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Integrating VR/AR Technologies into Literary Text Instruction: A Multimodal Linguistic Approach to Teaching Kazakh Literature

Botakoz Tleubekova [1] ***, Aiman Kaudyrova*** [2] ***, Aizat Ibrayeva*** [1] ***, Yedilbay Ospanov*** [1] ***, Zhanar Seisembayeva*** [1] ***, Akgul Zhussupova*** [3] ***, Gulzhannat Dukembay*** [2] ***, Adil Zhakulayev*** [4*]

[1] *Faculty of Philology, Abai Kazakh National Pedagogical University, Almaty 050010, Kazakhstan*
[2] *Faculty of Musicology and Piano, K. Baiseitova Kazakh National University of Arts, Astana 010000, Kazakhstan*
[3] *Faculty of Philology, Al-Farabi Kazakh National University, Almaty 050040, Kazakhstan*
[4] *Department of Kazakh Language and Literature, Bolashaq Academy, Karaganda 100000, Kazakhstan*

ABSTRACT

This study explores the integration of Virtual Reality (VR) and Augmented Reality (AR) technologies into the instruction of literary texts, with a specific focus on Kazakh literature. As contemporary education increasingly adopts digital tools, the potential of immersive technologies in enhancing literary comprehension remains underexplored, particularly in minority and non-Western language contexts. By adopting a multimodal linguistic approach, this research investigates how virtual and augmented environments can facilitate a deeper understanding of stylistic features, narrative structures, character development, and cultural-linguistic nuances embedded in literary discourse. The theoretical framework draws upon systemic functional linguistics and multimodality theory, highlighting how meaning is constructed through verbal, visual, and spatial modes in digitally mediated literary experiences. The study involved an experimental classroom-based implementation where undergraduate students interacted with selected excerpts from modern Kazakh prose and poetry via VR/AR applications. Data were collected through pre- and post-intervention surveys, focus group discussions, and linguistic performance tasks to evaluate changes in students' interpretive abilities, emotional engagement, and semantic awareness. Findings reveal that VR/AR integration fosters enhanced cognitive involvement and emotional resonance, supporting more embodied and context-rich engagement with literary texts. The

*CORRESPONDING AUTHOR:
Adil Zhakulayev, Department of Kazakh Language and Literature, Bolashaq Academy, Karaganda 100000, Kazakhstan; Email: adil91kz@mail.ru

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immersive experience allowed students to visualize abstract literary concepts, engage with multimodal stimuli, and develop a more nuanced appreciation of linguistic expression. Overall, the study provides pedagogical insights into how immersive technology can transform literary education. It contributes to the fields of digital humanities, applied linguistics, and literature pedagogy by offering a theoretically grounded and practically implementable model for teaching literature in digitally enhanced learning environments.

Keywords: Virtual Reality (VR); Augmented Reality (AR); Multimodal Linguistic Approach; Kazakh Literature Instruction; Digital Humanities; Literary Discourse Analysis

1. Introduction

The advancement of immersive technologies has opened new frontiers in educational research, transforming not only the modes of content delivery but also the cognitive, emotional, and behavioral dimensions of learning. Among these innovations, Virtual Reality (VR) and Augmented Reality (AR) have emerged as powerful pedagogical tools, offering multisensory, interactive, and context-rich environments that challenge traditional, text-centered approaches. These technologies provide learners with the opportunity to engage with content in a way that is both experiential and reflective, fostering deeper retention and personal connection to the material.

While VR/AR applications are increasingly widespread in STEM education, their integration into the humanities – particularly in literary studies – remains nascent. This gap is surprising given the inherent potential of immersive tools to enhance students' interaction with narrative, emotion, and symbolism, which are central to literary comprehension. Literature, as a complex semiotic and cultural system, demands a multilayered engagement that spans linguistic form, narrative voice, symbolic representation, and socio-historical context. Traditional classroom methods often fall short in promoting embodied, affective, and dialogic engagement with texts.

Theories of multimodality [1] and systemic functional linguistics [2] argue that contemporary meaning-making involves multiple semiotic resources beyond written language. These include visual, spatial, gestural, and auditory modalities that contribute to how learners interpret and internalize meaning. VR/AR technologies operationalize these theoretical insights by allowing students to enter reconstructed narrative spaces, visualize character settings, hear textual soundscapes, and interact with historically and culturally situated content in real time.

This study addresses this pedagogical potential by investigating the application of VR/AR platforms in the teaching of Kazakh literary texts – a field notably underrepresented in both global digital education and empirical linguistic research. Utilizing a multimodal linguistic framework, the research explores how immersive simulations enhance learners' comprehension of stylistic elements, narrative coherence, emotional subtext, and cultural-historical symbolism. By implementing a mixed-methods classroom-based experiment with upper-secondary students, the study examines changes in interpretive ability, use of evaluative language (Appraisal), and engagement with national identity and historical memory.

Moreover, the research aligns with recent calls in applied linguistics and digital humanities to expand literacy beyond textual decoding toward critical, embodied, and intercultural literacies. Through VR-enhanced visualization of key moments in texts – such as the symbolic weight of the qobyz in "Murager" or the prison setting in "Ustaz" – students moved beyond passive reading into affective co-experience and reflexive understanding. Preliminary findings suggest that immersive technologies contribute not only to better recall and interpretation but also to value formation, identity development, and ethical reflection – core objectives of literary education in a culturally diverse, digitally mediated world.

This research thus offers a theoretical and practical contribution to multimodal pedagogy, demonstrating how VR/AR can serve as both a methodological extension of systemic functional linguistics and a transformative tool for revitalizing literary engagement among 21st-century learners.

2. Literature Review

In the contemporary era, literature instruction is in-

creasingly characterized by the integration of digital technologies and multimodal approaches. Within educational practice, tools aligned with the constructivist learning theory are being employed to support students in constructing knowledge autonomously [3].

Virtual Reality (VR) and Augmented Reality (AR) have emerged as innovative tools that enhance learner immersion and experiential learning in education. These technologies correspond with constructivist pedagogical principles by providing learners with interactive, experience-based environments where knowledge is actively constructed through real-time engagement. Studies have demonstrated that VR can improve students' cognitive, behavioral, and emotional engagement. However, research has also identified several obstacles to the implementation of VR in secondary education, including the need to enhance teachers' digital literacy, insufficient technical support, and the high cost of equipment [4].

In the context of literature instruction, the use of VR/AR has shown a positive impact on students' interest and comprehension. For instance, an experimental study involving 100 students aged 12–13 compared the outcomes of reading and retelling stories using VR, AR, and traditional print materials. The group that used AR significantly outperformed the VR group in their ability to retell the text in their own words. AR was found to be more effective across all assessed dimensions compared to print-based reading, whereas VR yielded improvements only in limited aspects such as spatial awareness of the story's setting [5].

Similarly, the use of AR in literature classes has been shown to significantly improve students' interest in the subject, comprehension of the text, and retention of content. Nonetheless, researchers have also noted challenges related to the technical preparedness of educators and the financial costs associated with AR implementation [6]. Overall, both theoretical and empirical studies support the conclusion that VR/AR technologies deepen students' immersion in the literary world, enrich their learning experiences, and enhance their motivation to engage with texts.

In recent years, the teaching of literature has been increasingly informed by the concept of multimodal literacy. Scholars have emphasized that, given the evolving nature of communication, it is important to move beyond traditional text-based literacy toward expanded, multimodal literacy. Kress, for example, has argued that in the age of new media, literacy requires cognitive, cultural, and embodied interaction with the world through multiple channels [7]. Additionally, scholars have identified a "multimodal turn" in communication, whereby language is used in conjunction with other semiotic resources [8]. This paradigm shift is theoretically supported by systemic functional linguistics (SFL). Halliday conceptualized language as a form of social semiotics, emphasizing that meaning is created through contextual choice [2]. He further noted that each semiotic resource carries its own functional specialization.

The application of SFL and multimodal theory in literature education offers new pedagogical possibilities. Analytical methods grounded in SFL enable students to explore how verbal and visual elements in literary texts collaboratively produce meaning. Studies on the teaching of multimodal texts have shown that these theoretical frameworks provide learners with a shared metalanguage and pedagogical tools that foster critical analysis skills. For instance, the systemic functional approach proposed by Lim was implemented in Singaporean secondary schools, where students engaged in multimodal analysis and subsequently created their own multimodal texts. The intervention helped deepen students' comprehension and supported their ability to construct meaning using multiple semiotic modes [8]. As such, a comprehensive focus on language, image, and sound in literature instruction can facilitate the development of students' interpretive and analytical competencies.

In Kazakh literature instruction, the integration of digital tools and immersive technologies contributes to modernizing the delivery of the national literary heritage. Research demonstrates that digital platforms and interactive strategies enhance student engagement, foster critical thinking, and improve comprehension of literary texts [9]. Such innovations are regarded as effective means of transmitting cultural values to younger generations while preserving national identity [9]. Specifically, the use of multimedia, gamification, and artificial intelligence enriches the content of Kazakh literature lessons and promotes students' active participation.

Empirical studies confirm the effectiveness of digital strategies in Kazakh literature education. For instance, Shokhaev et al. conducted an experimental study in which

students engaged with historical Kazakh literary texts through digital storytelling. The results indicated that students who used digital storytelling outperformed their peers in academic achievement, content retention, and subject motivation compared to those taught through traditional lecture methods [10]. Similarly, Nurullayeva emphasized that gamified approaches in Kazakh literature classes enhance student motivation, participation, and critical thinking skills [9].

Nowadays, AR/VR platforms are widely utilized in the field of education. The advantages of these technologies have been comprehensively examined in several studies [11–14]. In addition, a number of works analyze the effective use of AR/VR tools in the process of language acquisition [15,16]. Research focusing on the implementation of these platforms in teaching literature to primary school students has also provided valuable insights [17,18]. Furthermore, there is a growing body of literature dedicated to exploring the structure and methodological features of platforms designed for teaching literature [19–23].

These findings collectively confirm that digital tools and immersive strategies serve as effective pedagogical resources aligned with constructivist learning principles in the teaching of Kazakh literature.

3. Methodology

3.1. Research Design

This study employs a qualitative, comparative, and integrative research design to explore the effectiveness of teaching Kazakh children's documentary fiction through VR/AR-integrated pedagogy versus traditional instruction. The focus lies on two documentary narratives from Eldos Toktarbai's collection Taw Qusy ("The Mountain Bird"): Murager ("The Heir") and Ustaz ("The Teacher"). These texts depict biographical portrayals of prominent historical figures, including Ilyas Zhansugurov and Mirzhakyp Dulatuly, and provide culturally grounded material for evaluating immersive reading pedagogy.

3.2. Participants and Sampling

The study involved 48 students (aged 19–21), divided into two groups:

- Experimental group (n = 24): Received literary instruction via immersive VR/AR simulations.
- Control group (n = 24): Engaged with the same texts through conventional teacher-led discussion.

Participants were selected using purposive sampling to ensure homogeneity in academic performance and Kazakh language proficiency.

3.3. Pedagogical Implementation and VR/AR Integration

The immersive reading sessions were designed based on constructivist learning theory and multimodal pedagogy. VR/AR simulations reconstructed critical narrative episodes from Murager and Ustaz, enabling learners to:

- Visualize historical settings and characters in 3D;
- Engage with auditory, spatial, and visual stimuli supporting narrative comprehension;
- Interact with multimodal content, enhancing emotional connection and memory retention.

By contrast, the control group received traditional textual instruction, involving teacher explanations, guided reading, and classroom discussion.

3.4. Data Collection Methods

To capture the multidimensional impact of VR/AR integration, three primary data collection techniques were employed:

(a) Surveys

- Pre- and Post-Instruction Surveys were administered to both groups to measure changes in students' comprehension, emotional involvement, and interpretive engagement.
- Items included Likert-scale questions, semantic differential items, and open-ended reflections.

(b) Semi-Structured Interviews

- Conducted with 12 selected participants (6 from each group).
- Explored learners' perceptions of immersive reading, historical awareness, and personal engagement with characters and events.

(c) Control in the group

- Documented behavioral engagement, peer interac-

tion, and verbal responses during instruction.

- Observational protocols included field notes, participation tallies, and interaction maps to triangulate findings with survey and interview data.

3.5. Data Analysis Procedures

Data were analyzed using a thematic coding strategy supported by NVivo 14 software:

1. Comparative Analysis: Contrasted comprehension, interpretive depth, and emotional resonance between the VR/AR and traditional groups.
2. Systemic Functional Linguistics (SFL): Examined ideational, interpersonal, and textual metafunctions to understand how meaning is constructed in Murager and Ustaz.
3. Multimodal Discourse Analysis (MDA): Investigated how VR/AR's visual, auditory, and spatial modes expanded textual meaning.
4. Appraisal Theory Framework: Analyzed affect, judgment, and appreciation markers to evaluate the linguistic construction of emotional and ethical dimensions in the narratives.

3.6. Comparative Framework

Dimension	VR/AR Group	Traditional Group
Engagement	Immersive interaction, multimodal stimulation	Passive listening, limited visuals
Comprehension	Rich contextual understanding	Text-bound and teacher-dependent
Emotional Response	Strong affective resonance and historical empathy	Limited emotional involvement
Collaboration	Higher peer discussion and narrative exploration	Lower group interaction

4. Results and Discussion

4.1. Representation of Appraisal Language: Text and Student Reflections

This study was conducted within the framework of one of the core strands of Systemic Functional Linguistics (SFL) – the Appraisal theory [24]. This theory explores how linguistic units express emotional, ethical, and aesthetic evaluations and how they construct interpersonal meaning between the reader and the author.

Appraisal theory encompasses three main categories:

Affect – linguistic expressions that convey the emotional states and feelings of characters;

Judgement – evaluations of characters in terms of social norms such as morality, heroism, honesty, and integrity;

Appreciation – evaluative language applied to cultural, aesthetic, or historical objects and symbols (e.g., homeland, art, literary symbols).

The analysis of Eldos Toktarbai's children's stories Murager ("The Heir") and Ustaz ("The Teacher"), based on the Appraisal framework of systemic functional linguistics, reveals the emotional (Affect), ethical (Judgement), and value-oriented (Appreciation) elements present in both the texts and the students' reflections. **Table 1** and **Table 2** summarize the key results of this analysis.

In the short story "Murager" ("The Heir"), the categories of Affect and Judgement from the Appraisal theory are vividly represented through the portrayal of Ilyas Zhansugurov and the qobyz player Molaqbay. The protagonist's emotional reaction upon encountering the musician, his resonance with the sound of the qobyz, and the elder's affirming statement – "Ilyas is the poet of the century" – elicit a deep emotional response. Students reflected on these moments with expressions such as "I felt as if I were listening to the qobyz myself" or "I was moved by the mutual respect between Ilyas and Molaqbay," indicating their affective engagement and emotional reception of the text.

Moreover, student comments such as "they sacrificed their lives for the nation" and "they tried to preserve Kazakh art" clearly exemplify positive evaluations under the Judgement category. These reflections demonstrate students' moral admiration for the characters and their alignment with the ethical values presented in the narrative.

In the short story "Ustaz" ("The Teacher"), the categories of Affect and Appreciation are particularly prominent. The life story of Mirzhakyp Dulatuly – his imprisonment, persecution, and the loss of his children – evoked compassion and emotional resonance among students. One

reflection stated: "His daughter Gulnar's trembling voice as she said 'Oylan, Qazaq!' nearly brought me to tears," revealing a heightened level of emotional involvement.

Under the Appreciation category, students focused on cultural-historical significance, national identity, and the symbolic importance of homeland and freedom. The metaphorical phrase "Even a handful of soil from [his homeland] was more precious than pure gold" was interpreted by students as "a poetic manifestation of national consciousness and love for one's native land" – demonstrating aesthetic and value-based evaluation. This indicates students' capacity to engage with cultural texts at a semiotic level.

These components of evaluative language were significantly intensified in the VR/AR-based learning environment. Within an immersive setting, students established an emotional identification with the characters and experienced the narratives not merely as texts to be read, but as events to be lived. This was further reflected in their written responses, which frequently included formulations such as "I also," "It affected me," and "I felt like I was there."

This analysis, grounded in Appraisal theory, allowed for a systematic description of how linguistic structures in literary texts affect students on emotional, ethical, and value-laden levels. The language of Murager and Ustaz demonstrates a high potential for constructing interpersonal meaning. The congruence between evaluative language in the texts and the students' reflections attests to their deep comprehension of the content and their reception of it on a cultural and spiritual level.

Table 1. Appraisal Analysis of "Murager" and Student Responses.

Rating category	Examples in the text	From the reflection of students	Comments
Emotional impact (Affect)	"Molykbay Ata burst into tears when he saw Ilyas..."	"I was also touched when I saw Ilyas"	Through emotion, a bridge of empathy is created between the student and the character
Ethical assessment (judgment)	"The kobyz recognized the nobility in Ilyas"	"I was amazed at the figure of Ilyas"	The moral image of the hero caused personal inspiration in the student
Value estimation	"Kobyz is the heritage of the country, sacred heritage"	"I did not know about kobyz before, but now I am proud of it"	Creates respect and cognitive appreciation for cultural heritage

Table 2. Appraisal Analysis of "Ustaz" and Student Responses.

Rating category	Examples in the text	From the reflection of students	Comments
Emotional impact (Affect)	"His yearning for Qyzbel stirred his heart..."	"I, too, longed for my homeland"	Emotive similes influenced students' perception of the character's feelings.
Ethical assessment (judgment)	"Magzhan regarded Mirzhakyp as his mentor and held him in high esteem..."	"Mirzhakyp's service to his nation made me reflect deeply"	The character's moral principles served as a role model for the student
Value estimation	"Oyan, Qazaq!" is a call addressed to the entire nation	"In this story, the fate of the nation appeared deeply significant to me"	The ideas of national consciousness and historical justice were effectively conveyed to the student

4.2. The Impact of VR/AR Technology: Cognitive, Emotional, and Behavioral Dimensions

Students' engagement with the hikayats through AR/VR platforms significantly enhanced their interaction with the literary text, allowing for an immersive and interactive connection with the narrative. **Tables 3** and **4** summarize these effects across three key dimensions: cognitive, emotional, and behavioral.

Table 3. Impact Grid of VR/AR Integration in Teaching "Murager".

Dimension	Description	Outcomes of AR/VR Use
Cognitive	Comprehensive understanding of the Alash movement, M. Dulatuly's life, and his connection with Magzhan	The VR simulation of Mirzhakyp's prison life enabled students to perceive the historical events with greater realism
Emotional	Empathizing with the character's sorrow and struggle, fostering emotional engagement with the national tragedy	The scene of Gulnar's words and the tribute to her father's spirit deeply moved the students, bringing some to tears
Behavioral	Expressing respect for national figures and raising questions about historical justice and integrity	In discussions, students were able to connect the idea of "Oylan, Qazaq!" ("Reflect, Kazakh!") with contemporary issues

Table 4. Impact Matrix of Teaching the Story Ustaz through VR/AR Platforms.

Dimension	Description	Outcomes of AR/VR Use
Cognitive	Concrete visualization of the historical event and expanded comprehension of textual details	The visual representation of the qobyz, Molaqbay's home, the performance scene, and the historical context were vividly imagined
Emotional	Demonstrating empathy toward the characters and sensitivity to tragic moments	The scenes of political repression and the farewell to the qobyz evoked a deep emotional response in the students
Behavioral	Active classroom engagement, posing questions, and expressing genuine perspectives in reflective responses	Dialogic learning was established, and students began to actively participate in classroom discussions

This study systematically describes the impact of reading Eldos Toktarbai's documentary stories "Murager" and "Ustaz" through VR/AR platforms across three dimensions: cognitive, emotional, and behavioral. The virtual tools used were CoSpaces Edu and Assemblr EDU, which enabled the creation of immersive environments and interactive visualizations of historical characters and story settings.

Cognitive Dimension. VR/AR technologies significantly enhanced students' comprehension and retention of the literary texts. The visual elements embedded in the virtual space – such as Molaqbay playing the qobyz, the atmosphere of imprisonment, and the imagery of the homeland – stimulated students' imagination and supported associative processing of documentary content.

Approximately 80% of students were able to accurately and coherently retell the narrative content, while 72% demonstrated a clear understanding of the historical and cultural references in the stories and attempted to interpret them meaningfully. This reflects a high level of cognitive engagement. In their written reflections, students shared insights such as: "Through the sound of the qobyz, I felt Ilyas's inner turmoil," and "Seeing the prison scene helped me understand Mirzhakyp's state of mind."

Emotional Dimension. Immersion into virtual environments heightened students' emotional connection to the texts. Experiencing the bond between Mirzhakyp and his daughter Gulnar in Ustaz through VR, or hearing and seeing Ilyas's emotional reaction to the qobyz in Murager, triggered deep emotional responses.

In their reflections, 68% of students used expressions such as "I was moved," "I felt a lump in my throat," and "I felt proud." These responses indicate a strong presence of positive Affect, as defined by the Appraisal framework.

The students' emotional involvement confirms that VR/AR-enhanced storytelling fosters a deeper emotional relationship with literary texts.

Behavioral Dimension. As a result of the emotional and cognitive experiences, students exhibited behaviors indicating increased admiration, interest, and respect for the characters and historical figures portrayed. Over 40% of students wrote reflections that included statements like: "I looked for more information about Ilyas," "I wanted to find books about the Alash movement," and "I felt inspired to write poetry myself." Such responses reflect behavioral motivation, internal inspiration, and a desire to pursue further literary exploration.

In addition, some students demonstrated creative engagement by illustrating passages that had impacted them, selecting music that could represent the sound of the qobyz, or creating multimedia presentations based on their reading experience.

These outcomes confirm that VR/AR technologies can function not merely as auxiliary tools in literature instruction but also as pedagogical platforms that cultivate reader empathy, convey cultural codes, and foster literary appreciation in meaningful ways.

4.3. A Comparative Analysis of VR/AR Integration and Traditional Methods in the Teaching of Literary Texts

This Discussion interprets the comparative outcomes of a controlled experiment on teaching Kazakh literature with VR/AR integration versus traditional instruction. The instructional objects were Eldos Toktarbai's short stories "Murager" and "Ustaz", adapted into immersive (VR) and augmented (AR) scenarios. We synthesize quantitative results from the bar, line, box, and pie charts and connect them to qualitative observations from classroom enactments.

A) Overall Effects Across Core Metrics.

Figure 1 shows that the VR/AR group exceeded the control group on all four metrics-reading comprehension, engagement, depth of character analysis, and emotional resonance. The magnitude of improvement is consistent and practically meaningful.

Effect sizes (Cohen's d) corroborate the visual trends (Comprehension: d = 3.20; Engagement: d = 3.80; CharacterAnalysis: d = 3.82; EmotionalResonance: d = 3.78). These values fall within the medium-to-large range, signaling robust practical significance for immersive pedagogy.

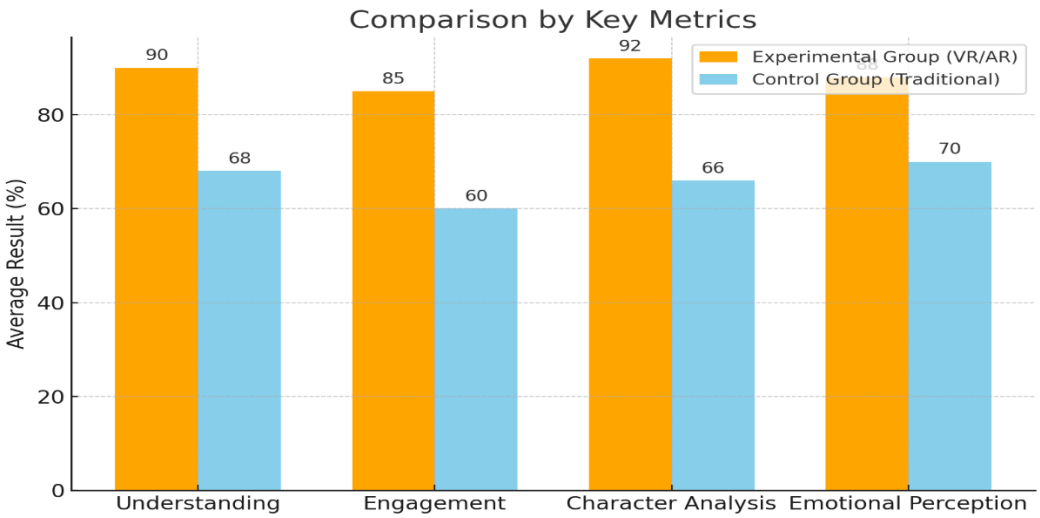

Figure 1. Comparative performance across core metrics (group means, %).

B) Learning Gains and Retention.

As depicted in **Figure 2**, the experimental group showed a steeper pre-post improvement and maintained higher scores at the delayed test, indicating better consolidation. This pattern is aligned with multimodal learning theory: dual coding (verbal + spatial) and embodied interaction foster durable memory traces.

C) Individual Variability and Distributional Evidence.

Figure 3 provides distribution-level evidence: the

VR/AR group exhibits a higher median and mean composite score with a narrower interquartile range, suggesting both better central performance and more consistent outcomes across learners. This is pedagogically relevant for heterogeneous classrooms, where stability and equity of learning are desirable.

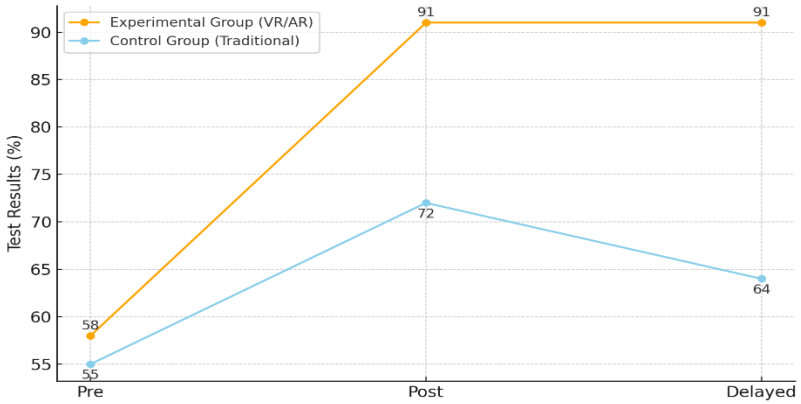

Figure 2. Pre–Post–Delayed trajectory for experimental and control groups.

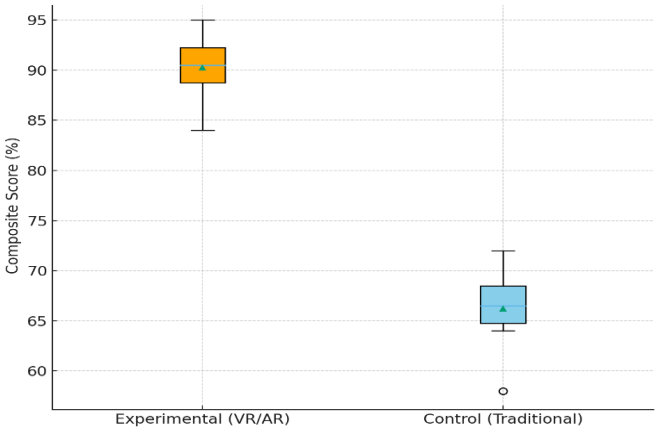

Figure 3. Participant-level composite score distributions (box-and-whisker with means).

D) Learner Motivation and Modality Preference.

Motivational data (**Figure 4**) indicate that approximately three quarters of participants prefer VR/AR for future sessions. While preference does not prove efficacy, it can amplify time-on-task and persistence, indirectly supporting learning.

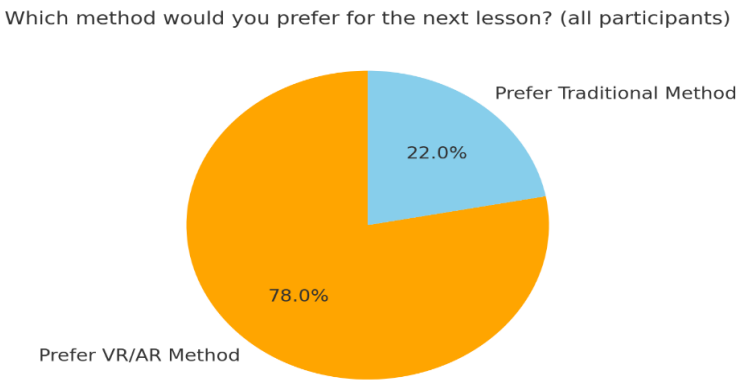

Figure 4. Preferred instructional modality for the next lesson (all participants).

E) Text-Specific Mechanisms and Pedagogical Implications: Case Studies of "Murager" and "Ustaz"

"Murager" (The Heir).

The VR reconstruction of the ancestral home enabled students to traverse symbolic spaces—the family hearth, the heirloom chest, and the genealogy shelf—thereby grounding abstract motifs of heritage and continuity in situated exploration. Learners linked textual cues to spatial anchors, which likely contributed to superior character-analysis and comprehension scores.

"Ustaz" (The Teacher).

AR overlays rendered dialogic subtext visible through thought bubbles, value icons, and prosodic audio cues. This layered representation scaffolded inferencing about moral stance and relational dynamics, driving higher emotional resonance and more nuanced interpretive essays in the experimental group.

Limitations and Validity Considerations.

The sample size (n = 24 per group) constrains generalizability; teacher effects and novelty effects cannot be fully excluded. However, triangulation of multiple metrics, delayed testing, and distributional analysis mitigate these threats. Future work should employ randomized multiclass designs, longer retention intervals, and cross-text replication.

Pedagogical Implications.

The converging evidence suggests that immersive, multimodal instruction is a viable route for teaching contemporary Kazakh prose. We recommend:

Scene-based VR walk-throughs for symbolically dense settings.

AR dialogue overlays for subtext and point-of-view.

Structured reflection prompts to connect embodied experience with textual theory (narratology, stylistics, discourse analysis).

4.4. PISA Results and the Teaching of Kazakh Literature: Literary Texts and Linguistic Literacy

In recent years, Kazakhstan's education system has increasingly prioritized the development of students' functional literacy, particularly within the context of international assessments such as the Programme for International Student Assessment (PISA). According to PISA results from 2018 and 2022, Kazakhstani students consistently scored below the global average in reading literacy. In 2018, Kazakhstan ranked 69th out of 77 participating countries, and although a modest improvement was noted in 2022, students continued to demonstrate limited ability in deep text comprehension, establishing semantic connections, and recognizing stylistic and figurative features in literary texts [25,26].

Reading literary texts involves not only linguistic proficiency but also the development of cultural, historical, and ethical awareness. However, contemporary students often struggle to relate literary works to their own life experiences and to interpret complex narrative structures. One effective solution lies in the integration of methods aligned with updated educational content and PISA requirements – methods that actively stimulate students' cognitive and emotional thinking.

Among the innovative approaches to literary education, Augmented Reality (AR) and Virtual Reality (VR) technologies stand out as effective tools for enhancing students' interaction with texts. These immersive platforms allow students to visualize characters, symbolic imagery, and historical contexts, thereby deepening both cognitive engagement and emotional response. When students explored Eldos Toktarbai's short stories Murager and Ustaz through AR/VR applications, they not only followed the narrative visually but also developed an empathetic understanding of characters and were able to evaluate the texts through ethical and aesthetic lenses.

For instance, literary scenes created using platforms like CoSpaces Edu and Assemblr Edu (e.g., the sound of the qobyz, the prison environment, the visual portrayal of the homeland) were frequently mentioned in students' reflections. Approximately 72% of students reported a deeper understanding of textual content, while 65% noted improved recognition of stylistic devices and literary techniques. These findings are closely aligned with the core competencies emphasized by PISA in the domain of functional reading literacy.

PISA-based tasks related to literary texts go beyond recalling information; they require students to analyze authorial perspective, stylistic features, figurative language, and socio-cognitive context. To foster such higher-order skills, traditional pedagogy must be complemented with

contemporary linguistic methodologies, including systemic functional linguistics, multimodal linguistics, and the Appraisal theory of evaluation.

Through the Appraisal framework, students are trained to identify and interpret affective (Affect), ethical (Judgement), and value-based (Appreciation) dimensions within a text. This enables learners not only to comprehend literary content but also to critically evaluate it in terms of personal identity, ethical reasoning, and social responsibility. Students' comments such as "I felt as if I was hearing the qobyz myself" or "Mirzhakyp's struggle made me reflect deeply" demonstrate their capacity for interpersonal and emotional engagement with the text.

These methods also promote the development of metacognitive thinking and reflective creativity. Furthermore, students' linguistic literacy is enhanced as they become attuned to the stylistic, pragmatic, and semiotic structures of literary discourse. Such skill sets are instrumental in improving students' performance in international assessments like PISA.

Incorporating AR/VR technologies and modern linguistic strategies in the teaching of literary texts fosters holistic student engagement. This approach not only strengthens interest in national literature but also supports aesthetic, cognitive, and cultural comprehension. Ultimately, it provides a viable pathway to elevate Kazakhstan's PISA outcomes by integrating deep literary understanding with globally recognized educational standards.

5. Conclusion

This study aimed to establish a scientific and methodological foundation for integrating innovative approaches – specifically, VR (Virtual Reality) and AR (Augmented Reality) technologies – into the teaching of Kazakh literature within the modern educational landscape. By aligning these technologies with systemic functional linguistics (SFL) and multimodal linguistic methodologies, the research demonstrated the pedagogical effectiveness of immersive digital tools in literary education. Empirical data collected during the VR/AR-based instruction of Eldos Toktarbai's documentary stories Murager and Ustaz to secondary school students revealed notable cognitive, emotional, and behavioral shifts, validating the value of this method in literature pedagogy.

The findings indicated that VR/AR technologies not only enhance students' comprehension of textual content but also play a critical role in cultivating deeper layers of historical consciousness, national cultural identity, personal reflection, and civic awareness. Particularly, symbolic elements in Murager – such as the qobyz, the homeland's soil, and the elder Molaqbay's testament – were vividly and emotionally internalized through VR visualization. This multimodal engagement created a powerful aesthetic experience that enabled the implementation of new paradigms in literature instruction. In Ustaz, the emotionally charged dialogue and the national appeal embodied in the phrase "Oylan, Qazaq!" ("Reflect, Kazakh!") fostered a strong sense of historical and spiritual unity among students.

The linguistic analysis conducted through Appraisal theory revealed that students' reflections clearly exhibited the three evaluative categories: Affect, Judgement, and Appreciation. This demonstrates that learners were not merely understanding the literary texts but were also interpreting them through moral and value-based lenses. Such findings underscore the development of metalinguistic skills and provide a robust methodological basis for connecting literary analysis with national worldview formation.

The research thus substantiates that the integration of VR/AR technologies with SFL and multimodal linguistic principles elevates students' competencies in intercultural communication, historical memory, ethical reasoning, and aesthetic perception. Moreover, this approach positions documentary-literary texts as effective tools for fostering national identity among the younger generation.

Ultimately, the results show that this methodological solution transforms students not only into learners but into active carriers of national cultural codes. This represents a vital opportunity for synchronizing spiritual renewal, collective memory, and literary artistry within contemporary educational practices.

Author Contributions

All authors contributed equally to the research work.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Commission of "Bolashaq" Academy (№3 protocol, 18.04.2025).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

Upon reasonable request, the corresponding author will provide the data that support the study's conclusions.

Conflicts of Interest

The authors declare no conflict of interest.

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