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Enhancing German as a Foreign Language Speaking Ability through Social VR: The Design and Implementation of *TravelKit*

Bailing He and Ferran Suñer Munoz
Université catholique de Louvain, Belgium

Introduction

Speaking is widely recognized as one of the most challenging competencies in second language (L2) acquisition. It requires the integration of multiple linguistic and cognitive processes, including lexical retrieval, grammatical planning, prosodic control, and interactional management (Saito & Hanzawa, 2018). Some learners often face communicators-oriented problems, which are linked to their self-perception and anxiety (Jamshidnejad, 2020; Newton et al., 2022). These factors necessitate innovative approaches to bridge the gap between theory and practice in L2 speaking instruction.

Digital Game-Based Language Learning (DGBLL) has shown strong potential for enhancing motivation, engagement, and communicative competence through meaningful and goal-oriented interaction (Peterson et al., 2020; Reinhardt & Sykes, 2014). When integrated with Virtual Reality (VR), it offers immersive, embodied learning experiences that simulate real-world interactions in engaging, low-risk environments (Gruber & Kaplan-Rakowski, 2022).

Building upon these insights, this study introduces *TravelKit*, a Social VR game designed to enhance L2 German speaking ability through collaborative missions. It addresses the following research questions:

1. How does a Social VR game support learners' development of L2 speaking?
2. How do individual learner profiles mediate these outcomes in immersive collaborative tasks?

E-mail: bailing.he@uclouvain.be

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By integrating empirical measures of oral performance with learners' perceptions, this study seeks to contribute to current understandings of how immersive, game-based environments can support the development of L2 speaking ability in socially situated contexts.

Game Design: *TravelKit*

TravelKit is a Social VR game developed on the *Rec Room* platform for the purpose of L2 German learning. Two players collaborate as travelers who arrive in a virtual German-speaking city and must complete a series of everyday scenarios, such as finding a lost passport, ordering food in a restaurant, or helping a friend navigate public transport, using only German. Each mission provides clear communicative goals, contextual clues, and feedback through task completion (e.g., unlocking the next location or earning travel-themed tokens).

For example, in the *Lost Passport* mission, one player realizes their passport is missing before departure, while the partner must ask questions, provide suggestions, and coordinate steps to locate it. Such tasks stimulate authentic interaction, promote speaking development through repeated reformulation, and foster collaborative problem-solving.

The mechanisms of *TravelKit* are grounded in well-established principles of second language acquisition. Each mission is built around an information-gap or problem-solving task that requires players to communicate effectively to achieve shared objectives, thereby simulating real-life communicative situations and fostering meaningful speaking practice. In this sense, the game draws on the Ecology of Learning (Douglas Fir Group, 2016) by embedding semiotic and interactive cues, such as menus, signs, and maps, that invite learners to act and speak within context-rich environments. It also reflects Instructed




Situation	In the Classroom	Before Departure	In the Restaurant	At the Police station
Task	Discussion about travel planning	Understand instructions and complete tasks	Express preferences and order food	Description of what happened in the past
Learning Objectives	• I can discuss travel plans. • I can discuss my preferences,desired destinations and travel arrangements.	• I can understand how someone describes the location of an object and perform the correct movement. • I can describe and understand the correct route.	• I can place an order . • I can express my personal preferences.	• I can describe what happened in the past. • I can communicate politely with others.
Vocabulary and Grammar	• Vocabulary: location, means of transport and accommodation. • Grammar: Prepositions (Wo? Wohin?Woher?)	• Vocabulary: location, flat and room, highway. • Grammar: Prepositions to indicate location; local prepositions in directions.	• Vocabulary: In the restaurant/cooking • Grammar: Subjunctive II of verbs (polite formulations).	• Vocabulary: means of transport, travelling. • Grammar: Present perfect.

Figure 1. Overview of *TravelKit* scenarios and linguistic goals

Second Language Acquisition (ISLA) (Han, 2016) principles by promoting negotiation of meaning, modified output, and collaborative engagement.

Through these interlinked design elements, *TravelKit* creates affinity spaces that mirror everyday contexts relevant to A2-level German learners. The linguistic objectives and vocabulary focus of each scenario are summarized in Figure 1, illustrating how communicative and pedagogical goals are aligned within the gameplay experience.

Methodology

Study Design

This research employs a learner-centered, mixed-methods design. The exploratory study aimed to evaluate *TravelKit* both as a pedagogical intervention and as a research tool.

The exploratory phase spanned seven weeks, combining classroom instruction with VR gameplay. Participants completed a pretest to establish baseline speaking ability, followed by regular German classes, then they will take a mid-test. After the mid-test, learners engaged with *TravelKit*, playing two scenarios per week over two weeks. A post-test was administered to assess post-intervention speaking gains. Seven university students aged 18 to 22, all with A2-level German proficiency (CEFR), participated. Most were native French or Dutch speakers with minimal prior exposure to German-speaking environments.

Data Collection

Data collection addressed both linguistic performance and learner perceptions. *Linguistic performance* was tested through standardized tasks adapted from the Goethe-Institute A2 speaking test and analyzed using PRAAT(Boersma & Weenink, 2007) focusing on three quantitative indicators representing different dimensions of speaking ability:

- Speech rate (words per minute), reflecting temporal fluency;
- Mean words per T-unit, indicating syntactic performance; and
- Lexical measure, operationalized as *lexical density (the proportion of lexical words to total words)*, serving as a proxy for lexical performance within this exploratory dataset.

Learner perceptions were captured through a 7-point Likert questionnaire completed after game scenarios, generating composite scores for cognitive and affective factors. These dimensions were adapted from established instruments from Makransky & Petersen (2021) and Petersen et al., (2022).

Semi-structured interviews were conducted after the first and final scenarios to gather qualitative insights on learners' experiences, perceptions of agency, and challenges encountered during the VR sessions.

Data Analysis

A triangulation matrix synthesized data across learner profiles from interviews, questionnaire scores, and speaking progression metrics. Analysis identified key affective and behavioral factors such as anxiety levels, confidence, and strategy use, resulting in three distinct learner profiles:

a. Moderate-Anxiety Reflective Learners, who exhibited balanced gains in fluency and complexity.
b. High-Anxiety Recovering Learners, who struggled with cognitive overload that constrained their progress.
c. Low-Anxiety Strategic Learners, who demonstrated steady lexical development through targeted strategies.

Key Findings

The findings illustrate how individual learner profiles shaped outcomes within the VR environment. Moderate-anxiety learners demonstrated the most balanced improvements across different dimensions of speaking ability, whereas high-anxiety learners experienced cognitive barriers that limited their oral performance. In contrast, low-anxiety learners capitalized on strategic engagement and peer interaction to enhance lexical use and overall fluency.

Substantial variation emerged in affective and cognitive experiences, including differences in sense of presence, motivation, and perceived cognitive load. While the VR setting enhanced engagement, it also introduced cognitive challenges for some learners.

Interactional dynamics played a pivotal role in shaping outcomes. Effective peer collaboration, clarity of task instructions, and positive self-perception facilitated learners' ability to navigate communicative breakdowns and maintain interactional flow, as noted by several participants during the interviews.

Conclusion and Future Directions

This exploratory study suggests that *TravelKit* offers considerable potential for supporting L2 German speaking ability through immersive and collaborative learning. The findings emphasize the importance of adapting VR interventions

to accommodate diverse learner profiles, particularly in managing cognitive load and anxiety.

Limitations such as small sample size and short intervention period limit generalizability but provide insights for refining the design. Building on these insights, the main study is currently underway. It extends the intervention to eight weeks and introduces eight distinct scenarios, each designed to offer varied communicative contexts. This expanded version aims to provide a more comprehensive and longitudinal understanding of how Social VR environments impact L2 German speaking ability. The ongoing study also incorporates pre-training sessions and further optimized collaborative scenarios to better support learner engagement and mitigate cognitive overload.

Through this iterative research process, *TravelKit* aspires to complement traditional language instruction by offering learners a dynamic, interactive platform for practicing spoken German in simulated real-world settings.

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