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The Effectiveness of Virtual Reality in Enhancing English Speaking Skills in English as a Foreign Language Classes

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A B S T R A C T

Speaking proficiency remains a persistent challenge in Indonesian EFL higher education, where students often demonstrate adequate linguistic knowledge but limited confidence and high speaking anxiety in oral communication. Although Virtual Reality (VR) has been widely discussed as an innovative tool in language learning, empirical evidence examining its effectiveness in improving both speaking performance and affective factors in Indonesian university contexts remains limited. The research employed a quasi-experimental design with pre-test and post-test measures to examine the effectiveness of Virtual Reality (VR) technology in improving speaking skills among second-ssemester EFL students at the Islamic University of Riau. The study involved administering assessments before and after the intervention, without a separate control group, allowing measurement of changes attributable to VR-assisted instruction. The findings indicate that the use of VR contributed to positive developments in students' speaking abilities and learning motivation. Quantitative data showed improvements in several key areas, while qualitative feedback highlighted increased motivation and engagement. The research outputs include empirical evidence supporting the integration of VR in EFL speaking classes, comparative assessment data, and the development of an instructional model for VR-based activities. These results are aligned with recent studies and the original research objectives.

Keywords: *Virtual Reality, Speaking, Technology, EFL*

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INTRODUCTION

Speaking is one of the most crucial skills in English language acquisition, particularly in English as a Foreign Language (EFL) context, where learners have limited exposure to authentic communication. At the Islamic University of Riau, many students still face challenges in developing their speaking skills, especially in terms of fluency, accuracy, and confidence. This is in line with studies reporting that EFL learners often struggle due to limited real-life speaking practice and anxiety about making mistakes in front of others (Burns, 2019) Teaching speaking in English language education is often overlooked, with many classroom activities focusing more on getting students to speak rather than explicitly teaching them how to speak effectively. Sahara conclude linguistics and psychological problems are a problem in speaking (Susilawati, 2021). The results showed that using these technologies to teach speaking helps students get along with each other, become more fluent and accurate, feel less anxious and scared, and gain confidence (Sosas, 2021).

The communicative competence and agency demonstrated by non-speaking students vary depending on the type of speech-generating device used and the participatory role assigned(Tegler & Pilesjö, 2023). Foreign Language Speaking Anxiety has been identified as a significant barrier to speaking performance, with speaking regarded as the most anxiety-provoking skill among the four language competencies (Bashori et al., 2022). In addition,

public speaking remains a common issue in EFL contexts and is not limited to student teachers in Indonesia (Azahra et al., 2025). To address the challenges, integrating teacher and peer support in language learning environments is essential, particularly in online or technology-mediated settings, as it helps foster a supportive and stress-reduced atmosphere that enhances learners' psychological well-being and overall language acquisition success (Tauchid, 2025)

Based on the research (Salehi & Marefat, 2014) Anxiety is an influential factor in the foreign language learning domain and plays a crucial role in language learners' performance (Serraj & bt. Noordin, 2013). Previous research indicates that interventions targeting foreign language speaking anxiety demonstrate moderate effectiveness in reducing learners' anxiety levels. The study further recommends integrating anxiety-reduction strategies into language teaching programs and promoting supportive classroom environments that encourage speaking practice (Kayhan, 2025)

In educational contexts, Virtual Reality (VR) facilitates immersive and interactive learning experiences that enhance students' conceptual understanding. By enabling simulations and virtual explorations, VR expands pedagogical possibilities beyond traditional instructional methods (Marougkas et al., 2023)VR technology has allowed teachers to create a lot of different ways for students to learn, like virtual field trips and complicated simulations. These can be used to get students interested and help them learn. To know how to design good learning experiences and how students learn, you need to know about learning theories and approaches. (Marougkas et al., 2023) Virtual Reality (VR) offers immersive, interactive environments that can simulate real-life communication scenarios. These environments allow learners to engage in speaking practice without the pressure of real-world judgment, which has been shown to reduce anxiety and increase motivation. Recent technological advancements have made VR more accessible in educational settings, presenting an opportunity for institutions like the Islamic University of Riau to explore its effectiveness in enhancing speaking instruction.

(Lampropoulos & Kinshuk, 2024)While some international research has explored VR in language learning, very few studies have focused specifically on its effectiveness in improving speaking skills in EFL classrooms within Indonesian Islamic higher education institutions. This study aims to fill that gap by exploring the implementation of VR as a learning tool to enhance speaking proficiency among EFL learners at the Islamic University of Riau.

This study about Virtual Reality applications that simulate real-life speaking situations (e.g., giving presentations, virtual conversations) will be selected and implemented during instructional sessions. Speaking performance will be evaluated based on established rubrics covering fluency, accuracy, pronunciation, and content development. Virtual reality-based education is more realistic because of the growth of virtual reality technology, which lets people move around freely and interact with others in a physical and sensory approach. Based on (Al-Ansi et al., 2023) VR through immersive digital experiences, interactive environments, simulation, and engagement, technologies have completely changed the way that learning is approached. Virtual Reality (VR) represents an innovative technological advancement that enables immersive learning and training experiences by simulating real-world environments through interactive and engaging digital platforms (Riches & Kaleva, 2025).

Previous studies have demonstrated the potential of Virtual Reality in language education, including vocabulary development, learner engagement, and speaking performance (Fitri Wulandari, 2025), (Urueta, 2023), (Zheng et al., 2023). The beneficial effects of virtual reality dental simulators in enhancing students' understanding and abilities (Koolivand et al., 2024). However, these studies are often conducted in Western or East Asian contexts and rarely consider cultural, institutional, and technological differences in Southeast Asia, especially in Islamic universities. The Novelty of this study is one of the first to evaluate VR's impact on EFL speaking skills in an Islamic university in Indonesia. It integrates a local context to assess how Virtual Reality aligns with student needs, cultural

values, and curriculum goals. While previous studies have demonstrated the cognitive benefits of VR in language learning, limited research has examined its impact on affective factors such as speaking anxiety, confidence, and willingness to communicate, particularly in Islamic higher education contexts. Considering that affective variables significantly influence speaking performance, investigating these dimensions is essential.

Based on the (Aini et al., 2023) using virtual reality can improve the students make their effective in teaching learning in classroom. Artificial intelligence (AI) technology had a big effect on schools, and using AI in education gave us new ideas for how to make better technology-enhanced learning systems. Recently, new ways of using technology to learn have come up, such as using virtual reality (VR) instead of regular multimedia materials, digital learning games, and educational software. Using Virtual Reality technologies in language learning makes it more creative, interactive, collaborative, problem-solving, and active knowledge building. The advantages of employing Virtual Reality in language education (Chang et al., 2024) (Xu et al., 2023), (Cicek et al., 2021)releted to use of virtual reality (VR) technology, learning objectives, student interest, and the efficiency, impact, and immersion of VR.

Virtual Reality (VR) offers several advantages in education, making learning more immersive, engaging, and effective. Here are some key benefits:

Enhanced Engagement

VR creates interactive and immersive experiences that capture students' attention, making lessons more interesting and enjoyable.

Experiential Learning

Students can learn by doing, exploring virtual environments, conducting experiments, or practicing real-life skills in a safe, controlled setting.

Improved Retention and Understanding

Immersive experiences help students better understand complex concepts and retain information more effectively.

Access to Otherwise Inaccessible Environments

VR can transport students to places they cannot easily visit, such as historical sites, outer space, or inside the human body.

Safe Practice for High-Risk Scenarios

VR allows students to practice skills like surgery, emergency response, or hazardous experiments without real-world risks.

Personalized Learning Pace

Students can learn at their own pace, revisiting VR modules as needed to reinforce understanding.

Increased Motivation

The novelty and interactivity of VR can boost students' motivation to participate and learn.

Collaboration and Social Learning

Many VR platforms enable collaborative activities, group problem-solving, and communication in virtual spaces.

Support for Diverse Learning Styles

VR accommodates visual, auditory, and kinesthetic learners by providing multi-sensory experiences.

Immediate Feedback

Interactive VR environments can provide instant feedback, helping students correct mistakes and learn more efficiently.

These advantages make VR a promising tool for enhancing education across various subjects and educational levels.

Although Virtual Reality has gained increasing attention in global education, its application in Indonesian higher education, particularly within Islamic Universities, remains limited. Most previous VR-based EFL studies have focused on second-semester settings and cognitive outcomes such as vocabulary acquisition and engagement. Research examining

affective dimensions such as speaking anxiety, confidence, and willingness to communicate remains scarce.

Furthermore, VR integration can be theoretically grounded in Kolb's Experiential Learning Theory, which emphasizes concrete experience and active experimentation. Through immersive simulations, VR provides authentic communicative experiences that align with experiential and immersive learning principles. By creating contextualized, interactive environments, VR facilitates meaningful language use while reducing affective barriers.

Therefore, this study seeks to explore the effectiveness of VR in enhancing speaking proficiency among EFL learners in Islamic University of Riau context, addressing both cognitive and affective dimensions of language learning.

METHOD

This study employed a quasi-experimental research design using a one-group pre-test and post-test approach to examine the effectiveness of Virtual Reality (VR) technology in enhancing speaking skills among English as a Foreign Language (EFL) learners. The design allowed the researcher to measure students' speaking performance before and after the VR intervention to determine whether statistically significant improvement occurred. In addition to performance outcomes, the study also explored students' perceptions regarding the use of VR in speaking instruction.

The participants were second-semester students enrolled in a university-level Speaking course at the Islamic University of Riau. A purposive sampling technique was employed, selecting students who were actively participating in a speaking class where VR-integrated activities were implemented. The study involved approximately 30–40 students from two parallel classes. The participants had relatively similar academic backgrounds and English proficiency levels, as they were enrolled in the same semester and followed the same curriculum.

This research included a speaking performance rubric and a perception questionnaire as instruments. The speaking rubric evaluated pupils on fluency, pronunciation, interaction, and content development according to predefined assessment standards. The questionnaire utilized a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree) to assess students' confidence, motivation, engagement, and reported enhancement in speaking skills following the VR intervention. Furthermore, students engaged in a speaking assignment where they either described a location or took part in simulated conversation scenarios, which were either recorded or conducted live.

The study was conducted in multiple phases. Initially, in the preparation phase, the researcher performed a literature study, created the speaking rubric and questionnaire, and identified suitable VR applications that replicate real-life speaking scenarios, including presentations, interviews, and virtual dialogues. Subsequently, a pre-test was conducted to evaluate students' baseline speaking proficiency, accompanied by the dissemination of a pre-questionnaire for evaluating initial perceptions and confidence levels. The VR intervention was conducted for a duration of about four to six weeks. In this phase, students involved in weekly VR-assisted speaking exercises aimed at replicating genuine communicative scenarios. The instructor oversaw, assessed, and offered feedback on students' performances. A post-test and post-questionnaire were conducted to assess alterations in speaking performance and perceptions following the introduction of VR.

The data were analyzed using qualitative descriptive. The speaking scores of students from the pre-test and post-test were analyzed to assess performance enhancement. Descriptive statistics were employed to determine mean scores and percentage distributions. A paired-sample t-test was used to see if a statistically significant difference existed between pre-test and post-test data. Responses to the questionnaire were examined by descriptive statistics to assess improvements in students' motivation, confidence, and involvement. The results were subsequently analyzed to assess the efficacy of VR integration in improving EFL speaking skills.

FINDINGS AND DISCUSSION

Improvement of Students' Speaking Skills After Virtual Reality Intervention

The findings of the pre-test showed that students had some difficulties speaking well. Most students said they were either neutral or not very confident when speaking in front of others. Their speaking performance was restricted in fluency, pronunciation accuracy, vocabulary range, and communicative involvement.

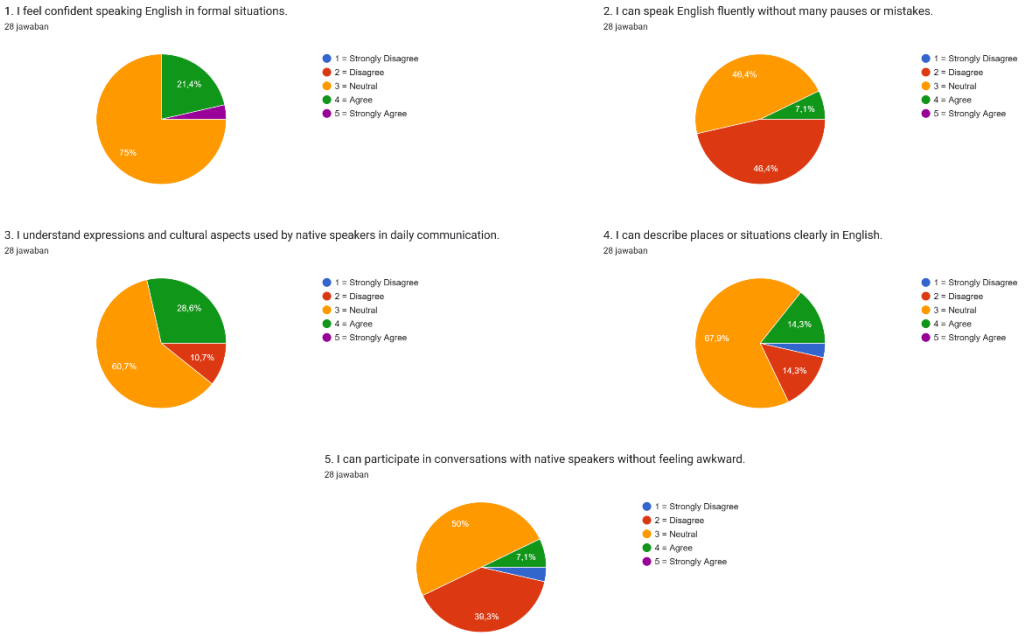

Figure 1. Pre-test Results of Students' Speaking Performance

The post-test findings showed a clear improvement after four to six weeks of speaking activities using virtual reality, as students demonstrated: (1) greater fluency with fewer pauses and hesitations, (2) better pronunciation and clearer speech, (3) improved use of vocabulary to describe situations and conditions, (4) increased confidence when speaking in front of others, and (5) reduced anxiety in simulated communication situations.

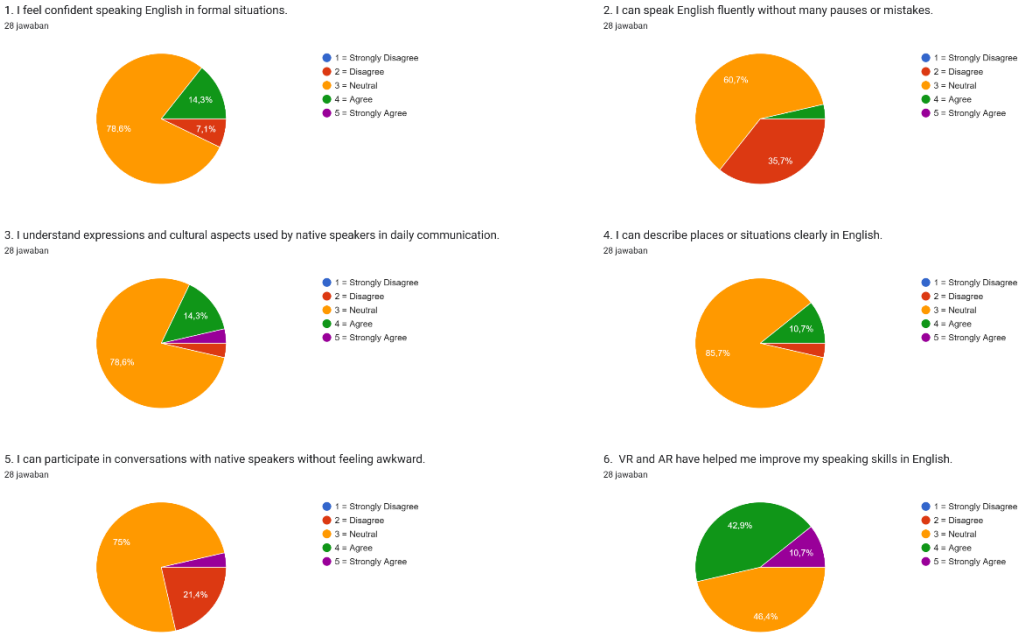

Figure 2. Post-test Results of Students' Speaking Performance

The difference between the results on the pre-test and the post-test demonstrated that overall speaking performance improved. According to descriptive statistics and a paired-sample comparison, the mean score on the post-test was higher than the mean score on the pre-test. This means that VR helped improve speaking skills.

The results for Research Question 1 show that Virtual Reality had a big effect on students' speaking skills, especially their fluency, confidence, and ability to communicate.

Students' Perceptions Toward the Use of VR

The findings of the survey showed that students had positive feelings about using virtual reality in speaking sessions. Before the intervention, many students reported: (1) low confidence when speaking formal English, (2) worrying about making mistakes, and (3) feeling nervous when speaking in front of others.

After the implementation of virtual reality, most students agreed or strongly agreed that it helped improve their speaking skills. They reported: (1) feeling more comfortable practicing English in virtual settings, (2) reduced fear of being judged, (3) increased interest and motivation during learning sessions, and (4) that immersive scenarios helped them better visualize how they would communicate in real-life situations.

Students' qualitative responses suggested that VR provided speaking practice engaging, interesting, and less stressful in comparison to conventional classroom presentation methods. In Research Question 2, students had favourable feelings about using VR in EFL speaking lessons, especially when it came to motivation, engagement, and reducing nervousness.

The findings show significant changes in students' reaction patterns following VR-assisted practice. The majority of pre-test responses were characterized by "Neutral," indicating ambiguity and moderate levels of confidence. This supports the issue emphasized in the abstract: students have linguistic understanding but lack significant confidence.

After the development of virtual reality, levels of agreement improved across various measures, mainly in confidence and comprehension of phrases. This indicates that immersive VR settings may provide contextual exposure that improves communicative competence.

Particularly in certain items (fluency and participation), the frequency of disagreement replies increased. This may suggest increased self-awareness. Following realistic speaking simulations, students may have assessed their competencies with greater evaluation. This phenomenon may indicate an increase of perception rather than a decrease in awareness.

This study aimed to address the following research questions: (1) To what extent does Virtual Reality enhance the speaking skills of EFL students at the Islamic University of Riau? (2) What are students' thoughts regarding using of Virtual Reality in their English as a Foreign Language speaking class?

Based on the pre-test and post-test comparative analysis, Virtual Reality (VR) demonstrated a moderate but observable positive impact on students' perceived speaking skills. Prior to the intervention, the majority of students selected neutral responses across indicators of confidence, fluency, descriptive ability, and conversational participation. This suggests that students initially experienced uncertainty regarding their speaking competence. After the Virtual Reality assisted instruction, several positive shifts were identified. Agreement levels increased in confidence in formal speaking and understanding of expressions and cultural aspects, while neutral responses decreased in multiple items, indicating clearer self-assessment.

Although improvement in fluency and conversational participation was not uniformly great, the data suggest increased metacognitive awareness following immersive practice. Students appeared to evaluate their speaking ability more critically after experiencing realistic Virtual Reality simulations. Importantly, negative responses in some confidence-related items were reduced in the post-test.

Overall, VR enhanced students' speaking skills to a descriptive and perceptual extent, particularly in strengthening confidence, pragmatic awareness, and communicative readiness. While the improvement was moderate rather than dramatic, the findings indicate that VR provides meaningful support for speaking development in the EFL classroom.

Based on the second research question, students' perceptions of virtual reality-assisted instruction were generally positive. The post-test results showed that 42.9% of students agreed and 10.7% strongly agreed that virtual reality helped improve their speaking skills, with no negative responses recorded. Nearly half of the participants selected neutral responses,

suggesting cautious optimism but overall acceptance. These findings indicate that students view virtual reality as: (1) an engaging instructional tool, (2) a supportive learning environment, and (3) a helpful medium for practicing speaking skills.

The absence of disagreement reflects a high level of acceptance and satisfaction with the Virtual Reality learning experience. Students appear to appreciate the immersive and interactive nature of Virtual Reality, which allows them to practice speaking in simulated real-life contexts with reduced pressure. The students perceive Virtual Reality as a beneficial and motivating technology that supports their speaking development and enhances their classroom experience.

Indicator	Dominant Pre-Test Response	Dominant Post-Test Response	Change
Confidence in Formal Speaking	75% Neutral	78.6% Agree	Significant Increase
Fluency	46.4% Disagree	60.7% Neutral	Moderate Improvement
Understanding Expressions	60.7% Neutral	78.6% Neutral (No Disagree)	Positive Shift
Conversational Participation	50% Neutral	75% Neutral + 21.4% Agree	Positive Shift

Based on the students' responses, the findings of this research are:

Confidence in Speaking English in a Formal Situation.

Based on the pre-test results, 75% of the students (n = 21) selected *Neutral*, indicating that most students were unsure about their confidence in speaking English in formal situations. Meanwhile, 21.4% (n = 6) agreed that they felt confident, and only a small proportion showed stronger confidence. This distribution suggests that, before the intervention, the majority of students demonstrated moderate self-confidence accompanied by uncertainty regarding their speaking ability.

Following the VR-assisted training, the post-test results showed a notable shift toward more positive responses. A total of 78.6% (n = 22) selected *Agree*, 14.3% (n = 4) chose *Strongly Agree*, and 7.1% (n = 2) remained *Neutral*. Importantly, no students expressed disagreement. This significant increase in agreement and strong agreement responses indicates a substantial improvement in students' confidence. The shift from predominantly neutral responses in the pre-test to predominantly positive responses in the post-test suggests that VR exposure provided structured and immersive practice in simulated formal speaking contexts, which enhanced students' emotional readiness and overall speaking confidence.

Fluency without Many Pauses or Mistakes

Based on the pre-test results, 46.4% of the students (n = 13) selected *Neutral*, while another 46.4% (n = 13) chose *Disagree*, indicating that a large proportion of students felt they were not fluent in speaking English. Only 7.1% (n = 2) agreed that they could speak fluently. These findings suggest that, before the intervention, most students either doubted their fluency or were uncertain about their speaking ability, confirming that fluency was a significant challenge.

In the post-test results, 60.7% (n = 17) selected *Neutral*, 35.7% (n = 10) chose *Disagree*, and only 3.6% (n = 1) selected *Agree*. The increase in neutral responses and the decrease in disagreement indicate a slight shift in students' perceptions. Although agreement responses slightly decreased, the reduction in disagreement suggests that fewer students strongly perceived themselves as lacking fluency. This pattern may reflect increased self-awareness after participating in immersive VR speaking activities. Through experiential learning, students may have developed a more realistic and reflective evaluation of their fluency, leading to more balanced (neutral) responses rather than strong disagreement.

Understanding Expressions and Cultural Aspect

The pre-test results showed that 60.7% of the students (n = 17) selected *Neutral*, 28.6% (n = 8) selected *Agree*, and 10.7% (n = 3) selected *Disagree*. These findings indicate that, before the intervention, most students were uncertain about their pragmatic competence and

intercultural awareness, while a smaller proportion felt confident, and some expressed a lack of confidence.

In the post-test results, 78.6% (n = 22) selected *Neutral*, 14.3% (n = 4) selected *Agree*, and 3.6% (n = 1) selected *Strongly Agree*, with no responses indicating disagreement. Although the proportion of neutral responses increased, the disappearance of disagreement and the emergence of *Strongly Agree* responses suggest a shift toward more positive self-perception. The reduction in disagreement may indicate improved understanding and reduced uncertainty. The presence of strong agreement, which was absent in the pre-test, suggests that some students developed higher confidence in their pragmatic and intercultural competence after experiencing Virtual Reality simulations. These simulations likely provided contextualized language exposure, helping students better understand expressions, cultural norms, and appropriate communication strategies.

Ability to Clearly Describe Places or Situations Results

Based on the pre-test results, 67.9% of the students selected *Neutral*, indicating that the majority were uncertain about their ability to speak descriptively in English. Meanwhile, 14.3% expressed *Disagree*, 14.3% selected *Agree*, and 3.6% chose *Strongly Disagree*. This distribution shows that before the VR intervention, many students were unsure of their descriptive speaking ability, while a noticeable proportion lacked confidence.

After the Virtual Reality Assisted treatment, the post-test results revealed that 85.7% of students selected *Neutral*, 10.7% chose *Agree*, and 3.6% selected *Disagree*. No students selected *Strongly Disagree* in the post-test. The increase in neutral responses suggests that students became more reflective and cautious in evaluating their descriptive speaking ability. Although strong disagreement decreased, indicating reduced negative perception, the dominance of neutral responses may imply that while VR activities raised awareness of descriptive speaking skills, students were still developing confidence and accuracy in delivering detailed descriptions.

Participation in Conversations Without Feeling Awkward

Based on the pre-test results, 50% of the students selected *Neutral*, indicating moderate uncertainty about their anxiety when speaking to others. Meanwhile, 39.3% chose *Disagree*, 7.1% selected *Agree*, and 3.6% chose *Strongly Disagree*. This distribution suggests that before the Virtual Reality intervention, a considerable number of students tended to deny experiencing anxiety, although half of them were still unsure about their feelings.

After the Virtual Reality-assisted treatment, the post-test results showed that 75% of students selected *Neutral*, 21.4% chose *Agree*, and 3.6% selected *Strongly Agree*. No students selected *Disagree* or *Strongly Disagree* in the post-test. The increase in neutral responses, along with the emergence of strong agreement, suggests a shift in students' self-perception. Rather than indicating increased anxiety, this change may reflect greater awareness and more honest self-evaluation after experiencing immersive speaking practice. The absence of disagreement responses suggests that students became more reflective and acknowledged the emotional challenges involved in real communicative situations.

Perception of VR and AR Effectiveness

How well Virtual Reality worked, the results 46.4% (n=13) were neutral, Agree: 42.9% (n=12), Agree: 10.7% (n=3). There is no disagreement. More than half of the people who took part (53.6%) said they agreed that VR helped them speak better. The lack of negative feedback shows that Virtual Reality is widely accepted as a teaching tool. This result strongly backs up the study's claim that immersive technology makes language learning more interesting and helpful.

CONCLUSIONS

This study was conducted to evaluate the impact of Virtual Reality (VR)-assisted training on both speaking proficiency and affective outcomes among second-semester EFL students at the Islamic University of Riau, using a one-group pretest–posttest design. The findings revealed notable descriptive improvements from pre-test to post-test. Prior to the VR intervention, students' responses were predominantly neutral, reflecting uncertainty and

moderate confidence in their speaking abilities despite having a fundamental understanding of English. After participating in VR-assisted training, students demonstrated increased confidence in formal speaking and improved comprehension of phrases and accents. The decline in neutral responses across various measures indicated clearer self-perception and greater awareness of their speaking skills. Although gains in fluency and conversational engagement were not uniformly observed, the data suggest enhanced self-awareness resulting from immersive speaking experiences. Importantly, more than half of the participants reported positive perceptions of the benefits of VR, with no negative feedback, highlighting VR's effectiveness as an engaging educational tool. Overall, the results indicate that VR-assisted training holds significant promise for enhancing students perceived speaking competence, confidence, and psychological readiness. While the benefits observed are descriptive rather than statistically validated, the study suggests that immersive VR environments can create meaningful learning experiences that foster both linguistic and emotional development in EFL classrooms. According to the implementation of VR-assisted training, many positive improvements were observed. There was an increase in confidence for confidence in formal speaking and comprehension of phrases and accents. The reduction of neutral responses across various issues suggests a more defined self-perception and an increased awareness of speaking capabilities. While enhancements in fluency and conversational engagement were not consistently suggested, the changes seem to indicate improved self-awareness rather than weakness. Students may have assessed their competencies further following participation in immersive and relevant speaking tests. Significantly, over fifty percent of the participants indicated an encouraging perception the VR technology enhanced their speaking abilities, with no adverse perceptions revealed. This indicates efficient support of VR as an immersive and beneficial educational tool. The study finds that VR-assisted training shows significant potential in enhancing students' perceived speaking competence, confidence, and psychological readiness. The observed benefits, although descriptive and not statistically validated, suggest that immersive VR environments can facilitate significant learning experiences that enhance both linguistic development and emotional growth in EFL classrooms.

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