The Effect of Using Artificial Intelligence and Digital Learning Tools based on Project-Based Learning Approach in Foreign Language Teaching on Students' Success and Motivation

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Article Info	Abstract
	The aim of this study is to determine the effect of digital tools and artificial intelligence applications on the achievement, motivation and retention of university students on the basis of project-based teaching approach in foreign language course. Pre-test post-test experimental design with control group was used as the method in the study. A total of 64 (32 experimental, 32 control) second-year students studying at the universities in Almaty, Kazakhstan participated in the study. The participants were divided into two groups as control and experimental groups. Foreign language Achievement Test and Motivation Scale for foreign language were used as data collection tools. In the research, in the experimental group, applications were carried out with digital tools and artificial intelligence on the basis of project-based learning approach. In the control group, the foreign language course was carried out with the traditional teaching approach. The application lasted eight weeks in total. The results of the analysis showed that the applications carried out in the experimental group had positive effects on the students' foreign language course achievement and motivation. On the basis of the project-based learning approach, digital tools and artificial intelligence applications not only contributed positively to students' achievement and motivation, but also ensured the retention of what was learned. Finally, suggestions for future research were developed in the study.

Introduction

Today, there are several problems in foreign language teaching, including lack of appropriate oral foreign language teaching and interaction environment, neglect of the learner's dominant position, old-fashioned way of teaching oral foreign language, etc. (Noom-Ura, 2013; Thrall et al., 2018). In particular, the traditional concept of exam-oriented education is very deeply rooted and in this approach, teachers mainly focus on teaching materials and content. However, for students to make progress, they need to practice in a specific language environment. Students also feel very bored because of the crammed learning environment. In the general environment, students' oral foreign language practice is only to cope with the exam and there is no need for real oral communication. In

this situation, students are caught in the dilemma of learning and memorizing foreign language mechanically and cannot really feel the great charm and importance of spoken foreign language (Khajloo, 2013; Zhou & Wu, 2022). Traditional foreign language teaching techniques have not achieved the desired success in language learning.

In teacher-oriented teaching, students' interests and desires are insufficient. Foreign language lessons based only on textbooks cause students to lose interest after a certain period of time, especially for students in today's conditions, and reduce students' motivation. A student who loses motivation and interest may give up learning the language. Therefore, in order to keep students' interest and motivation alive in foreign language teaching, we need to create a teaching environment that appeals to all their senses (Bazimaziki, 2020; Ramadhona, Putri & Wuisan, 2022). In addition, the traditional and direct teaching model used by teachers ignores the individual differences of each student. It focuses the teaching process on the content and the teacher, while ignoring students' perceptual skills. Often, before students have absorbed and digested the content of the previous lesson, the teacher starts teaching the next part, which puts students in a very disadvantageous passive position (Adair, Colegrove & McManus, 2017; Li, 2022). In foreign language teaching, some students have relatively poor learning ability and are often unable to follow the teacher's progress. Therefore, these students will be more likely to lose confidence and motivation in foreign language learning, fear taking foreign language classes, and find it difficult to improve their abilities (Chen, Zoga & Vaccaro, 2017; Sullivan & Pratt, 1996; Thrall, et al., 2018).

Researchers have found out that digital tool-assisted language learning provides learners with rich, real-time, relevant and contextualized learning opportunities in and out of the classroom (Kukulska-Hulme and Shiel, 2008; Hsu et al., 2013). Stockwell (2010) found that learners are more likely to use digital tools to perform language activities (Hsu et al., 2013). In another study, Nah, White, and Sussex (2008) reported positive attitudes towards using digital tools, which were found to be effective for improving language skills and for student-centered education (Hsu, Hwang & Chang, 2013).

One of the practices compatible with student-centered active learning (Gordon et al, 2022), that is, by doing and experiencing in the education process, is to use digital tools. These tools, which integrate the tradition of listening and telling, which is a primitive act, with digital media and technology, can be expressed as processing the content created about a specific subject with a specific purpose and perspective using multimedia (Robin, 2006; Susanty, et al., 2021). In addition to the richness of emotions, experiences, methods and techniques, the use of information technologies also increases motivation in the language skills teaching process. The perception of text has also changed with the impact of innovation and diversity that emerged with the development in technology, and the existing text structure has shifted from written texts to digitized texts that stimulate multiple sensory organs (Kimova et al., 2023; Liton, 2015; Yee & Hargis, 2012).

Today's students and teachers are increasingly using digital learning and teaching tools in their daily lives. Over the past few years, many educators have been using digital learning and teaching tools to prepare generations of learners in the learning and teaching processes to meet the skills needed by the digital life of the 21st century (Stevani & Putro, 2020). Technology helps to create an active environment where students not only solve problems but also become aware of their own problems (Bransford & Brown, 2000; Kibici, 2022). In this way,

students will not only learn but also play an active role in the learning process. Moreover, as Al Rawashdeh et al. (2021) point out, students learn systematically as the content is supported by animations, audio and video. These supports also support an active and fun learning process. The use of digital learning and teaching tools will contribute to lifelong learning by enabling interactive sharing between learners and teachers.

As the use of technology plays a key role in many areas of education, it is of great importance in foreign language learning. With the increase in digitalization in education, the use of digital tools that will contribute to foreign language teaching has increased. Since the four basic language skills are at the forefront in foreign languages, teachers are expected to use different materials and create the content of the materials according to the four basic language skills in order to develop these skills at the highest level. In this respect, digitalization provides a positive contribution to teachers in terms of time and energy in the process of creating materials. From a student perspective, it is thought that especially young people's interest in digital materials will affect learning even more positively (Asratie, Wale & Aylet, 2023; Jewitt, 2012; Nomass, 2013). Digital learning and teaching tools provide engaging ways in which students can interact and, most importantly, learn from course materials. These tools are digital programs that can be used to create and share projects and products created by students. They are interactive, multi-purpose, easy-to-use digital platforms that encourage students to collaborate with each other or create and share individualized products. These digital learning and teaching tools also enable students to collaborate (Donohue, 2014; Greener & Wakefield, 2015).

The language learning process can also take place outside the school thanks to different tools and techniques, and the learning environment does not only need the school environment. The teaching process will be easier and more efficient for the teacher thanks to these tools. Hundreds of digital educational tools have been created to give students autonomy, improve the management of academic processes, encourage collaboration and facilitate communication between teachers and students (Cunningham, Rashid & Le, 2019; Dash, 2022). One of the benefits of digital learning and teaching tools is their ease of use. Most students find these tools intuitive and user-friendly. Therefore, very little time is spent learning how to use the programs. The tools enable interactive learning and innovative solutions to assignments and assessments. Students see their ideas take shape quickly. It is also easy to organize projects under development so that students are engaged with the creative process. Students' ease of use of digital learning and teaching tools increases students' self-efficacy and will encourage students to engage more seriously and actively in learning processes (Huang et al., 2016; Teng & Wang, 2021). One of the tools used in recent years in all fields, especially in language teaching, is artificial intelligence applications.

AI systems generally include learning systems, utilization systems and management systems. Among them, the technology in the learning system is the most critical part, because the system needs to be learned before it can be used by its users (Burton et al., 2017). At the beginning, artificial intelligence was just a branch of computer science technology, but later it tried to understand the essence of intelligence and do things that humans take a lot of time (Agrawal et al., 2017). Artificial intelligence is highly dependent on the level and degree of development of computer technology, so its application area is initially limited to the recognition and input of text, speech and images. With the further integration and development of the Internet and cloud computing technology, big data analysis technology and artificial intelligence technology have been widely used in teaching fields (Aimiuwu,

2022; Guo & Niu, 2021; Kirstein, 2022; Renz, Krishnaraja & Gronau, 2020; Seidelson, 2021). At the same time, mobile phones and tablet computers have also brought certain opportunities for the development of digital classrooms.

AI technology is based on the knowledge teaching platform to build an intelligent classroom model and a learning library. This model integrates a series of functions such as diagnosis of learning status, student-centered practices, teachers' monitoring of homework, feedback correction and evaluation system (Opeifa et al., 2022; Long & Lin, 2022). It can create a smart learning environment. Such an environment realizes the unity of individual teaching and customized teaching, while the learning process is characterized by fun, intelligence and aesthetics. It also enhances teachers' professional competence (Huang, Saleh & Liu, 2021; Zeng, 2021; Zawacki-Richter et al., 2019).

In order to use artificial intelligence tools effectively in the teaching environment, as series of principles need to be followed. First, the integration of the teaching environment and the teaching content is important. Multimedia videos, tool ware and courseware demonstrations are used in AI teaching. Different forms of media are used in different teaching contexts to accomplish different teaching tasks. Second, the teaching environment should be consistent with the teaching objectives. Teaching tools are used to ensure effective teaching. Through their application, they can achieve teaching objectives and complete teaching tasks. Third, the teaching environment should be appropriate to students' cognitive characteristics and learning needs. It is not necessary to choose complex teaching tools (Duisembekova, 2021; Koenig, Uras & Cohen, 2020; Liu, Gao & Guan, 2021).

The development of information technology has entered a new era, and the development of AI technology has a certain regularity. The combination of AI technology and sound foreign language teaching in colleges and universities can achieve better results. Faced with such a situation, foreign language teaching in colleges and universities needs to be actively improved (Chiraz, 2022; Li, 2022; Softa, 2022). Artificial intelligence technology covers many fields and mainly simulates human conscious activities and thinking processes (Seraj et al., 2021). Therefore, AI technology can be used in foreign language teaching.

Artificial intelligence technology is the direction of the development of the era and teachers and students in colleges and universities need to actively adapt to this change. On the one hand, sound foreign language teaching in colleges and universities should build data awareness and make students think data-driven. Moreover, after a long period of development, sound foreign language teaching in colleges and universities has formed a relatively complete teaching system. Artificial intelligence naturally has many characteristics such as large amounts of data, various types of data, real data, and fast processing speed (Bin & Mandal, 2019; Wang, 2021). So, it is necessary to deeply analyze the application mode of AI technology in foreign language teaching and strengthen the in-depth integration of new technologies into foreign language teaching (Pengju, 2022).

In this study, digital tools and artificial intelligence applications were implemented in an Russian course using a project-based learning approach. This approach is preferred because it provides the opportunity to use innovative technologies in an eclectic way within the framework of the learner-centered paradigm. Project-based language

learning aims to learn a specific topic through a wide range of activities that extend beyond the classroom and the foreign language being learned (Stoller, 2001). Project work is a series of interconnected activities that involve research, problem solving, product development and product presentation (Beckett & Slater, 2005; Stoller, 2006). In this context, project-based learning involves the steps of examining a topic or problem in depth, conducting research on the topic or problem using scientific methods, finding an answer to the focused question or problem using interactions and individual creativity by sharing the results with stakeholders and evaluating them together (Assaf, 2018; Stoller & Myers, 2020). When it comes to language learning, project-based language learning is a language teaching, language skills development, and performance assessment method that makes the learning and teaching process meaningful, purposeful, and effective by strengthening research, communication, and collaboration skills, and thanks to these features, it has been and is being used in many native and non-native language teaching environments (Beckett & Slater, 2005; Sheppard & Stoller, 1995; Yimwilai, 2020).

This study examines the impact of digital tools and artificial intelligence applications within the framework of the project-based learning approach on second-year students of Russian at the university level. The study aims to contribute to the very scattered and one-dimensional literature in foreign language education in Kazakhstan and the world. The study aims to answer the following questions:

- To what extent do digital tools and artificial intelligence applications based on project-based learning approach affect university students' academic achievement in Russian courses?
- To what extent do digital tools and artificial intelligence applications based on project-based learning approach affect university students' motivation towards Russian courses?
- To what extent do digital tools and artificial intelligence applications based on project-based learning approach affect learning retention in Russian courses?

Method

This study, which aims to examine the effects of educational tools and artificial intelligence applications on university students' academic achievement and motivation in Russian courses on the basis of project-based learning approach, was designed according to the pre-test-post-test control group experimental design, which is one of the quantitative research methods. In the study, post-test control group randomized design, which is one of the experimental research methods, was used. Experimental research is used to examine the possible cause and effect relationship between the dependent variable and the independent variable (Creswell, 2002). In the randomized design with posttest control group, after the experimental procedure whose effect is investigated is applied to the experimental group from the experimental and control groups, both of which are formed by random assignment, a posttest of the dependent variable is applied to both groups (Fraenkel, Wallen, & Hyun, 2012). In posttest control group studies, a retention test can also be conducted to reveal whether the effect of the dependent variable continues some time after the end of the experimental process (Phakiti, 2014). For this purpose, a retention test was administered to the students in the experimental and control groups 4 weeks after the posttest. The experimental design of the study is shown in Table 1.

The study group of the research consists of a total of 64 second-year students studying at the universities in

Almaty, Kazakhstan, in the academic year 2022-2023. The experimental and control groups were formed by random assignment based on the school enrollment system among the students who study in the same department. There were 17 female and 15 male students in the experimental group and 18 female and 14 male students in the control group. The students in the experimental and control groups were equivalent to each other in terms of academic achievement in the previous academic year.

Table 1. Experimental Design of the Study

Group	Pre-Test	Experimental Procedure	Post-Test	No Action	Retention Test
Experimental	Russian Achievement Test Motivation Test for Russian	Teaching with project-based digital tools and artificial intelligence applications (8 Weeks)	Russian Achievement Test Motivation Test for Russian	2 Weeks	Russian Achievement Test
Control	Russian Achievement Test Motivation Test for Russian	Traditional Teaching (8 Weeks)	Russian Achievement Test Motivation Test for Russian	2 Weeks	Russian Achievement Test

Experimental Process

In this study, two groups of second-year students at the universities in Almaty were given Russian courses. According to the research schedule, it was decided to implement the experimental process of the study at the beginning of the second semester of the academic year 2022-2023. Digital tools and artificial intelligence applications based on project-based learning were implemented in the Russian courses of the students in the experimental group. In the control group, the courses were carried out with the traditional teaching method. The applications lasted for 8 weeks. After the experimental and control groups were determined, the contents of the books used by the students were analyzed and three Russian Grammar topics (Verbs of motion, Participles and Verb aspects) to be covered during the experimental study were determined according to the research schedule. Before the start of the experimental process, the lesson plans of the experimental and control groups were prepared for each topic included in the study, taking into account the foreign language levels of the students and the learning outcomes of the three topics.

Before the experimental procedures, Russian achievement test and motivation scale for the lesson were administered to both groups as pre-test. After the activity designs of the experimental and control groups were completed, the eight-week implementation process was started. Students in groups of 4 students used digital platforms and artificial intelligence programs created with dynamic web technologies to do general tasks within the framework of project-based learning approach during the weekly and implementation process given by the

researchers. The use of these environments was explained in detail to the students in the experimental group for 1 week by the instructor of the course. In this context, a project-based and collaborative learning environment was created using digital web technologies such as Google+ Plus, Documents, Blogger, Hangouts, Drive, Google. With these technologies, students were together with their groupmates in technological environments outside the class and they performed speaking, writing, translation and vocabulary memorization practices for Russian lesson more actively together. The purpose of using dynamic web technologies, which dynamic web tool to use in which process, how to use it and how to use it were explained to the participant students in detail with the help of presentations. With the Google Circle program, participants were divided into groups of 4 people each to work collaboratively. With one of these technologies, Google+ Blogger, an environment was created where the groups could write their weekly and daily content according to their needs in the work plan, make comments, and participate in discussion topics. Thanks to the Google+ Documents application, the groups were able to collaboratively edit and save all the texts they would prepare together online. They also used Google+ Documents to develop the content and resources they would create for the tasks assigned to them. Thanks to the Google+ Hangouts application, the participants in collaborative learning groups created in the frames were able to use audio, video and written meetings between each other and with the lecturer in connection with other dynamic web technologies (docs, chat, drive, etc.). With the additional sharing service provided by Google Plus on the main screen, the groups were able to share the tasks assigned to them during the implementation process with students in other groups. The participants used Google Plus to share the moving and still images (photos, videos), word boards and book translations they had prepared and to comment on each other's created and shared images to help them create better ones.

In the experimental group, the subject was also taught with videos on digital platforms. In the experimental group, Kahoot!, LearningApps, Padlet, Flipgrid, Nearpod, Socrative!, Duolingo and ClasDojo programs were used as digital platforms within the scope of practice and feedback applications, and Chat GPT and Perplexity programs were used as artificial intelligence. The experimental group performed exercises in teams with Kahoot!, LearningApps, Padlet, Flipgrid, Nearpod, Socrative!, Duolingo and feedback was given to the whole class with the ClassDojo application. The groups identified videos containing lectures related to their themes, analyzed and watched them in teams. In the experimental group, after the lecturing with digital tools, the experimental group solved exercises and questions as a team on Kahoot!, LearningApps, Padlet, Flipgrid, Nearpod, Socrative and Duolingo platforms. They shared the video narratives containing the solutions of these exercises with their friends in other teams.

Students in the experimental group analyzed Russian texts with artificial intelligence applications and practiced vocabulary, grammar and comprehension skills. The AI applications were used to develop students' skills in reading, understanding and analyzing texts. In addition, students worked in teams to perform grammar exercises, quizzes and interactive games using artificial intelligence programs. Students in the experimental group used Perplexity and Chat GPT programs in teams to perform writing tasks, compositions, story writing and creative writing activities related to the themes and topics of the course. Students in the experimental group were allowed to answer assessment and evaluation tools through digital platforms. Kahoot!, Socrative, LearningApps, Padlet, Flipgrid, Nearpod and Duolingo applications provided students with activities and exercises related to the weekly

topic, while weekly target words, rules and feedback were shared among students through ClassDojo application. In the last session of the experimental procedures, students automatically reported the activities they carried out in teams through digital tools and presented them to the whole class on video. At the end of the implementation process, all groups shared their work on group blogs and their posts were evaluated by the instructor member of the course.

At the end of the eight-week experimental process, the "Russian Achievement Test" and the "Motivation Scale" were administered to the students in the experimental and control groups to collect the posttest data and the necessary analyzes were made. After the application of the post-test, no action was taken for 2 weeks. Then, the retention test was applied to the experimental and control groups.

Russian Achievement Test

In the preparation of the Russian achievement test, firstly, a list of objectives related to the units to be covered during the experimental implementation was prepared. The questions obtained from the basic sources related to the field and the auxiliary materials of the textbook were placed in the test within the framework of the objectives. A test specification table was created to ensure that the objectives and related questions fully covered the units and were measured with a number of questions proportional to the estimated time allocated to each unit. This table also constitutes evidence for content validity. The questions and outcomes in the specification table were organized according to Bloom's taxonomy. In order to ensure content validity, the questions were examined by three Russian instructors teaching the same course in terms of content and form. In addition, the opinions of two different lecturers from the field of educational sciences were taken about the objectives. After the changes made within the framework of the opinions received, the test consisting of 40 questions was administered to 132 students who had previously taken the same course. During the coding of the answers to the computer, the papers of 2 students were found problematic and were excluded from the analysis. After the analysis, 5 questions that were found to be problematic in terms of item discrimination index and item difficulty index were removed from the test and the test was finalized. The reliability coefficient of the test, which was finalized to be applied to the experimental and control groups as pre-test and post-test, was found to be KR20=0.87. It can be said that this reliability coefficient is a good value for an achievement test. As a result of the item analysis, the average item difficulty index of the test was calculated as 0.45. According to this value, it can be said that the test consists of items of medium difficulty. As a result of the item analysis, the discrimination indices of the 35 items in the test ranged between 0.34 and 0.81. These values indicate that the Russian achievement test has high reliability and discrimination for 2nd grade university students.

Motivation Test for Russian

Within the scope of the study, the scale titled Attitude / Motivation Test Battery, developed by Gardner (1985) to obtain information about the motivation of French learners in Canada, was used to measure the level of their motivation towards the course. The scale attempted to determine the motivation levels of the students and which type of motivation they have with five-point rating questions. The section where students' motivation levels are

measured consists of 14 items and the section where motivation types are determined consists of 7 items. Four of the questions in the scale were written using negative expressions (not, I don't speak, I can't understand, etc.) in order to avoid leading and to facilitate students to answer more objectively. The scale was piloted with 132 students studying at the universities in Almaty. At the end of the study, Cronbach's Alpha reliability coefficient of the scale was found to be 0.82. In the study, the procedures were carried out based on the total mean scores of the scale. A high mean score indicates that students have high motivation towards the course.

Data Analysis

In the analysis of the data obtained in the study, arithmetic mean, standard deviation and independent groups t-test analyzes were applied. The data obtained on the experimental and control groups within the scope of the study were analyzed with the SPPS package program. The t-test technique was used to determine whether there was a significant difference between the pretest, posttest and retention scores of the experimental and control groups. In the interpretation of the results, 05 was accepted as the significance level.

Findings

The t-test results of the comparison of the pre-test scores of the students in the experimental and control groups from the Russian achievement test are given in Table 2.

Table 2. Experimental-Control Groups Pre-test Russian Achievement Means and t Values

	Group	N	Mean	Std. Deviation	t	p
Pre-test	Experimental	32	15.78	4.70	-0.19	0.85
Achievement	Control	32	15.97	3.06		

According to the pretest results of the Russian achievement test conducted before the experimental study, the arithmetic mean of the scores obtained by the control group was 15.97, with a standard deviation of 3.06. The arithmetic mean of the scores obtained by the experimental group was 15.78 with a standard deviation of 4.70. According to the values found, no significant difference was found in the unrelated group t-test conducted on the scores of the control and experimental groups in the pre-test of the Russian achievement test. In other words, it was determined that there was no significant difference between the prior knowledge of the two groups about the unit before the application.

The t-test results of the comparison of the pre-test scores of the students in the experimental and control groups from the Russian motivation scale are given in Table 3.

Table 3. Experimental-Control Groups Pre-test Motivation towards Russian Scale Means and t Values

	Group	N	Mean	Std. Deviation	t	p
Pre-test	Experimental	32	2.82	0.49	-1.31	0.19
Russian motivation	Control	32	3.02	0.73		

According to the results of the pretest of the Russian attitude scale conducted before the experimental study, the arithmetic mean of the scores obtained by the control group was found to be 3.02, with a standard deviation of 0.73. The arithmetic mean of the attitude scores of the experimental group was 2.82 and the standard deviation was 0.49. According to the values found, no significant difference was found in the unrelated group t-test conducted on the scores of the control and experimental groups in the pre-test application of the Russian attitude scale. In other words, it was determined that there was no significant difference between the attitudes of the members of the two groups towards Russian lesson before starting the application.

The t-test results of the comparison of the post-test scores of the students in the experimental and control groups on the Russian achievement test are given in Table 4.

Table 4. Post-test Russian Achievement Means and t Values for Experimental-Control Groups

	Group	N	Mean	Std. Deviation	t	p
Post-test	Experimental	32	29.13	4.00	3.09	0.00
Achievement	Control	32	25.66	4.92		

As seen in Table 4, the mean post-test achievement scores of the students in the groups after the experimental process were calculated as 29.13 for the experimental group and 25.66 for the control group. The achievement of the students in the experimental group, which was taught with digital tools and artificial intelligence applications within the framework of project-based learning approach, increased more than the achievement of the students in the control group, which was taught with traditional teaching method [t= 3.09; $p<0.05$).

The t-test results of the comparison of the post-test scores of the students in the experimental and control groups from the Russian motivation scale are given in Table 5.

Table 5. Post-test Motivation Scale for Russian Language Motivation Scale Means and t Values for Experimental-Control Groups

	Group	N	Mean	Std. Deviation	t	p
Post-test	Experimental	32	3.78	0.66	5.70	0.00
Russian motivation	Control	32	2.99	0.41		

As seen in Table 5, there was a significant difference between the motivation of the students in the experimental and control groups towards Russian lesson (t=5.70, $p<0.05$). Considering the averages of the groups, it is understood that the motivation of the students in the experimental group, where digital tools and artificial intelligence applications were carried out within the framework of the project-based learning approach, was more positive than the motivation of the students in the control group, where the course was taught with the traditional teaching method. This finding shows that teaching with digital tools and artificial intelligence applications within the framework of the project-based learning approach is effective in making students exhibit more positive motivation towards Russian lessons.

The t-test results for the comparison of the scores of the students in the experimental and control groups from the Russian retention test are given in Table 6.

Table 6. Experimental-Control Groups Retention Test Means and t Values

	Group	N	Mean	Std. Deviation	t	p
Retention	Experimental	32	19.09	3.87	3.70	0.00
	Control	32	15.50	3.89		

As seen in Table 6, the mean scores of the students in the groups in the Russian lesson retention test after the experimental process were calculated as 19.09 for the experimental group and 15.50 for the control group. The learning retention of the students in the experimental group who were taught with digital tools and artificial intelligence applications within the framework of project-based learning approach was found to be higher than the students in the control group who were taught with traditional teaching method [t= 3.70; p<0.05).

Discussion and Conclusion

In this study, the effects of digital tools and artificial intelligence applications on academic achievement, learning retention and motivation of university students in Russian courses based on project-based learning approach were examined. According to the findings of the study, the experimental group students who were exposed to digital tools and artificial intelligence applications based on the project-based learning approach achieved higher achievement levels compared to their peers in the control group. These findings are similar to the findings of the studies conducted by Berns et al. (2013), Butler (2015), Guerrero (2011), Johnson & Valente (2009), Neville (2015), Oh & Woo (2008), Sørensen & Meyer (2007). In the reviewed literature studies, different factors such as student, game, teacher, school administration and parents were addressed in language learning with digital games, and in the majority of the studies related to students, successful results were reported in learning with digital games (Berns et al. 2013; Johnson & Valente 2009; Neville 2015). In the studies that reported positive results in student achievement, it was stated that factors such as motivation, student autonomy, intense in-game and out-of-game interaction contributed positively to success (Butler 2015; Guerrero 2011; Sørensen & Meyer 2007).

In another sub-problem of the study, the effect of digital tools and artificial intelligence applications on students' motivation towards Russian lesson was examined on the basis of project-based learning approach. According to the research findings, the experimental group students had higher learning motivation compared to their peers in the control group. As a result of undergraduate studies conducted with digital learning tools, positive results have been obtained that students have positive attitudes, interest and motivation levels (Assaf, 2018; Bozna & Yüzer, 2020; Den Exter et al., 2012; Felix, 2002; Gu, Zhang & Gu, 2020; Hsu, Hwang & Chang, 2013; Liu et al., 2020; Uzunboylu et al., 2011; White & Sussex, 2008). This can be attributed to the fact that digital learning tools and artificial intelligence applications on a student-centered basis have the ability to attract students' attention, as well as being visual, auditory, textual and activity-based. In addition, the fact that the lessons are fun can be said to cause students to like the lesson and develop positive attitudes.

In this study, in which the effects of digital tools and artificial intelligence applications and traditional teaching method on learning retention were compared on the basis of project-based learning approach, it was determined that the method applied in the experimental group was more effective than the traditional method in terms of learning retention. These findings are similar to the results of studies in the literature (Achieng, 2023; Chiang, Yang & Hwang, 2014; Karimova et al., 2023; Yimwilai, 2020; Waemusa & Jongwattanapaiboon, 2023). Accordingly, digital tools and artificial intelligence applications on the basis of the project-based learning approach create a more effective and permanent learning environment for the student and it is observed that more positive and beneficial results emerge for the student in this method. Hence, it can be said that teaching Russian with digital tools and artificial intelligence applications based on the project-based learning approach in language teaching helps students and instructors in acquiring foreign language skills and increasing learning retention. Because the learning environment in which digital tools and artificial intelligence method are used on the basis of project-based learning approach offers a richer classroom environment and a variety of materials to the instructor. In addition, learning is more likely to be realized at the desired level as the application provides the student with a more flexible and motivating learning environment than the environment where the traditional method is used. Since students have different learning styles, providing diversity in the learning environment will increase the efficiency in perception and recall and will provide retention in learning.

When the results obtained are evaluated as a whole, the use of digital tools and artificial intelligence applications on the basis of project-based learning approach increased second year university students' achievement in foreign language, learning retention and motivation towards Russian course. Accordingly, digital tools and artificial intelligence applications based on project-based learning approach can be utilized in foreign language education to increase students' achievement and motivation towards the course. In order to achieve higher quality and efficiency in foreign language education, the effective use of digital tools and artificial intelligence applications should be expanded. The selection and effective use of digital tools and artificial intelligence applications suitable for the characteristics of the subjects to be taught, the level of education, the level of students and the level of difficulty of the information increases the efficiency in teaching and learning processes and contributes significantly to students' liking for the lesson, active participation in the lesson and increasing their success. Considering the challenging effects of today's information technologies, the design, development, implementation and evaluation phases of the process of using digital tools and artificial intelligence applications in foreign language lessons should be carefully planned. In this context, it is important to select the right instructional technologies and teaching methods and use them effectively in order to increase the quality and efficiency of foreign language teaching processes. Thus, the enrichment, diversification and effective use of digital tools and artificial intelligence applications in teaching and learning processes are important in achieving the goals of foreign language education.

In conclusion, using digital tools, artificial intelligence applications and project-based learning approaches in foreign language education contributes significantly to learners' achievement, motivation and learning capacity. However, as we have tried to explain in our study, despite all the understandable, realistic and original application possibilities offered by digital tools and artificial intelligence applications that address the universal dimension of language in context, most of the educators still do not have sufficient awareness of these tools and methods. Since

some of the tools we present in this study are not yet available in the Kazakhstan's education system, it is of great importance to continue the expansion of this field within the university and national education. Then, seminars should be organized for school and university instructors on these topics and more information should be provided about the use of digital tools, artificial intelligence, project-based learning and digital media. However, it should be kept in mind that there should be a balanced choice between traditional and innovative materials and methods that are appropriate to the objectives of foreign language education. We believe that the balanced and conscious use of digital media tools and artificial intelligence applications in foreign language education will not only increase the motivation of teachers and students, but also benefit the Kazakhstan's education system as a whole. Researchers who will work in this field can be recommended to examine the effects of the use of digital tools, artificial intelligence applications and project-based learning approach on different variables in foreign language education with longer studies.

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