

Virtual Reality and Immersive Environments for Language Learning

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ABSTRACT:

The article investigates the features of language interaction in immersive digital environments. The purpose of the work is to identify linguistic and communicative characteristics and functional differences between different types of VR and 360° platforms for language learning. The empirical basis is a comparative analysis of five digital environments (Mondly VR, Immerse, ImmerseMe, Noun Town, Language Lab VR). The selection of platforms was carried out according to the criteria of technological representativeness and communicative variability. The methodology combines the approaches of digital linguistics, discourse analysis and medially linguistics. In addition to a comparative analysis of the functional characteristics of platforms, modeling and discourse analysis of typical patterns of speech interaction in AI-mediated and social VR environments have been carried out. As a result, it was found that immersive environments form different models of language interaction: from structured individualized practice with AI to spontaneous socially interactive communication. This, in turn, determines the variability of speech behavior and discursive strategies of users. The key role of technological affordances (presence effect, multimodality, interactivity) in the transformation of language experience has been determined. A conceptual model of language interaction in immersive environments is proposed, which reflects the interconnection of technological, communicative and intercultural factors. The results of the study deepen the understanding of digital language discourse and can be used in further linguistic and interdisciplinary studies.

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1. Introduction

Over the past decade, digital technologies have radically transformed the way language functions, shaping new types of discursive practices and communicative environments. These changes are especially noticeable in the field of foreign language learning. Here, along with traditional online resources, platforms that integrate elements of artificial intelligence and virtual reality are actively developing. In this context, language ceases to be only an object of assimilation. It is increasingly appearing as a dynamic tool of interaction in a technologically mediated environment.

Modern language platforms demonstrate various models of communication organization: from algorithmized systems using AI that simulate dialogical interaction to immersive VR environments that create the effect of presence and provide opportunities for social interaction in real time. Such differentiation actualizes the need for linguistic comprehension not only of language content. In this case, the conditions for its functioning are important, in particular, the degree of immersiveness, intersubjectivity and multimodality of communication.

Despite the growing amount of research in the field of digital linguistics and Computer-Assisted Language Learning, the question of how different technological environments affect the formation of discursive competence remains insufficiently developed. In particular, it is necessary to clarify the relationship between AI-oriented applications that provide speech simulation and VR platforms, within which full-fledged social communication is implemented.

The purpose of this article is to identify the linguistic and discursive features of modern digital language learning environments through a comparative analysis of their functional characteristics. Particular attention is paid to distinguishing between algorithmic language practices and immersive communicative

experiences, as well as assessing their impact on the development of users' communicative and discursive competence.

2. Literature Review

In modern digital humanities and applied linguistics, virtual reality (further – VR), augmented reality (further – AR) and other immersive technologies are increasingly integrated into the process of learning foreign languages. The formation of digital linguodidactics occurs at the intersection of Computer-Assisted Language Learning (further – CALL), immersive learning, communicative approach and theories of embodied cognition. Modern research focuses on the impact of immersive environments on language competence, intercultural communication, motivation and social interaction during language learning. Of particular importance is the analysis of VR platforms in the context of English as a global language and Ukrainian as a comparatively low-resource language in the digital educational space.

Modern research shows a rapid increase in interest in VR-assisted language learning after the pandemic period. A systematic review by Hua and Wang (2023) confirms that VR technologies have a positive impact primarily on speaking, listening, vocabulary acquisition, and learner engagement. The authors emphasize that a high level of immersion creates the effect of contextualized communication, within which speech is used not in isolation, but in a situational social environment. At the same time, among the key challenges, researchers highlight the high cost of equipment, insufficient methodological standardization, and limited availability of platforms for less common languages (Hua & Wang, 2023).

At the same time, a separate area of research is being formed dedicated to the design of

immersive language environments. In a systematic review by Esteves et al. (2023), researchers analyze the principles of creating VR applications for learning English and emphasize the importance of multimodal interaction, social presence, and gamification mechanics. Particular attention is paid to voice recognition, avatar-based communication, and adaptive feedback as factors for the development of speech confidence and the reduction of foreign language anxiety.

Within the framework of digital linguodidactics, more and more attention is paid not only to language skills, but also to intercultural communication. Taguchi (2023) considers immersive VR as a tool for assessing intercultural conflict mediation and argues that VR scenarios allow modeling complex sociocultural situations close to real communication. The study demonstrates that virtual environments contribute to the development of pragmatic competence, perspective-taking, and intercultural awareness, which is especially important for English as a lingua franca in the global digital environment. Similar results are demonstrated by studies of intercultural learning in VR environments for English. Hein et al. (2023) consider VR as a space for the development of empathy, intercultural sensitivity, and translingual communication. The authors emphasize that immersive interaction through avatars promotes deeper emotional engagement compared to traditional digital learning formats.

A separate area of modern research is related to the negotiation of meaning in social VR environments. Chen and Sevilla-Pavón (2023) prove that immersive virtual exchange creates conditions for natural multimodal communication, where, along with speech, gestures, avatar positioning, non-verbal signals, and spatial interactions are actively used. Such mechanisms are especially important for the development of discourse competence and fluency in the English-speaking environment. Interdisciplinary research on social VR communication makes a significant contribution to the development of the concept of immersive communication. Wei et al. (2022) demonstrate

that social VR is gradually transforming from an entertainment environment into a full-fledged communicative space for collaborative interaction, language exchange, and intercultural participation. The authors emphasize the importance of social presence and co-presence for effective communication in VR.

In modern research, there is a trend towards the integration of VR and AI into language education. A systematic review by Yan et al. (2025) analyzes 2017–2024 studies on the combination of artificial intelligence, adaptive feedback, and extended reality in the process of language competence formation. The researchers note that AI-driven avatars and conversational agents can significantly enhance the personalization of language practice and provide more natural communicative interaction.

At the same time, research on augmented reality environments in the context of language learning is developing. A systematic review by Schorr et al. (2024) demonstrates that AR technologies are most effective for contextual vocabulary learning, situated interaction, and integration of language learning into the user's physical space. At the same time, VR provides a higher level of immersion and social presence, especially in the development of speaking skills and intercultural communication.

Studies of gamification in VR language learning ecosystems are also of considerable interest. Most modern platforms, including Mondly VR, Noun Town, ImmerseMe, and Immerse, actively use game mechanics: points, badges, leaderboards, quests, streak systems, and adaptive rewards. According to modern reviews, gamification has a positive effect on learner engagement, vocabulary retention, and long-term motivation (Hua & Wang, 2023).

The problem of language inequality in VR environments deserves special attention. Most modern immersive platforms are focused primarily on English, Spanish, Japanese, or Chinese. English dominates as the main language of interfaces, content, and social interaction, while, for example, Ukrainian is represented much more limitedly. Despite the gradual

emergence of Ukrainian language support in some applications, the number of full-fledged interactive scenarios and culturally adapted environments remains small. This indicates the asymmetric development of digital linguodidactics and the underrepresentation of less-resourced languages in the field of immersive language learning. At the same time, it is the Ukrainian language that is a promising area of further research in the context of VR-assisted language learning. In the current conditions of digital globalization and migration processes, there is a growing need to create immersive platforms for learning Ukrainian as a foreign language and supporting the language practice of the Ukrainian diaspora. Studies of cultural adaptation, sociolinguistic modelling, and avatar-mediated communication for Ukrainian-speaking VR environments are promising.

Modern scientific literature also demonstrates the interdisciplinary nature of immersive communication studies. A study by Shen et al. (2023) suggests the gradual formation of a new digital communicative ecosystem in which language interaction becomes multimodal, spatial, and avatar-mediated.

Thus, modern research confirms the high potential of VR and other immersive technologies for the development of language competence, interactive learning and intercultural communication. The most researched area remains the study of English in VR environments, while the Ukrainian language is not yet sufficiently represented in the global immersive ecosystem. This forms a promising research gap for further research in the field of digital linguodidactics, VR-assisted language learning and immersive intercultural communication.

3. Materials and Methods

The empirical basis of the study is the corpus of immersive digital environments for learning languages, selected according to the criteria of technological representativeness, functional diversity and relevance in the modern educational

digital space. The sample included five platforms: Mondly VR, Immerse, ImmerseMe, Noun Town, and Language Lab VR, which represent different approaches to organizing language interaction in a virtual environment (from individualized scenarios to socially interactive formats).

The research methodology is based on an interdisciplinary combination of approaches to digital linguistics, discourse analysis and media linguistics. The main method is comparative analysis aimed at identifying common and distinctive characteristics of speech interaction in immersive environments. The analysis took into account the following parameters: the type of environment (virtual reality or 360° immersive format), the level of interactivity (individual or social interaction), the nature of communication (synchronous/asynchronous), the presence of artificial intelligence as a mediator of language practice, as well as multimodal resources (visual, auditory, spatial).

In addition, elements of functional and communicative analysis were applied, which made it possible to interpret the speech behavior of users in the context of digitally mediated interaction. Special attention is paid to the intercultural dimension of communication, in particular the relationship between English as a global lingua franca and Ukrainian as a marker of local identity in the digital environment.

Analytical data processing was carried out by generalizing the functional characteristics of platforms presented in open sources (official product descriptions, user scenarios, demonstration materials), as well as their systematization in the form of a comparative table. Based on the results obtained, a conceptual model of language interaction in immersive digital environments was developed.

4. Results

In the context of the rapid digitalization of language education and the formation of new communication formats, the analysis of immersive environments as tools for the development of language competence is of

particular relevance. Virtual and augmented reality not only transform the way educational material is presented, but also change the very nature of language interaction, translating it into a multimodal, spatially organized and socially rich format. In such conditions, it is important not only to describe individual technological solutions, but also to systematically compare their linguodidactic capabilities.

Despite a significant number of studies on VR-assisted language learning, there is insufficient attention in the modern scientific literature to the comprehensive analysis of specific platforms as integral communicative ecosystems. This is especially true for comparing different types of immersion, levels of interactivity and models of language interaction, as well as assessing their impact on the formation of individual components of language competence. In addition, the issue of linguistic asymmetry in digital environments, where English dominates as a global standard, while Ukrainian is represented in a limited way, remains relevant.

The summarized results of the analysis are presented in Table 1.

Table 1. Comparative Analysis of Immersive Environments in the Context of Digital Linguodidactics

Platform Name	Immersion type	Level of interactivity and gamification	Communicative potential and intercultural interaction	Core Emerging Competencies
Mondly VR	Full VR (3D, HMD)	High (gamification, points, levels, instant feedback)	Medium–high (simulated dialogues, AI interaction, limited social communication)	Speaking, Listening, Vocabulary, Pronunciation
Immerse	Social VR (multi-user)	Medium-high (role-playing, quests, social gamification)	Very high (live interaction with users and teachers, intercultural communication)	Fluency, Discourse competence, Intercultural communicative competence
ImmerseMe	360° video + VR	Medium (interactive scenarios, limited gamification)	Medium–high (contextualized perception in authentic environments without full social interaction)	Listening, Cultural competence, Speaking
Noun Town	VR / Spatial learning	High (gamification, mini-games, rewards, spaced repetition)	Medium (limited interaction with Non-Player Characters, lack of full-fledged social communication)	Lexical competence, Vocabulary retention, Pronunciation
Language Lab VR	Social VR (multi-user)	High (multiplayer interaction, role-play,	High (language exchange, social interaction dependent on user activity)	Speaking fluency, Discourse competence,

With this in mind, in order to identify the functional, communicative and linguodidactic characteristics of immersive environments, a comparative analysis of modern VR and AR platforms for language learning was carried out. The sample included the most representative digital products reflecting different technological approaches to the organization of immersive learning, including Mondly VR, Immerse, ImmerseMe, Noun Town and Language Lab VR.

The analysis was carried out according to the following criteria: type of immersion (full VR, social VR, 360° environment), level of interactivity and gamification, communicative potential (including opportunities for intercultural interaction), as well as the impact on the formation of language competence (speaking, listening, vocabulary, discourse competence, etc.). Particular attention is paid to comparing the capabilities of platforms for learning English as a global lingua franca and Ukrainian as a comparatively low-resource language in the digital educational environment.

		gamified environments)		Communicative confidence
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Source: compiled by the authors based on the analysis of platform functionalities (Mondly, n.d.; Immerse, n.d.; ImmerseMe, n.d.; Noun Town, n.d.; Language Lab VR, n.d.) and recent research on immersive technologies in language learning (Makranksy & Petersen, 2021; Parmaxi, 2023; Radianti et al., 2020).

Mondly VR is considered one of the leading tools for digital linguodidactics. The platform offers a high level of immersion through realistic three-dimensional scenes that simulate typical communicative contexts of everyday life. The use of head-mounted displays (HMD) in combination with speech recognition technology and an interactive chatbot allows for natural oral practice in conditions as close to real as possible (Berns et al., 2020; Hua & Wang, 2023; Tai et al., 2022).

The level of interactivity and gamification in Mondly VR can be assessed as high. The platform actively uses gamification elements, including a point system, difficulty levels, a progress bar, rewards, and instant feedback on pronunciation. Such mechanisms significantly increase student motivation and engagement, contributing to regular practice and long-term retention of attention in accordance with the principles of gamification of learning (Berns et al., 2020; Hua & Wang, 2023). In addition, after completing conversational scenarios, the user receives a stellar rating, which adds a gamelike character to the process (Mondly, n.d.; Tai et al., 2022).

The communication potential of Mondly VR is one of the platform's key strengths. Situational dialogues built in accordance with the communicative approach allow you to develop not only lexical and grammatical skills, but also pragmatic and sociolinguistic competence in a contextualized environment. In addition, a high level of immersion contributes to a significant reduction in speech anxiety, which has a positive effect on the formation of confidence in real communication (Nicolaidou et al., 2023; Tai et al., 2022).

In terms of the impact on language competence, Mondly VR most effectively develops speaking,

listening, vocabulary acquisition and pronunciation skills. Research shows a statistically significant improvement in these competencies due to a combination of high immersion and immediate corrective feedback (Hua & Wang, 2023).

Mondly VR is one of the few commercial VR platforms that directly supports the Ukrainian language as a target language. This makes it especially useful for foreign students studying Ukrainian and for representatives of the Ukrainian diaspora. The platform allows you to practice conversational skills in typical everyday situations, contributing to the acquisition of vocabulary and the formation of basic intercultural communicative competence (Mondly, n.d.; Berns et al., 2020). At the same time, the cultural adaptation of scenarios for the Ukrainian language remains limited compared to English.

While Mondly VR is a specialized virtual version of the platform designed for use with VR helmets, Mondly is also developing a series of mobile applications. Because the VR version is integrated into Mondly's broader digital ecosystem and is based on shared content and learning scenarios, the study used mobile app data as an auxiliary empirical indicator of language content quality. For a deeper understanding of the popularity and perception of resources for learning English and Ukrainian, a comparison of three key mobile applications was carried out: universal Mondly: Learn 41 Languages, specialized English and Ukrainian options. An analysis of the distribution of user ratings in the Google Play Store shows a significant disparity between resources for these two languages (see Figure 1).

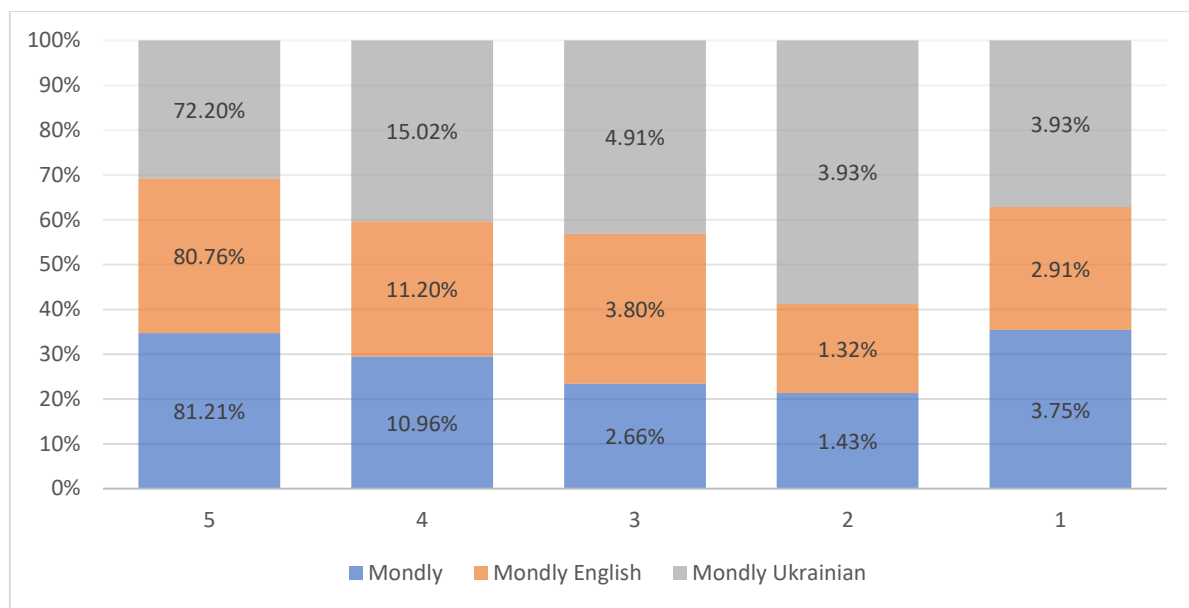


Figure 1. Distribution of user ratings of three versions of Mondly apps on the Google Play Store (as of May 2026)

Source: built by authors based on (Google Play Store user rating data, 2026a, 2026b, 2026c)

An analysis of the distribution of user ratings in the Google Play Store confirms a marked asymmetry between versions. Mondly's main all-in-one app, Learn 41 Languages, shows the highest level of user satisfaction with 81.21% five-star ratings. The specialized English version also has strong scores (about 80.76% of five-star reviews in the respective category), while the Ukrainian version receives a significantly lower percentage of the highest ratings (72.2%). In addition, the share of low ratings (1–2 stars) in the Ukrainian version is higher, which may indicate less content maturity and limited cultural adaptation for learning Ukrainian compared to English (Figure 1).

This disproportion reflects the general trend of digital linguodidactics: significantly higher quality and popularity of resources for learning English compared to others, including Ukrainian.

Immerse is one of the leading social VR platforms for language learning, which focuses on live communication in a multi-user environment. The platform uses high-quality social virtual reality, where users interact in the form of avatars in a variety of virtual spaces (Immerse, n.d.).

The level of interactivity and gamification in Immerse can be rated as medium-high thanks to role-playing, quests, and social gamification, which significantly increases student engagement.

The communication potential of the platform is one of the strongest. Through live sessions with teachers, AI coaches, and communication with other students, the platform creates conditions for authentic intercultural communication and the development of discourse competence (Lesnov & Wolhein Nava, 2023; Immerse, n.d.).

ImmerseMe is one of the pioneers of immersive language learning using 360° video and virtual reality. The platform offers a large library of interactive scenarios filmed in real locations, which creates a cultural immersion effect. It supports both VR mode (HMD) and regular devices (desktop, tablet, mobile) (Dhieb, 2024; ImmerseMe, n.d.).

The level of interactivity and gamification in ImmerseMe can be assessed as average. The platform uses interactive points, speech recognition tasks, and gamification elements (points, levels), which contributes to motivation, but is inferior to purely gamified platforms in terms of the depth of social interaction.

The communication potential of the platform is high due to authentic cultural locations and focus on real-world situations. ImmerseMe is particularly strong in developing listening comprehension, cultural awareness, and basic conversational skills through immersion in real-world environments (Lesnov & Wolhein-Nava, 2023; Dhieb, 2024).

As for the impact on language competence, ImmerseMe most effectively develops listening, speaking, and cultural competence.

Noun Town is an original gamified VR platform for language learning, built on the principles of spatial learning and memory palace. The user finds himself on a gray island, which gradually "comes to life" (acquires colors) as he learns words and phrases. The platform actively uses voice recognition, interaction with objects and Non-Player Characters for language practice (Noun Town, n.d.; Road to VR, 2022).

The level of interactivity and gamification in Noun Town is rated as high. The platform combines elements of an adventure game, a reward system, streaks, mini-games, and spaced repetition, making the learning process exciting and motivating.

The communication potential of the platform is average. The main emphasis is on lexical competence and spatial memorization, with the possibility of basic conversations with Non-Player Characters. The platform is less focused on free communication than social VR platforms, but it does a good job of developing confidence in using words in context (Coto Academy, 2023).

In terms of influencing language competence, Noun Town is particularly effective in developing lexical competence and vocabulary retention through a combination of immersion, physical interaction with objects, and repetition in context. Studies and user reviews confirm the high effectiveness for expanding vocabulary and improving pronunciation (Noun Town, n.d.).

Language Lab VR is a social VR platform for language learning that combines immersive environments, multiplayer interaction, and language exchange. The platform uses VR

communication through avatars, interactive language scripts, and conversational practice in virtual spaces (Language Lab VR, 2026). The platform supports a number of languages, including English, Spanish, Arabic, Chinese, French, German, Hebrew, Italian, Japanese, Korean, Portuguese, Russian, Ukrainian, and Dutch, which expands the possibilities of immersive language learning for less-resourced languages (Language Lab VR, 2026).

The level of interactivity and gamification in Language Lab VR can be assessed as high due to the use of multiplayer interaction, role-playing activities, and VR-based conversational environments. Social interaction in the VR environment contributes to the development of speaking fluency, discourse competence and communicative confidence, which is in line with current trends in immersive language learning ecosystems (Hua & Wang, 2023; Wei et al., 2022).

The analyzed platforms demonstrate a significant asymmetry in the possibilities of learning English and Ukrainian.

Mondly VR offers a high level of immersion and effective practice of speaking, listening, vocabulary, and pronunciation for both languages. The platform is particularly strong for learning English due to its wide range of realistic everyday and professional scenarios. For the Ukrainian one, Mondly VR remains one of the few commercial VR platforms with direct support, which makes it a valuable tool for the diaspora and foreigners, although the cultural adaptation of the scenarios here is significantly inferior to the English version.

Immerse (social VR) is one of the strongest platforms for the development of fluency, discourse competence and intercultural communication through live interaction with native speakers. For English, it offers a large number of classes with teachers and students. There is no official support for the Ukrainian language, but the platform allows you to create custom scenes and conduct private classes with Ukrainian-speaking teachers, which can be useful for the diaspora.

ImmerseMe (360° video + VR) develops listening comprehension and cultural competence well thanks to authentic locations. The platform is effective for the English language by offering a large library of quality scripts. There is practically no support for the Ukrainian language. Only generic 360° videos of Ukrainian locations are available here without specialized interactive content.

Noun Town is distinguished by its spatial approach to vocabulary learning and high gamification. The platform effectively develops lexical competence and pronunciation for both languages. It is equally well suited for English (beginner and intermediate levels) and Ukrainian, which it supports as one of the target languages, which is a significant advantage among VR platforms.

Language Lab VR focuses on language exchange and social interaction. For English, it creates a powerful environment for the development of fluency and intercultural communication. It is important that the platform supports the Ukrainian language among the target languages, which expands the possibilities of authentic language practice and intercultural communication for Ukrainian-speaking users.

As such, English has a significant advantage in the amount of content, quality of cultural adaptation, and social opportunities on most platforms. At the same time, Mondly VR, Noun Town, and Language Lab VR currently offer the best opportunities for the Ukrainian language, while Immerse and ImmerseMe are significantly limited in this aspect. This inequality reflects the general trend of digital linguodidactics towards the dominance of global languages.

Generalization of the results allows us to identify several key trends in the development of immersive environments for language learning. Firstly, different platforms implement fundamentally different models of language interaction: from individualized practice with AI (Mondly VR) to full-fledged social communication in multi-user environments (Immerse, Language Lab VR). This indicates the lack of a single standard for immersive learning

and the formation of different linguodidactic paradigms within VR ecosystems.

Secondly, the level of communicative potential directly correlates with the type of immersion: social VR platforms demonstrate the highest efficiency in developing fluency, discourse competence and intercultural communication, while individualized or semi-immersive environments are more effective for the formation of lexical and receptive skills.

Thirdly, the results confirm the presence of a pronounced linguistic asymmetry: English dominates both in the functionality of the platforms and in the quality of user experience, while Ukrainian is represented in a limited way both in VR environments and in accompanying digital products. This is especially evident in user ratings of Mondly's mobile apps, which reflect the uneven development of language content.

Thus, immersive technologies form a new type of digital language ecosystem that combines technological affordances, social interaction, and multimodal communication, but their development remains uneven depending on the linguistic context.

For a deeper understanding of the differences between these models of language interaction, typical communication patterns were modeled. The fragments are built on the basis of the functionality of the analyzed VR platforms (official demonstrations, described scenarios, and typical user interactions). They illustrate the key discursive features of AI-mediated and social interaction.

Example 1. AI-mediated interaction (scenario dialogue)

User: I'd like a coffee, please.
AI: Sure. What size would you like?
User: Medium.
AI: Would you like milk or sugar?
User: Milk, please.
AI: Your order is ready.

The above fragment illustrates a highly structured and predictable type of dialogue. Communication is organized as a sequence of closed-ended

questions that direct the user to predetermined answers. The initiative in conducting a dialogue belongs to a system that limits the variability of speech and reduces the need for spontaneous production of statements.

From a discursive point of view, such interaction is characterized by: limited alternation of remarks; lack of topic expansion; lack of negotiation of meaning; minimal pragmatic variability. Such environments are effective for practicing language patterns and basic communicative models, but limit the development of flexible communicative competence.

Example 2. AI-mediated interaction with variability elements

User: I am looking for a hotel.

AI: What type of hotel would you prefer?

User: A cheap one.

AI: How many nights will you stay?

User: Two nights.

AI: I found an option for you.

Despite a slight increase in variability, interaction remains purposeful and algorithmically limited. The user's statements are interpreted by the system, but communication is reduced to achieving a specific result.

Main discursive features: sequential implementation of the task; limited lexical range; lack of repair strategies; reduced dialogue co-construction.

Example 3. Social interaction in VR (interpersonal communication)

User A: Hey, where are you from?

User B: I'm from Spain. What about you?

User A: Ukraine.

User B: Oh nice! Are you learning English here?

User A: Yes, I just started.

User B: Same here, it's actually fun.

Unlike AI interactions, social VR environments demonstrate a spontaneous and less predictable nature of communication. Users collaborate to construct dialogue, initiate new topics, and maintain the conversation with clarifying questions.

Key discursive characteristics: dynamic alternation of cues; initiation and development of the topic; the use of phatic elements ("Hey", "Oh nice"); pragmatic flexibility of speech. Such interactions are close to natural communication and contribute to the formation of speech spontaneity.

Example 4. Matching Meaning in Social Interaction

User A: I go yesterday to the shopping mall.

User B: You mean you went yesterday?

User A: Yes, went.

User B: What did you buy?

User A: Some clothes.

The fragment demonstrates the presence of correction and clarification strategies, which are important components of natural discourse. Interaction includes implicit error correction and successful achievement of mutual understanding.

From a linguistic point of view, this contributes to: the development of the interlanguage system; awareness of speech errors; adaptive use of language resources in real time.

A comparative analysis of the above fragments shows that immersive environments differ significantly in their discursive potential. AI-driven systems shape structured, predictable, and pedagogically controlled interactions, while social VR platforms enable spontaneous, co-constructed, and pragmatically rich communication.

The results obtained suggest that AI-oriented environments are effective for the formation of basic language skills, while social interaction in VR plays a key role in the development of full-fledged communicative competence.

5. Discussion

The results obtained make it possible to interpret immersive digital environments not only as a technological tool for learning, but as an autonomous space for the functioning of language, in which the transformation of basic communication parameters takes place. Within this approach, virtual reality appears as an

environment where language interaction is implemented in conditions of increased contextualization, multimodality and simulated presence, which fundamentally distinguishes it from traditional formats of digital discourse. This gives grounds to talk about the formation of a separate type, namely immersive language discourse, which combines the features of oral, written and medial-mediated communication.

The analysis of empirical material shows that modern VR platforms for language learning operate within a polycentric digital ecosystem, where there is no single model for organizing language interaction. In particular, platforms such as Mondly VR represent an individualized model, which is dominated by AI-mediated interaction focused on practicing lexical and grammatical structures and script-limited communicative acts. Instead, social VR environments such as Immerse or Language Lab VR implement a different paradigm, namely a communicative-oriented one. It is based on synchronous interpersonal interaction, where speech is formed in the process of joint construction of meaning. Such a dichotomy indicates the coexistence of different linguodidactic strategies, reflecting different ideas about the nature of language competence in the digital age.

In this context, the category of immersiveness is of particular importance, which in the study is interpreted not only as a technical parameter (degree of immersion), but as a complex characteristic of the communicative environment, including the user's bodily involvement, interactivity, multimodality and dynamic variability of discursive roles. Immersiveness determines the way of organizing the linguistic experience, determining the transition from linear perception of the text to situationally determined participation in the

discourse. Accordingly, linguistic competence in such conditions acquires a procedural character and is closely related to the categories of performativity and intersubjectivity.

A separate result, which has both linguistic and socio-cultural significance, is the identified asymmetry between English and Ukrainian languages in VR environments. English functions as a global communication resource integrated into all levels of digital interaction – from interfaces to communication scenarios and social interaction of users. Instead, the Ukrainian language is presented in fragments, mainly in localization formats or limited training modules, which reduces its functional capacity within immersive environments. Such a disproportion reflects broader processes of digital language hierarchy and actualizes the problem of linguistic inequality in the context of technologically mediated communication.

It is also important to take into account that language interaction in immersive environments occurs in conditions of a combination of human and artificial agency. AI components (including speech recognition systems, chatbots, scripted dialogues) not only simulate communicative situations, but also affect the structure of discourse, setting its boundaries, temporality, and variability. In this sense, we can speak of the formation of a hybrid discourse in which human and algorithmic practices of generating and interpreting statements coexist.

The generalization of these provisions made it possible to form a conceptual model of language interaction in immersive digital environments, presented in Figure 2, which reflects the relationship between linguistic, technological and socio-cultural parameters of digital discourse for English and Ukrainian.

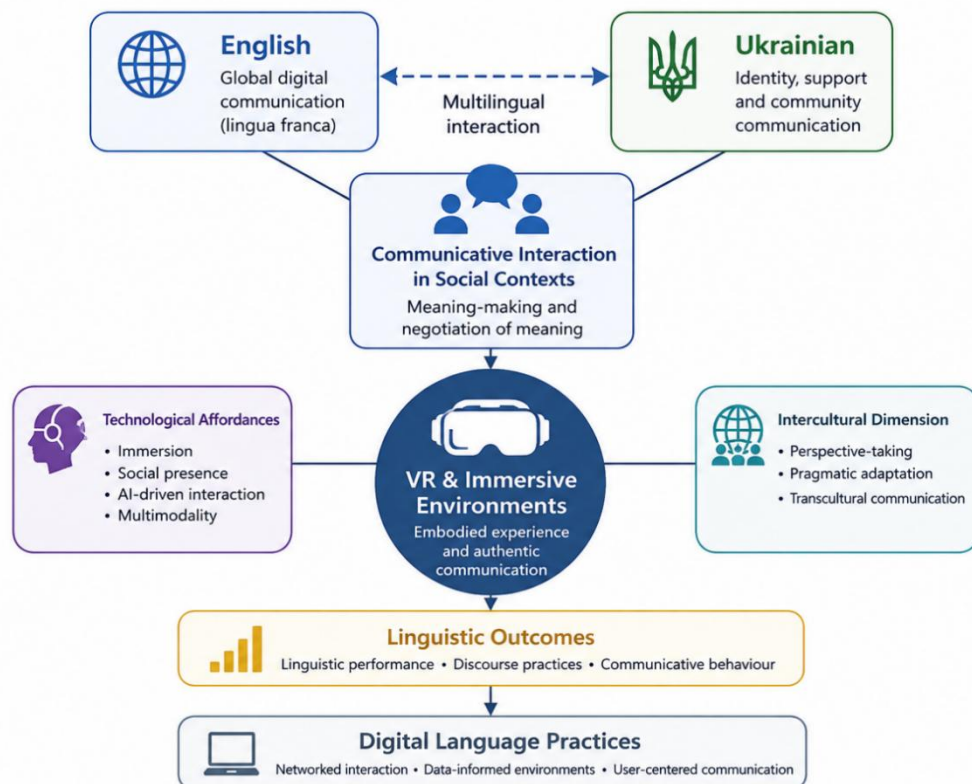


Figure 2. Conceptual Model of Language Interaction in VR and Immersive Digital Environments

Source: built by the authors

At the top of the model, a multilingual communication configuration is outlined, where English functions as a global lingua franca of digital interaction, while Ukrainian represents identity-oriented and community-oriented communicative practices.

The central element of the model is communicative interaction in social contexts, which involves the processes of constructing and agreeing on meaning in the context of digitally mediated communication. This interaction is implemented in virtual and immersive reality environments that provide a presence effect, multimodality and enhanced language experience.

The model also includes two key dimensions that determine the nature of language interaction: technological affirmations (immersion, interaction with the participation of artificial intelligence, multimodality) and intercultural dimension (forward-looking thinking, pragmatic adaptation in a transcultural environment).

The effective level of the model is represented by language behavior, discursive practices, and linguistic implementation of communication in immersive environments. These processes are integrated into broader digital language practices that reflect the networked, data-centric and user-centered nature of modern communication.

6. Conclusions

The study confirms that virtual reality and other immersive technologies are shaping a new type of digital speech environment. A comparative analysis of five platforms in combination with modeling and discourse analysis of typical patterns of speech interaction showed that immersive environments implement fundamentally different models of communication – from algorithmically structured (AI-mediated) to spontaneous social.

Within its framework, the transformation of traditional communication models takes place.

Immersive environments function not only as a learning tool, but as an autonomous space for the implementation of speech. This space combines multimodality, spatial organization of discourse and the effect of presence. This allows you to interpret VR communication as a separate type of digital discourse, namely as an immersive language discourse.

The results of the comparative analysis of the platforms show that modern immersive ecosystems are not homogeneous, but implement different models of language interaction. On the one hand, there is individualized AI-mediated communication. It is focused on structured language practice. On the other hand, socially interactive environments in which speech is formed in the process of synchronous interpersonal interaction. This demonstrates the formation of several parallel linguodidactic and discursive paradigms within immersive technologies.

It has been established that the type of immersion directly affects the nature of speech activity and the development of individual components of language competence. Social VR environments demonstrate the highest potential for the development of fluency, discourse competence and intercultural communication. But individualized or partially immersive formats are more effective for the formation of lexical, phonetic, and receptive competencies. Thus, immersive technologies do not unify language learning, but, on the contrary, differentiate it in accordance with communicative goals and interaction formats.

One of the key findings of the study is the identification of systemic language asymmetry in VR environments. English functions as a global lingua franca and dominates at the level of interfaces, content, and social interaction. At the same time, the Ukrainian language remains

limitedly represented both in the functionality of the platforms and in the quality of user experience. This reflects broader processes of digital language hierarchy and actualizes the problem of uneven development of languages in the global digital space.

The theoretical contribution of the study is the substantiation of the conceptual model of language interaction in immersive environments. The model integrates three key dimensions: linguistic (communicative practices and discursive organization), technological (VR/AR and AI accordances), and sociocultural (intercultural interaction and linguistic identity). The proposed model allows you to systematically describe the relationship between the structure of the digital environment and the features of the speech behavior of users.

The practical significance of the study lies in the possibility of using the results obtained to develop immersive language platforms of a new generation, focused not only on technological efficiency, but also on linguistic and cultural relevance. In particular, the results highlight the need to expand support for the Ukrainian language in VR environments, including the creation of full-fledged interactive scenarios, culturally adapted environments, and social communication tools.

Prospects for further research are associated with an in-depth analysis of immersive discourse as a separate type of digital communication, the study of multimodal mechanisms of meaning generation in VR, as well as the study of the interaction of human and artificial agency in the process of speech. The development of research on Ukrainian-language immersive environments in the context of globalization and digital transformation of language practice is especially relevant.

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8. Author Declaration

The authors confirm that this manuscript is an original work, has not been previously published, and is not under consideration for publication elsewhere. All sources, ideas, and materials used in the preparation of this article have been appropriately cited in accordance with academic standards.

The authors declare that there are no conflicts of interest, financial or otherwise, that could have influenced the research design, data collection, analysis, interpretation, or the presentation of the findings.