



Exploring EFL teachers' perceptions of using virtual reality in education

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ABSTRACT

Virtual reality (VR) has fundamentally changed how students interact with their subjects and learn because it offers an immersive learning environment. This qualitative study aims at exploring Omani English as a foreign language (EFL) teachers' perceptions of using VR. It employed semi-structured interviews with 20 schoolteachers working in Al-Dhahira Educational Governorate in Oman, 10 females and 10 males. The findings revealed positive perceptions towards VR integration into education. However, the study found key challenges hindering the implementation of VR in education, including time constraints, technological barriers, financial concerns, the need for professional training, content creation challenges, and the necessity for students to acclimate to VR technology. Further, it showed that the primary concerns related to VR focus on cultural considerations, hacking, privacy, data security, and potential addiction. It also illustrated teachers' main recommendations of providing sufficient infrastructure, institutional support, and continuous research on such technology. This research fills a gap in literature regarding the effective integration of VR into the Omani educational system. By tackling the specific challenges related to this context, it provides valuable implications and recommendations for Omani policymakers and educators to introduce VR for students in public schools in Oman.

Keywords: virtual reality, Oman, EFL schoolteachers, perceptions, technology integration

INTRODUCTION

Within the realm of education, the focal point is the learning domain, with students at its core. Challenges arise for students in comprehending abstract concepts and ideas, stemming from the nature and relevance of abstract thinking; therefore, educational institutions worldwide have started incorporating cutting-edge technology tools designed to cater to the diverse needs of student populations. Further, the swift and varied progress in technology is restructuring education, exerting influence across different facets of the learning journey. As technology becomes intricately woven into every facet of daily existence, its significant effects are particularly evident in the realm of teaching and learning. The progression of information technology has given rise to inventive learning approaches, granting learners the versatility to engage with education without being confined to the traditional limitations of time and place (Al-Sinani & Al Taher, 2023).

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Hence, there is an increasing focus on the rise of new technologies that are influencing various facets of human existence. These emerging technologies are being applied across diverse sectors, including education, finance, transportation, healthcare, and manufacturing. It is important to highlight that among the most noteworthy of these emerging technologies is VR (Alfarsi et al., 2020).

Virtual reality (VR) often offers a more immersive experience by letting users interact with virtual objects within completely virtualized environments. This immersive experience is typically provided via headsets (Alburaiki et al., 2022). Furthermore, Raja and Priya (2021) assert that the use of VR technology in the classroom has fundamentally changed how students interact with their subjects and learn because it offers an immersive learning environment that enables interaction with the outside world in ways that were not previously feasible, and it enhances students' psychomotor and cognitive abilities. With this technology, students may practice skills in a safe and controlled setting that mimics science examinations. Equally important, VR, a technology that has significantly influenced professional development over various epochs, is playing a vital role in education, offering a dynamic and captivating avenue for acquiring information (Alfarsi et al., 2020). VR, a technology that has significantly influenced professional development over various epochs, is now integral to the teaching methodology.

LITERATURE REVIEW

VR refers to the realm of computing that aims to construct a virtual world, allowing individuals to immerse themselves in it and interact within this artificial environment. This involves utilizing specialized devices to simulate surroundings and providing feedback to enhance the experience, striving to make it as realistic as possible (Boas, 2013). VR is one facet of extended reality that encompasses augmented reality (AR) and mixed reality as well (Onyesolu & Eze, 2011). The notion of AR is widely used to allow people to view digital information and virtual objects placed in the real environment. It is recognized that AR enhances and blends with reality instead of replacing it. This description outlines three aspects of AR, focusing on the integration of virtual and physical elements, real-time immersive experience, and 3D registration (Alburaiki et al., 2022).

In VR, individuals can fully immerse themselves in a digitally simulated environment. According to Kamińska et al. (2019), VR is an artificial three-dimensional environment created by computers and interactively presented to people. It refers to a computer simulation that represents an environment in which people can walk and interact with objects and simulated computer-generated people. In other words, virtual environments are typically three-dimensional and often attempt to replicate the appearance and physics of the real world (Onyesolu & Eze, 2011). It simulates the user's physical presence in an artificially created world, allowing interaction with the environment.

In addition, the integration of VR in education can change the way people learn, as it enables immersive learning experiences. Further, this technology allows students to visualize complex concepts, explore virtual environments, and engage in interactive simulations (Al-Amri et al., 2021). In this way, VR can bridge the gap between abstract ideas and tangible experiences. According to Sharma (2021) and Al-Sinani and Al Taher (2023), VR offers a distinctive learning experience compared to traditional methods, maximizing student motivation and enjoyment. It serves as an exemplar of experiential learning, providing students with opportunities to engage in virtual experiences such as visiting distant geographical locations, historical sites, or situations that are otherwise inaccessible. Overall, VR in education provides endless opportunities for students to explore places and situations they may never experience in real life, fostering creativity, innovation, and a deeper understanding of educational content.

However, a significant challenge in the utilization of VR pertains to the substantial expertise and costs associated with the development and implementation of VR systems, especially immersive ones. According to Onyesolu and Eze (2011), the creation of immersive VR necessitates advanced programming and graphics skills, along with expensive hardware and software. Therefore, effectively utilizing immersive VR in instructional settings demands a considerable level of proficiency. Although desktop VR technology has considerably mitigated the skill and cost requirements for virtual environments, it still entails a financial investment and time (Onyesolu & Eze, 2011). In the same vein, Alalwan et al. (2020) conducted interviews with 29 scientific teachers, which revealed that typical challenges to VR and AR adoption were incompetence, poor instructional design, a lack of focused attention, a lack of time, and inadequate environmental resources.

Research on the use of VR in education has highlighted several ethical issues, including data privacy, student safety, and cyberbullying. Data privacy and security are crucial concerns, as they involve data collection, potential breaches, and the need for better security measures (Dhirani et al., 2023). More importantly, sensitive data may be analyzed by VR technology to infer highly personal information, such as emotional states or medical issues. As a result, VR frequently entails managing highly confidential user information and interactions (Adams et al., 2018). Likewise, Skulmowski (2023) points out that letting young children and teens engage in virtual education might put them at risk for issues including manipulation, possible health issues, and invasions of privacy. The researcher provides a few suggestions to reduce these risks, such as utilizing spatial ability tests, creating virtual experiences with alternate pathways to minimize the possibility of manipulation, and using algorithms to make the comprehensive developmental profiles produced by educational VR. Student safety in VR environments is another area of concern, with strategies to improve safety including preventing physical injury, managing psychological risks, and monitoring student behavior during immersive learning experiences. VR environments can enable online crimes such as cyberbullying and harassment that have been shown to inflict real and significant emotional distress, such as theft or attacks on users' virtual identities. with mechanisms for prevention suggested (Badger et al., 2023). Additionally, the digital divide and access to VR technology in education are examined from a socio-economic perspective, with a focus on the challenges faced by underserved students in accessing VR tools (Le et al., 2014).

To this end, these benefits of VR outweigh its drawbacks, which include the high skill and financial requirements for its creation and use. As a result, researchers are greatly motivated to conduct this study to investigate and get a deeper comprehension of the use of VR in diverse settings.

PROBLEM STATEMENT

Despite the Omani Ministry of Education (MOE) endeavors to offer impactful professional development opportunities for teachers, Omani English as a foreign language (EFL) teachers continue to encounter numerous difficulties and challenges in relation to professional development within the school context (Al-Bulushi & Al-Issa, 2012; Al Jabri, 2008). Furthermore, although most schools in Oman have access to technological resources, teachers scarcely utilize them. This is attributed to constraints related to time, teachers' limited familiarity with advanced educational technology, their training, cultural backgrounds, as well as their concealed agendas, perceptions, and philosophies concerning EFL Teaching. These factors are notably influenced by the rigidly centralized nature of the education system, which heavily relies on textbooks and examinations (Al-Bulushi & Al-Issa, 2012).

In addition, research in Oman has pointed out that in teacher-centric classrooms, teachers predominantly rely on traditional teaching methods, leading to challenges for students in language acquisition, as noted by Al-Bulushi and Al-Issa (2012). These conventional approaches tend to engage lower order thinking and cognitive skills, proving ineffective for many students in comprehending the content covered in their EFL classes, according to Al Jabri (2008). Consequently, this issue significantly affects the effectiveness of EFL education and students' overall learning experiences. According to Saini and Al-Mamri (2019), educators require training to effectively incorporate technological tools into the classroom and assess their benefits. The researchers also note that some educators' express concerns about adapting to evolving technology and may, therefore, hesitate to embrace it.

In the context of addressing these challenges, the contemporary emphasis on removing constraints related to time and location is crucial for facilitating lifelong learning. The integration of multimedia and three-dimensional objects in teaching has the potential to enhance students' learning experiences, enabling them to navigate curriculum topics with a deeper understanding. Modern technologies, as highlighted by Al Shuaili et al. (2020), empower teachers to incorporate real-world elements into their teaching methods, eliminating traditional barriers to learning. The researchers emphasize that VR is particularly noteworthy for its unique capacity to represent reality by transforming abstract elements into dynamic ones. Additionally, leveraging technology, including VR, can address spatial comprehension challenges faced by students in understanding concepts, phenomena, or processes in educational institutions.

Although VR is proven to be beneficial for developing students' performance, it is not widely utilized in schools in Oman. In addition, very few studies have examined teachers' perceptions of using VR in teaching, particularly in Oman. Hence, it would be more beneficial to investigate the possibilities of VR in the Omani context. This exploration will provide a comprehensive understanding of its applications and accessibility within school settings, thereby paving the way for stakeholders to make informed decisions regarding its future implementation. With all these reasons in mind, the researchers were motivated to examine teachers' perceptions of using VR in teaching Omani students.

STUDY OBJECTIVES AND QUESTIONS

Given that VR significantly contributes to enhancing the learning experience for students, limited research has delved into the perspectives of teachers, especially in the context of Oman. Thus, this study seeks to investigate the Omani EFL teachers' perceptions regarding the integration of VR into classroom practices. Further, this study investigates the challenges teachers face in implementing VR as well as the benefits VR brings to the educational setting. This research aims to answer two main questions:

1. What are the perceptions of using VR in education among Omani EFL teachers?
2. What are the challenges that face the use of VR in EFL education?
3. What do teachers suggest for future reference in terms of VR integration in education?

STUDY IMPORTANCE

Empirically, VR's importance for teachers stems from its capacity to revolutionize pedagogical approaches. VR has the potential to be an extremely effective teaching technology that lets educators design immersive, hands-on learning experiences. It gives teachers a platform to create dynamic and creative lesson plans that engage students and make subjects come to life. Additionally, through data analytics, VR may provide teachers with insightful knowledge about how pupils learn, enabling more focused and successful teaching methods. Using VR in the classroom gives educators the flexibility to adjust to a range of student demands and raises the standard of instruction. Moreover, the emphasis shifts from the teacher serving as the only information source to a student-centered approach where students actively participate in creating their own knowledge using VR. To elaborate, VR has been shown to improve student engagement and involvement by fostering a setting in which students are not only more likely to maintain concentration but also actively participate in the construction of their own understanding. The traditional teaching paradigm is being revolutionized by VR, which enhances the learning experience by immersing students in dynamic and interactive virtual worlds.

Although countless studies on teaching and learning EFL suggest that VR is beneficial for teaching and learning, only few studies have examined teachers' perceptions about VR implementation in classroom practices, particularly in Oman. Consequently, this study is significant due to its focus on the Omani context. On the national level, this research contributes by exploring teachers' viewpoints on the integration of VR in EFL teaching, examining associated practices, and highlighting challenges. Consequently, it opens avenues for Omani scholars to evaluate the effectiveness of VR in enhancing diverse language skills and assess its suitability for students' learning in various academic subjects. Moreover, as teachers collectively express favorable opinions on the impact of VR on advancing student achievement, it suggests that VR has the potential to enhance learning outcomes across different disciplines.

METHODOLOGY

This section discusses the design of the research, the population and sample of the study, the instruments, the trustworthiness of the interview, procedures, and data analysis.

Research Design

The study employed a qualitative research design to answer the research questions (RQs) of the current study.

Table 1. The semi-structured interview items

No	RQ	Item
1	One	How would you describe your general understanding of VR?
2		What are your thoughts about the integration of VR in educational settings?
3		What benefits does VR bring to your students?
4	Two	What challenges do you face in applying VR?
5		Are there any concerns or reservations you have regarding the ethical implications of VR technology?
6	Three	What do you suggest for future reference?

Population and Sample

The population of the study was 60 EFL teachers in Al-Dhahira Educational Governorate, the Omani northern region (MOE, 2023). 20 schoolteachers were selected based on purposive criterion sampling technique by setting

“a specific criterion which should be followed for participants to take part in the study (and) ... to enable the relevant data to be collected. This method of sampling is very strong in quality assurance since the data to be generated will be from reliable sources” (Nyimbili & Nyimbili, 2024).

In this research, the sample was intentionally identified and selected for possessing knowledge about VR use in EFL education, practical experience in EFL teaching, and willingness to participate in the fieldwork. Male and female teachers were selected due to their distinctive VR use and location proximity during the fieldwork. Participants from 1 to 10 are female teachers while participants 11 to 20 are male teachers.

Instrument

One instrument, semi-structured interviews, was used to collect data for the study and explore teachers' perceptions of utilizing VR and to investigate the challenges teachers face in implementing VR as well as the benefits VR brings to educational settings when it is applied. To ensure the validity of the instrument, several specialized reviewers from different educational sectors at higher and public education levels validated the questions of the interview. Based on their feedback, modifications were made (Heintzelman, 2016). The same instrument was used with many teachers who work in different schools. The interview instrument consisted of six questions that addressed the RQs (Table 1).

To ensure the instrument's reliability, the “member-checking technique” was followed by presenting part of the study sample with the initial findings to review and verify the degree of their agreement with them and confirm the trustworthiness and authenticity of the results (McKim, 2023).

Procedures

1. Preparations were made to conduct the interviews after determining the exact number of those who would be interviewed and expressed their willingness to participate, in cooperation with their schools' administration.
2. The interview agreement was obtained in advance by contacting the selected EFL teachers individually to sign a consent form. Further, the interview questions were sent to the teachers so they could answer them. They were also assured of their data confidentiality, privacy and anonymity.
3. The interviews were conducted during the first and second semesters of the school year 2023-2024.

Data Analysis

To answer the RQs, the findings from interviews were analyzed, and themes were extracted. The first step was to send questions to teachers. The second step was to transcribe the responses from all participants to find common ideas. The third step is to derive themes by classifying the transcribed data according to the demographic data (VR knowledge and EFL teaching experience) and qualitative responses. This helped in identifying the relationships between the study aspects, comparing the study sample members' responses, and building a construct to understand the reality of using VR in education according to the study data.

FINDINGS AND DISCUSSION

Regarding the first RQ (What are the perceptions of using VR in education among Omani EFL teachers?), the study revealed diverse perspectives among teachers regarding their grasp of VR.

Teachers' Understanding of VR

Some responses merely acknowledge VR as a novel educational tool, lacking further detail or clarification of its understanding. For instance, teachers 1, 2, and 4 perceived VR as a new addition to education without delving into its specifics or functionality. Teacher 1 believed that "it means using programs or technology in education. Students can see real things in front of their eyes," while teacher 2 considered it "a new method that can be used in education nowadays." Teacher 20 defines VR as "an unreal environment created using a computer" in plain terms. Meanwhile, teacher 7 seemed to be aware of VR recently; as she commented, "I actually have little knowledge about VR, and I recently have discovered that it can be used as one of the learning strategies."

Conversely, other responses show a deep understanding of this technology, presenting a diverse array of insights among the participating teachers. They perceive VR as an augmentative technology that enriches reality and simplifies knowledge acquisition, offering interactive ways to introduce concepts. Teacher 5 articulated,

"I think VR is a new trend in our lives in which technology, specifically 3D, is used to make us feel as if we are in a specific area while we are not. It simplifies and proximate reality as can be viewed through our different senses by wearing glasses or any other device."

Also, teacher 6 clarified that

"VR is a technology that immerses users in a simulated three-dimensional environment, typically using headsets or other devices. It aims to create a sense of presence and allows users to interact with and explore computer-generated worlds or scenarios. VR often employs a combination of visuals, audio, and sometimes haptic feedback to enhance the immersive experience."

Also, teacher 9 expressed, "VR depicts the concept of utilizing technology to generate things similar to the real objects and scenes of the environment in a way that individuals feel as if they are immersed in the surroundings." These insights collectively highlight the respondents' awareness that VR technology facilitates interactive and immersive experiences, enabling users to engage with their surroundings in three dimensions. Furthermore, VR is recognized for its capacity to generate lifelike simulations, offering users the opportunity to explore new settings and acquire new skills within a secure virtual environment. Teacher 12 and teacher 13 both defined VR as "a computer-generated environment or world," demonstrating how they view VR as a game-changing technology that transports users to an interactive, simulated environment. "Imagine putting on a special headset and suddenly finding yourself in a different place entirely, maybe space or inside a book!" This imaginative depiction emphasizes the immersive and exploratory qualities of VR, where the boundaries of physical and digital realms blur, enabling learners to access environments otherwise inaccessible in traditional educational settings. These explanations are in line with those of AlGerafi et al. (2023), who described VR as a revolutionary technology that generates computer-generated simulations of surroundings and enables real-time user interaction. This knowledge highlights how VR can completely transform education by providing fresh, engaging learning opportunities. For example, it may imitate scientific investigations, take pupils to historical periods, or show them abstract ideas like ecosystems or molecules. This potential for immersion can appeal to a variety of learning styles by making information more remembered and interesting.

The diverse interpretations of VR among the interviewees indicate that VR is still a relatively new technology in need of further integration within the Omani context. This augmentation is crucial to streamline the comprehension and knowledge acquisition processes for students.

As technology evolves, so does the potential for immersive learning experiences. However, the range of understandings regarding VR within the interviewed group signals that its full potential has not been

harnessed yet. To truly optimize its benefits in education, there is a pressing need for comprehensive implementation and utilization tailored specifically to the Omani educational framework.

Augmenting VR within this context is not merely about introducing a novel technology; it is about strategically leveraging its capabilities to refine and streamline the learning process. By integrating VR effectively, teachers can create more engaging, interactive, and comprehensive learning environments that cater to diverse learning styles, ultimately facilitating a deeper understanding and retention of academic concepts for Omani students.

The Integration of VR in Educational Settings

The integration of VR in education has garnered widespread support due to its transformative potential. Both male and female teachers highlight VR's ability to engage students in ways that traditional methods cannot, making learning more interactive and immersive. As teacher 4 emphasized, VR "will help teachers make their lessons more interesting and will increase the motivation of students to practice something unique." Male educators share similar sentiments, with teacher 19 acknowledging that VR has the potential to "revolutionize education" by creating more interactive and engaging learning environments. Traditional teaching methods often face the challenge of maintaining students' interest and attention throughout a lesson. However, VR introduces an element of novelty and excitement that breaks away from the conventional approach. Teacher 18 believed that integrating VR "has the potential to transform traditional teaching methods by making learning more engaging, interactive, and accessible, especially for subjects like science, history, and technical skills." By immersing students in a virtual environment, teachers can present information in a manner that goes beyond textbooks and lectures. This aligns with Sharma (2021) and Al-Sinani and Al Taher (2023), who state that VR offers a distinctive learning experience compared to traditional methods, maximizing student motivation and enjoyment.

This enjoyable aspect of VR-based learning can lead to increased curiosity and self-motivation among students. As they find pleasure in the learning process, they are more likely to take initiative, delve deeper into topics, and explore beyond the structured curriculum. The female teacher 6 referred to this point in her response: "students are attracted to such methods. It's enjoyable for them, so they will learn from and remember the information provided more than usual." This view is shared by the male teacher 12, who believes VR creates "an environment where students can interact with the content in a way that feels like an adventure." As students immerse themselves in virtual simulations—whether it is exploring historical landmarks or conducting science experiments—they experience a "learning by doing" approach, which improves both understanding and retention. The hands-on nature of VR not only makes the material more engaging but also helps students retain information more effectively.

Another important benefit of VR is its ability to leave a lasting impression on students, encouraging greater motivation and participation. Teacher 10 noted, "I believe that VR can make learning more engaging and interactive. Students will also be impressed while they are exploring the amazement of VR." Male teachers such as teacher 13 also recognize the significant impact VR has on students, stating that

"it allows students to explore complex concepts in ways that textbooks cannot offer. I think VR is a fantastic tool for education. Imagine learning about ancient history while standing among the pyramids or studying biology inside a cell! making learning both fun and engaging."

The excitement students feel while interacting with VR environments can lead to better learning outcomes, as they engage with the content in a more meaningful way. Since learning is no longer limited to passively absorbing knowledge but is instead actively formed by direct involvement with the subject matter, these immersive experiences aid pupils in creating lasting memories.

Also, by incorporating VR into educational settings, teachers tap into a medium that naturally aligns with the technological inclinations of contemporary students. It bridges the gap between traditional teaching methods and the digital preferences of today's learners, making the learning experience more intuitive and engaging. Teacher 9 made this clear, as she believed that "It would be so beneficial to engage VR in today's educational settings since we are teaching digital natives who are highly open to the multiple media's sources." Called by Prensky as digital natives and sometimes digital immigrants, they are defined as children who are

grown up in a world surrounded by technological devices such as computers, games, cell phones, and tablets (Kivunja, 2014).

According to teacher 15, VR has the potential to improve “self-learning” emphasizing how technology might enable students to take charge of their own learning. Without continual supervision from teachers, VR may let students investigate subjects on their own, make discoveries on their own, and participate in experiential learning by offering an immersive and engaging environment. This is consistent with constructivist techniques, which emphasize students’ active involvement with the learning material to create their knowledge and emphasizes the importance of learner autonomy.

Similarly, teacher 14 had a similar viewpoint, stressing that “Teachers often view VR as a powerful tool for enhancing learning experiences. It provides opportunities for experiential learning, where students can explore environments like historical landmarks, the human body, or distant planets without leaving the classroom.” This viewpoint emphasizes VR’s special capacity to produce immersive, experiential learning possibilities that go beyond the constraints of conventional teaching techniques. Also, it stresses that VR can completely transform education by transforming abstract ideas into real, interactive experiences. Experiential learning empowered by VR has its influence in enabling students to “learn by doing,” activating multiple senses and promoting a deeper and more enduring comprehension of the subject matter.

Ultimately, the integration of VR in education is not merely about adopting a new technology; it is about leveraging a powerful tool that has the potential to revolutionize the way students learn and comprehend complex topics, fostering a more inclusive and effective educational experience for all.

Benefits of VR

The findings unanimously support the significant value of VR in education. To start with, the utilization of VR lies in its ability to captivate students’ interest and draw them into the content of the lesson. The immersive nature of VR creates an engaging and interactive experience that naturally grabs students’ attention, making the lesson content more appealing and intriguing to them, as teachers 1, 2, and 7 revealed. For instance, teacher 2 stated that VR “attracts them to the content of the lesson,” while teacher 7 thought that “If I use it, I think it would attract students’ attention and save time.” Male teachers supported this view, emphasizing VR’s ability to enhance engagement. For example, teacher 14 highlighted that VR “captures students’ attention through immersive experiences,” while teacher 20 noted that it helps students “improve focus and confidence.”

Learning in an enjoyable environment fosters motivation and engagement of students, as teacher 6 expressed, “it enhances engagement and motivation by making learning more interactive and enjoyable.” Male teachers echoed similar sentiments, pointing out that VR helps make lessons exciting and dynamic. Teacher 12 referred to VR as providing “enhanced engagement” by making lessons more interactive, while teacher 18 explained that VR “increases motivation, engagement, and provides students with experiences they would not be able to have in the classroom.”

Additionally, VR promotes experiential learning by allowing students to practice real-world skills in a safe and controlled environment. Teacher 6 explained that “VR provides opportunities for experiential learning,” while teacher 9 noted that VR “assists students to construct meaning easily since it relates their learning to their real-life and environment.” Similarly, teacher 18 emphasized how VR “allows students to explore complex concepts through 3D simulations and engage with content in more meaningful ways.” The use of simulations to enhance practical understanding was frequently mentioned. For instance, teacher 14 pointed out that VR “improves understanding of complex subjects, such as anatomy or engineering, through 3D visualization.”

This aligns with Alizadeh (2019), who illustrated that VR could promote knowledge creation by enabling participants to interact with each other, allowing them to discover facts on their own rather than relying on prepackaged information. This immersive, inquiry-based learning fosters critical thinking and deep understanding. Teacher 3 acknowledged that VR “encourages them to be creative and curious to search and think deeply and critically about a situation,” while teacher 6 stated that “it can stimulate curiosity and a sense of discovery.” Male teachers reinforced this by highlighting VR’s ability to cater to diverse learning styles. For instance, teacher 9 noted that VR “can impart the target information to most of the different learning styles

and multiple intelligences that exist in the same class.” Teacher 6 added that “VR can accommodate various learning styles and individual needs, offering personalized and adaptive learning experiences.”

Male teachers also emphasized VR’s role in enhancing retention and social skills. Teacher 13 shared that VR helps students “understand better and remember longer,” thanks to the interactive and engaging visuals. Teacher 20 pointed out that VR can “improve social and collaborative work,” as it often involves teamwork and communication in virtual environments.

Moreover, VR supports the development of 21st century skills, including problem-solving and critical thinking. Teacher 10 raised the importance of VR in fostering these skills, stating, “It will encourage students to enhance their problem-solving and critical thinking skills.” Male teachers echoed this perspective, emphasizing VR’s ability to provide meaningful practice in safe yet challenging environments. For example, teacher 17 noted that VR allows for the “safe practice of skills in collaborative environments,” while teacher 20 highlighted that it enables students to become more active learners and engage deeply with the material.

In conclusion, the perspectives of both male and female educators show how VR could revolutionize education. It accommodates a variety of learning styles, increases comprehension, and boosts engagement. In addition, VR gives students realistic, real-world experiences while fostering creativity, critical thinking, and social skills. These results highlight the need to carefully integrate VR into educational practices in order to optimize its advantages and create a more engaging, dynamic learning environment.

Challenges in Applying VR

Regarding the second RQ (What are the challenges that face the use of VR in EFL education?), the study discovered the following perspectives among teachers.

Teachers’ perspectives on the utilization of VR in educational settings raise several challenges that are connected to technology, resources, and pedagogy. To start with, teachers 1, 5, 9, and 20 underscore the necessity for additional time for all students to engage with VR. Teacher 1 notes, “It needs more time, so all students can try and use VR,” teacher 5 expresses, “It is time-consuming because I have to explain the steps of using it in each lesson,” and teacher 20 illustrates that it is, “hard to design lessons, needs a lot of preparation time.” These remarks stress how time-consuming it is to integrate VR into the classroom and how crucial it is to give students enough time to engage with and understand the technology. This also illustrates the logistical challenges of incorporating VR into the current curriculum and the need for sufficient time to provide meaningful experiences. The findings go in harmony with Alalwan et al. (2020), as they illustrated that 29 scientific teachers reported that one typical challenge to VR integration into educational settings was a lack of time.

Moreover, the reference to the need for a strong network underscores the technological obstacles that may impede the seamless incorporation of VR. For instance, teacher 2 observes, “The Wi-Fi signal is low. Mobile phones become hot while using them, so the time spent using VR is limited.” Similarly, teacher 4 articulates challenges related to connecting tablets to wireless networks, stating, “In my school, there are 15 tablets for each class, so we are able to apply technology anytime, but sometimes there is some problem in connecting the tablets to the wireless.” These challenges highlight the importance of having a reliable infrastructure and sufficient equipment to provide effective VR learning experiences.

Technical issues were also raised by male teachers, who emphasized the complexity of maintaining VR systems. For instance, teacher 14 notes, “Dependence on reliable internet and updated software can be challenging,” while teacher 18 identifies the “technical complexity requiring specialized training.” This aligns with earlier observations about the need for technical expertise and support to ensure the smooth functioning of VR systems in educational contexts.

Financial constraints emerged as a recurring theme across both groups. Teacher 5 and teacher 6 highlight financial considerations as potential obstacles, with teacher 5 stating, “I do not think the school will buy this type of learning as it is expensive.” Male teachers echoed this sentiment, emphasizing the high costs of equipment, software, and maintenance. Teacher 14 explains, “VR equipment can be expensive, limiting accessibility,” and teacher 20 concurs, stating, “It could be expensive.” These financial hurdles underscore the need for strategic planning and potential funding solutions to make VR technology more accessible.

In addition to infrastructure and financial issues, training for teachers was frequently mentioned as a critical challenge. Teacher 3 underscores, "Teachers need professional training to use VR," and male teachers echoed this concern. Teacher 14 states, "Teachers may need time and resources to learn how to use VR effectively," and teacher 20 adds that "teachers need to be trained." These responses emphasize the necessity of professional development programs to equip educators with the skills and confidence to integrate VR meaningfully into their classrooms.

Pedagogical challenges were also highlighted, particularly regarding the development of appropriate content and classroom management. Teacher 7 identifies the difficulty of creating suitable content, stating, "Designing and making suitable videos of games and activities would be a challenge," while teacher 18 points out the "limited availability of high-quality educational content." Classroom management was another concern, as teacher 14 notes the difficulty of "ensuring equitable access and maintaining focus during VR activities." Additionally, teacher 20 raises the potential for VR to "distract students," further underscoring the need for structured and well-planned VR lessons.

Finally, the novelty of VR poses adaptation challenges for students. Teacher 5 observes, "It is something that students are not familiar with, so they need time until they get used to it." This sentiment aligns with male teachers' acknowledgment of accessibility issues, as teacher 18 notes the "limited access for all students," and teacher 20 highlights the need for specific rooms and spaces to facilitate VR usage effectively.

In conclusion, the perspectives of both male and female teachers offer a thorough grasp of the challenges involved in incorporating VR into learning environments. To successfully integrate VR in education, these challenges, which include pedagogical, financial, and technological elements, highlight the necessity of funding infrastructure, training, and content creation. Through cooperative efforts, schools may overcome these obstacles and realize VR's promise to improve learning outcomes and experiences.

Concerns or Reservations Regarding the Ethical Implications of VR Technology

The responses from the teachers regarding the ethical implications of VR technology reveal a spectrum of concerns, considerations, and attitudes. To start with, both teacher 2 and teacher 4 emphasize the importance of cultural and social considerations in choosing VR content. For instance, teacher 2 highlights that she "should be careful when choosing the content because not everything suits our social or cultural aspects. This emphasizes the importance of selecting content that is relevant and respectful of cultural norms." Teacher 4 also indicates that "as we are teaching cycle one, we prefer to choose the VR applications carefully and know where and when to apply them." This underscores the importance of age-appropriate content.

Additionally, teacher 3 mentions a serious concern about potential unethical practices, specifically using hacking techniques, as she states, "Using hacking techniques to get some VR tools." This highlights the need for ethical considerations in the acquisition of VR resources. In alignment with this concern, teacher 6 shows that "VR raises privacy and data security concerns, as user data and experiences can be collected, stored, and potentially misused." She also states, "One concern is the potential for addiction or overuse of VR, especially among younger users. It is important to establish guidelines and ensure responsible usage. Another concern is the potential for creating misleading or false experiences that could affect users' perceptions of reality." This thorough viewpoint emphasizes the significance of an ethical approach to VR integration in education, supporting proactive measures and shared responsibility among developers, educators, and users.

In addition, several male teachers express concerns about the possible overuse of VR in the classroom. Teachers 11, 12, 13, 14, 15, 17, and 18 draw attention to the risks of addiction or "over-reliance" on VR, which they say may have negative long-term consequences. Teacher 11 and teacher 14 specifically expressed concern that pupils can become detached from the real world, which might result in a "reduction in social interaction" and a deterioration of their interpersonal skills. Teacher 13 also brought up the topic of "desensitization to real-world issues," cautioning that pupils may get disconnected from the reality around them. Teacher 12 agreed, warning that because VR settings are so engaging and compelling, students may "neglect the real world" entirely. Likewise, teacher 15 and teacher 18 said that they thought excessive VR use would have a negative impact on students' mental health. This is consistent with research by Marougkas et al. (2023), which found that prolonged use of VR can lead to a few health issues, such as nausea and balance

disruption. The teacher identification of psychological dangers in addition to these physiological side effects raises critical questions about the boundaries of VR integration in educational settings.

These findings imply that although VR has enormous promise as a revolutionary teaching technology, best practices and standards must be established immediately to guarantee its appropriate usage. Limiting screen time, implementing frequent breaks, and striking a balance between VR activities and conventional teaching techniques should all help mitigate these concerns while preserving students' sense of connection to the real world and fostering their holistic development.

Regarding the third RQ (What do teachers suggest for future reference in terms of VR integration in education), the study revealed the following perspectives among teachers regarding the suggestions.

Suggestions for Future Reference

The suggestions provided by the teachers reflect a range of perspectives on the integration of VR technology in education and highlight diverse considerations for future implementation. These recommendations can be categorized into three main areas: systemic support and infrastructure, teacher training and education, and ongoing research and development.

To begin with, teachers 1, 2, 7, and 9 emphasize the importance of systemic support to ensure the successful integration of VR in education. They advocate for the provision of facilities, free access to VR resources, Wi-Fi connections, and VR hardware in schools. For instance, teacher 2 states, "For the MOE to provide free access to such applications and websites for all teachers. Also, all schools must have Wi-Fi connections to ease the process of integrating technology in the classroom." This interconnectedness underscores the consensus that effective integration requires not only technological resources but also widespread accessibility. Similarly, teachers 11, 12, and 14 stress the importance of creating affordable and accessible VR systems through funding strategies. Teacher 12 highlights the need to "develop funding strategies for partnerships to make VR accessible to all schools." These recommendations align with the findings of Onyesolu and Eze (2011), emphasizing the necessity of systemic infrastructure and financial accessibility to support VR integration.

A significant number of teachers, including 3, 8, 9, 12, 14, 16, 17, 19, and 20, highlight the critical need for teacher training to ensure the effective adoption of VR in classrooms. They recommend incorporating VR-focused training into teacher education programs, conducting workshops, and providing explicit in-field training. Teacher 3 recommends "giving VR more attention in schools and training teachers to use such technology," while teacher 9 illustrates the importance of preparing future educators, noting, "Train students' teachers in education colleges and universities to implement VR in their future careers as a priority and provide in-field training for teachers to introduce them to whatever VR works well with their students." Similarly, teacher 12 emphasizes the value of professional development, suggesting the need to "conduct workshops to train teachers on VR technology and pedagogy." Teacher 20 adds another dimension by advocating for "online courses that focus on how VR can be implemented in education and training." These perspectives highlight the pivotal role of educators in the successful integration of VR and stress the importance of equipping them with the necessary skills and knowledge.

Finally, teachers 6, 10, 12, and 13 underscore the importance of ongoing research and staying updated with advancements in VR technology. Their recommendations emphasize the dynamic nature of VR and the necessity of continuous development and practical research. Teacher 6 notes, "For future reference, I recommend staying updated with the latest advancements in VR technology and its applications in education." Teacher 10 further stresses the need for an evidence-based approach, stating, "I would recommend conducting many studies and doing much research for future reference." Teacher 12 brings attention to the long-term implications of VR on students, advising to "study the long-term effects of VR on learning, cognition, and student well-being," while teacher 13 points to the need for high-quality educational content, asserting, "We need more research on how to use VR effectively and safely in education. We should also work on developing high-quality educational content for VR." These insights highlight the importance of a well-researched and continuously evolving framework for the implementation of VR in education.

In conclusion, the teachers' recommendations collectively underscore the importance of systemic support, teacher preparation, and ongoing research to fully realize the potential of VR in education. Teachers can

guarantee a smooth and long-lasting VR technology integration in the classroom by addressing these challenges, which will benefit students as well as the wider educational community.

CONCLUSION

The present study examined the perceptions of integrating VR in Omani schools in the first semester of the school year 2023-2024 in the schools of Al-Dhahira Governorate. The data was collected through semi-structured interviews, which were conducted with 10 female EFL teachers.

The study revealed diverse perspectives on VR among the 10 teachers. Moreover, the findings highlighted those teachers advocated for VR integration for several reasons. They emphasized the engaging and interactive qualities of VR, noting its capacity to boost student engagement, motivation, and curiosity. Additionally, its utilization significantly contributes to advancing technology within Imani schools. Furthermore, the results demonstrated numerous advantages associated with VR integration. These included facilitating recall and retention, fostering 21st century skills, enabling students to construct meaning autonomously, comprehending abstract concepts, and accommodating various learning styles and multiple intelligences.

In addition, the study revealed that the primary challenges to the widespread adoption of VR in education are time constraints, technological barriers such as unreliable networks, financial concerns, the need for professional training, challenges in creating content, and the need for students to familiarize themselves with and adjust to VR technology. Further, the findings showed that the primary concerns regarding VR center around ethical implications, specifically focusing on cultural considerations in selecting content, unethical practices such as hacking techniques, as well as broader issues encompassing privacy, data security, potential addiction, and the creation of misleading experiences. Additionally, the teachers' primary recommendations center on infrastructure and institutional support, highlighting the necessity of facilities, free access to VR resources, and Wi-Fi connections. They recommended giving educators specific training to apply VR. Teachers also stress the value of continuing research and keeping up with advancements in VR technology.

The study's findings strongly suggest that the integration of VR can be highly advantageous for Omani EFL teachers and students, significantly enhancing the overall educational experience. Consequently, there is a compelling need for curriculum developers and policymakers at the MOE to acknowledge and incorporate VR into educational frameworks to improve teaching and learning processes. Furthermore, it is recommended that the teacher's guide includes specific guidance on the optimal methods and contexts for implementing VR. Additionally, it is crucial to consider the training of teachers in VR usage to ensure effective implementation and customization to meet individual student needs. However, this research study and its conclusions face certain limitations. Primarily, the study is constrained by a relatively small sample size, impeding the generalizability of its findings to all instances in Oman. It is possible that conducting the study in diverse contexts with a larger and more varied population could yield different outcomes. Additionally, the possible impact of participant demographics, such as age, background, or teaching experience, is another limitation since it might affect the generalizability of the findings. Hence, following are recommendations for future research are provided considering the current study:

1. The study was conducted on teachers belonging to one governorate, namely Al-Dhahira. However, it would be beneficial to extend this study to include teachers from various other governorates to shed light on the implementation of VR in different settings.
2. The small size sample is one of the limitations that restrict the generalizability of the findings to a broader population as they may not fully capture the diversity of experiences or perspectives present in a larger sample. Future research could address this limitation by expanding the sample size, which would improve the findings' generalizability in other settings.
3. Since this study used a qualitative approach, it would be advantageous to perform quantitative supported research with students to assess the effects of VR at different grade levels.

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Data availability: Data generated or analyzed during this study are available from the authors on request.

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