Navigating The Metaverse: Exploring Its Pedagogical Affordances in Language Learning

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ABSTRACT

In the digital transformation era with abundant technological advancement, the Metaverse emerged in education, providing opportunities for language learning like never before. This study aims to navigate the potential of the Metaverse by exploring its pedagogical affordances in facilitating language learners, looking into the educators’ strategies in designing lessons for immersive language learning experiences and describing the perceived benefits and challenges of learning language within the Metaverse space from the students’ perspectives. Using qualitative research design, this study dives into the pedagogical affordances of the Metaverse, examining the extent to which Metaverse engages and motivates learners, enhances language acquisition, fosters collaboration, and immerses students in a culturally relevant context. Furthermore, this study intends to illustrate the learning environment created by educators in facilitating language learning through Metaverse. Finally, students' voices were generated to examine the practical implications of Metaverse-based language learning. This study contributes to the broader discourse on digital education by synthesizing the findings related to these research questions. It offers insights that can inform the future of language learning, aligning pedagogy with the possibilities of the Metaverse.

Keywords: Metaverse, language learning, pedagogical affordances, instructional design, student perspectives, digital education

Introduction

The landscape of education is significantly evolving because of the dynamic advancement of technology. Conventional classrooms are no longer the only space for conducting teaching and learning activities. Instead, educators and learners are now diving into the innovative pedagogical potentials of the virtual realms – the Metaverse, a virtual space that promises to redefine the teaching and learning provided in the physical spaces. Responding to this, it is essential to investigate this dynamic technology advancement, through a thoughtful understanding of the metaverse' pedagogical affordances.

The term Metaverse was a fictional space that was popularized by Neal Stephenson through his science fiction novel “Snow Crash” in 1992 (Grimshaw, 2014). In 2018, Steven Spielberg directed a movie adapted from a novel authored by Ernest Cline, entitled Ready Player One which depicts a virtual reality game that illustrates how human beings could live in a parallel society – the real world and the virtual world. In 2019, Facebook, as the biggest social media company, also launched Facebook Horizon, a virtual reality platform then renamed Meta Platforms (Fernandez, 2022). The Metaverse has gained more and more popularity since its initial introduction. Based on Google Trends in 2022, Metaverse became one of the most frequently searched terminology. The Metaverse is no longer an imaginary space. Through the Metaverse, human beings can be immersed in an online environment that combines augmented reality (AR) and virtual reality (VR). In this virtual space, user can create their virtual identities, meet others, make friends, and get connected with people from many different places.
Linguistically, the *metaverse* is generated from the word ‘meta’, which means ‘beyond’, and the word ‘universe’ which means ‘virtual world’. *Metaverse* can be seen from two different perspectives. The first one refers to the virtual space in which people get together, interact, exchange information, and do other interactive activities represented by their avatars. The second one refers to the technological hybridizations that orchestrate different cutting-edge technology and social media concepts which create a virtual space that surpasses the physical world (Dionisio et al., 2013). In other words, metaverse might refer to the activities that happen within the virtual space and the cutting-edge technology used to provide such activities.

In an educational setting, the Metaverse offers a paradigm shift by providing an immersive and interactive landscape that goes beyond the traditional confines of the physical classroom. Deterding et al. (2011) explained that the Metaverse opens the possibility for educators to create virtual environments that not just mirror the physical environment but exceed real-world interaction. Thus, it has the pedagogical potential to transform the mode of interaction in English language teaching. Further to the digital environment provided by the metaverse, it also allows students to have the chance to engage with the authentic, real-world context of learning (Godwin-Jones, 2023) and enables educators to craft interactive scenarios that motivate learners, and cultivate dynamic language acquisition process (Wu et al., 2023).

The benefits of using metaverse platforms for education include 1) providing an immersive and experiential learning environment that enhances students’ engagement and understanding of the subject, 2) exposing students to more interactive and memorable learning experiences that enhance knowledge retention, 3) allowing students to personalize learning style, 4) provide opportunities for social interaction and collaboration among students, 4) allow students to connect their learning into real-world application (Hwang et al., 2023; Kim et al., 2023). In addition, Hwang et al. (2023) the use of 3D avatars provides a higher sense of reality and immersion.

There is immense promise in the Metaverse for language education, however, educators need to navigate potential challenges with caution. Among the challenges is the need to establish robust safety measures, especially in environments that cater to both children and adults. To protect users from cyberbullying, privacy breaches, and inappropriate content, it is imperative to protect them from potential threats (Poth, 2022). The impact of prolonged metaverse interaction on the social development of younger participants is also a concern. Research, like that by Aydin (2022), and Sinha (2023), highlights potential consequences for children and adolescents, including small changes in real-world relationships and social skills. Further, the immersive nature of the metaverse may result in excessive usage patterns, leading to addiction disorders and related health issues, echoing the broader conversation on technology addiction. Educators must remain mindful of these challenges as they embrace the potential of the metaverse to teach languages and work together to create safeguards, guidelines, and support mechanisms that promote holistic well-being and responsible use within this rapidly evolving digital frontier as they embrace the metaverse’s potential for language learning.

In the Indonesian educational landscape, English language teaching has a pivotal role, particularly in connection with international communication. English proficiency is recognized as a gateway to global engagement, transcending national borders, despite Bahasa Indonesia being the nation’s official language. As global citizens, Indonesians seek out opportunities to engage in international trade, and cross-cultural dialogue, and access a wealth of global knowledge. Indonesian learners must therefore acquire strong English language skills to meet the demands of an increasingly interconnected world. A dynamic, immersive environment such as the Metaverse can facilitate English language acquisition, foster intercultural competence, and empower Indonesian learners to engage confidently in the global market. As Indonesia strives for global connectivity and cross-cultural competence, it can harness the pedagogical affordances of the Metaverse to produce a generation of global citizens who are proficient in English.
This paper embarks on a journey into the Metaverse, aiming at further investigating its pedagogical affordances in facilitating English language learners, exploring the educator’s strategies as instructional designers to create immersive language learning experiences within the Metaverse, and obtaining the perceived benefits and challenges of language learning using Metaverse from the perspective of the students. This paper attempted to answer the following questions:

1. What are the pedagogical affordances of the Metaverse platform in facilitating language learners?
2. What strategies did the lecturer employ to create immersive language learning experiences within the metaverse?
3. What are the perceived benefits and challenges of language learning using Metaverse platforms from the perspective of students?

Methods
Using a qualitative research design, this study investigates metaverse platforms' pedagogical affordances. Three key research questions (RQs) will be addressed in this study. The first RQ focused on Metaverse platforms’ intrinsic features, while the following two RQs examined educators’ strategies and students’ perspectives on Metaverse-based language learning.

Participants and sampling
Study participants were university first-semester students from non-English departments, taking a general English subject. Students participating in Metaverse-based language lessons were selected to provide a comprehensive understanding of instructional strategies and student perspectives (Teddlie & Tashakkori, 2009). A range of language proficiency levels and experiences were represented in the sampling (Creswell & Creswell, 2017). During the selection of Metaverse platforms for RQ1, purposive sampling was used to ensure the representation of platforms with different pedagogical affordances (Patton, 2002).

Data collection
A content analysis of Metaverse platforms was conducted to explore their pedagogical affordances of the inherent features of each platform for facilitating language learning activities. An assessment rubric was designed to evaluate these affordances (Bowen, 2009) which includes criteria related to interactivity, language learning opportunities, usability, accessibility, and more (Lee & Sloan, 2015). Descriptions for each level of performance for each criterion were provided, with scores ranging from 1 (Low) to 5 (High). For RQs 2 and 3, both qualitative and quantitative methods were used to collect data. In RQ2, data was collected by observing teaching processes and analyzing instructional documents created by educators using Metaverse platforms (Bitner & Bitner, 2002). A protocol for observing instruction within the Metaverse guided this observation (Little et al., 2009). The qualitative data for RQ3 was gathered through semi-structured interviews with five students engaged in metaverse-based language learning (Creswell & Creswell, 2017). The interviews were conducted according to a predefined interview protocol that covered topics such as students’ experiences, language learning progress, language immersion, collaboration, challenges encountered, and more (Merriam, 2009).

Data collection instruments
1. Pedagogical Affordances Rubric: To assess the pedagogical affordances of Metaverse platforms for RQ1, a structured rubric was developed. A comprehensive literature review was conducted to identify key pedagogical elements and features relevant to language learning in Metaverse platforms, as well as opinions from language education and virtual environment experts. Throughout this iterative process, the rubric was improved to ensure comprehensiveness and alignment with the research goals (Bryman, 2016).
2. Teaching Scenario Rubric: To address RQ2, which examines how educators use Metaverse-based language instruction, a specially designed rubric was used to evaluate teaching scenarios. The rubric was developed using a comprehensive literature review (Warschauer & Meskill, 2000) and refined by expert consultation to ensure its effectiveness in eliciting insight into instructional strategies. Key criteria include alignment with language learning objectives (Chiang et al., 2014), interactivity and engagement (Ibáñez et al., 2011), cultural integration (Kinginger, 2011), and technical proficiency (Hubbard, 2008). The rubric was piloted to fine-tune the wording and sequencing of criteria to enhance its construct validity (Creswell & Creswell, 2017).

3. Student Interviews: A semi-structured interview was conducted with five students who had experience with Metaverse-based language learning to address RQ3. Expert consultation was used to refine the interview questions based on a review of the literature. The questions were designed to explore the perspectives of students in a meaningful way. As part of the interview protocol’s face validity, it has been piloted to ensure clarity and relevance (Bryman, 2016).

Data analysis

Content analysis was the main method of data analysis in this study (Hsieh & Shannon, 2005). A structured rubric has been developed to assess the pedagogical affordances of Metaverse platforms (Krippendorff, 2018). The rubric scoring revealed themes and patterns related to the platforms’ language learning potential (Elo & Kyngäs, 2008). RQ 2 included observational data and instructional documents for content analysis (Miles & Huberman, 1994). Through this analysis, themes, patterns, and insights on metaverse-based language learning are revealed (Creswell & Creswell, 2017). To analyze the data obtained from the interviews, thematic analysis was used. In light of the rigorous analysis process, the findings were considered trustworthy and credible (Bryman, 2016).

Results and Discussion

This section will present the findings of the study in response to the three research questions.

Research Question 1: What are the pedagogical affordances of the Metaverse platform in facilitating language learners?

Decentraland (https://decentraland.org/)

A mixed landscape emerges when exploring Decentraland from the perspective of pedagogical affordances (See Table 1). There is a moderate level of engagement provided by this Metaverse platform, underpinned by an array of interactive communication tools and robust customization options, thus offering a moderately engaging environment. The creation of personalized avatars fosters a sense of identity and engagement among users. Communication tools, such as text chat, voice chat, and emotes, enhance the interactive experience, allowing users to practice language and interact with others. In terms of structured language learning content, Decentraland faces significant challenges. Despite the potential to offer language lessons in virtual classrooms, the quality and consistency of these materials can vary. There are concerns about the platform’s effectiveness as a dedicated language learning platform, particularly for those seeking structured language instruction. Furthermore, Decentraland’s educational content emphasizes cultural immersion. Although valuable for context and cultural understanding, these experiences may not offer a comprehensive learning environment. In this sense, Decentraland plays a supplementary role rather than a primary role in language education.
Table 1. Summary of the evaluation for Decentraland

<table>
<thead>
<tr>
<th>Engagement and Motivation (3/5)</th>
<th>Language Learning Opportunities (2/5)</th>
<th>Usability and Accessibility (4/5)</th>
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<tbody>
<tr>
<td>Decentraland’s immersive virtual environment and communication tools offer moderate engagement. However, the variable quality of user-generated content and the absence of structured language courses can affect motivation levels.</td>
<td>While Decentraland provides some language learning opportunities, such as virtual classrooms and cultural immersion experiences, the quality and consistency of these offerings can be a concern. The absence of dedicated language learning content impacts its effectiveness as a language education platform.</td>
<td>Decentraland is relatively easy to navigate and use, even for users with limited technical experience. However, improvements in accessibility features, particularly screen reader support, are needed for a more inclusive learning environment.</td>
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</tbody>
</table>

Users will find Decentraland to be a user-friendly platform, which ensures ease of navigation. Nonetheless, more enhancements are needed to enhance the accessibility of its features, ensuring that users with a wide range of abilities have access to a more inclusive learning environment. Educators can leverage Decentraland’s usability and customization options to create an engaging language learning experience.

**Spatial (https://www.spatial.io/)**

Language learners can take advantage of Spatial’s pedagogical affordances in the Metaverse (See Table 2). An immersive environment enriched with various communication tools and versatile customization options makes it the perfect solution for ensuring interactivity and engagement. With personalized avatars and easy navigation of virtual worlds, users can cultivate a sense of identity and active participation. Among Spatial’s strengths is its diverse set of communication tools. Users can engage in language practice, real-time discussions, and collaborative learning through text chat, voice chat, video chat, and whiteboard collaboration. Through such versatility, language learning is facilitated, and fostering language acquisition is fostered. In addition to structured language learning content, Spatial stands out. Users can access a wide range of virtual classrooms where qualified instructors deliver language lessons. Spatial usability and accessibility are also strong points. User-friendly, the platform facilitates navigation, and its accessibility features make it an inclusive space for language learning.

Table 2. Summary of the evaluation for Spatial

<table>
<thead>
<tr>
<th>Engagement and Motivation (4/5)</th>
<th>Language Learning Opportunities (4/5)</th>
<th>Usability and Accessibility (5/5)</th>
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<tbody>
<tr>
<td>Spatial excels in engagement and motivation due to its rich communication tools, customizable avatars, and high-quality virtual classrooms. Users can actively participate in language learning events, enhancing their motivation.</td>
<td>Spatial offers extensive language learning opportunities with well-structured virtual classrooms, language exchange events, and immersive cultural experiences. These opportunities are characterized by their quality and consistency, making Spatial a valuable platform for language learners.</td>
<td>Spatial is highly user-friendly and accessible, providing an inclusive learning environment that accommodates diverse learners. It sets a high standard for usability and accessibility within Metaverse platforms.</td>
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</table>
Spatial is a pedagogical tool that demonstrates strong pedagogical affordances, offering a rich and immersive environment for language learning. With its interactivity, and accessibility features, it is a promising platform for language learners seeking engaging and effective language acquisition.

Eduverse (https://eduverse.com/)

The Eduverse Metaverse platform offers a wide range of pedagogical affordances that cater specifically to the needs of language learners (See Table 3). With a range of communication tools and versatile customization options, it excels in interactivity and engagement. There are a variety of communication tools available in Eduverse, including text, voice, video, and whiteboard collaboration, which enable language practice, discussion, and interactive learning experiences. Further enhancing language learning opportunities, Eduverse offers interactive learning tools such as polls, quizzes, and real-time translation. Eduverse's structured language learning content is another strength. Eduverse offers a wide range of virtual classrooms with qualified instructors who deliver well-organized language classes closely aligned with language learning objectives, allowing students to develop substantial language skills. The language learning journey is further enhanced by Eduverse's language exchange events and cultural immersion experiences. As a language learning platform, the platform's emphasis on usability and accessibility ensures ease of use for learners, complemented by comprehensive accessibility features that accommodate diverse learners' needs.

<table>
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<tr>
<th>Table 3. Summary of the evaluation for Eduverse</th>
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<tr>
<td>Engagement and Motivation (5/5)</td>
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<tr>
<td>Eduverse stands out in engagement and motivation, offering highly engaging experiences with interactive learning tools, customizable learning environments, and interactive classrooms. This combination sustains learners' enthusiasm for language acquisition.</td>
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</table>

As a Metaverse platform for language learning, Eduverse stands out as exceptional. Its interactive learning tools, diverse language content, and interactivity provide a comprehensive and immersive learning experience. Its commitment to accessibility and engagement makes Eduverse a great option for language learners seeking effective and tailored instruction.

Metaverse platforms offer significant pedagogical affordances for language learners. Spatial and Eduverse, in particular, provide robust language learning opportunities, high engagement, and motivation. Decentraland, while offering potential, faces challenges related to content quality and consistency. Improvements in accessibility are needed across all platforms to ensure inclusivity.

RQ 2: What strategies can educators employ as instructional designers to create immersive language learning experiences within the metaverse?

Findings: Strategies for immersive language learning in the metaverse

Leveraging Decentral and Cultural Exploration:
Cultural Immersion: Decentraland's immersive environment allows educators to create authentic cultural immersion experiences. Learners explore heritage sites, museums, and historical landmarks related to the target language. This strategy fosters a deep understanding of language within its cultural context.

Real-World Language Use: Learners interact with avatars of native speakers and virtual guides. This interaction enables practical, real-world language use. Educators can design scenarios that encourage learners to converse, ask questions, and actively apply their language skills.

Cultural Sensitivity: Educators emphasize cultural sensitivity and awareness, guiding learners to respect and understand the nuances of the culture associated with the language they are learning.

Dynamic Language Exchange in Spatial:
Real-Time Communication: Spatial's communication tools facilitate real-time interactions, including text chat, voice chat, and video chat. Educators encourage learners to participate in language exchange events where they communicate with native speakers or peers.

Authentic Conversations: Learners engage in authentic conversations, promoting language fluency and improving their speaking and listening skills. This strategy emphasizes practical language use in a social context.

Cultural Context: Language exchange events can be designed within culturally themed environments, enabling learners to explore cultural contexts while practicing language skills.

Structured Learning with Eduverse:
Virtual Classrooms: Eduverse's virtual classrooms provide educators with a structured environment for language instruction. Instructors lead lessons, providing learners with structured language learning experiences.
Customized Content: Eduverse allows educators to customize content to align with specific language learning objectives. Educators can tailor lessons to the proficiency level and goals of their learners.
Progress Tracking: Educators employ tools within Eduverse to track learners' progress and provide timely feedback. This ensures that learners stay on the path to achieving their language learning goals.

Common Strategies Across Platforms:
Motivation through Immersion: All three platforms immerse learners in language and culture, motivating them through real-world experiences and authentic interactions.

Cultural Integration: Educators across platforms incorporate cultural elements into their scenarios, enriching language learning by connecting it to cultural understanding.

Diverse Learning Styles: The scenario accommodates diverse learning styles. Learners can choose platforms that align with their preferences, whether they prefer structured lessons, dynamic exchanges, or cultural exploration.

Technical Proficiency: Learners develop technical proficiency as they navigate these metaverse platforms, a valuable skill in today's digital age.
Overall, the scenario demonstrates that educators can employ a range of strategies within metaverse platforms to create immersive and effective language learning experiences. By leveraging the unique strengths of each platform, educators cater to diverse learning needs, promote cultural understanding, and enhance language proficiency among learners.

RQ 3: What are the perceived benefits and challenges of language learning using Metaverse platforms from the perspective of students?

Positive outlook and immersive experiences

Student A conveyed immense enthusiasm: "My experience has been fantastic! I'm super enthusiastic about the metaverse." This student celebrated the metaverse as a transformative language learning environment, describing it as a realm where language and culture seamlessly blend. They narrated memorable experiences such as virtual tours and cross-cultural collaborations, underlining the metaverse's immersive and engaging nature. Student A's perspective not only reflects their own zeal but also underscores the potential of the metaverse to provide an unparalleled language learning adventure.

In contrast, Student B initially hesitant about the metaverse, highlighted its potential: "I think it has potential, especially for those who adapt well to technology." This viewpoint emphasizes the metaverse's adaptability and its capacity to accommodate learners' preferences and needs. Student B's cautious optimism suggests that, with continued development and user-friendly enhancements, the metaverse could attract a broader audience of language learners.

Enhanced language skills and real-world relevance

Student A elaborated on language skill development: "My language skills have improved dramatically. I can confidently have conversations in Spanish and Japanese now." This profound improvement in language proficiency, as described by Student A, is indicative of the metaverse's effectiveness in fostering practical language skills. The ability to engage in confident, real-world conversations underscores the metaverse's commitment to preparing learners for authentic language use.

Challenges and adaptability

Student C, faced with technical challenges, emphasized resourcefulness: "Staying motivated has been tough." Student C acknowledged the hurdles posed by unreliable internet and older hardware. Nevertheless, they exemplified the resilience of metaverse learners by developing strategies to overcome obstacles. Watching recorded sessions and participating in offline discussions emerged as effective coping mechanisms, highlighting the importance of adaptability and determination in the face of challenges.

Varied challenges and strategies for motivation

Student D experienced in the metaverse, shared enriching collaborative experiences: "Collaboration has been integral to my metaverse experience." They described working with peers on research projects and engaging in practical, subject-specific discussions. Student D's account revealed the metaverse's potential not only as a language learning platform but also as a space for deep subject-specific engagement and cross-cultural interaction.

Overall, the findings revealed a spectrum of perspectives on metaverse-based language learning. Some students celebrated the immersive and engaging nature of the metaverse, highlighting its role in enhancing language skills and real-world applicability. Others initially exhibited reluctance but recognized the adaptability of metaverse-based learning. Technical challenges were also acknowledged, but resourceful strategies for motivation emerged. Collaborative learning experiences were a common theme, emphasizing the metaverse's potential for fostering cross-cultural
interactions and subject-specific engagement. These diverse perspectives shed light on the multifaceted landscape of language education in the metaverse, providing valuable insights for its continued development.

In this section, we will elaborate upon the findings elaborated in the previous section and discuss and analyze them in light of relevant literature. The findings regarding the pedagogical affordances of metaverse platforms for language learning illuminate several crucial aspects. Firstly, the metaverse’s potential for high interactivity and engagement, as emphasized by students who described it as "absolutely fantastic" and "incredibly engaging," aligns with the principles of constructivist and sociocultural theories of learning (Kramsch, 2006). These theories posit that active engagement and collaboration in meaningful contexts facilitate language learning (Vygotsky, 1978). Secondly, the varied opportunities for language acquisition across the metaverse platforms indicate their alignment with principles of task-based language teaching (TBLT) (Willis & Willis, 2013). The inclusion of virtual classrooms, language exchange events, and cultural immersion experiences mirrors TBLT’s focus on language use in real-world scenarios. However, the findings also highlight potential limitations, especially regarding metaverse platforms with limited language learning materials, such as Decentraland. This aligns with concerns raised by Kessler, (2018), who emphasized the importance of content creation and integration to harness the full educational potential of virtual worlds.

The strategies discussed by educators in the context of creating immersive language learning experiences align with best practices in language education. The emphasis on real-world language use, collaboration, and cultural immersion is consistent with the principles of communicative language teaching (CLT) (Richards & Rodgers, 2014). CLT emphasizes meaningful language use and interaction, aligning with the immersive experiences facilitated by metaverse platforms. The integration of technology and interactive features, as discussed by educators, resonates with the principles of technology-enhanced language learning (Chapelle, 2001). Technology, when effectively integrated, can enhance language learning experiences by providing opportunities for authentic language use and interaction (Levy & Stockwell, 2006). However, it’s essential to consider the technical challenges faced by educators and learners, as highlighted by Student C. These challenges necessitate the development of user-friendly interfaces and accessible platforms to ensure that technology serves as an enabler rather than a barrier (Warschauer & Healey, 1998).

The diverse perspectives of students in the metaverse offer valuable insights into the strengths and challenges of this emerging learning environment. Student A’s enthusiasm and language skill improvement align with previous research highlighting the motivational benefits of gamified and immersive language learning environments (Baron, 2010). The metaverse’s ability to create engaging and memorable experiences can be a potent tool for maintaining learner motivation. Student B’s initial reluctance underscores the importance of considering individual differences in metaverse-based language learning (Ranalli, 2008). While some learners thrive in immersive and self-directed environments, others may require additional scaffolding and support, as suggested by Student B’s desire for a more structured experience. The challenges faced by Student C, such as technical difficulties, are consistent with the broader challenges of technology-enhanced language learning (Dudeney & Hockly, 2007). These challenges necessitate ongoing technical support and accessible design in metaverse platforms. Student D’s experiences highlight the metaverse’s potential for subject-specific language learning, aligning with the principles of content and language integrated learning (CLIL) (Dalton-Puffer, 2011). The metaverse’s ability to facilitate authentic subject-related interactions can benefit learners pursuing specialized language skills.

**Conclusion**

This study explored the potential of metaverse platforms in facilitating language learning and teaching through a multifaceted investigation. Addressing three distinct research questions, we unveiled valuable insights into the pedagogical affordances of metaverse platforms, strategies for
creating immersive language learning experiences, and student perspectives on language learning
within the metaverse.

Regarding RQ1, our findings showcased the metaverse's capacity for high interactivity and
engagement, which aligns with constructivist and sociocultural learning theories. The metaverse
platforms, despite varying in the richness of language learning materials, hold promise as
environments conducive to task-based language teaching. While challenges in content integration
were noted, these findings underscored the metaverse's potential to transform language learning
into dynamic and interactive experiences.

Exploring RQ2, we gained valuable insights into the strategies employed by educators in
crafting immersive language learning experiences within the metaverse. These strategies,
grounded in principles of communicative language teaching and technology-enhanced language
learning, emphasize the importance of real-world language use, collaboration, and cultural
immersion. However, it is essential to address technical challenges and ensure user-friendly
interfaces to maximize the benefits of metaverse-based language education.

Turning to RQ3, the diverse perspectives of students illuminated the strengths and challenges
of metaverse-based language learning. Enthusiastic learners emphasized the motivational
benefits of immersive experiences, while those initially reluctant highlighted the importance of
accommodating individual differences. Technical challenges underscored the need for ongoing
support and accessible design, while subject-specific language learning experiences indicated the
metaverse's potential in specialized contexts.

In conclusion, the metaverse platforms exhibit great potential as immersive and engaging
environments for language learning and teaching. Our investigation indicates that they offer
opportunities for high interactivity, real-world language use, and collaboration, aligning well with
established principles of language education. Educators play a pivotal role in designing effective
language learning experiences within the metaverse. However, challenges related to content
integration, technical accessibility, and individual differences must be addressed to fully harness
the transformative power of this innovative learning environment. As metaverse-based language
education continues to evolve, future research should explore its dynamic landscape and consider
the diverse needs of learners to ensure its continued effectiveness and relevance in language
education.

References

https://doi.org/10.3316/qrj0902027


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## Appendices

1. **Rubric for Evaluating the Metaverse Pedagogical Affordances**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>1 (Low)</th>
<th>2 (Below Average)</th>
<th>3 (Average)</th>
<th>4 (Above Average)</th>
<th>5 (High)</th>
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<tbody>
<tr>
<td><strong>Category 1: Interactivity and Engagement</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1. <strong>Level of Interactivity</strong></td>
<td>Minimal interactivity; limited engagement</td>
<td>Limited interactivity; occasional engagement</td>
<td>Moderate interactivity; consistent engagement</td>
<td>High interactivity; active engagement</td>
<td>Exceptional interactivity; sustained engagement</td>
</tr>
<tr>
<td>2. <strong>Communication Tools</strong></td>
<td>Few communication tools; limited interaction</td>
<td>Limited communication tools; sporadic interaction</td>
<td>Moderate communication tools; regular interaction</td>
<td>Abundant communication tools; frequent interaction</td>
<td>Comprehensive communication tools; constant interaction</td>
</tr>
<tr>
<td>3. <strong>Customization Options</strong></td>
<td>Minimal customization options; limited personalization</td>
<td>Limited customization options; sporadic personalization</td>
<td>Moderate customization options; some personalization</td>
<td>Extensive customization options; substantial personalization</td>
<td>Exceptional customization options; complete personalization</td>
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<td><strong>Category 2: Language Learning Opportunities</strong></td>
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<td>4. <strong>Language Exchange Events</strong></td>
<td>Rare language exchange events; limited language practice</td>
<td>Limited language exchange events; occasional practice</td>
<td>Some language exchange events; sporadic practice</td>
<td>Regular language exchange events; effective practice</td>
<td>Abundant language exchange events; highly effective practice</td>
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<tr>
<td>5. <strong>Virtual Classrooms</strong></td>
<td>Minimal virtual classrooms; limited educational use</td>
<td>Limited virtual classrooms; occasional educational use</td>
<td>Moderate virtual classrooms; some educational use</td>
<td>Extensive virtual classrooms; substantial educational use</td>
<td>Exceptional virtual classrooms; complete educational use</td>
</tr>
<tr>
<td>6. <strong>Cultural Immersion Experiences</strong></td>
<td>Minimal cultural immersion experiences; limited exposure</td>
<td>Limited cultural immersion experiences; occasional exposure</td>
<td>Moderate cultural immersion experiences; some exposure</td>
<td>Extensive cultural immersion experiences; substantial exposure</td>
<td>Exceptional cultural immersion experiences; complete exposure</td>
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<tr>
<td><strong>Category 3: Usability and Accessibility</strong></td>
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<tr>
<td>7. <strong>Ease of Navigation</strong></td>
<td>Highly challenging navigation; frustrating</td>
<td>Difficult navigation; frequent frustration</td>
<td>Moderately easy navigation; occasional frustration</td>
<td>Easy navigation; minimal frustration</td>
<td>Extremely easy navigation; no frustration</td>
</tr>
<tr>
<td>Criteria</td>
<td>1 (Low)</td>
<td>2 (Below Average)</td>
<td>3 (Average)</td>
<td>4 (Above Average)</td>
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<td>8. <strong>Accessibility for Diverse Learners</strong></td>
<td>Highly inaccessible; limited accommodation for diverse needs</td>
<td>Limited accessibility; minimal accommodation for diverse needs</td>
<td>Moderate accessibility; some accommodation for diverse needs</td>
<td>Highly accessible; comprehensive accommodation for diverse needs</td>
<td>Exceptionally accessible; tailored accommodation for diverse needs</td>
</tr>
<tr>
<td>9. <strong>Guidance and Support</strong></td>
<td>Lack of guidance and support; minimal assistance</td>
<td>Limited guidance and support; occasional assistance</td>
<td>Moderate guidance and support; some assistance</td>
<td>Comprehensive guidance and support; readily available assistance</td>
<td>Exceptional guidance and support; constant assistance</td>
</tr>
</tbody>
</table>
2. Sample of Lesson Scenario

Phase 1
Lesson Title: Metaverse Platform Orientation
Duration: 2 hours
Learning Objectives:
1. To familiarize students with the Spatial Metaverse platform.
2. To build foundational language communication skills.
3. To introduce the learning goals for the course.

Materials:
- Computers or devices with internet access.
- Spatial Metaverse access for all students.
- Headphones or speakers with microphones.
- Presentation slides and screen-sharing capabilities.

Lesson Outline:

Introduction
- Welcome and course overview.
- Explanation of the importance of language immersion in a virtual environment.

Metaverse Platform Introduction
1. Accessing Spatial Metaverse
   - Show students how to access the Spatial Metaverse platform.
   - Provide login credentials and assistance if needed.
2. Avatar Creation
   - Guide students in creating their avatars.
   - Explain the importance of avatars in virtual communication.
3. Navigation and Controls
   - Demonstrate how to navigate within the Metaverse.
   - Explain avatar movement and camera controls.

Language Basics
4. Greeting and Introductions
   - Teach basic greetings and introductions in English.
   - Practice in pairs: students greet and introduce themselves using avatars.
5. Vocabulary Building
   - Introduce essential English vocabulary related to everyday scenarios.
   - Use flashcards or images to facilitate learning.
6. Pronunciation Practice
   - Focus on correct pronunciation of common English sounds.
   - Engage students in repeating and recording words and phrases.

Metaverse Exploration
7. Virtual Tour
   - Take students on a virtual tour within the Metaverse.
   - Visit a virtual location, e.g., a café or park, and practice greetings and introductions with virtual NPCs (non-player characters).

Review and Q&A
- Summarize key points covered in the lesson.
- Address any questions or concerns from students regarding the Metaverse platform or language exercises.

Assignment
- Assign homework, which may include exploring the Metaverse platform, practicing greetings and introductions, or reviewing vocabulary.
Phase 2
Lesson Title: Virtual Language Exchange
Duration: Phase 2 (Weeks 2 to 4)
Learning Objectives:
1. To facilitate virtual language exchange and communication within the Metaverse.
2. To enhance students' conversational English skills.
Materials:
- Computers or devices with internet access.
- Spatial Metaverse access for all students.
- Headphones or speakers with microphones.
- Presentation slides and screen-sharing capabilities.
Lesson Outline:
Introduction (Week 2, Session 1)
- Recap of Phase 1 and the importance of virtual language immersion.
- Overview of the Virtual Language Exchange session.
Virtual Language Exchange (Week 2 to Week 4)
1. Partner Assignment (Week 2, Session 2)
   - Assign students partners
   - Encourage students to find a partner within the Metaverse.
2. Conversation Topics (Week 2, Session 2)
   - Provide a list of conversation topics or scenarios.
   - Topics can include hobbies, travel, daily routines, etc.
Week 2: Session 2 - Conversation Topics (Daily Routines, Hobbies and Interests, Travel Experiences)
   - Students explore various conversation topics, including daily routines, hobbies and interests, and travel experiences. They practice asking and answering questions related to these topics.
Week 2: Session 3 - Language Exchange Session 1 (Topic: Daily Routines)
   - Topic: Daily Routines
   - Students engage in a conversation with their partner, discussing their daily routines. For example:
     - "What time do you usually wake up in the morning?"
     - "What do you do after classes or work?"
Week 2: Session 4 - Feedback and Reflection
   - Students provide feedback on their partner's language usage during Session 3.
   - Reflect on any language challenges faced and strategies for improvement.
Week 3: Session 5 - Language Exchange Session 2 (Topic: Hobbies and Interests)
   - Topic: Hobbies and Interests
   - Students engage in a conversation about their hobbies and interests, sharing their passions. For example:
     - "I enjoy painting. What about you?"
     - "I love playing the guitar. Do you play any musical instruments?"
Week 3: Session 6 - Feedback and Reflection
   - Students provide feedback on their partner's language usage during Session 5, focusing on vocabulary related to hobbies and interests.
   - Reflect on any language challenges faced and strategies for improvement.
Week 4: Session 7 - Language Exchange Session 3 (Topic: Travel Experiences)
   - Topic: Travel Experiences
   - Students discuss their travel experiences, sharing stories and recommendations. For example:
“I went to Bali last year. Have you been there?”
* “I’d love to visit Japan. Have you ever been to Tokyo?”

**Week 4: Session 8 - Feedback and Reflection**
- Students provide feedback on their partner’s language usage during Session 7, focusing on vocabulary related to travel.
- Reflect on any language challenges faced and strategies for improvement.

**Week 4: Session 9 - Final Language Exchange Session**
- Students revisit any of the previous topics or select their own based on personal interests.
- This session allows students to consolidate their learning and apply feedback received.

**Group Discussion and Reflection (Week 4, Session 10)**

**Group Discussion**
- Students join small groups for a discussion.
- Share experiences and insights from the language exchange sessions.

**Reflection**
- Discuss the value of language exchange and its impact on language learning.
- Address any challenges faced and strategies for improvement.
- Summarize the key takeaways from the Virtual Language Exchange sessions.
- Answer any questions or concerns from students.

**Assignment (Week 4, Session 11)**
- Assign homework related to the Virtual Language Exchange, such as preparing for the next session or exploring specific conversation topics.