

The Effect of the Use of Contemporary Technologies on Teaching New Terms in Literature

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Abstract

Upon examining the historical trajectory of literature, it becomes evident that literary works often incorporate terminology shaped by contemporary age and technological advancements. An essential consideration lies in understanding the influence of technology on language skill development, learner achievement, attitudes, and motivation in literature education, particularly regarding the introduction of new terms. This study investigates the impact of modern teaching technologies on the instruction of new terms in Kazakhstan literature, analyzing its effects on students' achievements, attitudes, and knowledge retention. Employing a quasi-experimental design with a control group pre-test post-test model, the study involved 63 students in a literature department at a Kazakh university. The experimental group was taught new terms through the MoodleCloud program, while the control group received traditional instruction. Experimental applications in the study lasted 6 weeks. The research findings underscore a significant enhancement in students' achievements, attitudes, and retention when utilizing modern teaching technologies for literature instruction.

Keywords: *Contemporary technologies, experimental research, literature lesson, new terms*

Introduction

In the contemporary era, proficiency in literature and language is intricately intertwined with communication, serving as the cornerstone for acquiring new terms, information, and instigating change. The ability to access information, analyze it discerningly, comprehend and articulate it effectively, and employ language aptly are integral facets of twenty-first-century skills. These competencies encompass essential aspects such as reading, writing, interpretation, and synthesis,

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particularly in the context of incorporating new terms into language use (Trilling & Fadel, 2012; Geisinger, 2016).

Computer and communication technologies play a crucial role in literature education, offering valuable tools for accessing new instructional approaches that enhance language skills and leverage developments in linguistics (Karmini, 2022; Moldagali et al., 2022). Electronic resources facilitate effective communication with students, as noted by Hill and Slater (1998). In the realm of linguistics and teaching, materials, many of which are tangible and visible, are essential components of the curriculum (Mayer, 2014a). According to Nunan (1995), these materials serve to concretize and implement linguistic features. The key functionalities afforded by materials used in teaching literature include: (a) fostering a comprehensive understanding of a language spoken at a normal pace, (b) developing stress and intonation in the pronunciation of new words in the first language, (c) acquiring sophisticated language skills and the ability to speak at a normal speed, (d) comprehending language as a regulated system of behavior, (e) gaining the ability to use new terms and expressions contextually, (f) practicing the use of appropriate sound and speech patterns, and (g) honing reading and writing skills, while also enabling the development of tests for all language skills such as auditory comprehension, pronunciation, speaking, reading, and writing (Mackey, 1967).

In literature, terms are defined as "limited and special names given to the concepts of various fields of specialization such as science, technique, art, sports, and crafts" (Korkmaz, 2003). These terms constitute the specialized language of a specific field of science, art, or profession, created by employing the shared vocabulary and rules of general language. However, the distinctive meanings and specialized usage of words distinguish this special language from general language. Practitioners within the realms of science, art, and profession communicate using this "special" language, making it essential for effective communication. Without a "unity of reference" in this specialized language, individuals may struggle to express their thoughts accurately and establish meaningful communication. Hence, each branch of science requires its own specific terms. Literature, a subfield of both art and science, inevitably necessitates its own set of terms. While science is universal in its methods and materials, it must adopt a national character in terms of its language and terms. This is due to the fact that individuals can most effectively comprehend, make

sense of and explain existence, the world, and events within the framework of their mother tongue (Bergeron, 1990; Cuddon, 2012).

Literary culture encompasses the art of coining terms, composing texts, and engaging in the act of reading. This cultural dimension is inherent in every instance we refer to as literature. Each literary endeavor, as articulated by Şengül and Sünbül (2015), undertakes the task of constructing a world through words, giving form to a text. The essence of literary events lies in their ability to create a textual realm; those that fall short of this, failing to build a world through text, are deemed incomplete and deficient in realizing their own existence. Delving into the annals of literary history, it becomes evident that literary works are significantly influenced by the creation of texts based on the emergence of new terms arising from the prevailing age and technology. Novelists and poets, according to Tursunovich (2022), enhance their craft by incorporating new terms into their works, expressing their mastery through the texts they produce.

The "science of literature" operates as a social science intricately interwoven with various branches of the broader social sciences. This interdisciplinary nature implies that literary products maintain close ties with the evolving terminology used in society over time, with explicit manifestations observed in texts featuring "technological and scientific content." Distinctions exist among spoken language, literary language, and scientific language, and discerning the variance between literary and everyday language proves challenging. Everyday language, encompassing diverse forms such as spoken, commercial, official, religious, and student slang, functions independently, akin to literary language (Tsang, Paran & Lau, 2023). In everyday language, signs (words) are often overlooked, only gaining attention when symbolically expressing names, gestures, or engaging in wordplay. Literary language, in contrast, utilizes language more meticulously and systematically, expanding and organizing the possibilities inherent in everyday language, at times compelling them to captivate our attention. Poetry, as a form of literary language, enriches and reinforces linguistic possibilities, shaped over generations through silent and anonymous endeavors (Foerster et al., 2017; Lawall, 1988). Despite the complexity of literary works, each piece brings order and unity to the diverse elements it employs, forming a multifaceted structure with various meanings and intricate relationships (Wellek & Warren, 1990).

Conversely, the language of science is deemed "explanatory" or "signaling," aiming to establish a complete correspondence between signifier and signified. Governed by strict rules, the language

of science contrasts with literary language, which may be perceived as imperfect and incomplete in certain aspects. Literary language, laden with historical elements, memories, and associations, allows ample space for words with profound meaning (Wellek & Warren, 1990).

The evolution, progression, and standardization of Kazakh literature and language are intrinsically linked to the developmental and standardization phases of Central Asian dialects. Consequently, during the formative period, Kazakh language and literature were significantly shaped by the languages spoken by the diverse peoples of Central Asia and Asia Minor. The Kazakh language assumed its independent form as the spoken language of the Kazakh people in the 15th and 16th centuries (Hitchins, 1999). In the 19th century and the first half of the 20th century, the Kazakh language was often considered alongside Kyrgyz, leading to some confusion. During this era, they were collectively referred to as Kazakh-Kyrgyz or Kyrgyz-Kaysak (Hitchins, 2001; Kirchner, 1998; Küderine, 2010).

The written form of the Kazakh language has undergone several transformations throughout its history. Since 1940, Kazakh Turks, who had been using the Cyrillic alphabet, initiated a transition to the Latin alphabet under the directive of Nursultan Nazarbayev in April 2016. A systematic plan was devised for the gradual shift of secondary school textbooks to the Latin alphabet by 2018 and the complete transition of all books, periodicals, and official documents by 2025. Kazakhstan officially adopted the new 32-letter Latin alphabet in October 2017 (Batyrbekkyzy et al., 2018). This Latin alphabet, introduced in 2017, underwent reorganization in 2018 with some modifications.

During the era of Westernization and renewal, marked by an increased influence of Western civilization on Kazakh literature, various concepts emerged at different time intervals, with the New Kazakh Literature being the prevailing conceptualization. Numerous terms and concepts were introduced during this phase, particularly amid significant social, cultural, artistic, technological and literary transformations. While there is a widespread consensus among literary scholars and researchers regarding new concepts compared to classical ones, there is also notable confusion in this regard (Batyrbekkyzy et al., 2018; Kim, 2018).

In the contemporary era marked by increasing specialization, there is a discernible trend towards in-depth studies within specific and narrow fields of expertise. The demand has shifted towards

specialists who possess comprehensive knowledge in specific domains rather than individuals with a broad, albeit imperfect, understanding of various subjects. This trend is reflected in the field of literature, where instead of all-encompassing books covering every term, concept, and foundational knowledge as the literary landscape expands and intertwines with other art forms, there is a growing emphasis on studies dedicated to specific genres or periods. Alongside dictionaries focused on major branches or periods of literature, recent scholarly works delve into the fundamental information and terms pertinent to modern literary genres (Bekmanova et al., 2022; Levis, 2023).

Within the realm of Kazakh language and literature, there has been an increasing demand for encyclopedic books. Comprehensive works have emerged to address this need, offering a wealth of information encompassing general knowledge, terms, names, and periods within the field (Mazhitayeva et al., 2015; Levis, 2023). The evolution of literature in Kazakh society, with the introduction and proliferation of new genres such as novels, stories, and plays, the increased production of prose works, the evolution of aesthetic tastes and perceptions, the integration of newspapers into social life, and the inclusion of "literature" courses in new schools have collectively necessitated the publication of books containing essential "literature information" (Mazhitayeva et al., 2015).

Technology, as a cultural product, emerges within the cultural context and seeks completion and meaning within the culture it exists. Like any product, technology is intricately linked to the values of the social world, with its meaning realized through these social values (Combi, 2016; Murphie & Potts, 2017). Literature, positioned as one of these cultural values, plays a crucial role in shaping the meaning of technology. Social sciences contribute significantly to technology by addressing the missing field of meaning within it. Consequently, technology evolves beyond being a purely mechanical device, transforming into a meaningful object understood in alignment with the values and experiences of the moral world. It becomes a field where human values are not only dominant but also actively engaged, adding an ethical dimension to technology and contributing to the formation of its meaningful world (Crowley & Heyer, 2015; Eisenlohr, 2004).

However, challenges persist in the realm of literature education, as highlighted by Zhang et al. (2014). First, a prevalent issue is the uniformity of teaching materials, making it difficult to capture students' attention. Second, the slow pace of updating teaching materials results in outdated content

and perspectives, failing to align with students' desire for the latest information. Third, textbooks often contain a plethora of traditional concepts, adversely impacting students' motivation to engage with literature. Addressing these issues is crucial for enhancing the effectiveness of literature education and ensuring students' active participation and interest in the subject matter.

Yi (2013) advocates for the establishment of a digital teaching platform in literature courses, contending that such a platform can seamlessly integrate new terms and relevant academic resources. The incorporation of extensive text, video, and audio materials within this digital framework is proposed to enhance students' knowledge and refine their learning methods. Additionally, modern technologies provide an avenue for active student participation in literature classes, empowering them to emphasize their subjectivity and leverage their reading, research, and expressive abilities (Al-Zoube et al., 2010; Makena & Feni, 2023; Shan, 2017). Campbell (2016) further recommends that teachers optimize and reform current teaching methods in literature classes by fully utilizing modern educational technology and network multimedia. This includes updating teaching content, enhancing teaching efficiency, and training students to master effective learning methods. The quality of teaching materials used in literature courses plays a pivotal role in students' ability to internalize new terms and utilize them effectively in literary works (Li, 2017).

The positive impact of technology on literature teaching extends to the development of literacy and language skills, as emphasized by Mayer (2014b). Research findings underscore the favorable outcomes of technology-supported teaching, particularly in fostering understanding of new terms, improving reading and comprehension skills, enhancing writing and expression skills, refining listening skills, and facilitating vocabulary development (Chen, Ma, & Matsuzawa, 2015; Hani & Alghonaim, 2014; Makaleni et al., 2023; Trainin et al., 2016).

Understanding the impact of technology on the development of language skills, learner achievement, attitudes, and motivation is crucial, particularly within various dimensions of literature teaching processes, especially when it comes to introducing new terms. Furthermore, evaluating the benefits of incorporating current technology for instructors and the teaching is essential for assessing the overall functionality of the technology in use. This study focused on investigating the effect of modern technologies in teaching new terms within Kazakh literature

courses, specifically examining how it influences students' achievement, attitudes, and retention of learned content. The study aimed to address the following questions:

1. Is there a significant difference between the pre-test achievement of the experimental group in which contemporary technologies were applied in teaching new terms in literature course and the control group in which traditional teaching was applied?
2. Is there a significant difference between the pre-test course attitudes of the experimental group in which contemporary technologies were applied in teaching new terms in literature course and the control group in which traditional teaching was applied?
3. Is there a significant difference between the post-test achievement of the experimental group in which contemporary technologies were applied in teaching new terms in literature course and the control group in which traditional teaching was applied?
4. Is there a significant difference between the post-test course attitudes of the experimental group in which contemporary technologies were applied in teaching new terms in literature course and the control group in which traditional teaching was applied?
5. Is there a significant difference between the learning retention of the experimental group in which contemporary technologies were applied in teaching new terms in literature course and the control group in which traditional teaching was applied?

Method

Research Design

In our study, a "quasi-experimental design" was employed, guided by Creswell's (1999) methodology, which involves matching pre-existing groups on specific variables and then randomly assigning them to treatment groups. The research design encompassed a "Pretest-Posttest Paired Control Group Design" to analyze the differences in achievement tests within and between groups. Both experimental and control groups received pretests, including an achievement test and attitude scale, followed by posttests consisting of achievement and practice tests along with the attitude scale. Additionally, an exclusive "Posttest Paired Control Group Design" was applied to assess differences in practice exam and attitude scores between the groups. This comprehensive approach, featuring pretests, posttests, and retention tests, allows for a thorough examination of the impact of modern technologies on teaching new terms in Kazakh literature

courses, specifically focusing on achievement, attitude, and retention outcomes within the experimental and control groups. The research designs employed in our study are outlined below and summarized in Table 1:

Table 1
Research Design

Group	Pre-Test	Experimental Procedure	Post-Test		Retention Test
Experimental	Test on New Terms in Literature Attitude Scale Test on New Terms in Literature Attitude Scale	Information Technology Supported Literature Teaching	Test on New Terms in Literature Attitude Scale	No Action 4 Weeks	Test on New Terms in Literature
Control	Test on New Terms in Literature Attitude Scale	Traditional Instruction	Test on New Terms in Literature Attitude Scale		Test on New Terms in Literature

Study Group

The study was conducted with 2nd-year students enrolled in the Kazakh Literature Department of a university in Almaty, Kazakhstan, during the 2022-2023 academic year. To ensure the formation of comparable groups, 32 students each were selected for the experimental and control groups based on their 2nd-grade general mean scores and gender distribution. Following the transfer of one student from the control group to another branch, the final composition included 32 students in the experimental group and 31 students in the control group. Gender distribution was balanced, with 17 girls and 15 boys in the experimental group and 16 girls and 15 boys in the control group. It is noteworthy that the academic achievements of both the experimental and control groups in the semester preceding the experimental procedures were found to be at a similar level. According to Janowski & Pinson (2015), 15 participants for each group may be sufficient in experimental studies conducted with strict controls. Some researchers emphasize that the number of participants should be at least 30. However, considering the difficulties in finding participants and the number of studies conducted with a small number of participants, groups of 30 participants seem ideal. At the beginning of the experimental research, the participants were randomly assigned to the groups based on their pre-test scores from the achievement and attitude scales. Subsequently, the school administration was requested for the past grade point averages of these participants. It was understood that the groups were equal in terms of students' past grade point averages. Therefore,

it can be argued that the number of the participants in the experimental and control groups in the study is at an acceptable level.

Experimental Procedures

The pre-implementation stages and the procedures executed during the implementation were meticulously detailed in the study.

In the first week of the study, both the experimental and control groups underwent a pretest, consisting of the "New Terms in Literature" achievement test and an attitude scale towards the course. Subsequently, the experimental group received weekly instruction on the designated topic through face-to-face sessions conducted by the instructor using MoodleCloud. The weekly activities and quizzes were then administered online, followed by assigning homework to reinforce the covered material, which students submitted via the system within a week. The control group, in contrast, received teacher-centered, face-to-face instruction on the same subject, activities, and homework.

Today, there are many open-source learning management systems, one of which is the moodle learning management system. Moodle, whose first version was introduced in 2002, continues to be widely used today (Ally, 2022). Thanks to moodle, which is open source, free and has a wide tester base, text, video and image files can be shared and interactive training can be done with the whiteboard application. Additionally, Adobe Connect, Open Meetings and BigBlueButton programs can be used as web conferencing tools on moodle (Armbrust, et al, 2010). Using the infrastructure of these technologies that we have heard about frequently recently, Moodle has developed the cloud-based learning management system (MoodleCloud) that individual users can easily benefit from as of July 2015 (Chang, & Huang, 2022).

Throughout the study, after each activity, students from both groups were asked to complete a cognitive load scale related to the respective activity. Before the commencement of the application, the researchers developed a weekly lesson content and plan based on the MoodleCloud program for the "New Terms" unit in the Literature course. The instructional design adhered to Mayer's (2014a) design principles in multimedia learning. Following Mayer's (2014a) coherence principle, the content focused on relevant materials, excluding extraneous information. To attract attention, key points in the "New Terms in Literature" unit were emphasized through underlining, color

variation, and bold text. The spatial proximity principle ensured that related texts and new terms appeared together on the screen, while the temporal proximity principle presented them simultaneously. The content was segmented into four parts each week—lecture, activity, homework, and quiz—according to Mayer's (2014a) segmentation principle. The form principle was applied by presenting pictures and new concepts together, while the personalization principle involved using everyday language and providing additional examples to explain "New Terms" topics. Throughout this process, the instructor employed a simultaneous screen display to explain topics to all students.

The study facilitated students' access to the covered topics by uploading the content to the MoodleCloud program, allowing them to retrieve the materials online at their convenience and from any location. Students actively engaged with the content, creating their own texts on the subject of "New Terms in Literature," submitting activities and homework through the system, and taking exams online, with immediate access to their results. The MoodleCloud system served as a storage tool for course-related materials. Instructors adhered to the predetermined work plan each week, ensuring consistency in the instructional approach.

In the 6th week of the study, both the experimental and control groups underwent a post-test, involving the "New Terms in Literature" achievement test and an attitude scale towards the course. Following the post-test, a retention test was administered to both groups four weeks later, using the "New Terms in Literature" achievement test. This approach allowed for a comprehensive assessment of students' understanding, attitudes, and retention of the covered material over time, contributing valuable insights to the study's outcomes.

Data Collection Tools

The data collection tools were the "achievement test" and "practice exam" developed by the researcher for the "New Terms" module of the Literature course to investigate the effect on achievement and retention in learning. In addition, the "Literature Course Attitude Scale" developed by the researchers was used to measure students' attitudes towards the course and activities.

Achievement Test

A 30-question achievement test was developed to investigate the effect of the content in the Kazakh Literature course "New Terms" theme on students' achievement and retention in achievement. The researchers first prepared a specification table showing the achievements and course topics for the Kazakh Literature course. To this end, 32 test questions related to the theme of "New Terms in Kazakh Literature" and the achievements of the course were prepared. The opinion of Kazakh Literature lecturers was taken in terms of the suitability of the prepared test to Kazakh grammar rules. For content validity, the opinions of 2 lecturers who teach this course were also sought. According to Porter et al. (2008), one of the most important methods used to ensure the validity of achievement tests is to prepare a specification table and to consult expert opinions. For this purpose, a specification table was prepared to ensure the content validity of the literature course achievement test. Expert opinions were consulted to test the consistency and quality of the questions prepared in relation to the specification table with the achievements of the course. For the reliability study of the test, a pilot study was conducted with 55 3rd grade students who had previously taken this course. As a result of the pilot study, the items of the test were analyzed in the TAP test analysis program and SPSS 26.0.

The process of item analysis was conducted meticulously to ensure the reliability and validity of the Literature achievement test. Items with discrimination values below the threshold were rigorously evaluated, leading to the removal of two items with values below 0.2. Additionally, items 4, 12, and 21, with discriminating values of 0.25, underwent corrections to enhance their quality and were consequently retained in the test. Following these adjustments, the item analysis results for the remaining 30 items indicated a high level of reliability, with a KR-20 value of 0.84. The item difficulty value was 0.56, reflecting an appropriate level of challenge for the test-takers, and the item discriminating value was 0.47, indicating the ability of the test to effectively discriminate between high and low performers. With these positive indicators, it can be asserted that the Literature achievement test is both reliable and valid. The literature course achievement test was administered to both the experimental and control groups as a pre-test, post-test, and retention test, providing a robust foundation for assessing the impact of the teaching methods on students' achievement and retention of the material. The retention test was implemented to assess whether contemporary instructional technologies had a lasting impact on the retention of new concepts learned in the literature course. Following a common practice in literature studies, the

achievement test served as a retention test, re-administered after a 4-week interval from the conclusion of the study.

Literature Course Attitude Scale

Regarding the Attitude Scale towards Literature Course, it is a Likert-type scale comprising 22 items and was developed by experienced researchers. Both exploratory factor analysis and confirmatory factor analyses were employed, revealing a unidimensional structure for the scale. The exploratory factor analysis indicated a KMO value of 0.959, signifying high sampling adequacy, and the Bartlett Sphericity Test was significant. The unidimensional structure explained 58.75% of the total variance, demonstrating the scale's coherence. The reliability coefficient (Cronbach Alpha) for the single factor derived from the scale was 0.921, indicating strong internal consistency. In the specific research sample, the Cronbach Alpha Reliability of the Attitude Towards Literature Course scale was calculated as 93%, reinforcing the scale's reliability. These results collectively affirm that the scale meets rigorous criteria for reliability and validity, effectively measuring the attitudes of university-level literature students towards the course.

Data Analysis

In the analysis of the research data, a comprehensive set of statistical methods was employed to ensure accuracy and reliability. Descriptive statistics were utilized to analyze and present the descriptive findings, providing a clear summary of the data. To evaluate the distribution of the data, the Kolmogorov-Smirnov test was applied. These tests are commonly used to examine whether the data follow a normal distribution. Since the research data satisfied the assumptions of normal distribution, the unrelated samples t-test was chosen as an appropriate statistical tool. Lewin's Area test was applied on the measurements obtained from the literature achievement test and 'Literature Course Attitude Scale' and it was seen that the distribution was homogeneous. Lewin's field test and normality test results for achievement and attitude measurements are given in Table 2. According to Kim (2015), an independent sample t test is used when comparing the scores of two independent groups on the basis of parametric testing. This t-test was employed to compare the literature achievement, attitude, and learning retention scores between the experimental and control groups, providing a robust method for assessing the effectiveness of contemporary instructional technologies in the literature course.

Table 2

Normality and homogeneity test results of pre-test achievement and attitude scores obtained from the research groups

		Statistic	df	p
Kolmogorov-Smirnov ^a	Pre-Test Achievement	0.099	63	.461
	Pre-Test Attitude	0.110	63	.058
Levene Statistic	Pre-Test Achievement	0.551	61	.124
	Pre-Test Attitude	0.335	61	.565

In Table 2, the Kolmogorov Simirnov (K-S) test was applied to determine the normality of the pre-test achievement and attitude mean scores of the students since the total group was larger than 50. As a result of the analysis, it was understood that the assumptions of normal distribution were met since $\alpha=0.05$ value was greater than the Alpha value. Levene's statistic technique was used to test the homogeneity of the participants' pre-test achievement and attitude mean scores. As a result of the analysis, it was understood that the groups showed homogeneous distribution since $\alpha=0.05$ value was greater than the Alpha value.

Findings

The initial sub-problem investigated in the study aimed to ascertain whether there existed a distinction in the achievement levels of the experimental and control groups in the unit of new concepts in literature before the commencement of experimental procedures. To assess this sub-problem, a comparison was conducted between the pretest achievement scores of students in both the experimental and control groups. The detailed analysis of the comparison of pretest achievement scores for the experimental and control groups is presented in Table 3.

Table 3

Comparison of Pre-Test Achievement Scores of Groups in Teaching New Terms

Pre-Test	Group	N	Mean	Std. Deviation	-t-	p
Achievement	Experimental	32	9.22	3.72	-0.81	0.423
	Control	31	9.87	3.41		

Table 3 shows a marginal difference of 0.65 points in mean pretest scores between the experimental and control groups, favoring the control group in the unit of new terms in literature.

The results of the conducted t-test to assess the significance of this difference indicated that it was not significant at the 0.05 level. Therefore, it can be concluded that the cognitive entry behaviors of students in both the experimental and control groups concerning new terms in the literature course were comparable before the commencement of the study.

The second sub-problem investigated in the study aimed to determine whether there existed a disparity in the attitude levels of the experimental and control groups toward the literature course before the experimental procedures. To examine this sub-problem, a comparison was made between the pretest attitude scores of students in both the experimental and control groups, as outlined in Table 4.

Table 4

Comparison of Pre-Test Course Attitude Scores of Groups in Teaching New Terms

Pre-test	Group	N	Mean	Std.	-t-	p
				Deviation		
Attitude	Experimental	32	3.22	0.67	-0.83	0.410
	Control	31	3.31	0.69		

Table 4 shows a minor difference of 0.09 points in mean pretest attitude scores between the experimental and control groups, favoring the control group. The results of the t-test to assess the significance of this difference indicated that it was not significant at the 0.05 level. Therefore, it can be concluded that the attitudes of students in both the experimental and control groups toward the literature course were equivalent before the research.

The third sub-problem investigated in the study sought to determine whether there existed a disparity in the achievement levels of the experimental and control groups in the unit of new concepts in literature after the experimental procedures. To investigate this sub-problem, a comparison was made between the post-test achievement scores of students in both the experimental and control groups following 6 weeks of implementation, as outlined in Table 5.

Table 5*Comparison of Post-Test Achievement Scores of Groups in Teaching New Terms*

Post-Test	Group	N	Mean	Std.	-t-	P
				Deviation		
Achievement	Experimental	32	20.13	2.77	2.94	0.005
	Control	31	18.26	2.24		

Table 5 reveals a 1.87 point difference in mean posttest scores between the experimental and control groups, favoring the experimental group. The t-test results indicate that this difference was significant at the 0.05 level. Therefore, the program supported by contemporary instructional technologies, developed for the unit on using new terms in literature, appears to be more effective in improving student achievement compared to traditional teaching practices. In essence, the program supported by contemporary instructional technologies demonstrates success in practical application.

The fourth sub-problem under consideration in the study aimed to investigate whether there existed a difference in retention levels between the experimental and control groups regarding the unit on new concepts in literature after the experimental procedures. To assess this sub-problem, the retention test scores of students in both the experimental and control groups were compared four weeks after the posttest applications, as outlined in Table 6.

Table 6*Comparison of Retention Test Scores of Groups in Teaching New Terms*

Test	Group	N	Mean	Std.	-t-	P
				Deviation		
Retention	Experimental	32	16.03	2.88	3.94	p<0.01
	Control	31	13.48	2.19		

As it can be seen in Table 6, there is 1.19 point difference between the mean posttest attitude scores of the experimental and control groups, favoring the experimental group. However, the results of the t-test conducted to assess the significance of this difference, was found to be not significant at the 0.05 level. Thus, it can be concluded that there was no significant difference in the attitudes of students in the experimental and control groups toward the literature course after the research interventions.

In summary, the findings of the study suggest that the contemporary instructional technology-supported program developed for the unit on using new terms in literature had a significant positive impact on students' achievement and learning retention compared to traditional teaching practices. However, there was no significant difference in the attitudes of students toward the literature course between the experimental and control groups after the research interventions.

Table 7

Comparison of Post-Test Attitude Scores of Groups in Teaching New Terms

Post-Test	Group	N	Mean	Std.	-t-	p
				Deviation		
Attitude	Experimental	32	4.24	0.65	2.93	0.005
	Control	31	3.80	0.52		

As can be seen in Table 7, there was 0.44 point difference between the mean post-test attitude scores of the experimental and control groups in favor of the experimental group. According to the results of the t-test conducted to determine whether this difference was significant or not, it was found that the difference was significant at the 0.05 level. Attitudes of the students in the experimental group towards the course were higher in the post-test compared to the control group. Consequently, it is evident that the program supported by modern instructional technologies developed in the unit of using new terms in literature is more effective in shaping student attitudes compared to traditional teaching practices.

Discussion

This study investigated the influence of modern technologies on the achievement, attitude, and retention of learning while teaching new terms in Kazakh literature to students. The research program demonstrated the effectiveness of a six-week application of MoodleCloud in the literature course's 'New Terms' unit, resulting in a notable level of achievement. Hayta (2014) highlights the potential for successful language teaching and learning through diverse resources such as online dictionaries, grammar exercise websites, digital programs, stories, novels, magazines, newspapers, and social media platforms. Scholars in the field of language and literature education increasingly advocate for a shift towards technology-enriched, learner-centered teaching approaches that enhance language proficiency (Adedokun et al., 2023; Hamakali & Josua, 2023; Hong et al., 2017;

Maja, 2023). These researchers advocate for a holistic approach to language education that integrates language and literature (Mohr & Welker, 2017; Morska et al., 2018; Van Lieshout & Cardoso, 2022; Young, 2012). Consequently, language education should transcend the confines of specific content, themes, and concepts. Instead, it should equip students to navigate the rapidly changing economic, technological, and social landscape, fostering their adaptability to new terminologies in the dynamic realities of a globalized society (Eubanks, Yeh & Tseng, 2018; Moeller & Abbott, 2018; Quicios, 2018). In this context, the application of modern teaching technology, such as MoodleCloud, in the experimental group facilitated a meaningful and enduring acquisition of new terms in Kazakh literature.

Another of the findings of this study is the effects of the use of modern technologies in teaching students new terms in Kazakhstan literature on attitudes towards the course. The results of the study indicated that students in the experimental group, where MoodleCloud technologies were employed for teaching "New Terms" in the literature course, showed remarkably positive attitudes compared to traditional teaching methods. This aligns with the findings of Carter et al. (2020), who found heightened interest and engagement among students utilizing contemporary technologies in their learning processes. The integration of personalized and adaptive learning technology not only facilitated effective learning of new terms in literature courses but also contributed to the development of positive attitudes toward the content.

Building on this, Balaman Uçar (2016) conducted a study examining the impact of digital technologies on university students in the context of language courses, evaluating factors such as motivation, interest, attitudes toward educational technologies, self-efficacy, and perceptions of the study. The results indicated that the method grounded in digital technologies was statistically more effective in enhancing language and writing skills, as well as motivation levels, compared to alternative methods. In essence, the study underscores the positive influence of modern technologies, particularly MoodleCloud, on students' attitudes toward learning new terms in literature courses. This aligns with broader research highlighting the benefits of contemporary technologies in fostering engagement, motivation, and skill development among students. According to the researcher's observations in the experimental applications of this study, students easily used the MoodleCloud program and shared their learning content with their friends. This positively affected their attitudes towards the course. As a matter of fact, according to Adewole

Odeshi (2014), students find it easy to use digital learning tools and therefore show positive attitudes towards digital technology-based applications. In another study supporting these findings, Liaw, Huang, and Chen (2007) reported that participants found digital learning environments enjoyable and effective.

In employing this method, a notable observation was the consistently high and increasing interest among students throughout the process. Moreover, this approach had a positive influence on their self-efficacy perceptions and attitudes toward educational technologies. According to Li (2020), contemporary technologies play a crucial role in supporting personalized and self-directed learning, empowering students to monitor their progress, set goals, and customize their learning experiences to align with individual needs and interests. Li's findings are consistent with the study conducted by Eubanks et al. (2018), where they explored the effectiveness of a technology-integrated twenty-first-century writing workshop on students' writing skills and attitudes. The results indicated a reduction in writing barriers associated with new terms, highlighting the positive impact of technology integration.

As digital technology becomes increasingly prevalent in education, understanding its influence on attitude change and sustainable learning, especially in the context of teaching new terms, becomes paramount. This study has the potential to contribute to the development of more successful teaching methods that seamlessly integrate contemporary technologies into language education. Furthermore, contemporary technologies can foster constructive attitudes toward literature and language learning, thereby enhancing students' overall experience and competence in acquiring new terms. Ultimately, comprehending the role of contemporary technologies in reshaping attitudes and facilitating sustainable learning of new terms paves the way for the emergence of effective literature education practices. By offering more efficient and enjoyable language learning experiences for students across various proficiency levels, contemporary technologies have successfully assumed a pivotal role in literature classes, particularly in the acquisition of new terms.

Conclusion

This study demonstrates the effectiveness of incorporating modern technologies into the teaching of new terms in Kazakhstan literature, positively impacting achievement, attitude, and the retention

of learned material. However, it is essential to acknowledge certain limitations in the study. The generalizability of the findings is constrained by the small sample size from a specific geographical region and the unidimensionality of the contemporary technology programs used. Moving forward, future research endeavors should prioritize the exploration of optimal strategies for seamlessly integrating contemporary technologies into literature teaching, fostering authentic learning experiences tailored to individual needs. Since the results obtained within the scope of the experimental research were obtained on a relatively small representative sample, this can be considered as a limitation of the research. In this context, it is thought that it would be appropriate to repeat the results obtained for this study on larger samples at different grade and teaching level levels.

Recommendations

Furthermore, ensuring equal access to contemporary technologies and learning materials for all literature students, irrespective of their backgrounds, is crucial. Efforts should be concentrated on facilitating their meaningful participation in literature learning activities, particularly those related to new terms. Collaborating with educational and technological experts to develop a holistic approach to literature education will prove effective in addressing the multifaceted challenges of the contemporary literature learning environment. Additionally, practical seminars can be given to students and faculty members on the use of contemporary technologies in literature courses in general and in teaching new terms in particular. Instructions, sample activities and application templates on the use of contemporary technologies can be included in literature course curriculum. Sample course software and applications can be developed for the use of contemporary technologies in the literature course.

References

- Adedokun, T., Zulu, S., Awung, F., & Usadolo, S. (2023). Sustainable Lessons Learnt from the Attitudes of Language Instructors toward Computer-Assisted Language Teaching. *Research in Social Sciences and Technology*, 8(4), 216-236. <https://doi.org/10.46303/ressat.2023.40>
- Adewole Odeshi, E. (2014). Attitude of students towards e-learning in South-West Nigerian Universities: An application of Technology Acceptance Model, *Library Philosophy and Practice* (e-journal), 1035. <https://digitalcommons.unl.edu/libphilprac/1035>
- Al-Zoube, M., Abou El-Seoud, S., & Wyne, M. F. (2010). Cloud computing based e-learning system. *International Journal of Distance Education Technologies (IJDET)*, 8(2), 58-71. DOI: 10.4018/jdet.2010040105, <https://www.igi-global.com/article/cloud-computing-based-learning-system/42095>
- Ally, S. (2022). Review of Online Examination Security for the Moodle Learning Management System. *International Journal of Education and Development using Information and Communication Technology*, 18(1), 107-124.
- Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., & Zaharia, M. (2010). Communications of the ACM. *A View Of Cloud Computing*, 53(4), 50-58.
- Balaman Uçar, S. (2016). *The impact of digital storytelling on English as a foreign language learners' writing skills*. Unpublished doctorate dissertation, Hacettepe University, Institute of Educational Sciences, Ankara.
- Batyrbekkyzy, G., Mahanuly, T. K., Tastanbekov, M. M., Dinasheva, L. S., Issabek, B., & Sugirbayeva, G. (2018). Latinization of Kazakh alphabet: History and prospects. *European Journal of Science and Theology*, 14, 125-134. http://www.ejst.tuiasi.ro/Files/68/12_Batyrbekkyzy%20et%20al.pdf
- Bekmanova, G., Nazyrova, A., Amangeldy, N., Sharipbay, A. & Kudubayeva, S. (2022). A New Approach to Developing a Terminological Dictionary of School Subjects in the Kazakh Language, *7th International Conference on Computer Science and Engineering (UBMK)*, Diyarbakir, Turkey, 2022, pp. 527-532, doi: 10.1109/UBMK55850.2022.9919581.
- Bergeron, B. S. (1990). What does the term whole language mean? Constructing a definition from the literature. *Journal of Reading Behavior*, 22(4), 301-329. <https://doi.org/10.1080/10862969009547716>
- Buran, A. (2012). The importance of terms in science and the term. *Electronic Turkish Studies*, 7(4), 21-25. <https://www.acarindex.com/dosyalar/makale/acarindex-1423933298.pdf>

- Campbell, S. (2016). Teaching cloud computing. *Computer*, 49(09), 91-93. DOI Bookmark: [10.1109/MC.2016.286](https://doi.org/10.1109/MC.2016.286)
- Carter Jr, R. A., Rice, M., Yang, S., & Jackson, H. A. (2020). Self-regulated learning in online learning environments: strategies for remote learning. *Information and Learning Sciences*, 121(5/6), 321-329. <https://doi.org/10.1108/ILS-04-2020-0114>
- Chang, Y. C., Li, J. W., & Huang, D. Y. (2022). A personalized learning service compatible with moodle e-learning management system. *Applied Sciences*, 12(7), 3562. <https://doi.org/10.3390/app12073562>
- Chen, B., Ma, L., Matsuzawa, Y. & Scardamalia, M. (2015). The development of productive vocabulary in knowledge building: A longitudinal study. (O. Lindwall, P. Häkkinen, T. Koschman, P. Tchounikine, ve S. Ludvigsen. (Eds.), *Exploring the Material Conditions of Learning: The Computer Supported Collaborative Learning (CSCL)* In. Gothenburg, Sweden: The International Society of the Learning Sciences. <https://doi.org/10.22318/cscl2015.401>
- Combi, M. (2016). Cultures and technology: An analysis of some of the changes in progress—Digital, global and local culture. In *Cultural Heritage in a Changing World*, 3-15. ISBN 978-3-319-29544-2, ISBN 978-3-319-29544-2.
- Creswell, J. W. (1999). Mixed-method research: Introduction and application. In *Handbook of educational policy* (pp. 455-472). Academic press. <https://doi.org/10.1016/B978-012174698-8/50045-X>
- Crowley, D., & Heyer, P. (2015). *Communication in history: Technology, culture, society*. Routledge. ISBN: 9780205693092
- Cuddon, J. A. (2012). *A dictionary of literary terms and literary theory*. John Wiley & Sons. ISBN: 978-1-4443-3327-5
- Eisenlohr, P. (2004). Language revitalization and new technologies: Cultures of electronic mediation and the refiguring of communities. *Annual Review Anthropology*, 33, 21-45. <https://doi.org/10.1146/annurev.anthro.33.070203.143900>
- Eubanks, J. F., Yeh, H. T., & Tseng, H. (2018). Learning Chinese through a twenty-first century writing workshop with the integration of mobile technology in a language immersion elementary school. *Computer Assisted Language Learning*, 31(4), 346-366.
- Foerster, N., McGalliard, J. C., Wellek, R., Warren, A., & Schramm, W. L. (2017). *Literary Scholarship: Its Aims and Methods*. University of North Carolina Press, Retrieved May 19, 2023, <https://philpapers.org/rec/FOELSI>

- Frolova, E. V., Rogach, O. V., & Ryabova, T. M. (2020). Digitalization of Education in Modern Scientific Discourse: New Trends and Risks Analysis. *European Journal of Contemporary Education*, 9(2), 313-336. DOI: 10.13187/ejced.2020.2.313
- Geisinger, K. F. (2016). 21st century skills: What are they and how do we assess them?. *Applied Measurement in Education*, 29(4), 245-249. <https://doi.org/10.1080/08957347.2016.1209207>
- Hamakali, H., & Josua, L. (2023). Engendering Technology-Assisted Pedagogy for Effective Instructional Strategy in the University of Namibia Language Centre. *Research in Educational Policy and Management*, 5(1), 18-32. <https://doi.org/10.46303/repam.2023.3>
- Hani, N. A. B., & Alghonaim, A. S. (2014). The utilization of e-mail technology in developing writing skills to freshman EFL learners. *Instructional Technology*, 11(8), 43-53. https://itdl.org/Journal/Aug_14/Aug14.pdf#page=47
- Hayta, F. (2014). *An examination of language learning strategies with reference to computer and mobile phone technology*. Unpublished master's thesis, Diyarbakır: Graduate School of Educational Sciences English Language Teaching Department.
- Hill, B. & Slater, P. (1998). Network technology and language learning. *Education & Training*, 40(8), 374-379. <https://doi.org/10.1108/00400919810239428>
- Hitchins, K. (1998). Neighboring Cultures: Central Asia, Afghanistan, China. *Iranian Studies*, 31(3-4), 571-582. <https://doi.org/10.1080/00210869808701933>
- Hitchins, K. (2001). Der weiBe Berg.(Mongolia). *World Literature Today*, 140-141. University of Oklahoma, <https://link.gale.com/apps/doc/A82262868/AONE?u=anon~6b7db36a&sid=googleScholar&xid=4a73ecac>
- Hong, S. B., Park, J., Moon, Y., Grandmason, M. L., Nowroski, D., & Moon, M. (2017). Learning a foreign language in adulthood using principles of neuroscience. *ARC Journal of Neuroscience*, 2(1), 10-13. DOI: <http://dx.doi.org/10.20431/2456-057X.0201003>
- Janowski, L., & Pinson, M. (2015). The accuracy of subjects in a quality experiment: A theoretical subject model. *IEEE Transactions on Multimedia*, 17(12), 2210-2224. [10.1109/TMM.2015.2484963](https://doi.org/10.1109/TMM.2015.2484963)
- Karmini N.W. (2022). Digital Literature and Independent Learning in COVID-19 Pandemic: A Correlation Study. *Journal of Social Studies Education Research*, 13 (4), 336 – 352. <https://jsser.org/index.php/jsser/article/view/4673/600>
- Kim, B. (2018). Transition of the Kazakh writing system from Cyrillic to Latin. *International Journal of Advanced Culture Technology*, 6(4), 12-19.

- Kim, T. K. (2015). T test as a parametric statistic. *Korean Journal of Anesthesiology*, 68(6), 540-546. <https://doi.org/10.4097/kjae.2015.68.6.540>
- Kirchner, M. (1998). Kazakh and Karakalpak. In *The Turkic Languages* (Ed. Lars Johannesson– Éva A. Csató), (318-332). London-New York: Routledge. ISBN: 0-415-08200-5
- Korkmaz R., & Deveci, M. (2011). *Türk Edebiyatında Yeni Bir Tür: Küçürek Öykü*. Ankara: Grafiker Publication.
- Küderina, A.E. (2010). *Qazaq Tili – Özdik Jumıstarğa Arnalğan Mätinde*. Pavlodar: Kereküw Baspası
- Lawall, S. (1988). René Wellek and Modern Literary Criticism. *Comparative Literature*, 3-24.
- Lewis, P. C. (2023). On the Sociolinguistic Origins of the term Qazaq: A Proposal for an Alternative Etymology of ‘Cossack’/‘Kazakh’ and an Argument for the Analytical Usefulness of Register in Historical Linguistics. *Acta Orientalia Academiae Scientiarum Hungaricae*, 76(1), 93-128. DOI: [10.1556/062.2023.00274](https://doi.org/10.1556/062.2023.00274)
- Li, M. (2020). Multimodal pedagogy in TESOL teacher education: Students’ perspectives. *System*, 94, 102337. <https://doi.org/10.1016/j.system.2020.102337>
- Li, W. (2017). Application of cloud computing in informatization of physical education teaching resources[J] *Revista de la Facultad de Ingenieria*, 32(11), 626–631. <https://doi.org/10.1051/e3sconf/202129203037>
- Liaw, S. S. & Huang, H. M. & Chen, G. D. (2007). Surveying instructor and learner attitudes toward E-learning. *Computers & Education*, 49, 1066-1080. [10.1016/j.compedu.2006.01.001](https://doi.org/10.1016/j.compedu.2006.01.001)
- Mackey, W. F. (1967). *Language teaching analysis*. London: Longmans, Green & Co Ltd. ERIC Number: ED021493, <https://eric.ed.gov/?id=ED021493>
- Maja, M. (2023). Teachers’ Perceptions of Integrating Technology in Rural Primary Schools to Enhance the Teaching of English First Additional Language. *Journal of Curriculum Studies Research*, 5(1), 95-112. <https://doi.org/10.46303/jcsr.2023.8>
- Makeleni, S., Mutongoza, B., & Linake, M. (2023). Language Education and Artificial Intelligence: An Exploration of Challenges Confronting Academics in Global South Universities. *Journal of Culture and Values in Education*, 6(2), 158-171. <https://doi.org/10.46303/jcve.2023.14>
- Makena, B., & Feni, V. L. (2023). Teachers’ Perspectives on the Efficacy of Oral Presentation Tasks toward Promoted Linguistic Acquisition. *Research in Social Sciences and Technology*, 8(4), 125-134. <https://doi.org/10.46303/ressat.2023.36>

- Mayer, R. E. (2014a). Introduction to multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 1–24). Cambridge University Press. <https://doi.org/10.1017/CBO9781139547369.002>
- Mayer, R. E. (2014b). *The Cambridge handbook of multimedia learning*. NY, USA: Cambridge University Press.
- Mazhitayeva, S., Rapisheva, Z., Kagazbayev, Z., Toleubayeva, K., Zhumagulov, A., Zhumagulov, S., & Smagulova, N. (2015). The Creative Activity of National Intelligencia in the Creation of Kazakh Terminology. *Asian Social Science*, 11(19), 49.
- Moeller, A. J., & Abbott, M. G. (2018). Creating a new normal: Language education for all. *Foreign Language Annals*, 51(1), 12-23.
- Mohr, K., & Welker, R. W. (2017). The role of integrated curriculum in the 21st century school. *Dissertations*. <https://irl.umsl.edu/dissertation/688>
- Moldagali, B., Sultanova, B.M., Akhtayeva, N.K., Suleimenova, A., Akimbekova, S. (2022). Innovative Technologies: Digitalisation of Education, *Journal of Social Studies Education Research*, 13(4), 209-224. <https://jsser.org/index.php/jsser/article/view/4523/594>
- Morska, L. I., Skibska, J., Sulym, V. T., & Masztalir, V. V. (2018). Didactic potential of the integrated approach to teaching future programmers professional communicative competence in a foreign language. *Інформаційні технології і засоби навчання*, 64(2), 1-12.
- Murphie, A., & Potts, J. (2017). *Culture and Technology*. Bloomsbury Publishing.
- Nunan, D. (1995). *Language teaching methodology*. Prentice Hall Europa.
- Quicios, J. D. (2018). The North American Intelligence Community: language management as a vital tool in generating safe and effective future intelligence. *The International Journal of Intelligence, Security, and Public Affairs*, 20(2), 132-154.
- Porter, A. C., Polikoff, M. S., Zeidner, T., & Smithson, J. (2008). The quality of content analyses of state student achievement tests and content standards. *Educational Measurement: Issues and Practice*, 27(4), 2-14. <https://doi.org/10.1111/j.1745-3992.2008.00134.x>
- Shan, C. (2017). 93. Improvement Design of Teaching Management System Based on Cloud Computing in Colleges and Universities. *Boletín Técnico*, ISSN: 0376-723X, 55(19).
- Şengül, K. & Sünbül, A.M. (2015). An Investigation into Comprehension Competence and Grammar Achievements of Learners of Turkish as a Foreign Language in Turkey. *Educational Alternatives*, 13, 573-580

- Trainin, G., Hayden, H., Emily, W., K. and Erickson, J. (2016). Examining the impact of Quick-Reads' technology and print formats on fluency, comprehension and vocabulary development for elementary students. *Journal of Research on Educational Effectiveness*, 9(1), 93-116.
- Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. John Wiley & Sons.
- Tsang, A., Paran, A., & Lau, W. W. (2023). The language and non-language benefits of literature in foreign language education: An exploratory study of learners' views. *Language Teaching Research*, 27(5), 1120-1141.
- Tursunovich, R. I. (2022). Linguistic and Cultural Aspects of Literary Translation and Translation Skills. *British Journal of Global Ecology and Sustainable Development*, 10, 168-173.
- Van Lieshout, C., & Cardoso, W. (2022). Google Translate as a tool for self-directed language learning. *Language Learning & Technology*. 26, 1–19.
- Watt, H. J. (2010). How does the use of modern communication technology influence language and literacy development? A review. *Contemporary Issues in Communication Science and Disorders*, 37(Fall), 141-148. DOI: 1092-5171/10/3702-0141
- Wellek, R., & Warren, A. (1990). *Literary Theory*. Jakarta: Gramedia.
- Yi, G. (2013). Study on new mode of higher education information based on cloud computing. *Lecture Notes in Electrical Engineering*, 226, 157–165.
- Young, C.A. & Bush, J. (2004). Teaching the English Language Arts With Technology: A Critical Approach and Pedagogical Framework. *Contemporary Issues in Technology and Teacher Education*, 4(1), 1-22. Waynesville, NC USA: Society for Information Technology & Teacher Education. Retrieved November 22, 2023 from <https://www.learntechlib.org/primary/p/21903/>.
- Young, J. S. (2012). Linking learning: Connecting traditional and media literacies in 21st century learning. *Journal of Media Literacy Education*, 4(1), 70-81.
- Zhang, L., Liu, M., Shi, Z., & Ma, X. (2014, January). Research on virtual basic laboratory and experimental teaching resources platform based on cloud computing. In *Proceedings of the 9th International Symposium on Linear Drives for Industry Applications, Volume 2* (pp. 549-554). Springer Berlin Heidelberg.