible to state that AR-enhanced reading helps learners negotiate with the text and eliminate any confusion that can arise in their minds related to the vocabulary presenting field-related concepts and processes. Wu et al. (2013) argue that when students encounter unfamiliar words, they can quickly improve their reading comprehension by using AR to find the exact meaning of the word they do not know. Thus, AR-enhanced reading can signify a fruitful process for EFL learners in order to increase their reading comprehension.

Another sub-category emerged from the qualitative analysis was increased ‘positive feelings’ (n=8). According to the participants, this intervention with AR was an enjoyable experience for them and provoked positive feelings towards learning English. One of the participants stated her view as:

‘There is a stereotypical English system we have been taught to this day. I know that we have started to learn English since primary school and we still do not understand ... We still forget. We still cannot use English properly. I think learning English with this kind of practice can be more supportive, more encouraging, catchier and more fun.’ (participant 3)

It can be understood from the utterances of *participant 3* that the language learning process should be attractive and enjoyable so that the learners can engage more with the target content to achieve better. It has been stated in the literature that considering all language skills, reading in the target language requires mastery of various linguistic, metalinguistic, lexical and strategic processes and is a cognitively demanding task (Grabe, 2009). Furthermore, many long-

term reading difficulties are the results of lack of confidence and motivation in learning due to reading failure (Armbruster et al., 2001; Nation et al., 2002). Therefore, it can be argued from these findings that AR-enhanced reading texts increased joy and motivation among learners and consequently decreased the negative factors that can result from the above stated nature of the reading in the target language.

Conclusion and Suggestions

The results of the current study revealed that using AR enhanced reading through smartphones has a meaningful effect on mobile technology acceptance of EFL learners. Furthermore, EFL learners consider smartphone applications in EFL learning enjoyable, useful and advantageous for autonomous learning. Therefore, EFL instructors should seek ways to integrate such technologies in order to trigger even hard-to-reach students' motivation for learning the target language. Especially with the growing interest to latest technologies among many learners, integrating mobile tools into their learning process can help them develop more positive perceptions towards EFL learning which is also signified in the findings of this research.

In the light of these findings this study suggests several implications. First of all, EFL instructors can effectively integrate technology into their classrooms by considering the needs and technology availabilities of their students and contribute to their students achieving more successful results in vocabulary learning. Considering the wide variety of advantages that mobile technologies provide for learners (Jee, 2011; Kukulska-Hulme et al., 2017; Liu, 2016; Vavoula et al., 2009; Wang & Smith, 2013) and the challenges that learners face in EFL reading (Iqbal et al., 2015; Nezami, 2012), it is highly suggested to include AR technologies to ease the path and motivate learners. Second, EFL learners' can be provided opportunities practicing AR-enhanced reading outside the class through specifically designed EFL textbooks that promote the use of mobile technologies for learning English. Third, EFL instructors can be encouraged to use technologies like AR in the classroom by raising awareness of the benefits that new technologies can offer them and their students.

This study was only conducted with culinary EFL learners, other field areas taking EFL courses can also be included in further research to see a wider effect of AR enhanced EFL reading on smartphone (or technology) acceptance. Furthermore, the application utilized in this study is no longer available for use. Bearing this in mind, it is important to highlight that the purpose of this study was not to promote this application, but to treat AR as a tool that can be used in field specific EFL reading. Due to constantly changing and developing technologies, available applications may change or disappear over time. Accordingly, this study provides an example of how AR can be integrated into EFL learning situations, regardless of application. AR technologies are constantly improving, bringing new opportunities such as holograms and AI-integration, thus, further studies may focus on the most recent forms of AR. Additionally, due to the nature of the study design, it was impossible to eliminate nor analyze the effects of control variables that could affect the dependent variables alongside the independent variables. Therefore, future studies can adopt static group comparison design to illuminate this issue. Future studies can also analyze the relationship between the amount of exposure to this technology and the achievement levels of students.

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