PAPER

Metaverse-Based Activities for Enhancing Communicative Competencies among Young Learners

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ABSTRACT

The transformative potential of the metaverse in English language learning, particularly in rural areas such as the Felda (Federal Land Development) Malaysian communities, has gained popularity following the COVID-19 outbreak. This study explores the use of metaverse-based activities to enhance communicative competencies among young learners in these rural areas. Employing a quantitative methodology, the research involves 60 participants divided evenly into two groups: an experimental group and a control group. The former received metaverse-based English language instruction, while the latter followed traditional classroom teaching. Results from pre- and post-tests, as well as structured questionnaires, indicate that the metaverse significantly improves communication competencies, including speaking, listening, and social interaction skills. The data show that metaverse-based activities provide a more engaging and immersive learning environment, promoting natural and authentic improvements in communicative abilities for young children in rural primary schools. These findings hold significant implications for English language instructors and curriculum designers, highlighting the potential of integrating modern technology into early childhood education.

KEYWORDS
metaverse, English language teaching, young learners, communicative competency, rural primary school

1 INTRODUCTION

Using cutting-edge technologies has significantly changed the educational scene in recent years. A dynamic, interactive learning environment has replaced the old classroom paradigm's static lectures and standardised tests. The metaverse is one such technological innovation that is transforming education. It is an immersive virtual environment where users may communicate in real time with digital items and one another. The current educational revolution is intimately related to the developments of Industry 4.0 and Society 5.0. Information and communication technology

is advancing at a rapid pace in the Industry 4.0 and Society 5.0 eras, as seen by the proliferation of the Internet of Things across multiple domains [1].

The development of English language communicative competencies remains a major difficulty for young learners in rural locations, like the Felda (Federal Land Development) Malaysian communities, even with the developments in educational technology. Conventional classroom instruction frequently falls short of offering the immersive and stimulating atmosphere required for language learning to be effective, especially in social contact, speaking, and listening. These issues have been made worse by the COVID-19 pandemic, emphasising the need for creative methods of teaching languages. To overcome the shortcomings of traditional teaching approaches, this study explores the potential of metaverse-based activities as a means of improving English communicative competencies among young learners in rural primary schools.

The metaverse is a virtual reality (VR) environment that has gained increasing attention as a potential tool for language instruction and learning among young learners in recent years [2]. It can improve learning outcomes and the effectiveness of instructional materials. Moreover, many advantages are provided by the metaverse's VR technology. The metaverse is a cutting-edge technology platform that lets users access virtual environments, such as virtual classroom settings. Eliminating the need for an actual classroom saves money and improves learning outcomes by enabling real-time engagement for theoretical and practical components, specifically for communicative competencies [3]. It also can be used in the classroom, and it provides dynamic learning experiences by fusing real-world connections with 2D and 3D features in dynamically generated learning content in real time due to its potential use in various devices such as smartphones and computers [4, 5].

The term metaverse is a compound word consisting of the Greek prefix 'meta,' which means 'after, after or beyond,' and the word 'universe' [6]. The metaverse is a realm that exists beyond reality where users can interact with each other in a continuous and shared environment that merges the physical world with the virtual world [7]. This technology can help students learn a language by giving them engaging and interactive experiences [8]. By creating virtual environments, the metaverse allows language learners to practice their skills, connect with real-world language situations, and get feedback immediately [9].

In the globalisation context, the significance of English language education for young children has grown substantially [10]. In a globalised world, the importance of teaching young children English has grown significantly [11, 20]. As countries become more connected [12], English has become a worldwide lingua franca [13]. The number of young people who want to learn English has increased because it is seen as an important skill in a globalised world [10, 17]. Learning English is becoming more and more important for many reasons [37]. English enables access to many educational resources, like academic literature, online courses, and study papers [13, 36].

Researchers have investigated how the metaverse could be used to teach languages such as English and found that it can help people learn languages faster. The immersive structure of the metaverse can help get people interested in and motivated to learn a language [15]. Using the metaverse platform has pedagogical potential and transformative effects on communication in English language teaching [16]. Research has used a qualitative approach and revealed several pedagogical implications, such as promoting immersive language learning experiences and enhanced interaction and collaboration [16]. Learners can actively participate in language tasks, practice making language, and participate in games that are true to life [19]. The metaverse can help people learn language skills like easily understanding what is being said and speaking [44]. Using the metaverse, students can customise their virtual avatars, talk to other users in real time, and use various language tools [7].

These interactive and personalised elements can help build a learner-centred learning process [20]. Importantly, using the metaverse to teach languages is still a new field, and more research is needed to fully understand its potential and success [12].

The importance of this study is in its ability to revolutionise teaching English to young pupils in rural primary schools by utilising the metaverse platform-based learning. This strategy goes beyond traditional methods, allowing for the development of creative communication skills, improving the organisation of language and promoting motivation in the learning process. This is significant for educators, politicians and researchers because it provides evidence-based insights on effectively using metaverse technologies to overcome communication barriers among young learners. The study enhances accessibility, engagement and effect in communicative competencies within English language learning, notably benefiting a group commonly faced with problems in conventional educational settings. This paper introduces the idea of metaverse-based platforms and how they could affect communication skills. The literature review looks at earlier research on VR and language learning before going into methodology and outlining our study's design and participant selection in depth. The presentation of our empirical investigation's results is followed by a discussion of the findings and how they relate to technology integration in education. We wrap up by summarising the most important discoveries and providing suggestions for more study in this developing area.

2   LITERATURE REVIEW

The literature review examines the incorporation of the metaverse into English language instruction with the aim of improving communicative competencies among young learners in rural primary schools. The review will focus on how well the metaverse's immersive and stimulating learning settings work. The study's methodology and results—which comprised 60 participants split into experimental and control groups—will also be covered. The control group was instructed using traditional means, and the experimental group was instructed based on the metaverse. The experimental group's speaking, listening and social interaction abilities significantly improved, according to pre- and post-test results and structured questionnaire responses. These results highlight how incorporating contemporary technology into early childhood education can promote genuine and organic improvements in communicative skills.

The review seeks to shed light on the advantages of using the metaverse for educational purposes for English language teachers and curriculum designers. This study explores how metaverse technology can improve language acquisition and communication abilities in educational situations by analysing techniques, findings, and implications, building on earlier research. The goal is to find patterns, gaps, and opportunities for successfully incorporating immersive virtual worlds into language training by synthesising empirical data from several studies. This analysis helps us grasp the advantages of technology-enhanced learning settings for students and guides our approach.

2.1   Metaverse as an English language learning platform

The term 'Metaverse' refers to a vast and interconnected VR experience frequently characterised by shared digital spaces where users engage in various activities, interactions and experiences. It is a dynamic mix of virtual environments, social interactions and digital assets that creates a parallel digital world that people can move through using avatars or digital copies of themselves [14, 15]. The idea of the metaverse has become more popular as digital technologies improve and virtual interactions

become a larger part of everyday life. [4]. The metaverse is a major step forward in how people deal with technology because it gives people an immersive and connected experience [45]. In addition, the metaverse could also change how people interact with digital material and each other [30]. New technologies like augmented reality (AR), VR and different Internet-based platforms are helping to drive this change.

The metaverse allows people to have immersive experiences that include entertainment and games, education, business and communication [40, 41]. Users can interact with each other and digital material in real time, making connections, working together and doing activities that often go beyond the physical world [4]. The metaverse can change many industries and how people see and interact with digital environments [5]. People can now attend VR events, travel through beautiful landscapes and engage in rich, multi-sensory experiences thanks to the advancement of VR technology [29]. The metaverse has a larger impact on society, communication and the economy as technologies and connectivity improve [19]. In essence, the metaverse is where technology, VR and human interaction meet to create a place similar to and different from the real world [1].

Even with these improvements, young students in rural areas still have considerable obstacles ahead of them to gain communicative English language skills in Felda Malaysian communities. Conventional classroom instruction frequently falls short of offering the immersive and stimulating atmosphere required for language learning to be effective, especially in social contact, speaking and listening. These challenges have been made worse by the COVID-19 pandemic, thereby emphasising the need for creative methods of teaching languages.

2.2 Communicative competencies in English language teaching and learning

In developing communicative competencies, specifically listening and speaking skills, the metaverse-based platform is a potential way to achieve that objective. The immersive and interactive nature of the metaverse enables learners to engage in communicative tasks that simulate real-world situations, allowing them to practice language use in a safe and stimulating environment [46]. VR technology, such as the metaverse, can increase the motivation and engagement of very young language learners [31]. Communicative competencies refer to the capacity of a learner to effectively and properly communicate in a language that is being targeted [18]. It encompasses various skills, including speaking, listening, reading and writing. According to [39], the utilisation of the metaverse, a platform based on VR, demonstrated the potential to enhance the communicative competencies of young learners, particularly in their abilities to speak and listen. The metaverse's immersive and interactive characteristics generate an appealing and dynamic educational setting that promotes motivation and active involvement in language-based activities. Participating in genuine and interactive language exchanges allows individuals to enhance their vocabulary, grammar and pronunciation skills [24–26]. The metaverse's interactive nature enables rapid feedback and correction, thereby promoting precise and smooth speech cultivation. The metaverse provides a variety of audio-visual materials and stimuli that enable young learners to engage with and enhance their listening skills. Students can actively engage in listening exercises, comprehend verbal communication and participate in interactive auditory-based tasks [21]. The integration of auditory stimuli, visual aids, and situational instructions within the digital realm amplifies the ability of learners to assimilate and grasp communication through words [23]. Integrating metaverse into language learning environments improved speaking fluency, vocabulary acquisition and listening comprehension [35].

2.3 English language learning in young learners

Early childhood or preschool-aged children, commonly known as very young learners, are typically within the age range of three to seven years old [33]. Children exhibit fast progression in their linguistic abilities in this stage and possess a remarkable aptitude for acquiring various languages [35]. Children's cognitive abilities are developing, and they acquire knowledge most effectively through experiential learning, play, and significant social interactions [34]. Moreover, the activities must be ensured to be captivating, participatory, and suitable for their age group to sustain their attention span [18]. The early childhood phase is crucial for cognitive and linguistic advancement in language acquisition [27]. Children aged three to seven exhibit exceptional aptitude for language acquisition and display a high degree of accessibility to new knowledge. VR environments, such as the metaverse, provide a one-of-a-kind opportunity to design immersive and compelling language learning experiences for very young students [13]. This paper examines the potential benefits of metaverse-based English language instruction and learning for young learners in rural primary schools.

2.4 Theoretical framework

The research was based on the technology acceptance model (TAM) theoretical framework, initially introduced by Davis in 1989 to explain the elements influencing users' acceptance and adoption of new technologies. TAM asserts that consumers' intentions and actual use of technology are significantly influenced by their perception of how easy it is to use and how valuable it is. Within the scope of the study, the TAM offers a theoretical framework for comprehending the cognitive processes and active involvement of young pupils in a rural primary school in Malaysia regarding their perception and utilisation of a metaverse-based platform specifically created for English language acquisition. The long-lasting significance of TAM and its effectiveness in analysing users' attitudes towards technology [16].

3 METHOD

3.1 Research design

This quantitative research examines the effects of using a metaverse-based platform on the communication competencies of 60 young English language learners in a rural school environment. The participants in this study were young learners between the ages of seven and nine. The participants were intentionally segregated into two cohorts: an experimental group that interacted with the metaverse-based platform developed explicitly for language acquisition, and a control group, which adhered to conventional English language instruction techniques. The study used pre- and post-test evaluations and structured questionnaires to gather data systematically.

3.2 Sampling

A total of 60 pupils aged seven to nine years old who had been chosen participated in the study as the participants. The sample size was restricted to 60 individuals due to practical limits on the number of participants. A sample size of 60 has been proposed

to be adequate to obtain a satisfactory degree of power to detect effect sizes, according to Lakens [48]. However, the study may not fully represent the general population because only 60 participants were present. This problem becomes more apparent when working with a diverse group of interests. As a result, not every member of the target demographic may benefit from the study's conclusions. All participants had the same English language proficiency based on their classroom-based assessment (PBD). The demographical characteristics of the participants are shown in Table 1.

Table 1. Demographical characteristics of the participants

Variables	Category	F	%
Age	7 years old	20	33.33
	8 years old	20	33.33
	9 years old	20	33.33
Total		60	100

3.3   Research instruments

The quantitative research instruments consisted of a pre- and post-exam with four unique portions, each designed to evaluate the various language skills of the participants. The initial segment centred on oral aptitude, encompassing three inquiries to assess verbal communication competence. The second component focused on assessing listening skills, consisting of two questions designed to measure auditory comprehension. The final segment evaluated writing abilities, including two prompts to evaluate written communication.

The fourth portion was a single question, summarising the participants' total language skills. In addition, the structured interviews were segmented into four portions, with each component comprising five questions rated on a Likert scale. The extensive interview style allows for a detailed examination of the participants' viewpoints and encounters with the multiverse-based English language teaching technique. This yielded interesting qualitative insights that complemented the quantitative data.

3.4   Data collection methods

The study used a pre- and post-test control group design to assess the effects of the metaverse intervention on communicative competencies [38]. Pre- and post-tests assessing communication abilities were conducted before and after implementing the metaverse language platform [28]. The pre-test ensured that the control and experimental groups had the same starting point before the intervention because they were assigned randomly [43]. The metaverse was utilised as the primary tool for manipulating variables in the experimental group. Comparing the post-test scores between different groups enables the identification of the learning gains that may be attributed to the intervention, as opposed to those that can be attributed to typical development. This outcome highlights the effectiveness of immersive virtual environments and demonstrates that the metaverse platform surpasses traditional methods in developing essential language skills [42], even in the early stages of development. Structured surveys were used to collect numerical data. For this study, structured interviews will be used to discover people's thoughts, feelings, experiences or even their age and gender. Interview answers were coded and analysed quantitatively to find common themes, trends or relationships [32].

3.5 Validity

To ensure the items in this questionnaire have a high degree of validity, the questionnaire was evaluated by two panels with expertise in the ESL field: one panel from School Improvement Specialist Coaches Plus (SISC+) with 19 years of experience and a second panel comprising the head of the English panel in a primary school in Malaysia and a senior assistant teacher with a Masters in TESL. Their comments were considered before the questionnaire was edited and sent to the respondents. In the initial process of collecting data, permission to carry out the research was first obtained from eRAS 2.0 (Educational Research Application System 2.0). Given that the researchers were from different districts and being there physically in the research setting would be difficult, cooperation from Pahang State Education Department (JPN Pahang) and Temerloh District Education Department (PPD Temerloh) was requested. The criteria checklist of the two experts is visualised in Table 2.

Enhancing validity was necessary to guarantee the reliability and credibility of study findings. Although reliability is concerned with the consistency of results across time, validity is concerned with how well a study measures its intended construct [50]. To improve validity, content validation entails two subject matter experts carefully reviewing a survey questionnaire and test questions. These experts, who included the head of the English panel with eight years of experience as a teacher and an expert in creating questions for the Ujian Akhir Sesi Akademik (UASA)—the primary school national final exam of the academic session—reviewed the items to make sure the measured construct was accurately represented. Their input helped point out any unclear or extraneous details that needed adjustment.

Standardised rubrics were used in the pre- and post-tests to guarantee the accuracy and reliability of the measurements and to preserve data validity. Table 2's validity analysis showed an average total summary value of 80.7%, indicating strong content validity and item acceptability. According to Tuckman and Waheed [51], a more than 70% content validity index demonstrated a high degree of expert agreement. In addition, a pilot study was carried out on a limited sample size to understand the items' relevance and clarity. The test instrument's content validity was improved by detecting possible problems and making the required changes with the help of feedback from pilot participants.

Table 2. Criteria checklist of the participating experts

Profile	Expert A	Expert B
Institution	The Temerloh SISC+ (English Language) officer	Senior English lecturer in a teacher training institute
Expertise	English language, Curriculum, pedagogy, and innovation	English language, Curriculum, pedagogy, and educational research
Training experience	Teacher in service	Teacher trainee and teacher in service

4 RESULTS

4.1 Data analysis

Pre- and post-test. The study used pre- and post-test methods to evaluate the language proficiency of 60 participants, identified as P1 through P60, who participated in metaverse-based English learning. The pre-test assessed participants'

language proficiency before exposure to metaverse-based learning, and the post-test assessed their language proficiency following the immersive learning experience. 30 participants were grouped into experimental groups, and the other 30 were in a control group. The pre- and post-test results for the experimental group are shown in Table 3.

Table 3. Pre- and post-test results for the experimental group

Experimental Group	Pre-Test	Post-Test
Participants	Percentage %	Percentage %
P1	12	50
P2	11	55
P3	13	65
P4	15	40
P5	15	66
P6	14	54
P7	17	56
P8	20	57
P9	18	76
P10	15	45
P11	14	44
P12	15	46
P13	12	57
P14	12	66
P15	18	57
P16	12	50
P17	11	55
P18	13	65
P19	15	40
P20	15	66
P21	14	54
P22	17	56
P23	20	57
P24	18	76
P25	15	45
P26	14	44
P27	15	46
P28	12	57
P29	18	66
P30	12	57

The pre-test results for the experiment group showed a mean score of 14.733, with both the median and mode at 15, showing a central tendency. The small standard deviation of 2.558 indicated a narrow distribution around the mean, indicating consistency across participants. After the intervention, the post-test results showed a significant improvement, with an average score of 55.6, a middle score of 56 and a most frequently occurring score of 57. Nevertheless, the post-test's higher standard deviation of 9.626 suggests a greater range of results and more variability in individual performance. The pre- and post-test results for the control group are shown in Table 4.

Table 4. Pre- and post-test results for the controlled group

Controlled Group	Pre-Test	Post-Test
Participants	Percentage %	Percentage %
P31	25	23
P32	11	12
P33	8	8
P34	14	15
P35	12	14
P36	9	9
P37	15	17
P38	13	16
P39	15	15
P40	21	22
P41	11	11
P42	15	15
P43	13	13
P44	14	10
P45	11	11
P46	25	23
P47	11	12
P48	8	8
P49	14	15
P50	12	14
P51	9	9
P52	15	17
P53	13	16
P54	15	15
P55	21	22
P56	11	11
P57	15	15
P58	13	13
P59	14	10
P60	11	11

The descriptive statistics for the control group showed significant patterns in the pre- and post-test outcomes. During the pre-test, the participants had an average score of 13.667, with a median score of 13. This indicates that the distribution of scores had two peaks, or modes, at 11 and 15. The pre-test results exhibit significant variability, as indicated by the standard deviation of 3.976. Transitioning to the post-test, the average score experienced a modest increase to 14.0667, with a middle value of 14 and a most frequently occurring value of 15, suggesting a movement towards higher scores. The post-test's standard deviation of 4.242 highlights the ongoing variability in participant performance.

4.2 Normality test

The normality test is essential for conducting the paired sample t-test. It assesses whether the data conforms to a normal distribution, a prerequisite for this test. In this analysis, the data comprises pre- and post-test values. The examination of the sample data involved utilising the gain score data within the SPSS 23.0 software, with the Kolmogorov-Smirnov test applied. A data set is deemed to follow a normal distribution if the significance (two-tailed) value exceeds 0.05. The p-value for the test is 0.57872, which is normally distributed. The p-value for the post-test is 0.68808, which is normally distributed.

Table 5. Kolgomorov Smirnov normality test

Test	Kolmogorov-Smirnov	Statistic	df	Sig.
Score	Pre-Test	0.191	14	0.505
	Post-Test	0.175	14	0.347

4.3 Paired sample T-test

The paired sample t-test, which compares average values before and after therapy to assess treatment success, is used in this analysis. Its main characteristic is gathering twice pre- and post-treatment data from the same sample. A paired sample t-test was utilised in this investigation to evaluate the research hypothesis. The following are the evaluation criteria: (a) The rejection of H0 occurs when the probability value, or sig. (two-tailed), is less than 0.05, indicating a significant difference between the pre-test and post-test. By contrast, H0 is accepted if the probability value, or sig. (two-tailed), is greater than 0.05, suggesting that there is no significant difference.

Table 6. Paired sample T-test

		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std Deviation	Std Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-test – Post-Test	−40.87	2.60	9.80	2.617	−46.23	−35.51	−15.6142	28	0.000

4.4 Structured questionnaires

The study included structured interviews that included closed-ended questions with five-point Likert scale replies to collect supplementary quantitative data on students' learning experiences. Scales were created to evaluate important aspects such as perceived language improvements, involvement, user-friendliness, satisfaction, motivation for future usage, and comparisons with traditional English teaching methods, using well-established concepts from previous studies. The scales comprised five to seven Likert scale items for each component, then averaged to get summary scores for statistical comparison. The sample of the structured questionnaires was collected from 15 participants from the experimental group. Only the experimental group questionnaire was collected because they were the ones involved with exposure to using the metaverse platform in English language learning. This study builds upon Davis's established theoretical model.

Section 1: Perceived language improvement (five items). This segment tries to understand participants' thoughts on their language improvement. Five questions assess distinct language capabilities, including general language aptitude, oral, auditory, and writing progress, and learners' confidence in using English for communication. For the first question about the good influence of the metaverse on language proficiency, 66.7% strongly agreed, while 33.3% generally agreed. Regarding the second question on metaverse activities adding to English speaking skills, 83.3% highly agreed, 16.7% agreed and 25% stayed neutral.

Question three, which focused on the impact on listening abilities, provided different responses: 3.3% disagreed, 23.3% were neutral and 23.3% agreed. For question four on strengthening writing talents, 20% disagreed, 16.7% were neutral, 10% agreed and 3.3% strongly agreed. Regarding issue five about feeling more confident in using English, 73.3% strongly agreed, 10% agreed and 3.3% stayed neutral. These percentages provide an overview of participants' viewpoints, boosting understanding. Figure 1 visually illustrates participants' replies in Section 1.
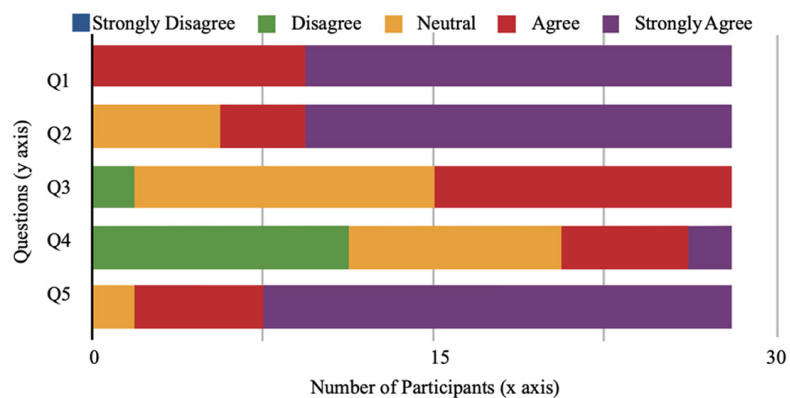

Fig. 1. Perceived language (Section 1)

Section 2: Involvement (five items). The second component of the survey analyses users' participation and motivation in linguistic activities within the metaverse. This section examines the impact of metaverse technology on the passion, curiosity, determination and sense of achievement of young language learners. It primarily focuses on the emotional and motivational components of their involvement in language learning. Analysis of responses suggests that, for question one, 53.3% concurred, with 26.7% in agreement and 26.7% strongly agreeing. Similarly, on question two, 51.7%

agreed, with 23.3% expressing agreement and 28.3% strongly agreeing. Question three saw a 61.7% agreement rate, with 20% in agreement and 41.7% strongly agreeing. Regarding question four, 51.7% agreed, with 23.3% expressing agreement and 28.3% strongly suggesting agreement. Question five garnered a significant 53.3% consensus, with 28.3% agreeing and 25% strongly agreeing. These statistics show participants' positive sentiments toward involvement and motivation in language activities within the metaverse. Figure 2 visually shows the responses in Section 2.
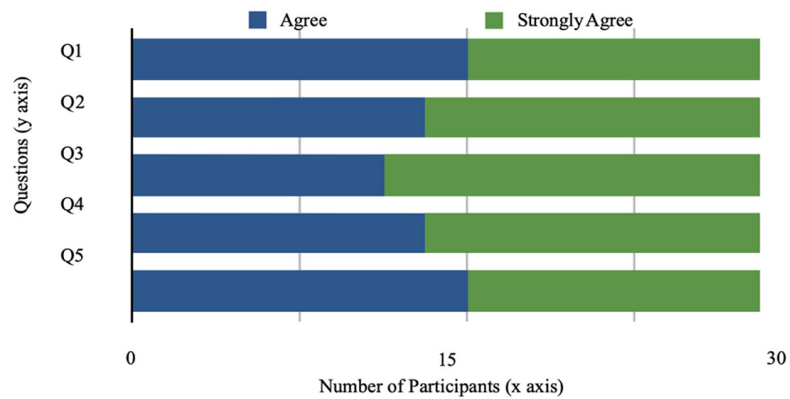
Fig. 2. Involvement (Section 2)

Section 3: User friendliness (five items). This section thoroughly explores how easily users can operate the metaverse platform, including elements like simplicity, intuitive tools and interfaces, clear instructions and overall accessibility. Understanding the viability and acceptance of metaverse technology, especially among young children in rural primary schools, is vital for appreciating how users engage with the platform's user-friendly features. Analysis of replies shows that, for question one, 60% of respondents agreed, with 30% suggesting agreement and another 30% strongly indicating agreement. Regarding question two, 55% agreed, with 26.7% expressing agreement and 28.3% strongly suggesting agreement. Question three indicated a 55% agreement percentage, with 26.7% agreeing and 28.3% strongly agreeing. For question four, 60% agreed, with 20% expressing agreement and 40% strongly suggesting agreement. Finally, issue five revealed a large 55% consensus, with 28.3% agreeing and 26.7% strongly agreeing. These percentages reflect positive sentiments regarding the user-friendliness of the metaverse platform among participants. Figure 3 visually illustrates participants' replies in Section 3.
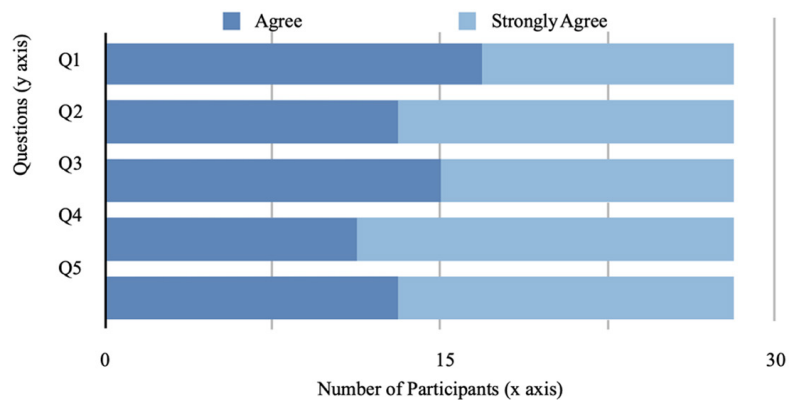

Fig. 3. User friendliness (Section 3)

Section 4: Participants' motivations for future involvement in metaverse-based language learning and their preferences in comparison with conventional English-teaching approaches (five items). The last chapter analyses what motivates participants to stay engaged in language learning using the metaverse and how their preferences relate to standard English teaching techniques. The questions evaluate why learners continue using the metaverse, their preference over traditional methods, satisfaction and views on the effectiveness of metaverse-based learning versus traditional classrooms. This section assesses learners' attitudes regarding continuous involvement and potential preference adjustments between innovative and traditional teaching strategies. These well-designed questionnaire sections, inspired by TAM [11], provide a comprehensive framework for examining various aspects of enhancing communication skills in young students attending rural primary schools through English language education in the metaverse.
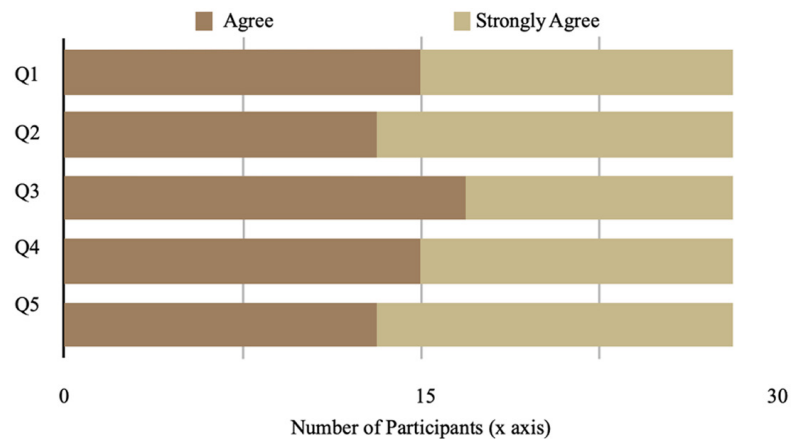

Fig. 4. Participants' motivations for future involvement in metaverse-based language learning and their preferences in comparison to conventional English teaching approaches (Section 4)

Evaluating replies indicates that for question one, 53.3% of participants agreed, with 40% agreeing and 13.3% strongly agreeing. Regarding question two, 55% agreed, with 33.3% indicating agreement and 21.7% strongly indicating agreement. Question three received a 60% agreement rate, with 40% agreeing and 20% strongly agreeing. For question four, 53.3% agreed, including 26.7% agreeing and 26.7% strongly agreeing. Question five showed a high 55% consensus, with 21.7% in agreement and 33.3% strongly in agreement. These percentages show participants' positive sentiments regarding future engagement and preferences for language learning through the metaverse. Figure 4 visually illustrates participants' replies in Section 4.

5   DISCUSSION

5.1   Pedagogical implications of using the metaverse platform in enhancing communicative competencies

The study makes a substantial contribution to English language teaching specifically on communicative competencies, by providing valuable insights on the effectiveness of metaverse-based platforms in addressing the specific difficulties young

learners encounter in rural areas. Given the growing significance of proficient communication abilities in a globalised environment, the research's emphasis on communicative competencies is especially pertinent. The remarkable enhancement observed in the experimental group's ability to communicate, as indicated by the notable disparities between the outcomes of the initial and final assessments, highlights the transformative power of using metaverse-based interventions for learning English. This advancement shows potential for educators and policymakers looking for creative and captivating methods to address language acquisition disparities, particularly in under-resourced rural elementary schools. Furthermore, the study's thorough examination of communicative competencies enhances the current literature by providing insight into the subtle elements of language acquisition in young learners. The emphasis on metaverse-based platforms go beyond traditional teaching methods, offering a more immersive and captivating language learning experience. Moreover, with ongoing technological progress transforming education, the study emphasises the significance of adjusting teaching methods to use new technology. It promotes a transition to creative and student-centred methods that utilise the capabilities of virtual environments for language learning.

5.2 Immersive language learning experiences

The discussion component of this study contains a complete assessment. The findings and implications shed light on using the metaverse to promote communicative abilities in English language acquisition for young learners in rural primary schools. The study's core focus was on studying the transformative influence of metaverse-based English language training on the communicative competencies of young learners aged seven to nine. Integrating pre-post exams and structured interviews allows for a comprehensive understanding of the consequences of this new teaching strategy. The pre-post test results demonstrated noteworthy increases across key linguistic skills. Notably, individuals displayed greater verbal communication ability in the speaking segment, showing that the metaverse fostered an environment conducive to developing expressive language talents. Combining large amounts of practice and situations relevant to daily life, immersive metaverse environments might help learners learn the language more effectively [47, 48]. Using role plays, simulations, and other interactive activities that align with task-based language teaching methodologies, metaverses enable language learners to use their language abilities in meaningful ways in real-world situations. Figure 5 shows how the respondents used metaverse-based platforms during the research. The platform used is Roblox, and the game is Roblox High School 2.
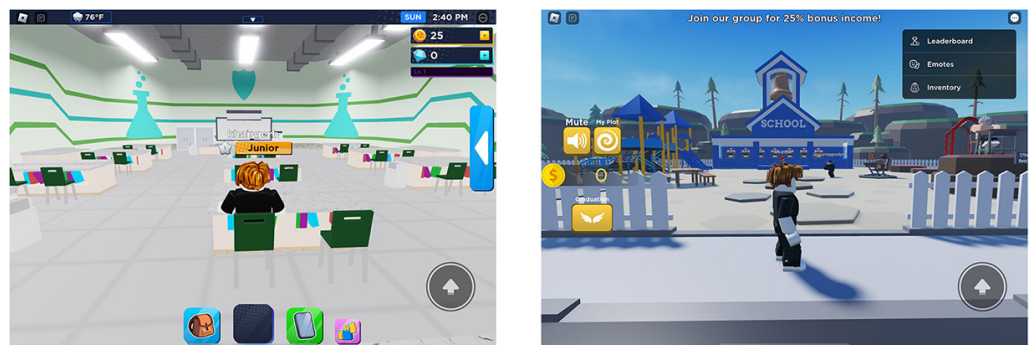

Fig. 5. Roblox: Roblox high school 2 used by the experimental group

5.3 Enhanced interaction and collaboration

The listening and writing components also demonstrated positive outcomes, demonstrating gains in auditory understanding and written expressiveness. The fourth portion, designed to provide an overall language competence assessment, further validated the positive influence of the metaverse on communicative competencies. The structured interviews, including Likert scale questions, complemented the debate by presenting qualitative insights into participants' experiences. The outcomes from the interviews demonstrated a high degree of engagement and motivation among young learners, emphasising the metaverse's success in generating a good learning environment. Moreover, the qualitative data underlined the metaverse's ability to make English language learning more accessible and pleasurable, particularly for students confronting obstacles in traditional educational settings. Following sociocultural theory [49], metaverse environments enable improved language learners' interaction and collaboration. Peer-to-peer feedback, cross-cultural interactions, and virtual networking are important elements that make this possible. Group role-plays and virtual talks are collaborative activities that help language development within an immersive and supportive environment. Cross-cultural interactions in metaverses foster intercultural communication and understanding [50]. Peer feedback also fits with the ideas of peer-assisted learning [51] because it enables students to become more proficient in a language while maintaining their independence and capacity for self-reflection. Having this kind of productive feedback conversation also strengthens the sense of community.

5.4 Increased motivation

This study has implications for educators, policymakers, and researchers beyond the classroom. The evidence-based material can help develop curricula, train teachers and develop policy initiatives to integrate metaverse technology into early childhood English language instruction in rural primary schools. This study found that enhanced motivation is one significant advantage of metaverse-based language learning. Previous research [16] has not stated that the metaverse could increase motivation, thus improving the learners' ability to enhance their communicative competencies, specifically listening and speaking skills. metaverses can motivate students through gamification, collaborative activities, and interesting virtual worlds [44]. It results in higher levels of involvement, determination and language proficiency [22]. The discovery that metaverses can motivate students from various backgrounds is significant, in addition to the numerous pedagogical possibilities that have been discovered. This study adds to the ongoing conversation about cutting-edge teaching strategies by highlighting the metaverse's capacity to improve learning outcomes and break down barriers to communication for this group of students. This study lays the groundwork for future research into metaverse-based language education and emphasises how it might improve young students' communicative skills in rural primary schools.

Several issues surface while investigating the pedagogical ramifications of using metaverse platforms to improve communicative competencies in English language instruction. Ensuring fair access to these platforms is a crucial factor to consider, especially in remote and under-resourced schools where the availability of internet connectivity and appropriate technology may be limited. Providing educators with the necessary training to successfully incorporate metaverse technology into their lesson

plans and ensure that they can handle technological nuances and create immersive learning environments that support learning goals is another difficulty. The assimilation of these technologies into current educational frameworks also necessitates meticulous preparation to preserve the emphasis on communicative abilities while capitalising on the interactive characteristics of virtual spaces. Assessing the effectiveness of metaverse-based therapies is difficult because language acquisition and communicative skills cannot be reliably measured in digital situations using typical assessment methods. Finally, ethical issues pertaining to privacy, digital citizenship and online safety need to be addressed to establish a safe and encouraging virtual learning environment. Resolving these issues is essential to fully utilising metaverse platforms' promise to improve language learning results in a variety of educational contexts.

6 CONCLUSION

The research contributes substantially to English language teaching by providing valuable insights into the effectiveness of metaverse-based platforms in addressing the difficulties young learners encounter in rural areas. Given the growing significance of proficient communication abilities in a globalised environment, the research's emphasis on communicative competencies is especially pertinent. The remarkable enhancement observed in the experimental group's ability to communicate, as indicated by the notable disparities between the outcomes of the initial and final assessments, highlights the transformative power of using metaverse-based interventions for learning English. This advancement shows potential for educators and policymakers looking for creative and captivating methods to address language acquisition disparities, particularly in under-resourced rural elementary schools. Furthermore, the study's thorough examination of communicative competencies enhances the current literature by providing insight into the subtle elements of language acquisition in young students. The emphasis on metaverse-based platforms goes beyond traditional teaching methods, offering a more immersive and captivating language learning experience. Moreover, with ongoing technological progress transforming education, the research emphasises the significance of adjusting teaching methods to use new technology. It promotes a transition to creative and student-centred methods that utilise the capabilities of virtual environments for language learning.

Through the use of immersive virtual worlds, metaverse-based learning provides a revolutionary method for language learning that increases accessibility, engagement and involvement. Learners are immersed in dynamic virtual worlds where they can engage with the language in genuine, real-life circumstances by means of state-of-the-art technologies like AR apps and VR simulations. Using AR and interactive 3D models, integrating the metaverse with language instruction creates immersive learning environments. This is demonstrated by the BIPLOB program, which increases engagement and retention by teaching the Bengali alphabet using 3D models and top-notch audio. This method demonstrates how AR can transform language instruction [56]. An educational tool that uses AR to teach the Bengali alphabet is called BIPLOB. It makes learning a language more interesting and immersive for young language learners by utilising interactive 3D models and audio pronunciations that are of excellent quality. This method shows the promise of AR technology in language instruction by enhancing engagement, retention, and understanding [56].

Augmented reality is a growing technology thanks to the expansion of mobile devices. AR tries to offer multimedia content in a didactic and enriching way to the user, increasing their perception of reality and providing many advantages in

education [52]. Not only does this immersive experience help with cultural immersion, but it also increases the interest and recall of language learning. Instead of replacing reality, AR enhances and adds to it [53]. Furthermore, learners can access resources and engage in activities from any location with an Internet connection because of the flexibility of metaverse-based learning, which eliminates traditional geographical restrictions and permits asynchronous learning. metaverse-based techniques are known for their collaborative learning features, which facilitate peer-to-peer engagement and communication within a supportive learning community through virtual classrooms and multiplayer experiences. By leveraging the novelty and excitement of virtual worlds, interactive technologies and gamified experiences can further improve motivation and retention.

By contrast, immersion and engagement may be limited by traditional language learning techniques, which frequently rely on teacher-centred methods, printed materials, structured curriculum and in-person interaction. Implementing technologies such as AR promotes effective learning because it allows students to interact with virtual elements in our real environment [54]. Through the use of AR and VR technology, the metaverse improves language instruction by establishing dynamic and captivating learning environments. To address the limitations of conventional techniques, these technologies use 3D models, interactive scenarios and high-quality audio. Students are more engaged, retain information better and comprehend complex scripts and phonetic systems while using this immersive technique [55]. Although each strategy has advantages, language learners looking for flexible, interesting and culturally rich learning opportunities will find that metaverse-based learning offers special benefits due to its immersive and interactive character. Various technical and accessibility hurdles impede the implementation of metaverse technology for instructional purposes in rural elementary schools. New research on the use of augmented and VR in the classroom offers useful information for language learners utilising metaverse environments. Immersion-based virtual environments foster cooperation and involvement, which may be advantageous for metaverse-based language learning. Although there isn't much direct research, what is known about mobile accessibility, multimodal learning, and simulated settings in VR/AR education could help create immersive language learning experiences on metaverse platforms [57].

These difficulties include differences in the degrees of digital literacy between students and teachers, insufficient Internet infrastructure, and restricted access to high-end computing devices. For example, poor Internet connectivity is a common problem in rural locations, making it difficult to use online metaverse platforms and services with ease. Furthermore, for schools with tight budgets, the expense of purchasing and maintaining the equipment and software required for metaverse integration can be too much. Another major obstacle to the efficient use of metaverse technology in rural primary schools is the lack of familiarity that both teachers and children have with the technology. While many educators do not have the resources or assistance needed to integrate metaverse-based learning activities into their curricula, students might find it difficult to navigate virtual environments and comprehend lessons delivered through immersive technologies.

Proactive action is needed to overcome these challenges and improve the usefulness of metaverse technology in rural elementary schools. This could entail funding infrastructure upgrades to provide broadband connectivity in remote areas and giving grants or subsidies to schools so they can buy necessary software and gear. Comprehensive training programs should also be put in place to give teachers the information and abilities they need to successfully incorporate metaverse-based learning resources into their lesson plans. In rural areas, collaborative projects

including government agencies, educational institutions and technology providers can be extremely important for creating customised solutions and promoting equitable access to education facilitated by the metaverse.

In conclusion, by acknowledging and addressing the specific technical and accessibility challenges associated with metaverse integration in rural primary schools, educators and policymakers can pave the way for more equitable and effective educational experiences for students in underserved communities. Through strategic investments in infrastructure, capacity-building initiatives and collaborative partnerships, the transformative potential of metaverse technology can be realised, enriching learning opportunities and empowering learners regardless of their geographical location.

7   LIMITATIONS

A more longitudinal study is also required to evaluate the long-term durability of using metaverse-based platforms to improve communicative competencies because it uses a relatively small sample size. A larger sample size can provide more robust data and can also be representative of the larger population. The study acknowledges that its findings may be limited by geographical scope, indicating that they may only apply to the specific situation and are not easily generalisable to other areas or cultural contexts. Furthermore, time limitations are recognised to be a constraining element, suggesting that the study's duration may not encompass long-lasting impacts or alterations over a prolonged span.

A longitudinal study in this context would involve observing and analysing participants' language skills and communication behaviours within the metaverse environment over an extended duration, possibly spanning months or years. This approach would allow researchers to capture the long-term effects of metaverse usage on language acquisition, fluency, proficiency and sociolinguistic competence. By tracking participants' progress and changes in their communicative behaviours over time, researchers can gain deeper insights into how immersive virtual environments influence language learning and usage patterns. This study would enable us to comprehend the ways in which the usage of VR affects language learning, speaking fluency, understanding and social language use. We can gain additional insight into how virtual environments influence language learning and communication by tracking individuals' advancement over time.

8   ACKNOWLEDGEMENTS

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