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Article

From Tasks to Talks: Enhancing EFL Oral Communication through Gamified Metaverse in Higher Education

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Abstract
This study investigates how task-based language teaching (TBLT) enacted in a metaverse environment supports Thai EFL undergraduates' oral communication and how students experience such learning. Addressing concerns about Thai graduates' low English proficiency and limited opportunities for meaningful speaking practice, the study embeds TBLT cycles in gamified metaverse-based environment. An explanatory sequential mixed-methods design was employed with 67 non–English-major undergraduates from Thai public universities selected through purposive volunteer sampling. Metaverse-based oral tasks were implemented for four weeks, with oral communication tests to assess range, accuracy, fluency, coherence, and pronunciation. The tests were administered before and after the intervention, followed by semi-structured interviews with 33 students. Paired-sample t-tests showed significant gains in overall oral communication with improvements across all five dimensions and the largest effect for lexical range. Thematic analysis indicated that the tasks in the gamified metaverse environment promoted genuine language use and reflection. In addition, the avatar-mediated "safe space" reduced anxiety and built confidence, and cross-institution interaction together with promoting authentic collaboration, although the issues of platform stability, connectivity, and screen fatigue posed some challenges. The findings suggest that carefully designed gamified metaverse-based TBLT can enhance both linguistic performance and affective readiness for communication. Future research should employ larger and more diverse samples, longer interventions with delayed post-tests, and comparative designs, such as metaverse vs. non-metaverse TBLT or gamified vs. non-gamified tasks, to clarify boundary conditions and support wider implementation.

Keywords
Gamification, higher education, metaverse, oral communication, task design

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1 Introduction

Computer-assisted language learning (CALL) is one of the teaching approaches in language education. These technological tools have created more spaces for language use and, therefore, help facilitate second language learning. Digital networks are now frequently used to mediate language learning as a significant communicative medium impacting the communication process (Kern, 2014; Thorne, 2016). These digital technologies and tools have provoked increasing attention in pedagogical research as they reshape and transform educational frameworks towards a broader future-oriented learning environment.

Recent innovations in digital learning have included the integration of immersive technologies, such as the metaverse, into educational contexts. The metaverse, a virtual world platform, enables the creation of simulated learning environments in which learners can interact and collaborate with virtual reality (VR) peers beyond the constraints of the physical classroom (Hwang & Chien, 2022). Such platforms expand the possibilities by allowing students to participate in discussions, exercise autonomy in decision-making, and engage in cross-cultural exchanges. Within language education, in particular, metaverse-based environments have demonstrated potential to enhance learners' communicative competence (Filippone et al., 2025; Kim, 2023), thereby supporting the broader objective of preparing graduates with the collaboration and communication skills demanded by future work (Muthmainnah et al., 2025).

Across these environments, gamification could be integrated. Gamification refers to the use of game elements, such as narrative quests, points and badges, time-bound challenges, and collaborative leaderboards, in non-game contexts (Deterding et al., 2011; Shen, Lai, & Wang, 2024). Layering gamification elements can strengthen task goals and feedback loops, thereby increasing autonomy, persistence, and social interaction during task-based language learning (TBLL). Meta-analytic evidence in higher education indicates small-to-moderate positive effects of gamification on motivation, engagement, and learning, especially in oral communication (e.g., Aal-Asheakh & Saud, 2024), while also cautioning that outcomes are sensitive to design quality and context (Hamari et al., 2014; Li et al., 2023; Sailer & Homner, 2020).

Oral communication ability is a core component of communicative competence because speaking allows learners both to convey information and to manage social relationships in real time (Brown & Yule, 1983; Slimani, 2018). Inside the classroom, speaking functions as the main tool through which teachers and learners express ideas, negotiate meaning, and clarify misunderstandings, so weaknesses in this skill can directly limit participation and overall language development (Slimani, 2018). In many EFL contexts including Thailand, however, learners have limited exposure to authentic interaction and often experience anxiety about speaking, which reduces willingness to communicate and constrains progress.

TBLT is one of the strong approaches for meaningful communication, and it has documented benefits for speaking-related outcomes across diverse contexts. Recent syntheses indicate that task-based approaches can enhance oral performance (Medina Fernández, 2021). At the same time, immersive environments—virtual reality and emergent metaverse platforms—offer affordances (e.g., presence, interaction, low-stakes rehearsal) that can reduce anxiety and boost willingness to communicate, both key to developing oral communication ability. Yet, reviews also note uneven evidence for gains in fluency and call for tighter alignment between pedagogy and technology (Kaplan-Rakowski & Gruber, 2023).

In Thailand, ongoing concerns regarding graduates' English language proficiency and preparedness for the workforce have maintained oral communication as a priority on the reform agenda. Recent EF English Proficiency Index reports classify Thailand in the "very low" band and place it near the bottom of global rankings, indicating that many adults still struggle to communicate effectively in English (EF Education First, 2023). The Ministry of Higher Education, Science, Research and Innovation (MHESI) explicitly mandates the development of 21st-century competencies within higher education, including proficiency in English communication skills, as a key component of the nation's human capital strategy

(MHESI, 2022). Moreover, MHESI has been pressed to reimagine learning for future work promoting "Next-Gen University" directions—personalized, non-age-bound pathways, micro-credentials, and new digital learning platforms (NXPO, 2025). These policy signals, alongside the reinventing university initiative, position universities to trial immersive, technology-enhanced pedagogies that can strengthen graduates' communication and collaboration skills in English (Department of Education, Skills and Employment, 2020). The early trials with metaverse spaces (e.g., Spatial.io) in undergraduate courses report heightened engagement and measurable achievement gains, underscoring local feasibility. However, most studies (e.g., Çelik & Baturay, 2024; Kanharin & Chatwattana, 2025; Rahman et al., 2024; Wang et al., 2025) to date target vocabulary, game-based participation, and oral communication ability rather than embedding TBLT cycles in enhancing oral communication ability. Consequently, the research on gamified metaverse which embedded TBLT in the design to enhance oral communication should be explored when implemented in EFL contexts, like Thailand. The research aimed to investigate how TBLT enacted in a gamified metaverse environment impacts Thai EFL undergraduates' oral communication, and how students themselves experience such learning.

2 Literature Review

2.1 Task-based Language Teaching (TBLT)

Task-Based Language Teaching (TBLT) has become a widespread learner-centered methodology that structures instruction around meaningful tasks instead of isolated language elements. According to Ellis (2003) and Nunan (2004), a task in TBLT is generally characterized as an activity wherein learners utilize the target language to accomplish a communicative outcome, emphasizing meaning and practical applicability rather than the rote rehearsal of pre-instructed linguistic forms. More importantly, Ellis (2024) underscore TBLT utilizes that meaningful communication as the core of the syllabus and lessons. A classic framework, such as Willis's (1996) pre-task–task cycle–language focus, shows how tasks can be sequenced to promote both communicative effectiveness and attention to form. This orientation closely corresponds with communicative language teaching; however, it extends further by employing tasks as the fundamental unit of syllabus design and classroom implementation.

Empirical research contributes to speaking has been shown at various levels. Bryfonski and McKay (2019) demonstrates that TBLT using meta-analysis based on 52 studies is effective in enhancing learners' oral communication skills within EFL contexts in program-level implementations. Similarly, Medina Fernández's (2021) research has demonstrated that TBLT produces overall positive effects on second language (L2) achievement and significant improvements in speaking performance in particular using systematic review and meta-analysis. The review highlighted facilitative conditions, especially pre-task planning and task repetition, but also emphasized limitations in the evidence base such as the prevalence of small samples and laboratory-like conditions in some studies and the need for more classroom-based, randomized research to reduce sampling bias and strengthen causal claims.

Classroom research (e.g., Hasan, 2014) was conducted using quasi-experimental study with 21 EFL secondary students. Likewise, the results indicates that task-based programs result in considerable improvements in learners' fluency, accuracy, and confidence in speaking by comparing pretest and posttest scores. Additionally, the students reported favorable attitudes toward TBLT. Furthermore, both learners and instructors frequently express favorable perceptions of TBLT, emphasizing its relevance, the opportunities it provides for collaboration, and its positive influence on engagement (Sholeh et al., 2021). These features establish TBLT as a pedagogical foundation for the integration of technology-enhanced or metaverse-based environments designed to enhance EFL university students' oral communication skills and to explore their perceptions of such innovative instructional methods.

There studies, therefore, suggest that TBLT could be a promising approach for developing L2 speaking skills. However, they also reveal a gap regarding how technology-based approaches,

including gamified metaverse environments, should be explored. Therefore, this study investigates TBLT as a pedagogical foundation for examining how immersive, technology-enhanced or metaverse-based environments may develop EFL university students' oral communication skills and shape their perceptions of innovative instructional approaches.

2.2 Metaverse in English language learning

Across English language education, early evidence (e.g., Çelik & Baturay, 2024; McCallum & Tafazoli, 2024) suggests the metaverse can extend what CALL already does well—authentic interaction, social presence, and multimodal input—by adding embodiment and persistence in shared 3D spaces. For instance, Çelik and Baturay (2024) conducted a quasi-experimental study in a private high school with 86 EFL learners, comparing a metaverse-based vocabulary intervention (Spatial) with instruction using conventional technologies. Using pre- and post-tests and validated psychometric scales, they reported significantly higher vocabulary learning and retention, as well as stronger engagement in the metaverse group; however, social presence did not improve significantly, and the researchers underscored key limitations such as a short-term intervention and non-randomized grouping—leaving questions about sustained development and transfer to productive skills such as speaking.

At the university level, Ha (2024) examined metaverse-blended learning in a 15-week English presentation course at a university with 24 EFL students in South Korea using mixed-methods questionnaires and group interviews. Findings highlighted high satisfaction and engagement, with many students reporting reduced presentation anxiety and enjoyment of avatar-mediated interaction. Nonetheless, the study focused primarily on perceptions and affective variables rather than controlled comparisons or validated performance gains, making it difficult to determine how much improvement was attributable to the metaverse itself versus supportive instruction and the blended design. More importantly, recent literature focused specifically on English reports gains in engagement and learning outcomes, while also remarking on inconsistent methods and digital literacy demands for both teachers and students (Jiao et al., 2024; Li & Yu, 2023).

In addition, studies leveraging virtual world platforms (e.g., Second Life, OpenSim) show that task design drives the pedagogy: meaning-focused, collaborative tasks foster participation, scaffolding, and negotiation of meaning for L2 development (Deutschmann et al., 2009; Peterson, 2012). Reported benefits of virtual world include higher learner activity, improved turn-taking, and peer support; however, proper introduction to the virtual space and careful sequencing of tasks are essential.

Beyond participation, studies on learning outcomes focus on specific skills. Research finds that listening ability improves when virtual-world interaction is paired with complementary tools (e.g., Skype) and aligned to clear task objectives (Levak & Son, 2017). Therefore, learning motivation also emerges as a consistent advantage of metaverse/virtual-world activities in language courses (Wehner et al., 2011).

Teacher and learner perceptions are another key for consideration. With pre-service EFL teachers, designing metaverse classrooms increased self-efficacy and generated positive sentiment toward pedagogical use, but participants still noted infrastructural and design challenges, underscoring the need for practical training and robust task models (Hwang & Lee, 2024a; Li & Yu, 2023).

Collectively, research suggests that the metaverse holds promise for English language learning when pedagogy drives its use—leveraging immersion to deliver goal-oriented, interactive tasks, scaffolding learners' entry into the environment, and evaluating learning through clearly defined language outcomes. However, despite the growing body of evidence, findings remain mixed due to variations in task design, methodological rigor, and assessment practices. To strengthen claims of effectiveness, future studies should provide detailed task specifications, include appropriate comparison conditions, and

employ validated outcome measures (Jiao et al., 2024; Li & Yu, 2023). Consequently, a clear research gap remains for well-controlled, task-based investigations—particularly in EFL university contexts—examining how immersive (and potentially gamified) metaverse environments can enhance oral communication skills and shape learners' perceptions of innovative instructional approaches.

2.3 Gamification in English language learning

Gamification generally refers to the use of game elements, such as narrative quests, points and badges, time-bound challenges, and collaborative leaderboards, in non-game contexts (Deterding et al., 2011; Shen, Lai, & Wang, 2024). It has shown small-to-moderate benefits for cognitive and motivational outcomes in education and, specifically, in English as a Foreign Language (EFL) classroom, consistent gains in engagement with mixed effects on achievement depending on the targeted skill by offering points, badges, leaderboards, challenges, and instant feedback (Sailer & Homner, 2020).

In Thai higher education, Matyakhan et al. (2024) conducted a mixed-methods study with 70 first-year EFL university students in Thailand. They compare an experimental group that used gamified quiz applications (e.g., Kahoot and Quizzes) over a 14-week reading course with a control group receiving traditional instruction using pre-/post-reading comprehension tests, engagement surveys, and focus-group interviews. They found that gamified quizzes improved undergraduates' reading engagement and comprehension. Conversely, some studies report motivational gains without parallel vocabulary growth, underscoring outcome-specific effects (Sadeghi et al., 2022).

Yang and Jeaco (2023) investigated a corpus-based gamified vocabulary activity ("The Prime Machine") in an English-medium university context in China. They study combined a corpus-based analysis of the game's linguistic input with interviews from five Chinese university EFL students. Participants reported noticing recurring lexico-grammatical patterns and generally positive perceptions, but they also requested clearer corrective explanations and improvements to the reward system—highlighting how feedback design and scaffolding shape learning value. Quiz-style platforms that offer rapid feedback and light competition often enhance enjoyment and performance, though poorly designed leaderboards can reduce intrinsic motivation (Hanus & Fox, 2015).

A forward-looking design stance views gamification as an adaptive layer for language tasks: matching mechanics with learning goals (e.g., timed retrieval for lexis, narrative badges for discourse moves), balancing collaboration with competition, and using analytics to adjust difficulty and feedback. Importantly, affective factors are important matters—playful, low-stakes tasks can lower anxiety and increase willingness to communicate, which gamified designs can strengthen this since they support autonomy, competence, and relatedness (Reinders & Wattana, 2015). Although the evidence base is growing, many studies emphasize and target receptive skills (such as reading and vocabulary) more often than sustained oral communication. Moreover, inconsistent reporting of task designs, game mechanics, and validated language outcomes makes it difficult to compare findings across studies and identify which gamification features drive durable L2 development. Therefore, these findings suggest that durable learning gains emerge when gamification is driven by pedagogy rather than novelty.

2.4 English oral communication pedagogy through Metaverse-based gamification

Oral communication ability is a key component of communicative competence because speaking allows learners both to convey information and to manage social relationships in real time (Brown & Yule, 1983; Slimani, 2018). According to Goh and Burns (2012), speaking is central to language education because it enables learners to participate in academic discussion, professional communication, and everyday problem-solving, while also supporting the development of other skills such as reading and writing through meaning-focused interaction. In EFL research, the ability is commonly operationalized

through CAF—complexity (syntactic/lexical), accuracy (error rates), and fluency (speed, pausing), complemented by pragmatics or interactional competence (turn-taking, repair, backchannels, initiative). CAF provides analyzable performance indices, while interactional competence highlights co-constructed talk and task achievement (Galaczi & Taylor, 2018; Housen & Kuiken, 2009). However, classroom constraints (e.g., large classes and limited opportunities for extended interaction) and affective barriers (e.g., speaking anxiety and fear of evaluation) frequently restrict meaningful speaking practice in EFL contexts (Horwitz et al., 1986; Littlewood, 2007; Woodrow, 2006).

In this research, metaverse-based gamification has developed as a promising advancement in the field of oral communication pedagogy. The metaverse in education is generally characterized as a continuous, shared, three-dimensional virtual environment where students engage via avatars in real-time interactions. Jiao et al. (2024) reports that most EFL metaverse studies emphasize engagement and learning experience outcomes, but also highlights recurring challenges such as uneven digital literacy, infrastructure limitations, and a lack of curriculum-oriented task frameworks.

Empirical studies further suggest that metaverse may help reduce anxiety and support communicative needs when paired with clear pedagogical goals. It offers immersive, multimodal interaction and can enhance academic achievement when combined with sound pedagogy (Jiao et al., 2024). For example, Chen (2022) compared lecture-based, mobile-assisted, and VR-supported conditions with 33 university EFL learners over four weeks, and findings found that only the VR group showed statistically significant reductions in public-speaking anxiety, suggesting that immersive rehearsal environments may be particularly beneficial for anxious speakers. Research on VR for oral communication shows that immersion, interaction, feedback, and learner creation tend to reduce anxiety and increase motivation, confidence, cultural awareness, and willingness to communicate, even though gains in oral fluency are sometimes mixed (Petersen et al., 2022; Oh et al., 2018; Yudintseva, 2023). This is in line with Krashen (1982), which is that when affective barriers, such as anxiety, are lowered, learners are more likely to engage in sustained interaction and notice input, which in turn can enhance their English oral communication ability.

Gamification builds on these affordances by integrating game elements into VR or metaverse-based CALL ecosystems. Recent EFL studies show reductions in foreign language speaking anxiety after experiencing VR learning. Çelik (2025) utilized the multiplayer game Fortnite as a game-based metaverse and found that this approach boosted EFL learners' motivation, reduced language anxiety, and supported vocabulary learning and task engagement, illustrating how metaverse gamification can create low-risk, high-engagement conditions for communication-oriented tasks. Additionally, the qualitative data from some studies (e.g., Ding, 2024; Kaplan-Rakowski, 2023) metaverse increased communicative confidence. Similarly, Hwang and Lee (2024b) reported that avatar-mediated speaking practice in a metaverse environment lowered anxiety and increased willingness to communicate, while Ha (2024) implemented Gather Town in a 15-week blended English presentation course in South Korea with 24 university EFL students, using questionnaires plus group interviews; students reported increased engagement and lower presentation anxiety, but also raised technical constraints and the need for structured support. In addition, Cowie and Alizadeh (2022) examines the affordances and challenges of using VR for language teaching through a year-long case study in Japan. The researchers highlight a key gap in the literature—limited research on how teachers can prepare to teach with VR and on longitudinal, self-directed student learning in VR—and respond by tracking five learners (four university students and one high school student) who met weekly online over an academic year. The project progressed through three stages: (1) immersive headset-based use of Oculus Quest 2 in Engage, where students explored and reviewed VR apps linked to their academic disciplines; (2) a shift to Mozilla Hubs (browser-based) after most participants experienced cybersickness, where students designed their own rooms and taught each other content from their fields; and (3) student creation of 360-degree virtual tours using ThingLink, emphasizing learner production and self-directed exploration. Overall, the researchers argue

that VR offers strong potential for authentic engagement, collaboration, creativity, and contextualized learning, but its classroom adoption is constrained by cybersickness, hardware/network limitations (Wi-Fi and processing power), the need for training, and ethical/health concerns, concluding that effective implementation depends most critically on teachers' pedagogical knowledge to scaffold learning and design meaningful tasks rather than relying on immersion alone. At the assessment level, Shin et al. (2025) found that learners performed better and felt less anxious in metaverse-based speaking interviews than in traditional or Zoom formats.

Despite positive evidence for TBLT, metaverse platforms, and gamification in ELT, existing studies are fragmented. Few explicitly ground open-world 3D environments such in task-based principles or describe gamified speaking tasks in ways that can be replicated. University-level EFL contexts in underrepresented settings, such as Thai higher education, are also underexplored particularly regarding measured speaking improvements. The present study addresses these gaps by implementing TBLT in an immersive gamified metaverse environment as an intervention for Thai EFL university students and evaluating its impact on their English oral communication and their perceptions toward this integrated approach.

Therefore, this study is anchored in a TBLT-driven theoretical framework that explains how task design, strengthened through metaverse affordances and gamification mechanics, can support EFL learners' oral communication development. At the core, TBLT positions the task as the main unit of learning, where learners use language to achieve a meaningful outcome through sequenced stages (e.g., pre-task, task cycle, and language focus), creating sustained opportunities for purposeful speaking (Ellis, 2003; Nunan, 2004; Willis, 1996). Within this task cycle, learning is theorized to occur through interaction and output processes: tasks encourage negotiation of meaning, provide opportunities for modified interaction (Long, 1996), and encourage learners to produce more precise and fluent speech when communication must continue to complete the task (Swain, 1995). The metaverse environment functions as a mediating space that enhances these processes by enabling avatar-based, multimodal, real-time communication and creating a lower-pressure setting that could reduce anxiety and increase willingness to communicate (Krashen, 1982; MacIntyre et al., 1998). Moreover, gamification is conceptualized as a motivational layer embedded in task design—through goals, progression, and challenge—that sustains engagement and persistence during task performance. The framework conceptualizes learning as emerging from task-driven interaction in an immersive and motivating environment, where well-designed tasks are not only delivered through technology but are amplified by metaverse features and gamified structures to promote participation, reduce affective barriers, and generate measurable development in EFL oral communication and learner perceptions.

2.5 The study

To address the research gap in the literature, this study investigates the implementation of TBLT in a gamified metaverse learning environment for Thai university EFL learners. Specifically, it explores how integrating task cycles with metaverse features, such as immersive interaction, avatar-mediated communication, and game-like mechanics (e.g., points, quests, leaderboards, and challenges), may shape learners' engagement and language use during meaningful tasks. By situating TBLT in an interactive virtual space, the study aims to provide empirical evidence on both the pedagogical feasibility and potential learning benefits of this approach in the Thai higher-education EFL context. The research questions are as follows:

RQ 1: What are the effects of TBLT in the gamified metaverse environment on EFL university students' oral communication ability?

RQ 2: What are the students' perceptions toward TBLT in the gamified metaverse environment?

3 Methodology

3.1 Research design

This study adopted an explanatory sequential mixed-methods design. In the first quantitative phase, a pre-post design was implemented to examine the effects of oral tasks in a metaverse environment on EFL university students' oral communication ability (RQ1). In the qualitative phase, semi-structured interviews were conducted with a subset of participants after the post-test to explore their perceptions of the gamified metaverse-based oral tasks (RQ2). The qualitative findings were then used to help explain and elaborate on the quantitative results, with both sets of data integrated at the interpretation stage to provide a more comprehensive understanding of the impact of the intervention. The findings from previous research reveals that learners' perceptions, attitudes, and beliefs fundamentally shape second language oral communication through interconnected psychological mechanisms. Students with positive attitudes demonstrate significantly greater strategy use and willingness to communicate, which directly increases their frequency of oral language output. Learners› perceptions of speaking activities and their self-concept as language users serve as critical filters determining whether they engage in communicative opportunities across diverse contexts (de Saint Léger & Storch, 2009; MacIntyre & Charos, 1996; Rastegar & Mirzadi Gohari, 2016; Toomnan & Intaraprasert, 2015). The qualitative data, therefore, can illuminate the insights of the improvement of the oral communication.

3.2 Participants

The study involved 67 undergraduate students, consisting of 21 males and 46 females the aged 18 to 20, from public universities around Thailand selected using purposive volunteer sampling technique. The technique was employed by mailing to the official channels of six public universities in the northern, northeastern, and central regions. The students who met the requirements joined the project on a voluntary basis. The criteria consist of 1) being university students from a public university in Thailand to ensure the homogeneous characteristics of sharing similar digital infrastructures and national policy implementation. This provided a more consistent context for examining the impact the digital learning ecosystem through the metaverse, whereas private universities vary widely in technological support policy, 2) not being an English-majored student since English major students receive intensive language training as part of their core curriculum, meanwhile, non-English majors often have limited exposure to oral communication practice despite the needs of English for their future careers, and 3) being familiar with technology tools such as computers, tablets etc. The study focuses on digital learning environments; therefore, participants needed minimal technological readiness to complete tasks meaningfully. This criterion ensured that participants had the basic digital skills necessary to navigate the system and provide valid outcomes. Dörnyei (2007) stated that while larger samples are theoretically desirable, educational intervention research faces practical constraints. Intensive instruction requires manageable class sizes. We need quality over quantity in skill-based interventions, especially oral communication. Smaller groups enable individual speaking and listening practice, personalized feedback, authentic interaction opportunities, and detailed assessment of oral performance. In addition, regarding statistical power and effect size detection according to Cohen (1988), the medium effect size ($d = 0.5$) requires 64 participants per group; therefore, 67 participants are adequate.

33 students were voluntarily participated for the group interview to explore the perceptions toward TBLT in the metaverse environment. There are 13 males and 20 females selected based on the criteria of the most improved scores and the least improvement to ensure the representativeness of the group. According to Creswell and Plano Clark (2017), in explanatory sequential mixed methods designs, selecting approximately 50% of quantitative participants for qualitative follow-up would provide adequate depth to explain quantitative findings

3.3 Research instruments

3.3.1 Gamified metaverse tool

The researchers utilized Spatial.io as the metaverse platform for implementing gamified oral communication tasks in this study. Spatial.io provides 3D immersive spaces where users interact through personalized avatars using voice, video, and text in environments such as classrooms, exhibition halls, and meeting rooms. In this research, gamification was operationalized through specific mechanics rather than general game-like features. First, quests were designed as task-based speaking missions (e.g., information-gap role-plays, problem-solving discussions, and short presentations) that required students to use English to achieve communicative outcomes aligned with the lesson objectives. Completion of each quest awarded digital badges, which were displayed in the environment to signal achievement and encourage continued participation. In addition, a creator-made leaderboard tracked points earned from completing quests and demonstrating target behaviors (e.g., initiating interaction, asking follow-up questions, using target vocabulary), thereby linking game progress directly to the students' oral communication goals.

After virtual settings with the designed unit lessons in the gamified metaverse platform were developed, they were evaluated by experts in English language teaching and educational technology using the Item-Objective Congruence (IOC) index. The IOC value of .98 indicated that the platform was of the quality and practical for implementation in the main intervention. Consequently, a pilot study was conducted with 20 students who did not participate in the main study but had comparable traits of non-English majors and technological backgrounds, in order to examine usability and learner difficulties to adjust the platform. After completing two units which learners took approximately 90 minutes per one unit, participants reported issues such as occasional lag in certain virtual environment, long period of time needed for some missions due to the lack of enough guidelines, and a need for clearer onboarding instructions for first-time users, as revealed in their open-ended feedback. Taken together, the experts' evaluations and learners' comments were used to refine the platform and address the limitations identified in the pilot phase.

3.3.2 Oral communication lessons in gamified metaverse classrooms

The researchers designed the tasks with reference to the Common European Framework of Reference for Languages (CEFR) at B1–B2 levels because Thai higher education policy sets intermediate English proficiency as a key target for undergraduates, particularly in relation to communicating in familiar academic and work-related situations. To ensure that the task topics and difficulty were aligned with what Thai students typically encounter, the researchers first surveyed English courses at the participating institution and identified five textbooks that are widely used at the tertiary level in Thailand—Solutions, Upstream, Beyond, Destination, and Gateway. These textbooks were then systematically reviewed in terms of (a) their stated CEFR targets, (b) the relevance of themes to Thai students' academic and everyday contexts, (c) lexical and grammatical load, and (d) the nature and complexity of speaking and listening tasks. On the basis of this review, the researchers selected and adapted topics and task types that were judged to be pedagogically appropriate and consistent with the B1–B2 band. Therefore, there were four units designed using TBLT in this study process in the 3D metaverse platform, namely 1) Routine, 2) Leisure Activities, 3) Culinary Culture, and 4) Technology and Careers. All the topics are considered meaningful to learners of all majors since they are the topics in daily dialogues. The designed lessons were validated by three experts in the field of English language teaching and educational technology, and the results yielded 0.65, meaning the lessons needed adjustments. The researchers then revised the lessons in line with the experts' comments—most notably by adding a reflection component after the post-task cycle—and re-submitted the materials for further expert review to confirm their content validity

before they were implemented. The second round of IOC results yielded 1.00, which was considered acceptable for use in the main study.

3.3.3 Oral communication tests

Oral communication tests were designed to assess oral communication ability, which comprises 1) range, 2) accuracy, 3) fluency, 4) coherence, and 5) pronunciation using an analytic rubric with a total score of 20 (4 scores for each dimension). The rubric was designed based on the synthesis of previous studies in oral communication using CAF (Galaczi & Taylor, 2018; Housen & Kuiken, 2009) to match with purpose of assessing students' English proficiency. The test lasted approximately seven minutes in the role-play format. The topic of beauty pageants, as one of the pop cultures in Thailand, mirrors the real-life communication that makes a link to the experience of adolescent Thai learners. They watched a video of three beauty pageant contestants answering a question. They should summarize what each contestant's answer is, discuss how good each contestant's answer is, discuss who should win the competition, and select one contestant to be the winner. The test and the rubrics were validated by the experts in English language teaching yielding 0.67 of IOC results, which is valid. The test was piloted with non- English majored students. To ensure the reliability of the test rubrics, the interrater was employed. Two raters were English teachers with more than five years of teaching experience. They were informed and explained each dimension of the rubrics and trained on how to grade by the researcher. The results showed a Pearson correlation of 0.763, which means that they are reliable. An intraclass correlation coefficient (ICC) was calculated to examine inter-rater reliability of the speaking test scores. Overall inter-rater reliability for the oral communication score was assessed using a two-way random-effects model with absolute agreement, single measures [ICC(2,1)], and indicated good reliability, ICC = .86, 95% CI [.77, .91], $p < .001$. The same model was used for each analytic dimension. For *Range*, reliability was moderate for single measures (ICC = .55) and good for the average of the raters' scores (ICC = .71). For *Accuracy*, reliability was moderate-to-good for single measures (ICC = .62) and good for average measures (ICC = .77). For *Fluency*, reliability was moderate for single measures (ICC = .49) and moderate-to-good for average measures (ICC = .66). For *Coherence*, reliability was moderate for single measures (ICC = .58) and good for average measures (ICC = .73). For *Pronunciation*, reliability was moderate-to-good for single measures (ICC = .65) and good for average measures (ICC = .79).

3.3.4 Interview questions

The interview questions aimed to elicit the students' perceptions of TBLL in the metaverse environment. The semi-structured interview was conducted in Thai to avoid the language barrier and students' anxiety during the interview. The transcription of the interview was translated into English, and then the back translation was used to identify any discrepancies that may have been lost in the initial translation. The samples of the interview questions were: 1) What do you think about using a metaverse tool in learning English oral communication? 2) How do you find it beneficial or challenging? 3) What were your strategies when you coped with the challenges?

3.3.5 Data collection

The study took six weeks in total, including pretest and posttest. Week 1, the researchers informed about the purposes of the study and research procedures to gain the participants. Once they agreed to participate, the researchers administered a consent form. The participants who met the criteria voluntarily agreed to participate in the research. Then, they took the pretest. The purpose was to assess their oral communication ability before the intervention. From Week 2 to Week 5, the participants studied through TBLT in the metaverse environment and performed oral tasks. After the implementation, in Week 6, the

participants took the posttest and attended the semi-structured interview. As shown in Figure 1, students begin with warm-up activities that are aligned with the lesson content. Figure 2 illustrates how they then develop relevant vocabulary by studying the materials and engaging in related practice activities. In Figure 3, students work on the main tasks by participating in group discussions on a range of real-life topics. Finally, Figure 4 shows the reflection stage, where learners review what they have learned and share their feelings about the lesson.

Figure 1
Pre-task in the Metaverse Environment

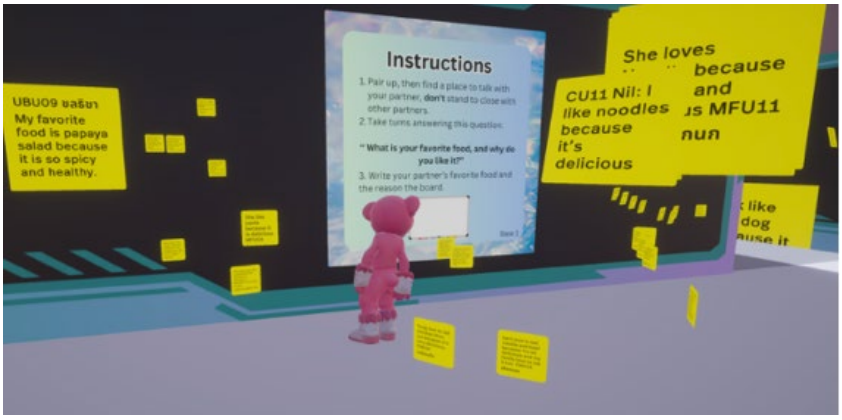
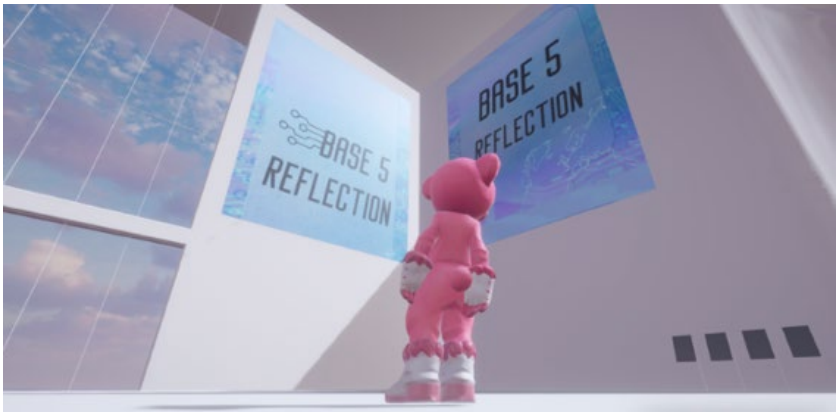


Figure 2
Learning Vocabulary in a Metaverse Environment

Figure 3
Task Cycle in the Metaverse Environment

Figure 4
Reflection in the Metaverse Environment



3.3.6 Ethical consideration

The research project was approved by the Research Ethics Review Committee for Research Involving Human Subjects of Chulalongkorn University (COA No. 352/67). Before data collection, all participants were informed about the purpose of the study, the procedures, potential risks and benefits, and their right to withdraw at any time without penalty. Written informed consent was obtained, and all responses were treated as confidential and reported in aggregate form only to protect participants' anonymity and privacy.

3.3.7 Data analysis

For quantitative data, students' oral communication pretest and posttest scores were analyzed by using a paired-sample *t-test*, mean, and standard deviation. For the qualitative data, thematic analysis was conducted to analyze the transcription of the semi-structured interview video recording. All interviews were transcribed verbatim and anonymized. The researchers first familiarized themselves with the data through repeated reading, noting patterns, and after that, initial codes were systematically generated across all transcripts. To establish intercoder reliability, a second researcher independently coded 20% of the transcripts ($N = 7$), then Cohen's Kappa was calculated, yielding $\kappa = 0.73$. Discrepancies were discussed until consensus was reached. Codes were organized into themes through a process of reviewing, refining, and defining thematic categories. Trustworthiness was enhanced through strategies with thick description and researchers' reflexivity notes, when intercoder agreement is established. The software MAXQDA was used to organize initial codes.

4 Results

4.1 RQ 1: What are the effects of TBLT in the gamified metaverse environment on EFL university students' oral communication ability?

To address RQ 1, a paired-sample *t*-test was conducted to compare students' oral communication scores before and after the metaverse-based oral tasks ($N = 67$). Posttest performance ($M = 11.28$, $SD = 3.17$) was higher than pretest performance ($M = 10.14$, $SD = 3.22$), yielding a mean gain of 1.14 points. The difference was statistically significant, $t(66) = 5.85$, $p < .001$, with a large effect size (Cohen's $d = 1.59$). These results indicate that engaging in oral tasks within a metaverse environment produced a reliable and practically meaningful improvement in EFL university students' oral communication ability.

Table 1
Comparison of Pretest and Posttest of Oral Communication (N = 67)

Evaluation	*M*	*SD*	95% Confidence Interval of the Difference		Diff	*t*	*p* value	Effect Size
			Lower	Upper				
Pretest	10.14	3.22	1.52150	.74715	1.14	5.849	<.001	1.59
Posttest	11.28	3.17						

Table 2
Comparison of Pretest and Posttest of Oral Communication in Each Dimension

Dimensions	Evaluation	*M*	*SD*	95% Confidence Interval of the Difference		*t*	*p* value	Effect Size
				Lower	Upper			
Range	Pretest	2.01	0.73	.64399	.35601	6.933	<.001	.59
	Posttest	2.51	0.68					
Accuracy	Pretest	1.99	0.71	.16037	.00380	2.094	.020	.32
	Posttest	2.07	0.74					
Fluency	Pretest	2.07	0.72	.30628	.08178	3.451	<.001	.46
	Posttest	2.27	0.67					
Coherence	Pretest	2.12	0.70	.27623	.09691	4.154	<.001	.37
	Posttest	2.31	0.70					
Pronunciation	Pretest	1.95	0.71	.27020	.07308	3.477	<.001	.40
	Posttest	2.12	0.71					

Across all five analytic dimensions, posttest performance exceeded pretest performance, and each pre–post difference was statistically significant with small-to-moderate effect sizes. *Range* increased from $M = 2.01$ (SD = 0.73) to $M = 2.51$ (SD = 0.68), $t(66) = 6.93$, $p < .001$, $d = .59$. *Accuracy* rose from $M = 1.99$ (SD = 0.71) to $M = 2.07$ (SD = 0.74), $t(66) = 2.09$, $p = .020$, $d = .32$. *Fluency* improved from $M = 2.07$ (SD = 0.72) to $M = 2.27$ (SD = 0.67), $t(66) = 3.45$, $p < .001$, $d = .46$. *Coherence* increased from $M = 2.12$ (SD = 0.70) to $M = 2.31$ (SD = 0.70), $t(66) = 4.15$, $p < .001$, $d = .37$. Finally, *Pronunciation* rose from $M = 1.95$ (SD = 0.71) to $M = 2.12$ (SD = 0.71), $t(66) = 3.48$, $p < .001$, $d = .40$. The largest effect was observed for Range ($d = .59$).

Therefore, after learning oral communication through the metaverse, students performed better across all five speaking dimensions, and each improvement was statistically significant. The largest gain was in range, reflecting a wider use of vocabulary. Accuracy also improved, though more modestly. Fluency, coherence, and pronunciation showed clear advances, leading to smoother speech, better organization, and more intelligible delivery.

4.2 RQ 2: What are the students' perceptions toward TBLT in the gamified metaverse environment?

4.2.1 Genuine language use and reflection through task design

Students perceived the metaverse's task design as pushing them to use English purposefully while also prompting reflection on learning. They described sequenced activities—peer discussions, voice submissions, and a culminating conversation—that not only kept them engaged but also helped them

improve their vocabulary knowledge and fluency. Moreover, the built-in contingency of the tasks encouraged active communication as well as functional language use through scenario-based practice.

> "We had tasks with discussions, and we finished by recording and submitting our voices, which let us recap what we learned."
>
> "The tasks help me learn to speak, but I couldn't expect that I would speak continuously, and I think I learn a lot of words."
>
> "It felt as if we didn't try to communicate, the task wouldn't end, so I ended up speaking better."
>
> "When we simulated real situations, we practiced forming conversational sentences as we went."

Hence, students viewed the metaverse's sequenced tasks as prompting purposeful English use while sustaining engagement and prompting reflection. Discussion, voice submission, and a culminating conversation structured deliberate practice and a clear recap of learning. Built-in task contingencies compelled active communication, and scenario-based activities supported functional, conversational language (Ellis, 2003; Nunan, 2004).

4.2.2 Building confidence and reducing anxiety due to avatar-mediated "safe space."

Students consistently described the metaverse as an avatar-mediated "safe space" that lowered evaluation pressure and encouraged them to take risks in speaking, especially for those who are just beginning to speak English.

> "I dared to speak more; no one judged my accent or when I used the wrong word."
>
> "The advantage is that people who initially lacked the courage became more confident."
>
> "It is like a safe zone for me as one who is just a beginner."

Collectively, these perceptions suggest that the metaverse setting helped reduce anxiety and build confidence, enabling freer and more frequent oral participation.

4.2.3 Widening authentic interactive collaboration

Students perceived TBLT in the metaverse as expanding authentic peer interaction through frequent, topic-driven exchanges that connected classmates across institutions.

> "We got to communicate with friends—this aspect stood out more."
>
> "We could talk with friends in real time."
>
> "At the final stage, there were set topics for us to discuss with friends."

Together, these accounts suggest that the metaverse supported sustained, purposeful collaboration that felt both social and academically focused.

4.2.4 Technical constraints

Despite generally positive views, students flagged technical and ergonomic issues—especially stability, connectivity, and screen strain during longer sessions.

> "The in-game components are still unstable."
>
> "The downside is the limitations of devices and the internet."
>
> "Motion sickness can occur if I play for a long period."

Together, these comments underscore that platform reliability and network quality, along with extended screen exposure, can hinder otherwise positive learning experiences in the metaverse.

Overall, students reported that gamified metaverse-based TBLT promoted purposeful, functional English use and reflective learning through sequenced tasks that maintained engagement and provided clear opportunities to recap learning; built-in task contingencies further compelled active, sustained communication in scenario-based practice. The avatar-mediated environment operated as a safe space, lowering evaluative pressure, reducing anxiety, and boosting confidence, particularly for beginners. Students also experienced widened authentic collaboration via frequent, topic-driven, real-time exchanges that connected peers across institutions, blending social presence with academic focus. Nonetheless, they noted technical and ergonomic constraints that can temper otherwise positive outcomes.

5 Discussion

This study provides converging evidence that gamified metaverse-based TBLT can enhance EFL university students' oral communication ability while shaping positive learner experiences. The quantitative findings indicate that gamified metaverse task-based lessons had a positive and statistically significant impact on students' overall oral communication ability. Students' total speaking scores increased from pretest to posttest (M = 10.14 to M = 11.28), with significant gains across all dimensions—range, accuracy, fluency, coherence, and pronunciation. Within a CAF-oriented perspective, this pattern suggests that the intervention supported not only more complex lexical use (range) but also more accurate, fluent, coherent, and intelligible spoken production. Additionally, qualitative findings explain these outcomes: oral tasks promoted purposeful and authentic communication and reflection; avatar-mediated interaction reduced evaluative pressure and encouraged risk-taking; and peer collaboration increased authentic exchanges, tempered by technical constraints (stability, connectivity, screen strain).

5.1 Performance gains through TBLT theory

The quantitative results align with previous findings that TBLT enhances learners' oral communication skills in EFL contexts. Bryfonski and McKay (2019) and Medina Fernández (2021) report that task-based instruction leads to significant gains in speaking performance, while Hasan (2014) similarly observes improvements in fluency and accuracy under task-based programs. In the present study, the sequenced metaverse tasks appear to have operated much like Willis's (1996) task cycle, offering repeated opportunities for meaning-focused interaction followed by reflection and refinement. Grounding the metaverse activities in TBLT principles thus seems to have created the kind of communicatively authentic, goal-oriented practice that the literature identifies as conducive to oral skill development (Ellis, 2003; Nunan, 2004).

At the same time, the relatively modest increase in accuracy is consistent with the fluency–accuracy trade-off predicted by processing accounts of task performance (Skehan, 1998), especially when tasks prioritize message conveyance over strict form control. Future iterations of the intervention should therefore incorporate planned focus-on-form techniques (e.g., brief pre-task priming, reactive prompts, or post-task language reflection) to deepen accuracy gains without undermining fluency (Long, 1996; Schmidt, 2001). Students' descriptions of the task cycles suggest that structured pre-task planning, task performance, and post-task reflection were in place—processes that are well-established levers for gains in fluency and complexity (Foster & Skehan, 1996). The required voice submissions likely pushed learners to monitor their output (Swain, 1995) and subsequently notice gaps in their interlanguage (Schmidt, 2001), which may explain the concurrent improvements in coherence and pronunciation alongside lexical and structural range. Taken together, these patterns converge with the broader TBLL

claim that meaning-focused activity, when cyclic and reflective, promotes automatization and more effective discourse organization (Ellis, 2003).

5.2 Affective benefits of Avatar-mediated communication

The quantitative and qualitative findings jointly indicate that avatar-mediated communication in the metaverse produced clear affective benefits that supported students' oral communication. Although the tests did not directly measure anxiety or confidence, such improvement in oral communication ability is consistent with a learning environment in which learners feel sufficiently relaxed and confident to take risks and sustain real-time speech. Students repeatedly described the metaverse as a zone where no one judged their accent or mistakes and where those who initially lacked the courage became more confident and dared to speak more. These accounts suggest that the visual separation provided by avatars, combined with the playful, game-like context, lowered perceived evaluation pressure and reduced speaking anxiety. This echoes VR and metaverse research showing that immersion, anonymity, and embodied presence can reduce foreign language anxiety and increase willingness to communicate as well as engagement (e.g., Çelik, 2025; Chen et al., 2022; Cowie & Alizadeh, 2022; Ha, 2024; Hwang & Lee, 2024b; Petersen et al., 2022; Shin et al., 2025). In terms of Krashen's (1982) affective filter hypothesis, the lowered anxiety reported by learners likely opened more "space" for comprehensible input and pushed output, which in turn manifested as improved oral performance.

5.3 Collaboration and community beyond the classroom walls

The gamified TBLT in the metaverse environment not only created opportunities to improve oral communication but also helped learners collaborate more effectively with their peers, according to their own reports. This aligns with virtual-world research showing that task design in 3D environments can foster participation, turn-taking, and peer support (Deutschmann et al., 2009; Peterson, 2012), and with TBLT in the immersive environment studies that highlight the value of collaborative tasks for engagement and positive learner perceptions (Cowie & Alizadeh, 2022; Sholeh et al., 2021).

Learners also emphasized real-time, topic-driven exchanges across institutions, which resonates with social-constructivist accounts of learning in communities of inquiry (Garrison et al., 1999). Embedding TBLT in a metaverse setting extends learners' interactional repertoire by multiplying interlocutors, contexts, and contingencies, thereby making language use functionally necessary (Long, 1996). This networked task ecology likely underpins the substantial gains in linguistic range and the steady improvements in fluency and coherence, as learners must manage turn-taking, topic shifts, and repair strategies with unfamiliar partners.

5.4 Technical constraints

Even though the gamified metaverse has shown several benefits, there are some negative effects that students have reported in terms of technical constraints. They pointed to unstable in-game components, limitations of their devices and internet connections, and physical discomfort such as motion sickness and eye strain during longer sessions. These comments imply that some learners' practice opportunities—and therefore their potential oral gains—may have been dampened by connectivity and hardware problems rather than by the pedagogy itself. These perceptions reflect recurring concerns about the metaverse and VR applications in language instruction. Immersion and avatar-mediated interaction can improve engagement and speaking outcomes, but they also require strong infrastructure, appropriate equipment, and careful regulation of cognitive and physical stress (Cowie & Alizadeh, 2022; Hwang & Lee, 2024b; Jiao et al., 2024; Li & Yu, 2023). Therefore, institutional support for stable platforms, adequate hardware, and ergonomic session design is not optional but essential.

Collectively, the quantitative and qualitative evidence suggest that gamified metaverse-based TBLT is a practical route to improving EFL speaking—especially lexical range and discourse organization—when tasks are sequenced to prompt pushed output and supported by affect-sensitive, low-friction technology.

5.5 Pedagogical implications

The research announces pedagogical implications for three groups: teachers, course designers, and policy makers. For teachers, sequencing tasks within a TBLT cycle—discussion, rehearsal or voice submission, and a culminating conversation—promotes pushed output, noticing, and discourse organization. Teachers can also leverage avatars and private rehearsal pods early in the course to reduce evaluation pressure and raise willingness to communicate, then gradually fade these supports to foster transfer to more open interaction. To manage cognitive load and motion/screen strain, teachers should chunk sessions, default to low-latency audio, and use motion-safe presets. Additionally, they should provide captions or brief text prompts as redundancy during connectivity dips. Finally, voice submissions should be used as formative evidence to track gains in lexical range and coherence across cycles and to personalize subsequent tasks.

Course designers should align gamification with learning—not just participation—by awarding points and badges for linguistically meaningful behaviors (e.g., lexical variety, successful repair, and turn management) and by surfacing analytics on these behaviors for both learners and instructors. They should curate a bank of scenario-based tasks with adjustable complexity (e.g., planning time, number of elements, and cognitive demands) so that cohorts can progress toward balanced CAF targets in a planned way. Rubrics ought to be standardized to weight lexical range and discourse coherence alongside accuracy and pronunciation, thereby reflecting the discourse-level gains observed in the study. Designers should also build cross-institution cycles—using shared topics, rotating interlocutors, and common assessments—to amplify authentic audience effects and social presence that sustain purposeful language use. Finally, they should provide accessible alternatives, such as asynchronous voice tasks and low-graphics rooms, to ensure equitable participation when bandwidth or device constraints arise.

Policy makers and program leaders should invest in the "last-mile" conditions that make learning work day to day. This means providing stable internet connections, audio-first infrastructure, device loaner pools, and quiet rehearsal spaces. These supports reduce unnecessary cognitive load and let teachers focus on teaching rather than troubleshooting. They should also fund ongoing professional development that blends TBLT with skills for mediated interaction, such as brief focus-on-form routines in VR and analytics-informed differentiation, backed by coaching cycles and micro-credentials to encourage adoption. Finally, evaluation frameworks should track more than course completion. They should measure growth in key oral-communication outcomes as well as affective indicators like anxiety and willingness to communicate (WTC), so investments can be tied to real learning gains.

6 Conclusion

This study indicates that the gamified metaverse-based TBLT can effectively enhance EFL university students' oral communication skills. Quantitative findings showed significant gains across all five speaking dimensions—range, accuracy, fluency, coherence, and pronunciation—with the largest improvements in lexical range, suggesting expanded vocabulary use. Qualitative data help explain these outcomes: students felt that sequenced, scenario-based tasks pushed them to use language purposefully and reflect on their performance, while the avatar-mediated, open-world environment lowered anxiety and increased confidence, especially among less proficient learners. Real-time, topic-based interaction with peers extended collaboration beyond the classroom and fostered engagement, social presence, and sustained communication, illustrating how meaningful, gamified tasks can integrate cognitive, linguistic, and affective benefits.

Concurrently, several limitations constrain the generalizability and interpretation of these findings. The sample comprised a relatively small group of Thai non-English-major undergraduates, limiting generalizations beyond similar higher-education EFL contexts. The six-week intervention (pretest, four weeks of metaverse TBLL, posttest) captured short-term gains rather than long-term retention or transfer. Technologically, the platform lacked built-in voice/video recording for in-world sessions, restricting fine-grained analysis of spontaneous interaction and independent rater verification. Participants also reported practical frictions related to platform stability, connectivity, and screen fatigue, which may have introduced variability into otherwise favorable learning conditions. These constraints point to the need for cautious interpretation and for implementation that anticipates both pedagogical and infrastructural demands.

Future research should therefore scale up and deepen investigation of metaverse-based TBLT. AI embedded metaverse is recommended in the design of the future studies Larger, multi-site studies with extended interventions and delayed post-tests are needed to examine retention and transfer of oral communication development. Methodologically, researchers should adopt platforms or secure add-ons that support privacy-compliant recording and logging, enabling detailed performance ratings and interaction analyses. Comparative and moderator-focused designs—contrasting metaverse TBLT with non-metaverse TBLT, and gamified with non-gamified tasks, while examining factors such as proficiency, sense of presence, cognitive load, and session length—can clarify for whom and under what conditions such approaches are most effective. Finally, future work should report task specifications, platform capabilities and constraints, and implementation logistics with sufficient detail to support replication and adaptation in other EFL settings.

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