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Female ESP Postgraduates' Acceptance of Virtual Reality Learning: Aye or Nay

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Abstract
The current study examined the views and attitudes of (N=20) postgraduates' after using virtual reality (VR) headsets to learn English for Specific Purpose (ESP) vocabulary. The study also explored factors affecting their perception. A mixed method approach was used to collect the data. First, initial focus group interviews were conducted with some students to explore their opinions. To assess whether other participants share the same views, a follow up online questionnaire was adopted and adapted, afterward, based on themes emerged from the literature review and the focus group interviews thematic analysis. The results concluded that students were enthusiastic about using VR as an instruction tool in their ESP classrooms. They also suggested integrating it in other courses. This study helps to bridge the gap in literature as few studies investigated Saudi female postgraduates' perception toward the use of VR headsets to learn ESP vocabulary. This study answers the calls of using immersive interactive VR in ESP environments to provide mock-ups of real-life experiences to compensate for the lack of authentic ESP learning.

Keywords: Perception, virtual reality headset, ESP vocabulary, immersion, imagination, Technology Acceptance Model, Task-Technology Fit.

Introduction

Researchers have shown an increased interest in the relationship between the techniques of teaching and the traditional and new strategies of learning lexis (Bahanshal, 2015; Elyas & Alfaki, 2014; Wahyuni & Rozani Syafei, 2016; Liu, 2016; Khonbi & Sadeghib, 2017).With the emergence of technology and the calls to integrate them when teaching a language, many scholars attempted to experiment their usage as well as investigate users' perceptions toward them. These are exemplified in studies that investigated the role of flipped learning, social network sites, blended learning, mobiles applications, video games and recently, wearable technologies that are generally

used for entertainment, tracking activities, and monitoring health. Some studies even reported new paradigm shifts and suggested combined models and frameworks to help understand the factors behind certain attitudes.

Since wearable technology markets have witnessed a dramatic change the last few years, vocational education recognized a need to integrate them into the curriculum. This is evident in a few recent studies. For example, in Switzerland, Rosenthal et al. (2008) explored 735 surgical trainees' attitude toward VR simulation for surgical assessment and training. The majority of the participants were motivated to train regularly via VR. Moreover, to collaborate in building cities, Nguyen et al. (2016) introduced a system to bring architectures together into a 3-dimensional (3D) virtual environment. Also, in an inclusive educational environment, Ip et al. (2016) designed six VR training scenarios along with corresponding training protocols to examine VR ability in facilitating social adaptation training for school-aged children diagnosed with Autism Spectrum Disorders (ASD). The findings revealed children's significant improvements in social reciprocity, affective expression, and emotion recognition.

Although the aforementioned investigations and many others reported interesting results, little work has examined the effect of VR headsets on female ESP students' ability to retain vocabulary related to their field of study, specifically, in the Saudi context. Therefore and based on the premise that VR may transform the learning experience, the current authors Madini & Alshaikhi (2017) examined in a previous study the interaction of (N=20) ESP Saudi female postgraduates with VR goggles while watching YouTube videos, recorded in 360°, related to Didactic Terminologies. The pre and post-test scores were compared. The result revealed that VR videos actually helped the postgraduates retain ESP vocabulary. This promising result prompted the authors to extend research further and explore, in this current study, the same participants' attitudes toward using VR goggles and the factors affecting their perception.

In the light of this, this paper aims to add to the growing body of VR literature by exploring Saudi ESP female students' attitude toward using VR goggles to retain ESP vocabulary and the factors affecting their perception. The long-term implications of this study will contribute to enhance knowledge on the impact of VR in ESP classes as well as inform policies to attend to ESP students' needs by adopting VR in ESP filed.

Literature Review

Virtual Reality Definition

Many scholars proposed various definitions of VR. Achille et al. (2016) for example, referred to it as "a computer technology that gives the illusion, to those who use it, of being immersed in a virtual environment that does not really exist." (p. 140). However, the term 'virtual reality' is often used interchangeably in the literature. Generally, it is used to refer to visualizing believable imaginary environments experienced in a three dimensional (3D) view. Specifically, it refers to the immersive hardware used to interact with objects viewed and heard in mock-ups 3D environments such as gloves and headsets. Furthermore, Fernandez (2017) offered to explain and clear the misconception between Augmented Reality (AR) and VR. He pointed out some distinctive features of both among them:

1. VR runs over new virtual environments in terms of touch and interaction while AR implements virtual elements to enhance the real world experience.
2. Virtual reality replaces the physical world while AR does not.
3. VR's immersion level is 100% where users are fully detached from their real world, unlike the AR where users are fully aware of their surroundings.

4. VR needs powerful processors while AR can be experienced through tablets , smart mobile phones and some dedicated devices such as Microsoft HoloLens or Meta 2
5. Depending on the application, VR "is 10% real and 90% virtual. Augmented reality is 75% real and 25% virtual" (p.3)

In addition, numerous recent studies identified different types of virtual realities. These are: fully immersive, non-immersive, collaborative, and web-based. Each of which has its own features and drawbacks (Huang, Rauch, & Liaw, 2010; Curcio, Dipace, & Norlund, 2016; Hsu, 2017; Hung, Chen, & Huang, 2017). Similarly, early literature documented different wearable devices that can be used to experience each VR type such as body suits, joysticks, helmets, data gloves, and recently goggles. For the purpose of this paper, the participants' views on the virtual environment are explored after inserting smartphones in VR headsets (Figure 1) to watch YouTube videos recorded in 360°.

Figure 1. Gear VR (Samsung mobile press, 2017)

Why Virtual Reality?

The literature highlighted some benefits for using VR in learning. Cassard & Sloboda (2016), for example, indicated that VR goggles help learners to be "fully immersed and engaged in the learning of content" (p.57). Moreover, Fernandez (2017) pointed out that they are flexible to access from anywhere and that the new immersive 3D experiences can be "worth more than a thousand images" (p.6). Lan (2015) supported that and proved that VR could save costs of physical field trips to complement the insufficient learning opportunities in EFL Taiwanese classes. The researcher created virtual *English Villages* and observed the English learning performance of 132 elementary school students. The result indicated that: a) the mobility of the VR worlds provide learners with the chance to learn without time and space constraints, b) VR provide EFL learners with an exciting game-like scenario, and (3) VR enhances their performances. Similarly, VR offers to enhance spatial knowledge, motivation, and engagement, effective collaborative learning, and contextualized learning as well as simplify complex abstract concepts (Dalgarno & Lee, 2010; Hwang & Hu, 2013). VR also triggers the imagination, initiate interaction instantaneously through users' motion detectors, enhances mental and physical immersion through multisensory stimuli and thus reduces cognitive load (Huang, Rauch, & Liaw, 2010; Huang, Liaw, & Lai, 2016).

By the same token, Duncan, Miller, & Jiang (2012) provided a valuable contribution to the literature by suggesting a general taxonomy for the various applications of VR environments inside the classrooms. According to them, VR is effective for virtual fieldworks, game-based learning, role-playing, collaborative learning simulation, enquiry-based learning, collaborative construction, virtual quests, and problem-based learning.

Challenges of Virtual Reality learning

Although the benefits of VR are still under investigation, some challenges have been reported and thought to limit their uses in education. For instance, Fernandez (2017) noted that learners' abusive use of VR in class might lead to personal isolation from their peers. Also, Walker (2009) and Stojsic, Dzigurski, Maricic, Bibic, & Vuckovic (2017) pointed out some concerns such as slow wireless Internet connections in the classrooms, limited VR content, and the inability to provide VR headsets in large classes due to their high prices. Also, as with most wearable devices, some psychological and physical discomforts were experienced. These include loss of balance, disorientation, motion sickness, and headset weight and fit (Merchant et al., 2014). Also, if not guided and used for the first time, VR may not aid absorbing the presented content but rather distracts students with the engaging sensory experiences (Adams, Mayer, MacNamara, Koenig, & Wainess, 2012; Rupp et al., 2016).

Factors Influencing Learning via Virtual Reality

When it comes to integrating new technology in education, concerns always rise, specifically regarding its usefulness, appropriateness in meeting tasks requirements, feasibility, acceptance, and learners' and teachers' attitude towards it. When comparing VR to theories and pedagogical practice, Bricken (1991) identified fear of technology, usability, and cost as three main challenges.

Likewise, the literature discussed other attributes that may affect the practical, effective use of VR in education such as lack of designed instructional principles, the need of theoretical guidelines, limited practical adoption in literature and lack of teachers' training in using VR within meaningful educational contexts (Curcio, Dipace, & Norlund, 2016). To solve the problem, Fernandez (2017) proposed six-steps to assist basic adoption of augmented and virtual reality within regular education. These steps start with (1) orienting instructors and familiarizing them with VR technology; (2) encouraging them to design conceptual prototypes; (3) developing the design with technical programmers and educational architects; (4) piloting the design with students; (5) training instructors to customize the courses they teach by adding pedagogical elements to include VR solutions; (6) encouraging instructors' implementation of the VR experience in their classes.

The Conceptual Framework

Evaluating learners' acceptance of VR is a critical issue to ensure wearable technologies are used effectively to serve the intended purpose. Therefore, Technology Acceptance Model (TAM) and Task-Technology Fit (TTF) are considered in this paper as a theoretical guideline to evaluate the appropriateness and effectiveness of VR. The use of the theoretical framework in developing research is of utmost importance as it helps the researchers to formulate the research problem, choose the best method to investigate the problem and guide the process of analyzing the research data (Imenda, 2014).

Technology Acceptance Model vs. Task-Technology Fit

TAM was proposed by Davis in 1986 (Chuttur, 2009). It is used as a tool to measure users' acceptance of using technology through their internal beliefs, attitudes, and intentions (Turner, Kitchenham, Brereton, Charters, & Budgen, 2010). Moreover, using TAM as a theoretical framework for a study helps in identifying factors that affect users' acceptance based on two beliefs: a) perceived usefulness (PU) and b) perceived ease of use (PEoU) (Marangunic & Granic, 2015). As defined by Davis (1989) PU refers to "the degree to which a person believes that using a particular system would enhance his or her job performance". However, PEoU indicates "the

degree to which a person believes that using a particular system would be free of effort" (as cited in Akour, 2010. P. 94).

When exploring the learner attitudes toward the acceptance of a certain technology particularly VR headsets, three features should be considered. These are imagination, immersion, and interaction (Burdea & Coiffet, 2003). As a result, the current study adopted a conceptual model (Figure 2) based on TAM which was developed by Huang, Liaw, & Lai (2016) to further investigate the relationship between the three features of VR and acceptance of VR learning systems.

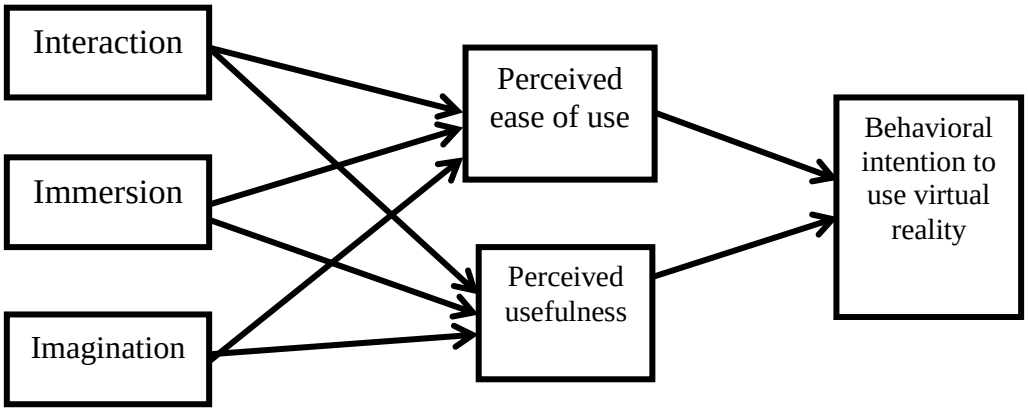

Figure 2. A conceptual model of learners' attitudes toward VR learning (adopted from Huang, Liaw, & Lai. 2016, p. 7)

On the other hand, Task-Technology Fit (TTF) model implies matching of the capabilities of the technology to the demands of the task (Dishaw & Strong, 1999). In other words, TTF investigates how well the new technology (VR headsets) fits the requirement of a particular task (acquiring and recalling ESP vocabulary relevant to the student's major).Therefore, this study also adopted Integrated TAM/TTF model (Figure 3) designed by Dishaw & Strong (1999) because TTF measures the fit between the task and the technology (Goodhue & Thompson, 1995).

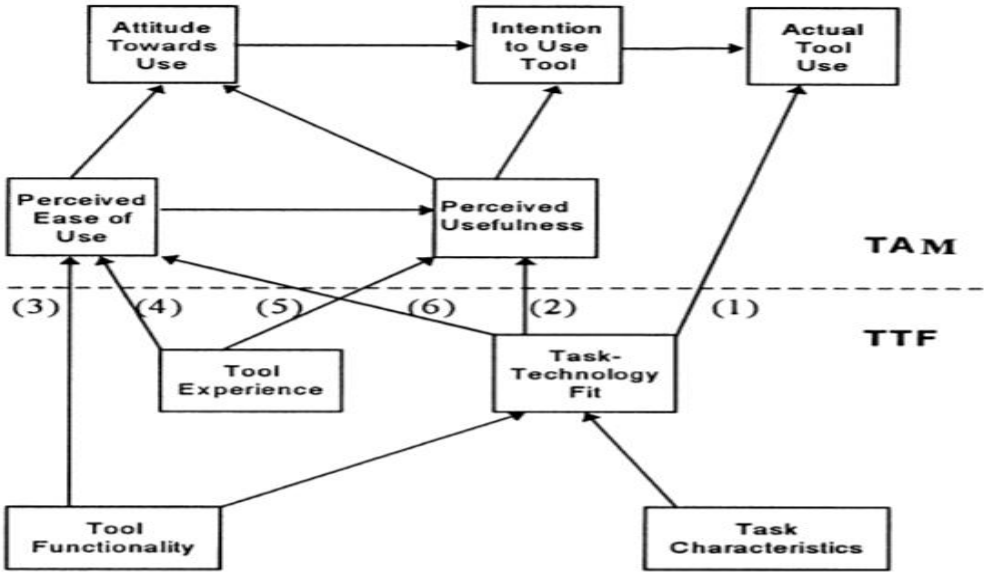

Figure 3. Integrated TAM/TTF model. (adopted from Dishaw & Strong, 1999, p.13)

To this end, combining TAM with TTF provides a more effective model than the TAM or TTF models alone. The combined model can be more useful for explaining the variance intentions of using the technology than using the TAM alone (Klopping & McKinney, 2004). TAM model helps in studying the attitude toward the use of VR headsets in language education, whereas TTF helps in investigating the functionality of the VR headsets and the characteristics of the task. Therefore, integrating both models is essential for this study to provide a better explanation for the variance in VR headsets utilization.

Research Objective and Questions

In this dynamic and 'interactionist' age, students' interest is exceedingly fading in traditional classrooms where they are chained to their chairs listening to a teacher standing next to a black or whiteboard. This gives rise to tasks with online settings. This availability of online contexts as an experimental field to practice and learn any target language suggests the use of technology as the best medium for language teaching and learning.Therefore and based on all that mentioned above, this research aims to explore the female ESP postgraduates' perception toward the use of VR headset in ESP learning and understand the factors affecting their perception. For this purpose the following two questions are addressed:

1- How do ESP postgraduates perceive retaining ESP vocabulary after using VR goggles?
2- What factors affect student's perception while using the VR goggles?

Methodology

Participants

The participants were (N=20) Saudi female ESP postgraduates enrolled in the Didactic Terminologies in English Language Course. This is the only English course available in the master program of Counselling and Guidance offered by the Department of Psychology at King Abdulaziz University, Jeddah, Saudi Arabia.

In a previous experimental study and during the second semester of the academic year 2017, the participants' interaction with VR headsets was examined. They were exposed to VR smart goggles by watching 360° videos on topics related to: 1) basic skills in counselling, and 2) some cases that require referrals such as depression, addiction, violence, domestic violence, suicide, autism, and bullying. This intervention lasted for about six weeks at the rate of one hour a week. The results of the pre and post tests found that VR headsets, in fact, enabled the postgraduates to retain ESP vocabulary related to their counseling and guidance program (Madini & Alshaikhi, 2017). On that account, a next step of investigating their perception toward the use of VR headsets was needed to explore the benefits as well as the challenges of using such instrument in language teaching. In addition, demonstrating the factors influencing their perception in such unique learning environment could possibly bring new insights to this novice topic.

The age of the sampled participants was ranged between 26 and 35 years old. Their English level varied between beginners to intermediate as determined by their TOFEL iBT and IELTS tests scores. Most of the participants indicated learning English in schools and university preparatory year.

Instruments and procedure

This research applied a mix method approach by employing both quantitative and qualitative instruments. To investigate the participants' perception toward the use of VR headsets for

improving their ESP vocabulary, the researchers followed an exploratory sequential design. For a better and stronger interpretation, Creswell explained that qualitative data collection and analysis builds on quantitative data collection and analysis (2008). Using two instruments also allows the researchers to have multiple insights and avoid bias views regarding the students' perception of using VR headsets for ESP learning.

The qualitative part of the study was collected through focus group interviews. Cassard & Sloboda (2016) highlighted the importance of assessing outcomes of learning via VR and recommended VR course designers to rely on qualitative feedback from students and faculty members using VR in their class. With a total of 12 participants, three focus groups were conducted. Each group had four members, and they were notified of their rights to withdraw. Arabic was used to avoid the language barrier. The researchers recorded, transcribed, and then translated the interviews into English. After that, data were coded thematically using Nvivo, a qualitative analysis software, and a number of references were checked. Four main themes emerged that corresponded with the purpose of this study and the research questions. These themes were: a) students' perception of using VR (such as, in learning new words, improving vocabulary retention, pronouncing new words, and enhancing their English language in general), b) advantages of using VR for learning as well as challenges (such as, motivation, enjoyment, easiness to use, immersion, ability to solve problems encountered in traditional classroom, comfort of use, affordance, and relevance to the course), c) factors affecting students' perception and performance (such as, feeling of physical presence in the watched 360° video, and improving interaction and spatial relationship with the characters presented in the 360° videos), finally d) suggestion for improvement. The Interview questions were adopted from Walker (2009), and Yang, Chen, & Jeng (2010) then adapted to suit the current research questions.

Based on the themes emerged from the literature review and the qualitative part of the study, the quantitative part was then developed. The questionnaire items were adopted from Wu & Chen (2017), and Huang, Liaw & Lai (2016) then adapted to suit the participants under investigation and answer the research questions. It consisted of two sections. The first one comprised six items related to the student's demographic information, such as age, English level, duration of learning the English language, and tool experience. The second section contained six parts with 27 close-ended question items on a five-point Likert scale with 5 indicating participants' strong agreement and 1 indicating a strong level of disagreement. Three constructs were related to TAM, for example, the perception of ease of use (5 items), the perception of usefulness (5 items) and intention to use the VR goggles (5 items). The other items were related to TTF model characteristics, such as interaction with VR goggles when watching a 3D video (4 items), imagination (4 items), and immersion (4 items). To avoid the language barrier from affecting the participants' answers, the questionnaire was translated into Arabic and validated. Then, the questionnaire link, hosted by Google Forms, was shared with the participants via WhatsApp application.

The questionnaire was further piloted to ensure its validity and reliability. Cronbach Alpha was used for testing the reliability coefficient of all the questionnaire items.

Table 1. Cronbach Alpha reliability coefficient of the questionnaire items

No.	Dimension	No. of items	Reliability
1	Perception of Ease of Use	5	0.796
2	Perception of Usefulness	5	0.910
3	Interaction with virtual reality goggles when watching a 3D video	4	0.839
4	Imagination	4	0.851
5	Immersion	4	0.924
6	Intention to Use the Virtual Reality Goggles	5	0.938
All Dimensions		27	0.959

As observed from table 1, the reliability coefficient of the five questions related to perception of ease of use is 0.796, while the reliability coefficient of the five question items related to perception of usefulness is 0.910. For interaction with VR goggles when watching a 3D video the reliability coefficient of the four question items is 0.839. The reliability coefficient of the question items related to imagination is 0.851, for immersion is 0.924, and for intention to use the VR goggles is 0.938. The reliability coefficient for all questionnaire dimensions is 0.959, indicating that the questionnaire is highly reliable and the internal consistency of the scale is acceptable and highly adequate.

Analysis and results

Qualitative Analysis

With regard to the results of the qualitative data collected, the majority of the interviewees expressed different views of their learning experience via VR headsets. Pseudonyms were used to ensure participants' privacy.

A group of participants expressed their enjoyment. They said VR goggles were "engaging", enjoyable", "fun", "interesting", "easy to use" and "promoting collaboration". Amal illustrated "They were good especially that we are now in a technology era. We no longer want traditional classes. We are bored. It was smart to introduce us to new technology in class." However, only one student expressed her dissatisfaction. She explained that using technology in her learning did not excite her as she preferred traditional class learning.

Participants were asked about their past experience of using VR goggles. Some expressed that it was their first time to use them. Others mentioned that they tried them before at home for games and entertainment but never for language learning.

When asked about VR headsets' usefulness and ability to help them retain ESP vocabulary, participants indicated different views. Amal commented: "I liked them because they helped me view and hear at the same time. I tend to forget a lot, but after watching the videos via VR goggles, I recalled the symptoms easily". Rahaf highlighted that VR goggles are fit for the requirement of her learning as they helped her recycle vocabulary, concentrate more in class, and reinforce information. Also, Mariam agreed that VR headset was suitable for helping her "understand the content more and they motivated her to buy one and watch more videos at home". Alaa' agreed and compared by commenting: "I started to enjoy watching the videos at home. I remember once I replayed the counselling video at home. I observed the body movement of the counsellor closely. I remembered all the things we were told about in a previous counseling course, but no one ever has shown us!" Similarly, Aisha mentioned developing the habit of paying more attention when watching videos as that helped her retain familiar lexis heard.

As for the VR headsets advantages, the participants praised their ability to break classes' routine as they helped them immerse in the virtual world. They positively commented that they felt their physical presence. Hala said, "I felt like I am the one committing the suicide". Other eight students shared the same view. Evan Lina expressed her amazement: "I even was surprised when I watched the Autism video! How could they manage to present the idea so clearly to the viewers? I was touched." Tahani commented on the interactive feature:" based on my head movement, I can view the clip from different angles. That is so interesting!".

Participants were also asked about challenges faced when using the VR headsets. One concern was motion sickness felt the first time wore. Sara said: "we only felt uncomfortable and dizzy when we first tried them, but it was a good new experience".

In response to the factors influencing their perception, they stated various views. These can be divided into three main categories: a) the videos' content and b) technical issues and c) the types of follow up activates. As regards the videos' content in general, the participants were concerned about the native speakers' speed rate, the limited VR videos related to their field, and the financial feasibility of VR goggles as they are hard to provide for large classes. Also, Lina added the distraction element: "at first, I was preoccupied with the video's content and 3D graphics, but after replaying the video, I managed to listen attentively".

Talking about the technical issues faced, Rawan and Maha highlighted problems with their headphones quality and the Internet service quality available in class. In fact, six more participants confirmed. The last influential factor was concerned with the follow-up activities. The majority of the participants asserted that the discussions held after watching the VR videos facilitated their understanding of the vocabulary meaning.

With regard to VR headset fit for ESP vocabulary practice, participants supported their use in future classes. They even confirmed their need and willingness to try them in different future courses as they are more appropriate in enhancing their understanding and application of the course's content specifically counseling skills and techniques. Some participants also shared: "We borrowed the VR goggles used in class to use them in the World Autism Awareness Day. A lot of people liked them. Some of them were standing in a line to try them out". Furthermore, some participants suggested watching 360° videos with captions, so they read words and small phrases while listening. Others, however, expressed their dissatisfaction as that may distract them. To solve that issue and aid comprehension, others supported watching the video first with Arabic subtitles then switching to English.

Quantitative Analysis

To analyze the questionnaire responses of the closed-ended items, the researchers used IBM SPSS version 21. Also, a descriptive statistical analysis of frequencies, percentages, and mode was used to describe the raw data collected. Firstly, the participants' demographic information is analyzed to understand their background.

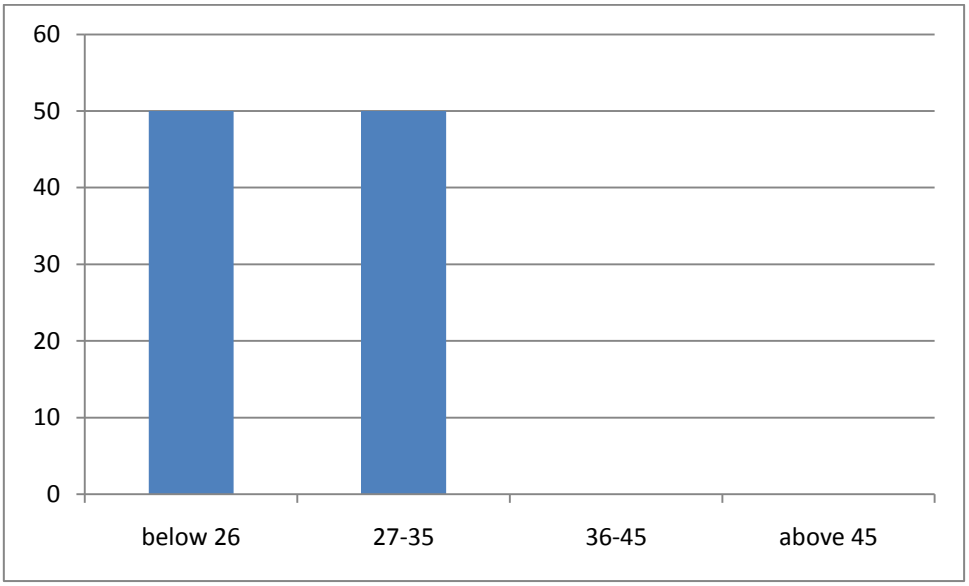

Figure 4. Participants age

Figure 4 above shows that 50% of the study sample ages are below 26 years, while the other 50% ranged between 27 and 35 years. As a result, none of the postgraduates under investigation was above 36 years of age.

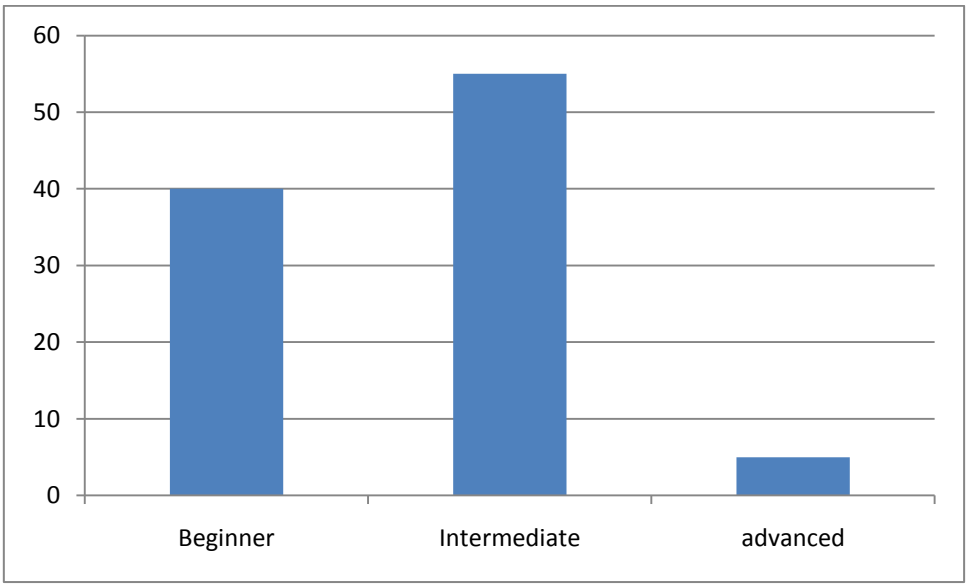

Figure 5. Participants' English Level

Figure 5 illustrates that 55% of the respondents considered their English level as intermediate, whereas 40% of them indicated they were beginners. A limited 5% of the participants considered their English level as advanced.

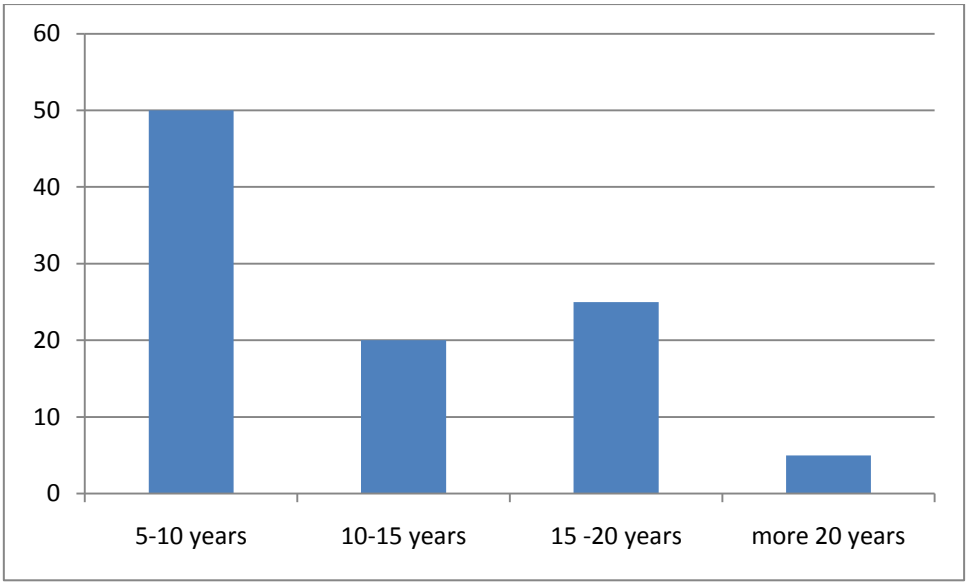

Figure 6. Participants' English background

As observed from the above figure, 50% of the study sample were studying English for 5 to 10 years, while 25% studied English for around 15 to 20 years. Besides, 20% of the participants reported studying English for about 10 to 15 years, and only 5% of them said they were studying English for more than 20 years.

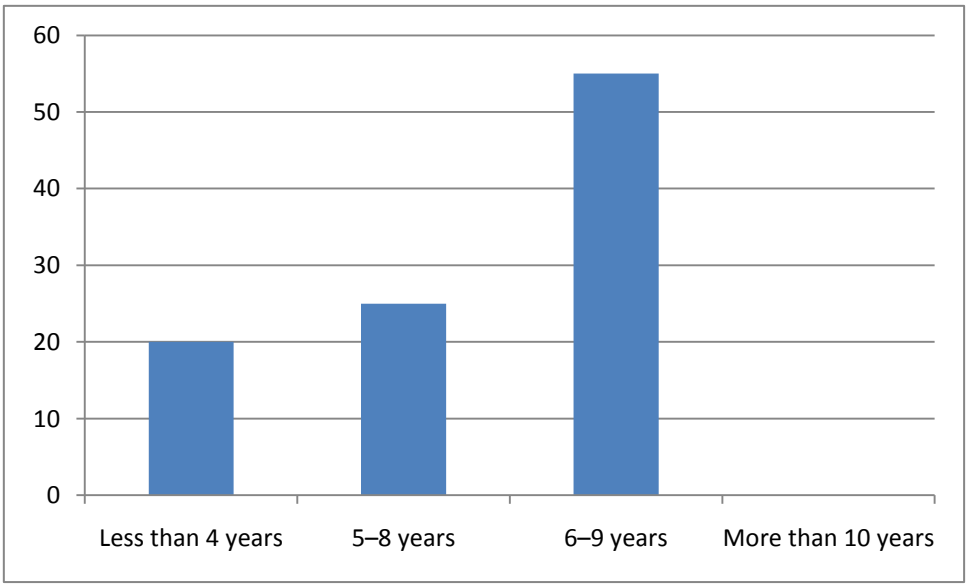

Figure 7. Using computers and handheld devices

The above figure indicates that 55% of the respondents have been using computers and handheld devices for approximately 6 to 9 years, while 25% of them have been using computers and handheld services for about 5 to 8 years. Moreover, 20% of the sample have been using computers and handheld devices for less than 4 years. None of the participants, in fact, mentioned that they ever used computers and handheld devices for more than10 years.

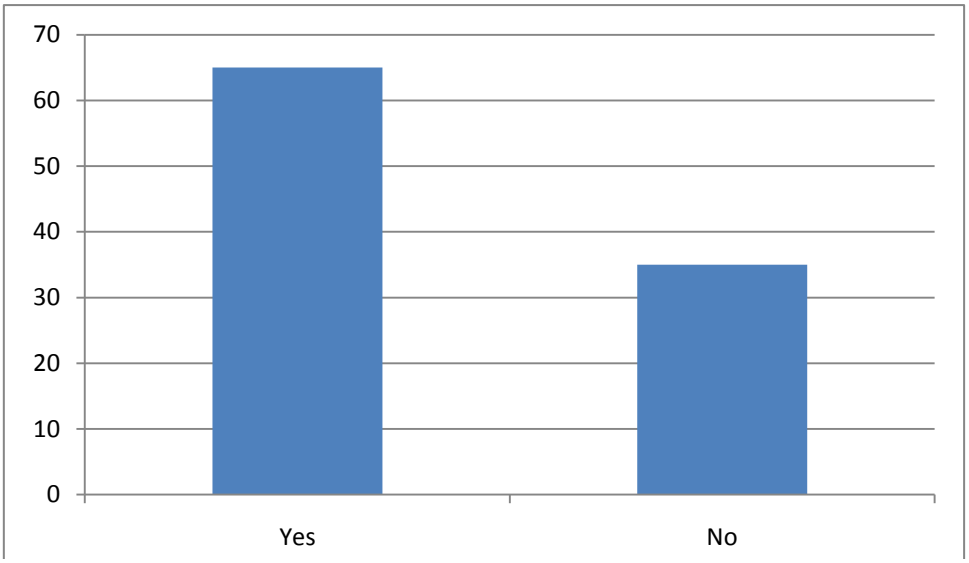

Figure 8. Past experience of VR headsets

Figure 8 highlights that 65% of the participants used VR headsets before; while 35% of the participants indicated that they have never used them before. For the majority who pointed out their previous use of VR headsets, their usage was limited to entertaining purposes such as watching videos or playing video games.

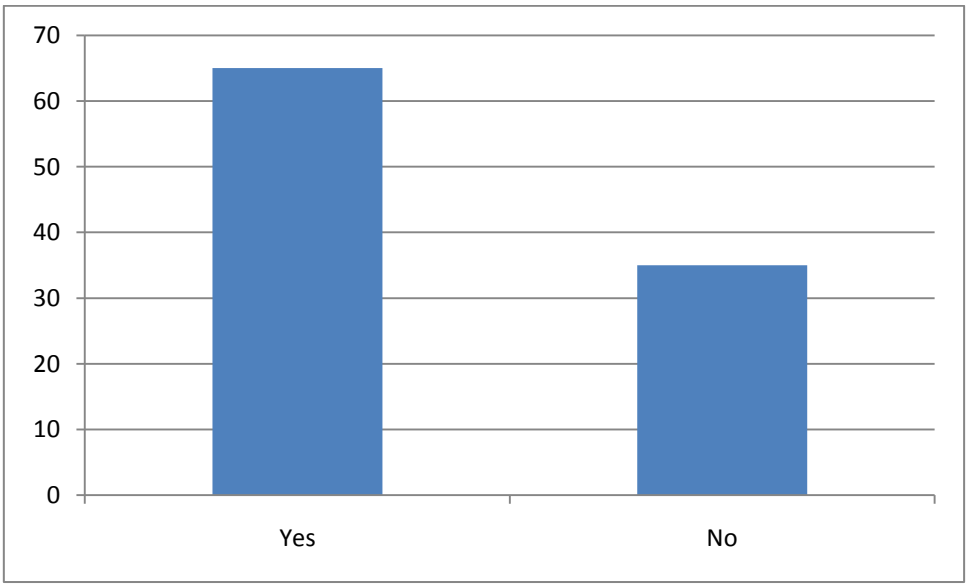

Figure 9. First time to use VR Headsets in ESP class

Figure 9 exhibits that this was the first time for 90% of the participants to use VR goggles in ESP class, while 10% indicated using them before. Even though the participants mentioned that they used the VR headsets before, the majority of them stated that they never used it in their language learning class.

With regard to the Likert scale, the second part of the questionnaire consisted of six constructs related to the conceptual model adopted from Huang, Liaw, & Lai (2016) and the combined TAM and TTF models adopted from Dishaw and Strong (1999). These are 1)

perception of ease of use, 2) perception of usefulness, 3) TTF, 4) task characteristics featuring interaction, imagination, and immersion, and 5) intention to use the VR goggles.

Perception of Ease of Use

Table 2. Perception of ease of use

	QUESTIONS	Strongly disagreed		Disagreed		Neural		Agreed		Strongly Agreed	
		No	%	No	%	No	%	No	%	No	%
1	I feel the virtual goggles are easy to use	0	0.0	1	5.0	0	0.0	8	40.0	11	55.0
2	The virtual goggles are easy for me to control	0	0.0	1	5.0	1	5.0	7	35.0	11	55.0
3	Learning how to use the virtual goggles is easy	0	0.0	1	5.0	0	0.0	5	25.0	14	70.0
4	I feel comfortable wearing the virtual reality goggles from the first time	0	0.0	6	30.0	2	10.0	10	50.0	2	10.0
5	After frequent use, I feel that wearing virtual reality goggles has become comfortable	0	0.0	1	5.0	0	0.0	11	55.0	8	40.0

Table 2 shows the students' perceived ease of using VR goggles in language learning. A total of 95% of the participants agreed and strongly agreed that VR was easy to use. Besides, 90% of the participants indicated a general agreement that virtual goggles were easy for them to control. Moreover, 95% of respondents agreed that learning how to use the virtual goggles was easy. In addition, 60% of the participants illustrated their comfortable feeling toward wearing the VR for the first time. However, 30% of the participants highlighted their discomfort toward wearing the VR goggles for the first time, and 10% revealed a neutral feeling. The participant's response showed a 95% confirmed that VR goggles have become comfortable after frequent use.

Perception of Usefulness

Table 3. Perception of usefulness

	QUESTIONS	Strongly disagreed		Disagreed		Neural		Agreed		Strongly Agreed	
		No	%	No	%	No	%	No	%	No	%
6	The virtual goggles increase my chances of good learning achieving	0	0.0	0	0.0	3	15.0	14	70.0	3	15.0
7	Unlike traditional classes, I feel the virtual reality	1	5.0	2	10.0	3	15.0	8	40.0	6	30.0

	goggles help me better understand the course contents										
8	The virtual reality goggles are a good tool for me to increase my knowledge of English psychological terms	1	5.0	1	5.0	2	10.0	9	45.0	7	35.0
9	I believe the virtual reality goggles help me understand concepts related to my field such as addiction, suicide, autism, and violence	0	0.0	2	10.0	0	0.0	9	45.0	9	45.0
10	I feel the virtual reality goggles are enjoyable assisting learning tool	0	0.0	1	5.0	2	10.0	6	30.0	11	55.0

Table 3 highlights the participants' attitude toward the usefulness of using VR goggles in learning ESP vocabulary. 85% of the respondents agreed that the virtual goggles actually increased their chances of good learning achievement. Also, 70% of the participants asserted that VR goggles helped them better understand the course contents, while a total 30% perceived either a neutral or a disagreement toward the same statement. Besides, 80% of the participants agreed that the VR goggles were good tools to increase their knowledge of English psychological terms. A total 90% of the participants agreed that VR goggles helped them understand concepts related to their fields such as addiction, suicide, autism, and violence. This indicated their realization of VR headsets usefulness. A majority 85% of the respondents agreed that VR goggles were enjoyable assisting learning tool.

Interaction with virtual reality goggles when watching a 3D video

Table 4. Interaction with virtual reality goggles when watching a 3D video

	QUESTIONS	**Strongly disagreed**		**Disagreed**		**Neural**		**Agreed**		**Strongly Agreed**	
		No	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**
11	Unlike 2D, I can establish interaction with the 3D objects and characters when using the virtual reality goggles	0	0.0	1	5.0	1	5.0	10	50.0	8	40.0
12	I can easily rotate the 3D videos by using the virtual goggles	0	0.0	2	10.0	3	15.0	7	35.0	8	40.0
13	By using virtual reality goggles, I can easily zoom in or zoom out 3D objects.	0	0.0	3	15.0	7	35.0	8	40.0	2	10.0
14	I can observe the 3D objects and characters from multiple viewing angles when using the virtual reality goggles	0	0.0	0	0.0	2	10.0	7	35.0	11	55.0

Table 4 indicates the participants' perception of their interaction with VR goggles when watching a 3D video. A total of 90% of the participants indicated establishing interaction with the 3D objects and characters when using the VR goggles. In addition, 75% of the sample agreed to rotate the 3D videos by using the virtual goggle easily. Likewise, 50% of the participants agreed to easily zoom in or zoom out 3D objects when wearing VR headsets, whereas 50% of them either showed a neutral perception or a disagreement to the same statement. Moreover, 90% of the respondents approved their ability to observe the 3D objects and characters from multiple viewing angles when wearing the VR goggles.

Imagination

Table 5. Imagination

	QUESTIONS	Strongly disagreed		Disagreed		Neural		Agreed		Strongly Agreed	
		No	%	No	%	No	%	No	%	No	%
15	I feel the virtual reality glasses help me understand issues related to my field better than a 2D video	0	0.0	1	5.0	2	10.0	10	50.0	7	35.0
16	I feel the virtual reality goggles improve my understanding of spatial relationships	0	0.0	1	5.0	1	5.0	11	55.0	7	35.0
17	I feel the virtual reality goggles help me better experience psychological disorders that require consultation and referral	0	0.0	1	5.0	2	10.0	11	55.0	6	30.0
18	Unlike physical clinical training, I feel the virtual goggles help me better understand psychological issues from patients perspective	0	0.0	1	5.0	5	25.0	10	50.0	4	20.0

The above table demonstrates the participant's perception of the imagination feature of VR goggles. A total 85% of the participants generally came to an agreement that they felt VR glasses helped them understand issues related to their field better than a 2D video. Besides, 90% of participants revealed their general agreement that the VR headsets improved their understanding of spatial relationships. In addition, 85% of respondents benefited from VR goggles in experiencing psychological disorders that require consultation and referral. A majority of 70% respondents reached an agreement that unlike physical clinical training, they felt virtual goggles helped them better understand psychological issues from patient's perspective, while 25% were not certain.

Immersion

Table 6. Immersion

	QUESTIONS	Strongly disagreed		Disagreed		Neural		Agreed		Strongly Agreed	
		No	%	No	%	No	%	No	%	No	%
19	The virtual reality goggles create a realistic learning environment	0	0.0	1	5.0	2	10.0	11	55.0	6	30.0
20	I feel immersed in the 3D videos when I wear the virtual reality goggles	0	0.0	2	10.0	0	0.0	10	50.0	8	40.0
21	I tend to pay more attention in class when using the virtual reality goggles	1	5.0	1	5.0	2	10.0	11	55.0	5	25.0
22	I believe the virtual reality goggles help me make better sense of psychological terms	9	45.0	8	40.0	9	45.0	1	5	2	10

The participant's perception of the immersion feature of the VR headsets is presented in Table 6. A majority 85% of participants approved that the virtual reality goggles created a realistic learning environment. In addition, a common 90% respondent agreed that they felt immersed in the 3D videos when they wore the VR goggles. 80% of the participants also showed their agreement with the statement indicating that they tend to pay more attention in class when using the virtual reality goggles. A total 85% of study sample agreed with the belief that VR goggles helped them make better sense of psychological terms, while only 15% disagreed.

Intention to use the virtual reality goggles

Table 7. Intention to use the virtual reality goggles

	QUESTIONS	Strongly disagreed		Disagreed		Neural		Agreed		Strongly Agreed	
		No	%	No	%	No	%	No	%	No	%
23	I feel the virtual reality goggles support my intention to learn	0	0.0	1	5.0	4	20.0	9	45.0	6	30.0
24	I am willing to use the virtual reality goggles in my future learning	0	0.0	1	5.0	2	10.0	11	55.0	6	30.0
25	I am in favour of adopting virtual reality goggles in other courses to facilitate my learning	0	0.0	0	0.0	6	30.0	9	45.0	5	25.0
26	I am willing to share my knowledge about virtual reality goggles with others	0	0.0	2	10.0	1	5.0	12	60.0	5	25.0
27	Overall, I think virtual reality goggles are good learning tools	0	0.0	0	0.0	2	10.0	10	50.0	8	40.0

The table above illustrates the participant's perception of their intention behind using VR goggles. A majority of 75% participants agreed that VR goggles supported their intention to learn. In addition, about 85% of participants agreed that they were willing to use the VR headsets in their future learning. Moreover, a total 70% of participants were in favour of adopting VR goggles in other courses to facilitate their learning. However, 30% indicated their neutral responses toward the same statement since they were not sure about the applicability of VR goggles to their other courses. A sample of 85% indicated their willingness to share their knowledge about VR goggles with others. Last but not least, a common 90% agreed that VR goggles were good learning tools.

Discussion and Conclusion

The purpose of this study is to explore female postgraduates' perception toward the use of VR headsets to learn ESP vocabulary. The students' opinions are useful not only in helping to evaluate the VR in learning but also in examining whether this wearable technology fits ESP teaching and learning. The qualitative and the quantitative instruments' results were combined to answer the research questions.

The current study combined TAM and TTF constructs and showed that this combination offers a better explanation for the variance in VR utilization than either the TTF or TAM model alone**.** Rather than only perceived usefulness and perceived ease of use, this VR utilization variance was explained by perceived usefulness, perceived ease of use, TTF, task characteristics, and tool experience. This assist**s** practitioners, researchers, as well as tool designers and developers better understand 1) the reason behind choosing to use a tool for particular tasks, and 2) how a tool's characteristics are fit for a particular task.

From the result obtained from the current study, it is clearly indicated that most participants were enthusiastic about using VR goggles in learning ESP vocabulary. This matches the one reported by Rosenthal et al. (2008). They also supported using them in future classes and suggested playing 360° videos with Arabic subtitles first then switching to English ones to ensure comprehension. It is somewhat surprising that only one participant in the focus group expressed her general dissatisfaction with technology integration in her learning. She asserted her preference of traditional class learning. This observation supports students' personal learning preferences and the calls of differentiated tasks within one classroom.

Also, it is interesting to note that some participants reported in the focus group that they were distracted and overwhelmed the first time they wore the VR headsets. However, after multiple repetitions of video watching, their attention was to the educational content presented and not the experience. One potential reason for this may be the novelty of the experience as Rupp et al. (2016) highlighted. This finding answers their calls for solving this issue and confirms the association between replaying the videos and overcoming distraction.

With respect to the characteristics of VR headsets, which are interaction, imagination, and immersion, participants reported VR headsets helped them improve understanding of spatial relationships, immerse in a realistic learning environment, contextualize learning, eliminate class boredom and distraction, and make better sense of psychological terms. This supports the studies of Lan (2015) and Hwang & Hu (2013) that outlined somewhat similar features.

In addition, the second research question investigated the factors influencing postgraduates' perception. The findings from the focus group interviews showed that usefulness and ease of use were in line with Rosenthal et al. (2008) findings that indicated these factors

significantly impact students' satisfaction. Also, most of the survey respondents (85%) reported that VR goggles were enjoyable assisting learning tools. On the other hand, the participants revealed that the limited VR content available online, slow Internet connections and financial feasibility affect their integration. The result is in the lines of earlier literature that noted the same factors such as Bricken's (1991) and Walker's (2009). These significant observations remind education technology supporters to not overemphasis its strengths.

As regards psychological and physical discomforts Merchant et al. (2014) noted, the present findings revealed that VR goggles have become comfortable after frequent use. This indicates that with frequent improvements witnessed every day in wearable technology, lighter-weighted interface designs can solve the problem.

The most important limitation in this study lies in the fact that the participants were limited to (N=20) as indicated above. Therefore, caution must be applied to a small sample size. Future studies may increase the sample size for more insights. Similarly, to help generalize the results, a fully random sample can be used as this study was gender limited due to the Saudi cultural constraints. Also, educators and curriculum designers may consider applying VR technology to wider groups of learners and different foreign and second languages.

Notwithstanding these limitations, the study suggests that VR technology is applicable in ESP classes. This indicates that the VR environments are effective, flexible and can be used not only to entertain but also to contextualize ESP learning and engage students from different age groups, disciplines and linguistic proficiency levels. This study also calls educators to keep abreast of the fast technology developments as they are nowadays considered to be learning requirements for the new generations. That is although VR is less than a decade old, it offered many implications that are subject to change. VR is still evolving and might be rapidly outdated. Thus, research on VR and its impact on language learning is expected to evolve as well especially that the technology markets witness daily improvements in their capabilities such graphics resolution, processing speed, and greater mobility.

In conclusion, the present study helped to supplement the literature as no studies investigated the Saudi female ESP postgraduates' perception toward the VR headsets. It also has gone some way towards enhancing our understanding of ESP learners' readiness of integrating VR in their classes.

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