

Riding the VR Wave: A Closer Look at Teachers' Acceptance in the ESL Classroom

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Abstract

The integration of technology in education is essential, particularly for the Alpha generation, who prefer engaging and stimulating learning environments. Incorporating virtual reality (VR) into English as Second Language (ESL) learning has immense potential, despite ongoing concerns about its effectiveness in the classroom. However, the relevance of VR in ESL courses in the Malaysian context warrants further investigation. This research aims to identify the factors that contribute to teachers' acceptance of VR in primary ESL classrooms. The study involved 113 primary English teachers in Rompin schools. Teachers' acceptance was measured through an online Likert-Scale questionnaire, consisting of 12 close-ended items. Descriptive analysis was utilized to compute the percentage, mean and standard deviation of the results. The findings reveal that the implementation of VR is perceived to benefit learners by significantly improving motivation and engagement, consequently enhancing learning achievement. Additionally, VR holds the potential to alleviate anxiety associated with learning English. This study is noteworthy in highlighting the untapped potential of VR in English language teaching and learning, aligning with the overarching goal of integrating technology into education for the future. By comprehending both the impact and limitations of VR in ESL classrooms, educators in Malaysia can make well-informed decisions about incorporating this technology to enhance the overall English language learning experience.

Keywords: Virtual Reality, Primary ESL Classrooms, Motivation, Engagement, Learning Achievement, Learners' Apprehension

Introduction

The infusion of digital technologies into education has emerged as a worldwide transformative influence, fostering innovation and prompting rapid shifts in educational paradigms (Singh, 2020). Nations globally have embraced digital innovations, recognizing their potential to spur innovation, enhance productivity, and strengthen competitiveness. Driven by the Internet of Things (IoT) and the exponential growth of data, the ongoing digital revolution not only significantly influences traditional classrooms but also stands as a strategic imperative for nations aspiring to lead in educational advancements. Malaysia, attuned to the importance of digital transformation, has deliberately designated it as a strategic initiative, imparting profound implications for the nation's educational landscape.

Against the backdrop of this global paradigm, the adoption of e-learning platforms, digital content, and emerging technologies like virtual reality (VR) and augmented reality (AR) has ushered in a revolutionary shift in the educational experience. Virtual Reality (VR) refers to a sophisticated technology that constructs simulated environments, providing English as a Second Language (ESL) learners with an immersive virtual world that closely mirrors real-life language usage. Within the domain of language instruction, VR serves as a transformative tool, furnishing learners with interactive platforms conducive to practicing language skills, engaging in authentic communication and reinforcing proficiency levels. Particularly notable is the transformative impact on language instruction, where immersive and interactive experiences have become essential for understanding complex concepts. Practically, learners utilizing VR technology can participate in scenarios that replicate diverse language situations encountered in everyday life.

In the Malaysian context, this global trend aligns seamlessly with the nation's unwavering commitment to digital transformation, as outlined in the Malaysia Education Blueprint (MEB 2013). This comprehensive educational reform plan emphasizes the integration of Information and Communication Technology (ICT) into curricula, with a specific focus on the current phase (Wave 3, 2021-2025). This immersive approach allows them to engage in virtual conversations, navigate simulated real-world settings demanding language application and partake in interactive language exercises within the virtual sphere (Yunus et al. 2014). The overarching goal is to elevate language learning experiences by delivering a more captivating, contextually rich and interactive milieu for ESL learners, aligning seamlessly with the educational objectives delineated in the Common European Framework of Reference for Languages (CEFR) curriculum — a framework renowned for its comprehensive approach guiding language learning and instruction in Malaysia (Belanger, 2022; Chaya & Inpin, 2020). In this context, the integration of virtual reality (VR) technology into English language instruction takes centre stage. VR, in the context of this study, refers to a technology that creates simulated environments, providing learners with immersive experiences mirroring real-world language usage. This seamlessly aligns with the CEFR curriculum's objectives, offering interactive and engaging platforms for language skill practice, authentic communication and the reinforcement of language proficiency levels.

The uniqueness of this research lies in its specialized exploration of uncharted territories—the attitudes of ESL educators in primary schools regarding the assimilation of Virtual Reality (VR) technology. In contrast to existing studies that have delved into broader applications of VR within educational contexts, the current research seeks to address a critical void by providing a localized and nuanced understanding of the challenges and opportunities inherent in the integration of VR technology in language instruction. Through the meticulous examination of this void, the study aims not only to enrich the broader international dialogue on digital education but also to provide insights precisely tailored to the distinctive requirements of Malaysian ESL educators. In essence, this empirical research aspires to reconcile global trends in digital education with region-specific challenges. The resulting findings are poised to guide precision-targeted interventions, enhance the effectiveness of ESL instruction in Rompin primary schools and contribute meaningfully to the expansive Malaysian educational landscape.

Despite the widespread enthusiasm for digital transformation in education, a conspicuous research gap persists, particularly concerning the implementation and perceptions of virtual reality in language learning within the Malaysian context. While numerous global studies have delved into the applications of VR in language education,

empirical research within Malaysia, especially in primary schools, remains scarce (Azar & Tan, 2020; Jerry & Yunus, 2021; Yunus & Abdullah, 2011). This identified research gap serves as the impetus to investigate teachers' acceptance towards the incorporation of virtual reality in English as a Second Language (ESL) instruction and learning in primary schools in Malaysia. This central inquiry directs the investigation into the nuanced dynamics shaping educators' perspectives on VR integration within the specific context of Malaysian primary schools. Consequently, in addressing this research void, the primary research question guiding this empirical study is as follows:

RQ1: What factors contribute to teachers' acceptance of virtual reality technology in primary ESL classrooms in Rompin?

Literature Review

Past Studies

Virtual Reality (VR) has emerged as a seminal paradigm in contemporary educational discourse, wielding substantial influence across diverse dimensions of language learning, including motivation, engagement, language achievement, and apprehension mitigation. A critical examination of extant empirical research substantiates the multifaceted impact of VR on the language learning milieu.

Lege, Bonner, Frazier and Pascucci's (2020) research highlighted that the integration of virtual reality (VR) in classrooms generates excitement and motivates learners to exert greater effort. This sentiment aligns with Hao and Lee's (2019) emphasis on language learning through immersion, indicating that VR technology facilitates virtual scenarios, making language acquisition more motivating. Chen and Chan (2019) contribute to this theme by suggesting that immersive learning environments, created through interaction with different virtual aspects, foster deeper comprehension and a more engaging experience for learners. The incorporation of VR not only increases learners' interest but also elevates their motivation to delve further into the subject matter (Yunus & Abdullah, 2011). Damio and Ibrahim's (2019) insights into high-input and output activities in VR-based learning underscore the effectiveness of such methods in motivating learners. Their findings emphasize how VR's immersive environments contribute significantly to learners' enthusiasm, particularly in activities like presentations. Moreover, comparative studies, such as Wang et al.'s (2022) work, consistently reveal that VR-based learning outperforms traditional methods in enhancing learners' motivation and overall attitude towards the learning process. These collective findings substantiate the enduring positive impact of VR on learners' motivation in language education.

Iqbal et al (2010) pioneered investigations into the use of virtual environments to captivate learners, emphasizing increased interaction and communication resources. Faridi et al (2016) advocate for student-centred learning experiences through VR activities, demonstrating how VR aligns with the twenty-first-century education paradigm. Li et al (2022) expands on this by emphasizing the benefits of VR in enhancing cognitive, behavioural and social engagement. The three-dimensional perspective of VR not only fosters cognitive reflection but also deepens learners' overall engagement with the learning material. Yang et al (2020) highlights the self-directed exploration made possible by VR, allowing learners to immerse themselves directly in concepts and encouraging active participation. The interactive and immersive experiences offered by VR technology, as emphasized by Tai (2022), provide learners with immediate feedback and essential scaffolding, resulting in a more engaging and participatory learning process. Through the circumvention of traditional instructional

limitations, VR creates personalized and interactive learning environments, enhancing information engagement and retention (Yunus & Arshad, 2015).

Cai et al (2021) shift the focus to the transfer of learning outcomes from virtual to real-world applications, showcasing VR's efficiency in providing realistic language scenarios. Yeh, Tseng and Heng (2022); Huang et al (2021) stress the interactivity of VR technology, enabling learners to develop greater language awareness and improved language skills. The use of VR applications facilitates real-time simulated activities, providing stress-free, secure opportunities for learners to employ language skills (Bryant et al. 2019; Kim et al. 2022; Yunus et al., 2013). Li et al.'s (2022) exploration of VR's impact on vocabulary acquisition and reading comprehension supports the notion that VR enhances language achievement. Additionally, the incorporation of VR in language learning, particularly for writing skills, proves beneficial, as highlighted by (Khodabandeh, 2022; Wang et al., 2022). The immersive experiences provided by VR contribute to enhanced writing abilities and a richer understanding of the writing context (Yunus et al., 2021).

The integration of gameplay mechanics in VR, as evidenced by Reitz et al (2019), contributes to a more relaxed and confident learning environment. Mirzaei et al (2019) emphasizes the role of avatars in reducing stress and anxiety, providing learners with an anonymous and safe space for collaborative learning. Wang et al.'s (2021) study further supports this, indicating that VR's immersive and supportive nature reduces learners' anxiety, allowing them to express themselves more freely. Moreover, VR's application in oral presentations, as studied by Damio and Ibrahim (2019); Santhanam and Yunus (2022), proves effective in reducing anxiety and increasing learners' confidence. The virtual platform for practicing presentations in a lower-pressure environment translates to improved fluency and self-assurance during actual presentations. The overall consensus is that VR's immersive and supportive learning environments contribute to creating a positive and empowering experience, mitigating apprehension among language learners.

In summary, past studies consistently underscore the transformative impact of VR on language education, categorically contributing to learners' motivation, engagement, achievement and alleviating apprehension. However, the hurdles associated with teachers' readiness and familiarity with VR technology in ESL classrooms are multifaceted, encompassing challenges related to experiential deficits, temporal constraints, technical proficiency and nuanced issues in classroom management. These findings provide a robust foundation for the ongoing exploration and integration of VR technology in language learning environments. As the research landscape evolves, these past studies offer valuable insights for educators, policymakers, and instructional designers seeking to maximize the potential of VR in language education. The identified themes collectively affirm the promising trajectory of VR's role in shaping the future of language learning.

Theoretical Framework

Fred Davis (1989) introduced the Technology Acceptance Model (TAM) as a framework to elucidate the adoption of novel technologies and information systems. Originating from Ajzen and Fisbein's Theory of Reasoned Action (TRA) in 1980, TAM centres on users' attitudes and decision-making in relation to the use of information technology. TRA, as expounded by Hidayat, Prasetyo and Wantoro (2019), scrutinizes the reactions and perspectives of consumers influencing their decision to adopt a technology. In contrast, TAM prioritizes two pivotal perceptions: perceived usefulness and perceived ease of use, both influencing individuals' attitudes toward embracing new technologies (Zakaria et al., 2021).

Perceived utility, denoting an individual's perception of how likely they are to benefit from a particular system, has been identified as a crucial element. Davis (1989) demonstrated that e-primary education, offering learners current and relevant information, enriches the learning process. Conversely, "perceived ease of use" in TAM characterizes users' expectations regarding the effort required to operate a system. This model aptly assesses users' evaluations of the desirability of an information system application, incorporating aspects such as user motivation, interface and procedures, self-efficacy, and supporting variables.

Researchers seeking to enhance TAM's applicability have introduced constructs like perceived enjoyment (PENJ) and performance expectancy (PEXP) in studies examining the use of innovative technology in educational and consumer contexts (Chang et al., 2018; Makransky and Lilleholt, 2018; Manis and Choi, 2018; Shen et al., 2019). Furthermore, Sagnier et al. (2020) extended TAM to assess user adoption of virtual reality (VR) in aeronautical assembly tasks, accounting for VR-specific factors and the applicability of VR in dynamic learning environments (Fussell & Truong, 2022). TAM has evolved into a prominent scientific paradigm for studying the adoption of learning technology over time by learners, teachers and other stakeholders (Teo et al., 2011). Importantly, TAM is extensively cited in the e-learning acceptance literature, frequently being expanded or modified with relevant components to gauge users' willingness to use e-learning tools (Granić & Marangunić, 2019).

Considering the advantages and challenges of e-learning, TAM has been frequently employed in research on e-learning acceptance, shedding light on teachers' experiences and learners' acceptance during the teaching and learning process. Consequently, TAM emerges as a robust model for assessing the acceptance and integration of virtual reality (VR) into ESL classroom teaching and learning practices.

Method

This quantitative inquiry explored the determinants influencing the acceptance of virtual reality technology among primary English as a Second Language (ESL) teachers in Rompin. The study sought to discern the factors contributing to teachers' acceptance of virtual reality technology. Employing a meticulously designed questionnaire with Likert scales, the survey collected both quantitative data through a purposive sampling technique applied to primary ESL teachers in Rompin. Data analysis involved calculating percentages to examine response distribution across various factors, revealing insights into the prevalence and variability of acceptance. Mean scores were computed to determine average levels of acceptance among teachers. Ethical considerations, including informed consent and data confidentiality, were rigorously observed throughout the research process.

The research encompassed a population of primary ESL teachers in Rompin, with data collected from 113 out of approximately 140 teachers across forty primary schools, achieving an 81% response rate to mitigate nonresponse bias. Purposive sampling ensured representation across various factors like teaching experience, educational credentials and technology proficiency, offering comprehensive insights into teachers' perspectives on virtual reality technology integration.

The survey questionnaire, structured with closed-ended Likert scale questions, assessed teachers' attitudes, beliefs and acceptance levels toward virtual reality technology, probing factors such as learners' motivation, engagement, language achievement and anxiety. A meticulous validation process involved expert evaluation and a pilot study to enhance content

and face validity. Cronbach's alpha analysis yielded a high reliability coefficient (0.868), ensuring the internal consistency of the questionnaire.

To corroborate the validity of research instruments, subject matter specialists validated the questionnaire, and a pilot study with thirty non-participating English teachers assessed clarity and readability. Google Forms facilitated data collection, and the subsequent analysis employed descriptive statistics, including percentages, means and standard deviations. The Likert Scale, structured with five intervals, allowed for nuanced interpretation, categorizing responses into distinct levels of agreement. This methodological framework aligns with established guidelines, ensuring a systematic and rigorous approach to data collection and analysis, ultimately providing comprehensive insights into teachers' perspectives on virtual reality technology in primary ESL classrooms.

Results

The gender distribution among the 113 respondents, reveals a notable prevalence of female participants at 75.2%, with males constituting 24.8%. In terms of teaching experience, the largest group (38.9%) has 11 to 20 years of experience, closely followed by 6 to 10 years (29.2%). Professional roles indicate that 69% identify as English Language Optionists and 31% fall into the "Others" category. Institutional affiliation reveals a majority in SK (95.6%) and 4.4% in SJKC, with none from SJKT. Regarding VR technology, 43.4% have knowledge, while 56.6% lack familiarity, and for educational purposes, only 14.2% claim familiarity, while 85.8% report a lack thereof. Recommended VR technologies for educational purposes show diverse preferences, with Oculus Quest leading at 25.00%, followed by VR Field Trip at 18.75%, and other technologies evenly distributed at 12.50% each, emphasizing the need to consider varied options for educators and learners.

Learners' Motivation in Learning English Using Virtual Reality

Table 1

Descriptive Statistics of Teachers' Acceptance towards the Implementation of VR in English Classroom: Learners' Motivation

Items	SD (%)	D (%)	N (%)	A (%)	SA (%)	\bar{x}	σ
I believe that integrating virtual reality technology in the English classroom can enhance learners' confidence to learn the content.	0 (0.0)	4 (3.5)	32 (28.3)	60 (53.1)	17 (15.0)	3.80	0.73
I perceive virtual reality experiences as a valuable tool for stimulating learners' curiosity and interest in English language learning.	1 (0.9)	3 (2.7)	34 (30.1)	56 (49.6)	19 (16.8)	3.79	0.78
I think that using VR can help make English lessons more enjoyable and exciting, thereby increasing learners' motivation to participate.	0 (0.0)	3 (2.7)	21 (18.6)	54 (47.8)	35 (31.0)	4.07	0.78
Overall						3.89	0.76

This survey systematically explores the potential impact of virtual reality (VR) technology on English language instruction, presenting the findings in a concise manner. The outcomes reveal a significant consensus among respondents (68.1%) who acknowledged that the utilization of VR enhances learners' confidence in comprehending English material. The corresponding statistical metrics, featuring a moderate mean score of 3.80 and a low standard deviation of 0.73, underscore a shared perspective among participants regarding the positive effects of VR on learner motivation.

Likewise, the survey responses highlight the perception of VR experiences as a valuable tool for sparking interest in English language acquisition. The second survey item indicates that 66.4% of respondents either "Strongly Agree" or "Agree" with this perspective. The mean score of 3.79, coupled with a slightly higher standard deviation of 0.78, implies a general alignment among respondents in recognizing the intrinsic value of VR experiences in cultivating interest and curiosity within the realm of learning English.

Moreover, the third survey question delves into the belief that integrating VR in English classes can heighten learners' enthusiasm to participate by creating more engaging and exciting sessions. The survey results affirm this belief, with a substantial majority of respondents (78.8%) expressing agreement. The mean score of 4.07, accompanied by a standard deviation of 0.78, suggests a prevailing sentiment among participants in favour of the proposition. The statistical analysis implies that the incorporation of VR can enhance the overall appeal and excitement of English sessions, thereby positively influencing learner motivation.

Considering all survey items collectively, the overall mean of 3.89 indicates a general inclination toward a favourable opinion regarding the use of VR in English language acquisition. The aggregate standard deviation of 0.76 signifies a moderate level of agreement among responders, supporting the notion that VR has a positive impact on learners' motivation. These findings suggest that integrating VR technology into English language instruction holds promise for boosting learners' confidence, motivation, and interest in language acquisition.

Learners' Engagement in Learning English with the Integration of Virtual Reality

Table 2

Descriptive Statistics of Teachers' Acceptance towards the Implementation of VR in English Classroom: Learners' Engagement

Items	SD (%)	D (%)	N (%)	A (%)	SA (%)	\bar{x}	σ
I believe that virtual reality can provide immersive and interactive experiences that enhance learners' engagement in English language activities.	0 (0.0)	1 (0.9)	32 (28.3)	55 (48.7)	25 (22.1)	3.92	0.73
I think that using VR technology can captivate learners' attention and create a more dynamic and interactive learning environment.	0 (0.0)	2 (1.8)	24 (21.2)	61 (54.0)	26 (23.0)	3.98	0.72
I perceive virtual reality as a tool that can promote active participation and collaboration among learners during English lessons.	0 (0.0)	2 (1.8)	29 (25.7)	58 (51.3)	24 (21.2)	3.92	0.73
Overall						3.94	0.72

The analysis presented below provides comprehensive insight into the impact of virtual reality (VR) integration on participation in English language learning activities. The first survey question aimed to explore the opinion that VR may offer immersive and interactive experiences that improve learners' engagement. A significant majority of 70.8% of respondents agreed with this statement, indicating a moderate level of agreement and a relatively consistent perspective on the enrichment potential of VR in improving engagement during English language activities. The mean score of 3.92 and the standard deviation of 0.73 further confirmed this view, suggesting that participants found VR to be an engaging and immersive tool for language learning.

The second survey question investigated participants' beliefs regarding how VR technology can capture learners' attention and create a dynamic, interactive learning environment. An overwhelming majority of 77.0% of respondents agreed with this statement, indicating broad agreement that VR might produce a more dynamic and engaging learning environment. The mean score of 3.98 and the standard deviation of 0.72 further corroborated this belief, suggesting that participants had a positive view of VR's ability to capture attention when used in the context of English language instruction.

The final survey question aimed to investigate how learners view virtual reality as a tool for promoting cooperation and active engagement in English classes. A considerable majority of 72.5% of respondents agreed with this viewpoint, suggesting that most participants believe VR may encourage teamwork and active engagement in English language learning environments. The average score of 3.92 and the standard deviation of 0.73 further

supported this idea, indicating that participants found VR to be an effective tool for promoting collaboration and interaction among learners.

The aggregated mean of 3.94, which takes into account all survey items, indicates a generally positive view of VR's potential to increase participation in English language learning activities. The moderate standard deviation of 0.72 indicates that participant agreement was consistent, with little variation in responses across survey items. Overall, the findings suggest that VR technology has the potential to be an effective tool for promoting engagement and collaboration in English language learning.

Virtual Reality Contributes to Learners' Language Achievement

Table 3

Descriptive Statistics of Teachers' Acceptance towards the Implementation of VR in English Classroom: Learners' Language Achievement

Items	SD (%)	D (%)	N (%)	A (%)	SA (%)	\bar{x}	σ
I believe that virtual reality can provide authentic language contexts and simulations that contribute to learners' language acquisition.	0 (0.0)	2 (1.8)	32 (28.3)	62 (54.9)	17 (15.0)	3.83	0.69
I think that incorporating VR technology in the English classroom can facilitate learners' practical application of language skills and concepts.	0 (0.0)	2 (1.8)	33 (29.2)	61 (54.0)	17 (15.0)	3.82	0.70
I perceive virtual reality as a tool that can help improve learners' pronunciation, vocabulary and overall language proficiency in English.	0 (0.0)	2 (1.8)	28 (24.8)	62 (54.9)	21 (18.6)	3.90	0.71
Overall						3.85	0.70

Analysing how virtual reality (VR) contributes to language learners' proficiency provides important new perspectives on the perceived impact of VR technology on language acquisition. Regarding the first survey item, exploring the belief that VR provides authentic language contexts and simulations contributing to language acquisition, 69.9% of participants express agreement. The mean score of 3.83, coupled with a standard deviation of 0.69, reveals a moderate level of consensus among participants regarding the potential of VR to offer authentic language experiences that enhance language acquisition.

Regarding the second survey issue, which examines the belief that using virtual reality (VR) technology in English classrooms may help learners apply language abilities and concepts

practically, 69.0% of participants indicate agreement. The mean score of 3.82, along with a standard deviation of 0.70, indicates a general alignment of participant views on the facilitative role of VR in enabling the practical application of language skills. These findings collectively underscore a consensus among respondents regarding the contribution of VR to the practical application of language skills within an educational context.

The third survey question explores how learners perceive virtual reality as a tool to enhance their vocabulary, pronunciation, and general English language skills. A significant majority of participants (73.5%) affirm this perspective. The average score of 3.90, with a standard deviation of 0.71, lends credence to the idea that most participants generally perceive VR as beneficial for enhancing various aspects of language proficiency.

The aggregated mean of 3.85 indicates an overall optimistic view of the contribution of VR to language achievement among learners. This score indicates that the participants have acknowledged the usefulness of VR in language learning. The moderate standard deviation of 0.70 indicates that participants' agreement was constant regarding the effectiveness of VR in language learning. Therefore, it can be inferred that the majority of the participants believe that VR has the potential to improve their language skills.

Implementation of Virtual Reality Lowered Learners' Apprehension in Learning English

Table 4

Descriptive Statistics of Teachers' Acceptance towards the Implementation of VR in English Classroom: Learners' Apprehension

Items	SD (%)	D (%)	N (%)	A (%)	SA (%)	\bar{x}	σ
I believe that using virtual reality technology in the English classroom can help lower learners' apprehension by providing a safe and immersive learning environment.	0 (0.0)	3 (2.7)	33 (29.2)	65 (57.5)	12 (10.6)	3.76	0.67
I believe that virtual reality technology allows for personalized and self-paced learning experiences, which can help alleviate learners' apprehension by accommodating their individual needs and preferences.	0 (0.0)	3 (2.7)	32 (28.3)	64 (56.6)	14 (12.4)	3.79	0.69
I perceive that virtual reality can provide learners with a sense of control over their learning, allowing them to gradually build confidence and overcome apprehension in the English classroom.	0 (0.0)	2 (1.8)	35 (31.0)	58 (51.3)	18 (15.9)	3.81	0.71
Overall						3.79	0.69

The exploration of the implementation of virtual reality (VR) technology in the English language classroom unveils insights into its potential to mitigate learners' apprehension. 68.1% of respondents, or the sum of the Agree and Strongly Agree percentages, indicated agreement with the first survey item, which explores the idea that adopting VR can reduce learners' anxiety by offering a secure and immersive learning environment. The mean score of 2.24, coupled with a standard deviation of 0.67, signifies a substantial consensus among participants regarding the role of VR in fostering a secure and immersive learning environment that contributes to reducing apprehension.

Regarding the second survey question, which addresses the idea that virtual reality (VR) technology enables personalized and self-paced learning experiences, thereby alleviating apprehension by accommodating individual needs and preferences, 69.0% of participants signalled agreement. The mean score of 2.21, with a standard deviation of 0.69, suggests a general alignment of participant views on the potential of VR to offer tailored learning experiences that contribute to alleviating apprehension. These findings collectively underscore a consensus among respondents regarding the apprehension-alleviating capabilities of VR by providing personalized and self-paced learning opportunities.

The third survey item delves into the perception that virtual reality can provide learners with a sense of control over their learning, allowing them to gradually build confidence and overcome apprehension in the English classroom. A notable majority of participants (67.2% - the sum of Strongly Agree and Agree percentages) affirmed this perspective. The mean score of 2.19, accompanied by a standard deviation of 0.71, largely confirms that participants believe virtual reality (VR) can help learners feel more in control, thereby aiding in the gradual building of confidence and overcoming apprehension.

Considering the overall findings across all survey items, the aggregated mean of 2.21 reflects a consistently positive outlook on the implementation of VR technology in lowering learners' apprehension. The moderate standard deviation of 0.69 indicates a consistent level of agreement among participants. This implies that the participants' opinions are generally consistent with each other regarding the potential of VR technology to reduce learners' anxiety.

These findings offer a promising picture of the motivational advantages of using VR technology in English language instruction, advocate for the potential of VR technology to positively influence learner engagement, positively impact language acquisition and proficiency and influence learners' emotional states. They provide a robust foundation for further exploration and discussion on the nexus of technology and language education in the subsequent sections.

Discussion

RQ1: What factors contribute to teachers' acceptance of virtual reality technology in primary ESL classrooms in Rompin?

VR enhancing learners' motivation to learn English

The primary survey item examines the belief in the potential of integrating VR technology to enhance learners' confidence in understanding English content. A substantial majority of participants (68.1%) concurred with this notion, aligning with the findings of Lege et al (2020), highlighting the widespread acceptance of Virtual Reality (VR) in education. VR provides immersive learning experiences that significantly boost student engagement and foster a heightened interest in learning. The capacity of VR technology to facilitate high-input and high-output activities plays a crucial role in motivating learners and cultivating a positive

attitude toward learning, as highlighted by (Damio and Ibrahim, 2019). The perception of VR experiences as a powerful catalyst for sparking curiosity and interest in English language learning resonates with the insights of Chen and Chan (2019), emphasizing how VR technology furnishes immersive learning environments that enhance comprehension by enabling learners to interact with virtual entities. A predominant percentage of participants (66.4%) affirmed the positive impact of VR experiences, underscoring its role in igniting curiosity. The integration of VR can infuse English lessons with heightened enjoyment and excitement, thereby amplifying learners' motivation to actively participate. These outcomes align with the research of Wang et al (2020) on the beneficial consequences of integrating VR into educational contexts. A substantive majority (78.8%) endorsed this perspective, indicating a pervasive sentiment among participants favouring this viewpoint. With a cumulative mean of 3.89 across all survey items, a prevailing inclination emerges toward a positive perception of VR's role in English language learning. The moderate standard deviation of 0.76 suggests a uniform consensus among respondents, indicating a shared belief in the efficacy of VR to enhance the allure and dynamism of English classes, thereby positively influencing learner motivation. These findings underscore the technology's potential to establish a robust motivational connection between the learner and the educational content (Lege et al., 2020).

VR fostering learners' engagement in learning English

The study conducted by Iqbal et al (2010) underscores the significant role of virtual environments in engaging learners, placing particular emphasis on the utility of interaction and communication tools for optimizing learning outcomes. This is corroborated by a significant majority of participants (70.8%) who concurred with the belief that VR can provide immersive and interactive experiences enhancing learners' engagement in English language activities. The integration of VR in education amplifies student engagement and aligns seamlessly with the contemporary emphasis on student-centred learning (Faridi et al., 2016). Studies by Yang et al (2020); Li et al (2022) underscore the efficacy of VR in enhancing social, behavioural and cognitive engagement. A substantial majority (77.0%) expressed agreement, underscoring the consensus among participants regarding the attention-capturing qualities of VR in the context of English language education. The incorporation of VR games and interactive elements within virtual environments stands out as an efficacious strategy for sustaining participant attention throughout instructional sessions, as noted by (Alemi and Khatoony, 2020). As articulated by Li et al (2022), VR's provision of a three-dimensional perspective encourages cognitive reflection and heightens overall engagement with instructional materials. A notable majority (72.5%) affirmed this perspective, supporting the notion that participants generally perceive VR as conducive to fostering active participation and collaboration in English language learning settings, as proposed by Tai (2022), emphasizing that direct interaction with the subject matter fosters a deeper understanding, creating a dynamic learning milieu that captivates learners and promotes active participation. Considering the overall findings across all survey items, the aggregated mean of 3.94 reflects a generally positive outlook on the role of VR in enhancing engagement during English language activities. The moderate standard deviation of 0.72 suggests a consistent level of agreement among participants, contributing to the growing body of literature supporting the affirmative impact of VR on learner engagement in language education. VR platforms exhibit positive emotional impacts, engender heightened motivation and evoke increased feelings of self-efficacy in learners.

VR strengthening learners' English learning achievement

The utilization of VR in language acquisition goes beyond mere entertainment, emphasizing the transference of learning objectives from virtual experiences to practical applications, according to (Cai et al., 2021). A significant majority of participants (69.9%) concurred with this proposition, indicating a shared conviction in the efficacy of VR to provide authentic language experiences conducive to language acquisition. A majority of participants (69.0%) expressed agreement, affirming the notion that VR can play a facilitative role in enabling the practical application of language skills, as proposed by (Zhang and Liu, 2018). VR applications featuring real-time simulated activities afford learners opportunities for authentic language experiences, thereby facilitating the practical application of acquired language skills in everyday conversations. A significant majority of participants (73.5%) affirmed this perspective, supporting the notion that participants generally perceive VR as a beneficial instrument for enhancing various facets of language proficiency, as according to (Li et al., 2022; Yeh et al., 2022). The role of interactive VR technology in fostering heightened linguistic awareness and proficiency delivers a distinctive and immersive learning experience conducive to improved long-term memory and heightened comprehension. In light of the cumulative findings across all survey items, the aggregated mean of 3.85 reflects an overarching positive sentiment regarding the role of VR in contributing to learners' language achievement. The moderate standard deviation of 0.70 suggests a consistent level of agreement among participants, aligning with the overarching theme in the literature emphasizing the constructive impact of VR on language acquisition and proficiency. Language schools incorporating VR have observed enhancements in reading comprehension, writing proficiency, and oral expression (Wang et al., 2021; Xie et al., 2022). Particularly noteworthy is the self-directed nature of immersive learning in VR, fostering heightened engagement, autonomous inquiry, and knowledge acquisition (Tai, 2022; Yunus & Arshad, 2015).

VR alleviating learners' apprehension to learn English

The amalgamation of VR and gaming dynamics emerges as a potent strategy for mitigating language learning anxiety (Reitz et al., 2019). This is revealed through the data that 68.1% of participants concurred with this proposition, indicating a substantial consensus regarding VR's potential to establish a secure and immersive educational milieu conducive to anxiety reduction. Virtual reality games provide a stress-alleviating and entertaining milieu that counteracts the adverse effects associated with traditional learning methods. A majority of participants (69.0%) expressed agreement, signifying a shared conviction in VR's potential to offer tailored learning experiences that contribute to the alleviation of apprehension aligned with the integration of avatars in VR, which establishes a private and secure environment for collaborative learning, concurrently diminishing self-consciousness and apprehension of judgment (Mirzaei et al., 2019). Writing anxiety is markedly reduced within the secure, encouraging, and immersive learning environments offered by VR, affording learners a safe space for self-expression. This is shown through a notable majority of participants (67.2%) affirmed this perspective, reflecting a shared belief that VR can contribute to learners' sense of control and gradual confidence-building. Through providing a virtual rehearsal space with diminished perceived pressure, oral presentation practice on VR platforms elevates learners' confidence while reducing anxiety levels (Damio & Ibrahim, 2019). The aggregated mean of 3.79 reflects a consistently positive outlook on the implementation of VR technology in lowering learners' apprehension. The moderate standard deviation of 0.69 indicates a consistent level of agreement among participants. These results

affirm the potential of VR, particularly in its gaming dynamics, to serve as a transformative tool in language education by providing a secure, personalized and confidence-building learning environment. The demonstrated reduction in anxiety levels through the application of VR underscores its potential as a transformative tool in language education.

Limitations, Implications and Recommendations

The integration of virtual reality (VR) into Malaysia's educational system encounters various challenges that demand prompt attention. One primary challenge is the absence of comprehensive studies on the acceptability and viability of VR in Malaysia context. The lack of in-depth research poses a significant barrier to verifying the utility and applicability of VR in the nation's educational system. Additionally, due to Malaysia's technological lag compared to other countries, teachers are ill-prepared and unfamiliar with virtual reality technology, necessitating support and training to integrate it into lesson plans. Furthermore, the incompatibility of VR content with existing curricula complicates the seamless incorporation of VR technology into Malaysia's educational framework.

The research study's findings have important implications for instructional practices and policy. The apparent discrepancy between educators' perceived benefits of virtual reality (VR) and its current implementation in Malaysian classrooms highlights the pressing need for deliberate policy changes. To develop and implement proposals facilitating the seamless incorporation of virtual reality technology into the current curriculum, policymakers must take decisive action. Close collaboration between curriculum designers and VR content creators is crucial to ensuring VR materials support learning objectives, advancing Malaysia's educational system toward greater student involvement and technological innovation.

The study also underscores the importance of initiating teacher training and professional development programs. Considering that teachers are reportedly not aware of or prepared for virtual reality technology, engaging in thorough training programs is essential. Education authorities and institutions should prioritize helping teachers become more digitally literate, providing them with the skills and confidence needed to successfully incorporate virtual reality into their lesson plans. Collaborating on these training programs with international specialists can help disseminate best practices and provide valuable insights that will enable teachers to maximize the potential of virtual reality (VR) to improve learning outcomes, student engagement, and the overall quality of education.

To align with the "education for all" principle and address these challenges, several feasible steps can be taken to bring Malaysia's educational system up to par with international standards. First and foremost, actively encouraging research and development into the application of VR in Malaysian education is imperative to offer evidence-based insights. Secondly, the implementation of professional development programs and teacher training is vital to augment the digital literacy and comprehension of virtual reality usage among educators, with international specialists providing invaluable insights into efficacious techniques. Thirdly, effective cooperation between curriculum developers, education authorities and VR content makers is imperative to integrate VR experiences with present curricula and address the essential concerns of curriculum integration and adaptation. Providing accessibility and inclusivity top priority is crucial to guarantee that VR deployment meets the varied demands of pupils. Lastly, by promoting information sharing and the exchange of best practices in VR applications, building relationships and international cooperation with academic institutions across the world can assist in increasing Malaysia's global connectivity and advancing the country's educational landscape.

Conclusion

In summary, the integration of virtual reality (VR) technology into education, particularly in language learning, represents a transformative trend driven by rapid advancements in multimedia technologies. VR's notable impact on language proficiency, providing immersive experiences in authentic language dialogues, aligns with the positive influence of multimedia technology seen in the situational interactive teaching system. The crucial role of educators' attitudes in successful VR implementation is evident, hinging on their accurate perceptions of VR and its educational benefits. Recognition and understanding of VR's value led to positive shifts in attitudes and intentions. Despite challenges, including costs and educators' resistance, the undeniable benefits of VR in transferring learned skills underscore the need to explore educators' acceptance of VR in classrooms. In a broader context, the convergence of multimedia technologies and VR holds promise in education.

This research significantly enriches the existing body of knowledge by providing a comprehensive analysis of the integration of VR technology into educational contexts, particularly language learning. Theoretically, it advances our understanding of how immersive VR environments can facilitate language acquisition by offering contextualized and authentic communicative experiences that traditional methods may lack. By situating VR within the broader framework of multimedia technology, this study highlights its potential to enhance situational interactive teaching systems, thus providing a nuanced perspective on technology-enhanced learning environments. Contextually, the research underscores the importance of educators' perceptions and attitudes towards VR, which are critical for its successful adoption and implementation in classrooms. The findings suggest that positive shifts in these perceptions can lead to more effective use of VR, thereby improving educational outcomes. Moreover, by addressing the challenges related to cost and resistance, the study provides practical insights for policymakers and educational institutions aiming to integrate VR into their curricula. In sum, this research not only contributes to the theoretical discourse on multimedia and VR in education but also offers practical implications for enhancing language learning through innovative technological solutions. Overall, this research not only contributes to the theoretical dialogue on the role of multimedia and VR in education but also offers valuable practical insights for improving language learning through cutting-edge technological solutions. Navigating the evolving technological landscape, embracing VR's positive attributes, and addressing challenges can substantially enrich teaching and learning experiences, contributing to the future of education.

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