External Factors Influencing Virtual Learning Environment Adoption in English Learning

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Abstract
Virtual reality (VR) technology is one of the popular technologies employed in education field as it creates virtual learning environment for learners. However, the implementation of this technology in English learning is still limited, especially for English acquisition. In that sense, many scholars have been conducting research for influencing factors on the technology adoption. Since there is insufficient research in regard to the influencing factors on VR technology adoption in education especially in English learning, there is no standard reference when studying the external factors affecting the application of VR technology. This study implemented a systematic literature review to identify the externals factors influencing VR technology utilization. Therefore, the results show that external factors identified is not only based on students' perspective, but also teachers' perspectives. At the same time, external factors include not only system quality, satisfaction, and self-efficacy, but also related to prior experience, technical support, and social support, such as norms or policy. This paper analyses the external influencing factors and summarizes which external factors have a greater impact on the use of technology, which plays a certain role in further promoting the application of VR technology in English learning.
Keywords: External Factors, Virtual Learning Environment Adoption, Virtual Reality Technology, English Acquisition

Introduction
Education informatization is the inevitable result of the digital transition. As one of the developments of informational technology, virtual reality (VR) technology refers to computer generated real-time representations of real or fictional environments that are three dimensional and interactive (Pletz, 2021). It allows users to truly feel like they are part of these immersive virtual environments. The use of VR technology is associated with many possibilities and advantages in the educational contexts (Fitria, 2023). Therefore, it is necessary to promote virtual learning environment (VLE) that VR technology established to various subjects in the education field to improve learning efficiency.

In the field of education, English is a public compulsory subject for each student, no matter which major students are in. While cultivating students' needed language ability, adopting teaching methods that more suitable for requirements of the information age. Furthermore, language learning requires a corresponding environment, but the reality is that there is no suitable language environment for learning (Parmaxi, 2023). VLE could provide a virtual language environment that allow learners to absorb and practice their skills. Thus, guiding students to learn language through virtual environments can improve learning effects.

Although VLE help language learning, enhance learning experience, and improve learning outcomes, few people use this method in actual situation (Jiang, 2022). The insufficient use of technology integration reveals that the technology integration teaching method confront some barriers. Finding the factors that hinder or promote the virtual learning environment into teaching procedure has been the key research emphasis. The major factors barrier to technology integration that has been noted from several aspects, like lack of teachers' technological, pedagogical, and content knowledge. Technology acceptance model (TAM), which put forward by Davis (1989) explain the factors of users' acceptance of a certain technology and illustrate those factors from perceived usefulness, ease of use, attitude, and behavioural intention, the four aspects. Same as the TAM, value-based adoption model (VAM) that published by Kim (2007) makes up for the shortcomings of TAM and explores factors from the perspective of benefit. In general, both the models investigate how those factors from cognitive and affective perspectives affect users' internal views and intentions (Mehta et al., 2019).

According to Huang et al (2019), external factors, such as the training, policy, infrastructure and so on also have influence on the technology integration in English teaching procedure. However, there are many studied factors but few focus on the external factors, which show the significant effect on VLE adoption. This paper analyses and synthesise research articles to show the external factors that effect on VLE integration in English course. The external factors were extracted from published studies from 2019 to 2023. It aims to provide a comprehensive overview of the external factors and serve as a guide for future researchers who interested in this subject matter.

Methodology

As the lingua franca in the world, English shows its' importance in communication. Owing to lack of real English-speaking environment, English learners rely on technology to practice language skills. This phenomenon provides the possibility for the application of virtual reality (VR) technology in language learning. However, language practice situation was limited by the lower usage of VR in English education. To explore the reason and find out the way to overcome the challenges that VR has confronted, this study tries to figure out the external factors, one of influencing factors that affect VR utilization, and it should follow the research flow as shown following: to achieve the research questions, to find qualified studies according to search strategy, and to filter studies based on inclusion and exclusion criteria.

Research Question

External factors are shown to have an impact on technology utilization (Hur et al., 2016). This study tries to foster a broad environment for language acquisition and increase learning efficacy in virtual learning environment. To achieve this research target, this study conducts the research follow the research questions as below

1. What is the classification of the factors for VLE adoption in English acquisition?
2. What are the external factors for VLE adoption in English acquisition?

Search Strategy
The relevant literature for the study's objectives was obtained by utilizing the Scopus and WOS database. With manual searches employing Boolean operators such as "AND" and "OR" alongside carefully chosen keywords, publications' abstracts, keywords, and titles were explored. The search terms included terms such as "factors", "external factors", "learning environment", "virtual learning environment", "VR technologies", "English learning", as well as "English acquisition", "language education", "second language education". This systematic method proved successful in identifying relevant studies in the field of education. In total, 303 studies were discovered, providing valuable insights aligned with the study's objectives.

Inclusion and Exclusion Criteria
To ensure the selection of appropriate studies for this study, the process was undertaken to establish a set of inclusion and exclusion criteria, as illustrated in Figure 1. This approach was implemented to guarantee that the chosen studies align with the specific requirements and objectives of the present investigation.

It was crucial to include the most current data to ensure the accuracy and relevance of findings. This study does the search from Scopus and WOS through using filters that were applied to manually select a time frame spanning from 2019 to 2023. Not only focus on the specified time frame, the inclusion criteria for selecting studies require complete text and the presence of both an English abstract and manuscript. This ensures that the chosen studies can be thoroughly examined and incorporated into the analysis.

Upon reviewing the abstracts of each study, activities that were not relevant to virtual learning environment (VLE), activities that did not involve immersive VR experiences or related technological experiences, and activities that did not related to English acquisition were excluded.

To make the research more reasonable, the further process of narrow down the selection was conducted. Studies that not available or not published in English were excluded from the analysis.
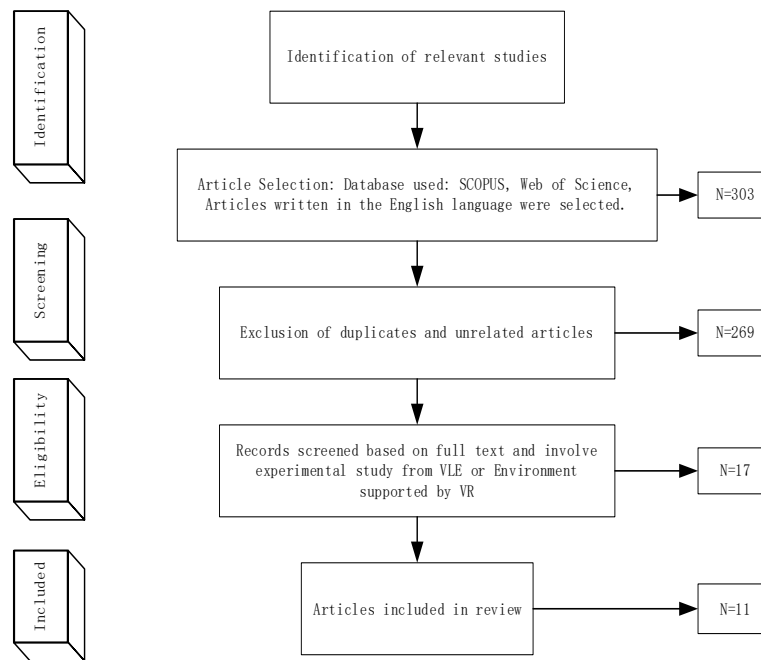
Figure 1: Flow Chart for Selecting Process of Articles

Results

For this systematic review, a total of 11 articles on external factors for VLE adoption on English acquisition from 2019 to 2023 were collected. The factors under various theories are summarized. While based on the most popular research model, technology acceptance model (TAM), to categorize the factors into external factors and others.

Table 1
Research studies on factors for VLE adoption on English learning

No.	Author	Influencing factors and classification
1	Kemp et al., 2019	Attitude and motivation, Social Factors, Usefulness and Visibility, Instructional Attributes, Perceived Behavioural Control, Cognitive Engagement, System Attributes
2	Shen et al., 2022	Perceived usefulness, Perceived ease of use, Hedonic motivation, Perceived price value, Attitude, Behaviour intention
3	Huang et al., 2019	Facilitating Conditions, Perceived usefulness, Teacher Perception, Subjective Norms, Technology Mania
4	AL-Oudat& Altamimi, 2022	Usability, Perceived compatibility, Perceived effort expectancy, Perceived facilitating conditions
5	Du et al., 2022	Information quality, system quality, service quality, Perceived usefulness, Perceived ease of use, Usage satisfaction
6	Raja & Lakshmi Priya, 2022	Perceived ease of use, Perceived usefulness
7	Abd Majid & Mohd Shamsudin, 2019	Perceived ease of use, Perceived usefulness
8	Pletz, 2021	Promote digitalization, Return of investment, Useful aspects of training, cost saving, Usefulness, Personal factors, Organization factors, Technology specific factors
9	Qashou, 2021	Perceived mobility value, Perceived enjoyment, Perceived self-efficacy
10	Liu et al., 2021	Interface design, Operational functions, Concept map usefulness, Perceived ease of use, Intention to use
11	Me, 2021	Satisfaction of course content, Need for communication, Self-regulation, Teachers, Classmates, Organizational problems, Situational problems

In addressing the research question, this study identifies all the influencing factors that previous studies had concluded. The most significant influencing factors from the research above is the perceived usefulness and perceived ease of use, as half of those studies (n=6) have mentioned. Some factors related to technology or instruments are also mentioned more frequently (n=8). Social factors, personal factors, perceived price value, and so on, has also been discussed. Among the reviewed studies, there is no classification of factors. Thus, this study based on the most useful research model for technology acceptance, technology acceptance model (TAM) to divide influencing factors into different categories.

Determining of External Factors
Based on TAM, which is used to predict user acceptance of technology new, the actual use of a certain technology affected by various factors. TAM determined perceived usefulness (PU) and Perceived ease of use (PEU) as the main influencing factors or independent variables

(Yuanquan et al., 2008). Attitude toward use and behaviour intention as the factors that usually affected by both PU and PEU. Except the two main influencing factors, other factors that influence the users' actual use of technology named as external factors. According to reviewed studies. The external factors are shown as following

Table 2
External factors for VLE adoption on English learning

No.	Author	External factors
1	Kemp et al., 2019	Social Factors, Instructional Attributes, System Attributes
2	Shen et al., 2022	Perceived price value
3	Huang et al., 2019	Facilitating Conditions, Teacher Perception, Subjective Norms, Technology Mania
4	AL-Oudat & Altamimi, 2022	Perceived facilitating conditions
5	Du et al., 2022	Information quality, system quality, service quality
6	Pletz, 2021	Promote digitalization, Return of investment, Useful aspects of training, cost saving
7	Qashou, 2021	Organization factors, Technology specific factors
8	Liu et al., 2021	Perceived mobility value, Interface design, Operational functions, Concept map usefulness
9	Me, 2021	Satisfaction of course content, Need for communication, Teachers, Classmates, Organizational problems, Situational problems

After extracting the external factors from all the factors, they need to be classified into different category, which shown as below:

Table 3
External factors into categorization

Categorization	External factors
Technology or Instrument	System Attributes, Facilitating Conditions, Information quality, service quality, Interface design, Situational problems
Social Support	Social Factors, Promote digitalization, Organizational problems
Environment	Need for communication, Teachers, Classmates
Value Consideration	Return of investment, Perceived price value, cost saving, Perceived mobility value
Experience or Training	Technology Mania, Useful aspects of training
Perception	Teacher Perception
Content	Instructional Attributes Satisfaction of course content

The external factors can be roughly divided into the following categories: Technology and instruments, social support, environment, value consideration, experience or training, perception, and content.

i.   The factors of technology and instruments emphasize the impact of the quality, performance, and experience of VR technology itself on users. The ease of operation of the device itself encourages users to continue using it in future studies. On the contrary, if the operation of device itself is complicated and cannot provide users positive feelings, it will hinder the users from continuing to learn through the virtual learning environment (VLE) in the future. Thus, the quality or condition of technology and instruments is regarded as one of objective external factor which affect users' subjective willingness of VR technology utilization.

ii. Social support is an important external factor influencing personal decisions, which categorized into policy support and institutional support. Generally, social support determines the individual decisions of users to some extent. In other words, whether from development of technology aspect or approvement of social cognition, social support is the prerequisite for users to use VR technology reasonably. From policy support aspect, the proposal of policies promotes the development of VR technology and provides foundation and guarantee for application VR technology in education, while it also shown as the guidelines for educational institutions. From institutional support aspect, educational institutions, which affected by policies directly, could provide a platform for VLE utilization and offer users with opportunities to use and understand VR technology.

iii. Environment refers to not only from the general aspect, including social support that mentioned above, the schools or institutions policies implement and VR technology equipment availability, but also from the individual aspect, including the family environment and surrounding learning environment. The overall environment provides users with chance to learn and use VR technology, while the individual environment influence users' awareness and acceptance of VLE learning method and the real use of VLE. In detail, the financial foundation of family is the key point that guarantee for VR equipment purchasing, meanwhile, the evaluation of VR supported learning by family members will affect users' attitude towards VR utilization. In addition, under the influence of herd mentality, the feelings of surrounding peers about learning through VLE will also have a subtle impact on users. Therefore, as an external factor, the environment could affect the utilization of VLE in real condition by influencing users' subjective attitude towards VLE.

iv. Value consideration is one part of technology and instruments factors to some extent, but it mainly focusses on the cost-effectiveness or price. Firstly, before the adoption of VLE in education procedure involves the transformation of teaching method, the adjustment of learning materials, and the preparation of teachers' digital teaching skills, and after the learning through VLE, the outcomes and efforts in early stage should be considered. The needed efforts before adoption of VLE may hinder the process of its utilization. Secondly, the price of VR equipment is also the factors that may restrain the VLE, even if some users or

institutions have the willingness. In all, the value consideration affects the acceptance of VLE from external perspective.

v. Experience or training related VR technology will directly influence users' feelings, which further influence the adoption of VLE in real learning and teaching procedure. The former experience can facilitate or hinder the users' adoption in current stage. The implementation of VLE will be easy if users have experience and a good feeling about VR. On the contrary, the bad feeling or lack of experience could set back the procedure of VLE adoption. For users with no relevant experience, the related training will affect user's feeling and use of VLE in the future.

vi. Users' perception reflects both teachers and students' use and understanding of VLE degree. It is seemed as a relatively comprehensive and subjective concept to some extent, which originated from several aspects that mentioned above and finally affect the users' feelings and using. Both the quality of VR technology itself and social value orientation are contributed to users' perception, and further affecting the internal factors, the factors that directly impact attitude and intention of VR technology, and then affecting the VLE adoption in real life.

vii. Content in this study mainly refers to the learning materials within VLE and the instructional method through VLE. Different from traditional learning method, the materials should be more acceptable for users to learn by digital method, meanwhile it also need to be more interesting and attractive that help users to learn by themselves. The course-design, which aims to improve learning outcomes, is required to make adjustment to accordance with the learning materials transformation. These two matters are important aspect for users to distinguish learning through VLE from traditional learning method and actively choose VLE. Therefore, the content is regarded as one of external factors that affect users' learning experience and attitude towards VLE adoption.

Discussion

This study identified the factors that influence VLE, or environment supported by VR based on earlier studies. The study's findings have shed important light on how VLE is being used. All selected articles were interpretively analysed and discussed in accordance with the research questions. Based on the reviewed articles, it was found that more studies focus on the factors related PEU and PU, which originated from technological acceptance model. While almost all the studies (9 out of 11) have mentioned external factors but hadn't put much attention. Meanwhile, the studies hadn't distinguished between factors. However, various factors have shown different affection on the actual use of technology. Therefore, it is crucial to make a distinction of factors and extracting external factors that affect their VLE application out of all the influencing factors.

Conclusion

By utilising the systemic literature review guidelines, this study allowed for a comprehensive analysis of existing literature, ensuring that all relevant studies were considered and included. This helped to present a comprehensive view of this issue and reduced the potential for bias. However, this study still has some limitations. This study only focusses on the external factors and neglect the methodology and underpinning theories that needed. Thus, the further study

can not only focus on external factors, but also on the classification of methodology, and theoretical foundations as well.

In general, this study focuses on the external factors that influence the VLE adoption in English acquisition procedure. It is helpful to increase the awareness of the difference between external factors and other influencing factors, and how the external factors influence the actual use of a certain technology. This study also provides a direction for future research by outlining the external factors and gives information to users and scholars in regard to the method of how to improve the utilization of VLE.

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