www.ijemst.net

The Effect of ICT-Enhanced Blended Learning on Elementary School Students' Achievement in English and Attitudes towards English Lesson

Danagul Assylzhanova
Kazakh Ablai khan University of International Relations and World languages, Kazakhstan

Nurzhan Seisenbek
Science Innovations Group, Kazakhstan

Sakhipzhamal Uzakbaeva
Kazakh Ablai khan University of International Relations and World languages, Kazakhstan

Bizhomart Kapalbek
Institute for the Development of the State Language, Kazakhstan

To cite this article:

Assylzhanova, D., Seisenbek, N., Uzakbaeva, S., & Kapalbek, B. (2022). The effect of ICT-enhanced blended learning on elementary school students' achievement in English and attitudes towards English lesson. *International Journal of Education in Mathematics, Science, and Technology (IJEMST), 10*(3), 632-649. https://doi.org/10.46328/ijemst.2463

International Journal of Education in Mathematics, Science and Technology

2022, Vol. 10, No. 3, 632-649 https://doi.org/10.46328/ijemst.2463

The Effect of ICT-Enhanced Blended Learning on Elementary School Students' Achievement in English and Attitudes towards English Lesson

Danagul Assylzhanova, Nurzhan Seisenbek, Sakhipzhamal Uzakbaeva, Bizhomart Kapalbek

Article Info

Article History

Received:
27 August 2021
Accepted:
12 March 2022

Keywords

English
ICT
Blended learning
Elementary school
Experimental research

Abstract

The purpose of the present study was to comparatively examine the effects of ICT-enhanced blended curriculum and traditional teaching practices in elementary school English courses. The research was carried out in accordance with the pretest posttest experimental model with a control group. The study was carried out in a elementary school in Kazakhstan with the participation of 60 elementary school students (30 experiment and 30 control) attending 4th grade. In the research, a pretest was applied to the experimental and control groups before the experimental procedure. As a pretest, the English achievement and attitude scales towards the same course were applied to the subjects. In the study, computer aided blended instruction was used in the experimental group and traditional instruction was applied in the control group. Experimental applications lasted eight weeks. In the study, the same scales were applied to the experimental and control groups as a posttest. Two weeks after the posttest, the English achievement test was administered to both groups as a retention test. According to the research findings, the computer-aided blended teaching application applied in the experimental group enabled the students to achieve higher English achievement, positive attitude and learning permanence compared to the control group in which traditional teaching was applied.

Introduction

Since the 1990s, many countries have decided to start teaching English as a second language or foreign language from a young age as a foreign language policy in order to adjust to some of the effects of globalization. This idea is closely related to the fact that English is not only the common language of international communication (linguafranca) but also the language of science and technology (Küçüktepe et al, 2014; Kırkgöz, 2010). Classes in which English is taught as a foreign or second language differ in terms of student motivation, choice of activity, use of technology, use of mother tongue and classroom culture (Chehimi & Alameddine, 2022; Krieger, 2005). Thus, it is possible to say that English is taught as a foreign language in our country where English is not used for communication purposes in daily life and is taught as a lesson in schools.

The rapid development of information and communication technologies in the world in the last quarter-century and globalization affect all countries in many ways, especially, social and cultural life. We see the best example of this in the language we use (An et al, 2021; Golonka et al, 2014). In today's world, where technology and the internet are developing very rapidly, educational scientists and computer software companies are working on the effective use of Information Communication Technologies (ICT) in foreign language education. In the age of technology, the borders between countries disappear thanks to the opportunities provided by the internet, and communication becomes a requirement for those who live there. English language is preferred because it is the language of technology and is widely used in communication between countries. Many countries have included English in their curriculum including primary school. However, teaching English did not occur at the same pace as described in the curriculum, and there were some difficulties in teaching (Butler, 2009; Enever and Moon, 2009; Jabali & Walker, 2021; Liang, 2021).

Regarding foreign language learning, many studies have been carried out for the easiest and most effective way, and ways to make the best use of information technologies. Computers have been actively used in foreign language learning since the 1960s (Lee, 2000; Lee, Yeung & Ip, 2016). The advantages of computer-assisted language education are listed by Lee (2000) as providing motivation, increasing student success, providing different resources in language learning, high interaction opportunities, enabling individualization of teaching, and global learning. The main difficulties encountered in computer-assisted foreign language education are listed as financial inadequacies, difficulty in reaching the desired computer hardware and software, inadequacy of computer technical and theoretical knowledge, negative attitude towards technology, inflexibility of the curriculum, students' unpreparedness for computer-assisted language education and the negative effects of computer games (Baek, 2008).

In order to achieve success in foreign language education in our country, it is necessary to apply different methods and to support English education with information technologies. According to Tafazoli and Golshan (2014), the integration of new technologies into foreign language classes can contribute to the solution of problems in language education. Computers can create shapes, sounds, graphics, etc. It can contribute to individual learning by increasing the motivation of students with software supported by audio-visual elements (Abass et al, 2021; Gurgenidze, 2018; Paudel, 2021). Students can spend hours with computers outside of school, and the intrinsic motivation provided by computers is effective (Baek, 2008; Al-Ghasab, 2022). Computers become more preferable in education due to reasons such as equality of opportunity, interaction in practice, and a universal perspective without being dependent on a single source (Lee, 2000).

When the literature is examined, a meta-analysis study conducted by Kulik and Kulik (1991) on the effectiveness of CBI (Computer Based Instruction) revealed comprehensive results regarding the effects of CBI at school. In this study, studies from kindergarten to university level were included in the analysis. In the lessons taught using this method, it was found that the students' scores increased by thirty percent, and this result affected success in a moderate, significant and positive way. In addition, Morrison et al. (1995) found that task-oriented incentives provided to students were more effective, especially in the use of CBI, and that the feedback information provided to users should be processed mentally, not superficially. Roblyer, Castine and King (1998)

stated in their book “Assessing the Impact of Computer-Based Instruction” that the ways in which CBI applications are used most effectively in certain levels, student groups and courses should be examined. The computer is a material that not only stays connected to the classroom environment but also supports communication skills by going beyond the walls, develops high-level thinking skills, and allows students to solve complex problems (Alan & Sünbül, 2010; Gürol & Yıldız, 2015; Shelly, Gunter & Gunter, 2010; Kaleli, 2021; Kibici, 2022a). It is seen that what is learned with the use of computers in primary schools is more permanent, lessons become more enjoyable, concretization is made and the world of imagination develops (Chang, 2012; Demirer, Cintaş & Sünbül 2010; Erbas, Çipuri & Joni, 2021; Kibici & Sarıkaya, 2021).

Studies conducted to determine the effectiveness of computer-assisted English teaching have revealed that computer-assisted English teaching is more effective than traditional methods and that students learn better and faster with computers (Avent, 1994; Chhabrab & Dhamija, 2013; Dunkel, 1990; Fox, 1992; Hu, Zeng & Wu, 2020; Swan, 1992; Thekes, 2021; Zhou et al, 2021). In a study conducted by Erbas, Çipuri & Joni (2021) on students of a primary school studying in a foreign language, the effect of computer-assisted learning method and traditional method in English learning was compared. It was found that computer-assisted learning environment is more effective than the traditional method in learning English.

It is claimed that learning and teaching take place effectively if computer-assisted instruction is implemented in an integrated manner with blended learning environments that allow face-to-face interaction. Blended education, which is seen as the last point reached in the use of technology in education, has been defined in many ways. Blended education can be defined as an educational delivery model in which online education is combined with traditional education method (Alammary, 2019; Baş, Kubiatko & Sünbül, 2016; Colis & Moonen, 2001; Rasmussen, 2003). The blended learning approach, which also includes web-supported learning, has been the subject of research and examination in recent years. Blended learning is defined as "a teaching program that is tailored to a specific group at a 'moderate' level and is prepared in the most appropriate way, by integrating different learning approaches, namely technologies, activities and activity types". The term “blending” comes from a new approach to face-to-face education with the addition of other electronic resources. Blended learning programs are used with different forms of e-learning (Bersin, 2004; Thompson & McDowell, 2019). According to Kerres and Witt (2003), blended learning is “combining face-to-face learning with technology-assisted learning”. In other words, blended learning or hybrid teaching is “combining the best features of classroom teaching with the best features of online learning, thereby encouraging active independent learning and shortening classroom time” (Garnham & Kaleta, 2002; Vo, Zhu & Diep, 2020). This type of learning takes the beneficial aspects of online learning together with both student-student and student-teacher interaction in learning and some lessons or subjects are given simultaneously while others are given at different times (Driscoll, 1999; Osguthorpe & Graham, 2003; Kaleli, 2020; Kibici, 2022b).

ICT-enhanced blended learning offers a versatile learning method by combining in-class face-to-face teaching with the use of ICT in English teaching. The computer-assisted English teaching in blended teaching consists of various multimedia-supported educational software. Students have the opportunity to use educational software on their own, via computers or tablets, whenever and wherever they want. Face-to-face education, which is the

other pillar of blended teaching, is provided by the implementation of activities based on conversation and communication between the teacher and their students in the classroom, thanks to the in-class activities module offered in the software, which the teacher can access through Registration Manager. Thus, the student learns the structure, rules, vocabulary of the foreign language and finds the opportunity to do various activities with the computer-aided educational software in the blended teaching environment. In addition, thanks to classroom activities, they get the opportunity to use and personalize information in a social environment by communicating with their peers with the guidance of the teacher (Hung, 2015; Knowles, 2004; Thaichay & Sitthitikul, 2016).
In studies on ICT-enhanced blended learning in the literature, it is seen that this cooperative application increases students' English performance and motivation (Alsowat, 2016; Brown, Campbell & Weatherford, 2008; Gobel, 2008; Huang & Wu, 2013; Kagaoan et al. al 2012; Kim, Cho & Lee, 2014; Tresnawati, 2011). The research shows that such positive results in applications abroad are not only due to the use of the software as a CALL tool, but also to the use of the software together with the blended learning system that the software offers (Brown et al., 2008; Ellsworth, 2015; Kagaoan et al., 2012).

Desired goals in foreign language teaching have not been achieved over the years. Among the reasons for this are the lack of traditional methods, methods applied in foreign language teaching or the inability to choose the appropriate teaching technique, the lack of appropriate materials, activities or measurement and evaluation tools, and the methodological errors that occur as a result of these factors. Information technologies and multimedia activities have been used in foreign language teaching in order to eliminate the problems arising from the use of the traditional method. Therefore, it is expected that the study will help the effective and efficient use of computer-assisted blended learning in the literature and in our country.

Although computer-mediated technologies or online technologies, increasing the interaction of students with their peers and teachers, have been developed to replace face-to-face interaction, it is still a question whether they can actually replace face-to-face interaction in the traditional classroom. Most of the research on the interaction in computer-assisted teaching focused on the comparison between online environments and face-to-face traditional environments, not blended learning environments that allow face-to-face interaction. Therefore, the extent to which blended learning strategies contribute to foreign language achievement and attitudes in computer-assisted teaching practices remains a question that needs to be answered. For this purpose, the effect of ICT-enhanced blended learning in primary school 4th grade English lessons on students' achievement, attitude and students' permanence was investigated in this study.

Method

In the research, the effect of ICT-enhanced blended learning-based English teaching program and traditional teaching practices was examined with pretest-posttest control group experimental design. In order to test the effect of the program, "pretest-posttest quasi-experimental design with paired control group" (Fraenkel, Wallen, & Hyun, 2012) was used. The experimental design applied in the study is summarized in Table 1. Quasi-experimental models are widely used when the controls required experimental models are not provided or these controls are not sufficient and experimental models cannot be applied. Experimental models have three basic

rules; (1) Control group, (2) Pretest-posttest, and (3) random assignment. According to Frankel, Wallen, and Hyun (2012), in quasi-experimental models, subjects are not randomly assigned to the experimental and control groups. In this study, random assignment could not be made in the schools where the practice was conducted, since the groups consisted of equal classes, and therefore the quasi-experimental model was used.

Table 1. Experimental Design

Groups	Pretest	Experimental Process	Posttest	No practice	Retention
G1	T1	ICT-enhanced blended English learning	T2	2 weeks	T3
C	T1	Traditional Teaching	T2		T3

In the research, G1 represents the experimental group in which ICT-enhanced blended English teaching program was applied, and C represents the control group in which traditional English language teaching was applied.

T1 → Pretest (English Achievement Test; Scale of Attitude towards English Lesson)

T2 → Pretest (English Achievement Test; Scale of Attitude towards English Lesson)

T3 → Retention Test (English Achievement Test)

A pretest was applied to both groups before the experimental procedure. As a pretest and posttest, English achievement tests and scale of attitude towards English lesson were administered to the participants in both groups. Two weeks after the posttest, the English achievement test was administered to both groups as a retention test.

Participants

Experimental and control groups were determined according to the convenience sampling method and the principles of the experimental research design, due to the fact that the experimental research would be carried out by the researcher, the application would last 2 hours a week and for 8 weeks, time, ease of transportation and being economical. The research was carried out in a primary school in Kazakhstan. Two equivalent classes were selected as the experimental and control groups. In determining the experimental and control groups, attention was paid to the equivalence of children's English success in previous classes, gender and age. In this context, the experimental and control groups consisted of 60 4th grade students in total, in two equivalent groups. In addition, the infrastructure, classes, foreign language teaching staff and school environment of the school where the research applications were carried out were suitable for the research, the educational status of the families, their socio-economic and cultural conditions were equal, the teachers and administrators in the school supported the research and the researcher was effective in determining the experimental and control groups.

Experimental Procedure

Activities and applications were carried out for 8 weeks for the experimental and control groups. ICT-enhanced blended learning approach was used in the experimental group and traditional teaching approach was used in the control group. Before the experimental sessions started, the English achievement and attitude scales were applied simultaneously to the experimental and control groups. Experimental sessions were carried out within

the scope of the 4th grade English lesson “Kazakhstan in the World of Sport” and “Values in Myths and Legends” units.

The students in the experimental group were informed about the ICT-enhanced blended learning approach before the application started. Multi-media software designed on the basis of ICT-enhanced blended learning was applied to the 4th grade students in the experimental group, bringing their English level from beginner to pre-intermediate level. ICT-enhanced blended learning software teaches basic vocabulary and grammar, as well as the basic communication language skills used in school and classroom environment. In the ICT-enhanced blended English course software, also a skill test measures the success associated with the units. The ICT-enhanced blended learning software applied in the experimental group, with its multimedia features such as sound, picture, animation, and including a midterm exam, ensures the active participation of the student by asking questions at regular intervals in the lesson. There are five different skills in the content of each unit of the software:

- Listening: This is the section where the basic language concepts of the units are given and practical opportunities are presented.
- Speaking (Dialogues): This section includes the conversations that the student may encounter in the school environment in relation to the units. Animated characters of the software animate the conversations.
- Vocabulary: It is the part in which the necessary words are taught. There are short quizzes at the end of the chapter.
- Grammar: In 2 units, the target basic grammar topics are presented. In this section, within the scope of ICT-enhanced blended learning software, adverbs of time, frequency and manner, time clause, present simple, interrogative pronouns, imperative, possessive adjectives, comparatives, infinitive, -ing forms, exclamatory sentences, past simple, adjectives, plurals, possessive case were taught in an 8-week period. At the end of the chapter, a midterm exam was applied as an evaluation application with ICT-enhanced blended learning software.
- Reading: This section includes basic reading texts which incorporates vocabulary and grammar with an aim of equipping students with basic reading skills. All students in the experimental group actively used ICT-enhanced blended learning software. They repeated the exercises as many times as necessary and used the dictionary (English and Kazakh) in the program.

In the experimental application, unknown words and sentences were tried to be guessed with the help of pictures and animations used in the program. The students recorded their sentences and answers for the exercises (sentence, word, letter, etc.) using the voice-recording feature of the software and compared their answers with the model answers in the program. Throughout this process, the English teacher provided active guidance. It was monitored when students entered and exited the program, how far they progressed, how long they stayed in the system, and how long they spent on a particular subject. The design in ICT-enhanced blended learning software allows students to progress at their own pace and freely skip to the subject they want to repeat. During the eight-week application, the students in the ICT-enhanced blended learning approach were given information

about the topics of that week, video presentation with audio and video, the application and summaries from within the software.

In the control group, the applications were carried out in the same units within the same period of time. The students in the control group carried out routine lesson activities in accordance with the curriculum of the 4th grade English lesson. Traditional face-to-face learning approach (distribution of printed notes, reading textbook, exercises, lecture, question-answer, explanations, discussion, repetition) practices were performed in the control group. After the applications in the experimental and control groups, an English achievement test and a scale of attitude test were used as a posttest. After the application of the posttest, no activity or teaching was provided to all groups for 2 weeks. Two weeks later, an English achievement test was administered again to all groups in order to measure the retention of what was learned. All measurement tools were administered to the experimental and control groups simultaneously.

Data Collection Tools

4th Grade English Lesson Achievement Test

In order to develop the achievement test, the target outputs of the English 4th grade curriculum were first analyzed. The aim of the achievement test is to determine the level of achievements of the 4th grade students in the "Kazakhstan in the World of Sport" and "Values in Myths and Legends" units in the English program. Before the achievement test was designed, a table of specifications was prepared on a unit basis. It was decided that the trial form should be composed of at least 2 items for each target output, taking into account the developmental characteristics of the students, their levels and the duration of the achievement test, together with the suggestions of the experts and English teachers. Accordingly, the draft form was prepared as 25 items. The achievement test consists of items measuring grammar, speaking vocabulary, reading, listening and sub-skills. In addition, one open-ended question was prepared for the writing and speaking tasks.

Expert opinion was obtained to address the validity of the achievement test. Opinions were received from three experts, one in the field of measurement and evaluation and two in the field of English language teaching. Corrections were made in the measurement tool in line with the opinions of the experts. In order to determine the reliability of the achievement test, it was administered to 4th grade students in a trial group and the results were analyzed. In the study, the scores obtained from the multiple-choice questions were transferred to the item analysis package program in order to obtain proof of validity in the trial application, and the item difficulty and distinctiveness of the questions were calculated. For the reliability of the achievement test, the answers given to the questions in the trial application were scored as "1 point for each correct and 0 points for each mistake", and its reliability was determined by the Kuder Richardson 20 (KR-20) reliability calculation method. The reliability KR-20 coefficient of the final test was found as 0.91. It could be argued that this value was at an acceptable level for an achievement test. It is seen that the item discrimination index values of the items in the test varied between 0.33 and 0.58. Item difficulty value varied between 0.25 and 0.78. Accordingly, it can be stated that there were easy and difficult items in the test. The average difficulty of the test was found as 0.52. As a result, the achievement test was valid and reliable enough to be used within the scope of the research.

Scale of Attitude towards English Lesson

Data related to attitude towards English lesson were obtained by the "Scale of Attitude towards English Lesson" developed by Orakcı (2017). The scale of attitude towards English lesson consisted of 16 items, 10 of which were affective and 6 of which were behavioral. These items included answers such as “always”, “often”, “sometimes”, “rarely” and “never”. While scoring the scale items, considering the positive or negative attitude expressions, positive attitude statements were scored as 5-4-3-2-1 and negative statements were scored as 1-2-3-4-5. The construct validity of the Attitudes towards English Lesson Scale was determined using principal component analysis. In explanatory factor analysis, the "Varimax" axis rotation method was performed on the data set in order to determine whether there are sub-dimensions in the scale and if there were sub-dimensions, which items were gathered under which sub-dimensions (Viera, 2011). After a "Varimax" axis rotation was performed, it was determined that the scale consisted of two factors (subscale). This study indicated good fit between the model and data, using CFA. The reliability of the scale was determined by the Cronbach Alpha method. As a result of the analysis, the Cronbach Alpha reliability of the scale was .88 in the affective subscale, .90 in the behavioral subscale and 0.89 in the whole scale. Thus, we could argue that the scale of attitude towards English lesson had high validity and reliability.

Data Analysis

The results of the normality test performed on the English course achievement test and attitude scale scores applied in this study show that the data followed a normal distribution. In this context, the sample t-test technique, independent of parametric statistical techniques, was used to compare the pretest, posttest and retention test scores of the experimental and control groups (Yurt & Sünbül, 2012). In the study, analyzes were carried out using SPSS 25.0.

Findings

In Table 2 shows the distribution of the scores of the achievement test in the experimental and control groups applied as a pre-test. There was no significant difference in the pretest achievement scores according to the t-value calculated between the mean scores of the groups. The low standard deviations and close mean scores showed that the groups were homogeneous and balanced. The pre-experimental English knowledge and attitude levels of the students participating in the research were very close to each other.

Table 2. Descriptive Independent Samples t-test Results between Pretest English Achievement Scores in Experimental and Control Groups

Pretest	Groups	N	Mean	Std. Deviation	t	p
Pretest English Achievement	Experimental	30	9.27	1.82	-0.38	0.702
	Control group	30	9.43	1.52		

Table 3 shows the results of the analysis performed on the attitude towards the English lesson of the students in

the experimental group, who received ICT-enhanced blended learning activities, and the control group before the research. The analyses regarding the t-values calculated in the affective, behavioral and total scores of the attitude scale of the two groups showed that there was no significant difference between the groups in the pretest. At the beginning of the research, it was seen that the attitudes towards the English lesson in both groups showed an equal and moderate distribution.

Table 3. Pretest English Attitude Scores of Students in Experimental and Control Groups

Pretest Attitude	Groups	N	Mean	Std. Deviation	t	p
Affective Dimension	Experimental	30	3.19	0.82	0.37	0.714
	Control group	30	3.27	0.69		
Behavioral Dimension	Experimental	30	3.07	0.24	0.17	0.863
	Control group	30	3.08	0.12		
General Attitude	Experimental	30	3.10	0.44	0.70	0.487
	Control group	30	3.17	0.36		

When Table 4 is examined, it is seen that there was a statistically significant difference between the posttest English achievement mean scores of the students in the experimental and control groups ($p<0.05$). Students in the experimental group obtained higher mean scores in the posttest English achievement level. This result showed that the computer-assisted blended teaching application applied in the experimental group enabled the students to achieve higher English achievement levels than the traditional teaching.

Table 4. Comparison of Posttest English Achievement Scores of Students in Experimental and Control Groups

Posttest	Groups	N	Mean	Std. Deviation	t	p
English Achievement	Experimental	30	17.37	0.93	8.53	0.000
	Control group	30	13.27	2.46		

Table 5 shows the results of the analysis performed on the attitude scores of the students in the experimental group, who received ICT-enhanced blended learning activities, and the control group.

Table 5. Comparison of the Posttest Scores of the Students in the Experimental and Control Groups Regarding the Attitudes towards English Lesson

Posttest Attitude	Groups	N	Mean	Std. Deviation	t	p
Affective Dimension	Experimental	30	4.12	0.41	5.38	0.000
	Control group	30	3.40	0.61		
Behavioral Dimension	Experimental	30	4.01	0.23	8.18	0.000
	Control group	30	3.32	0.40		
General Attitude	Experimental	30	4.07	0.27	7.85	0.000
	Control group	30	3.36	0.41		

According to the analysis, the t-values calculated in the affective, behavioral and total scores of the attitude scale

of the two groups show that there was a significant difference between the posttest scores of the groups ($p<0.05$). The ICT-enhanced blended learning program applied in the experimental group led to a significant difference in students' attitudes towards English lesson. The English attitude scores of both groups are shown in Figure 1.

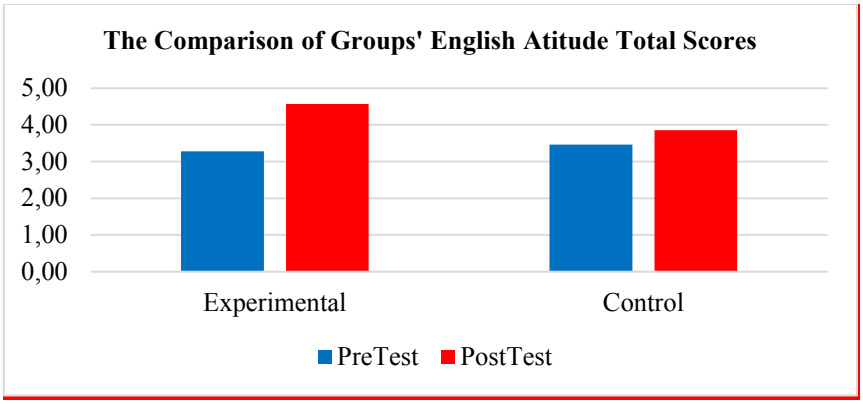

Figure 1. Groups' English Attitude Total Scores

The Table 6 displays that there was a statistically significant difference between the mean scores of the English achievement retention test ($p<0.05$). The students in the experimental group obtained higher scores in terms of retention in English. This result showed that the ICT-enhanced blended teaching application in the experimental group had a positive effect on the retention in English rather than traditional teaching. The results of the pretest, posttest and retention test scores in English achievement are shown in Table 6 and Figure 2.

Table 6. Comparison of the English Achievement Retention Test Scores of the Students in the Experimental and Control Groups

	Groups	N	Mean	Std. Deviation	t	p
Retention	Experimental	30	14.67	1.65	5.82	0.000
	Control group	30	11.80	2.14		

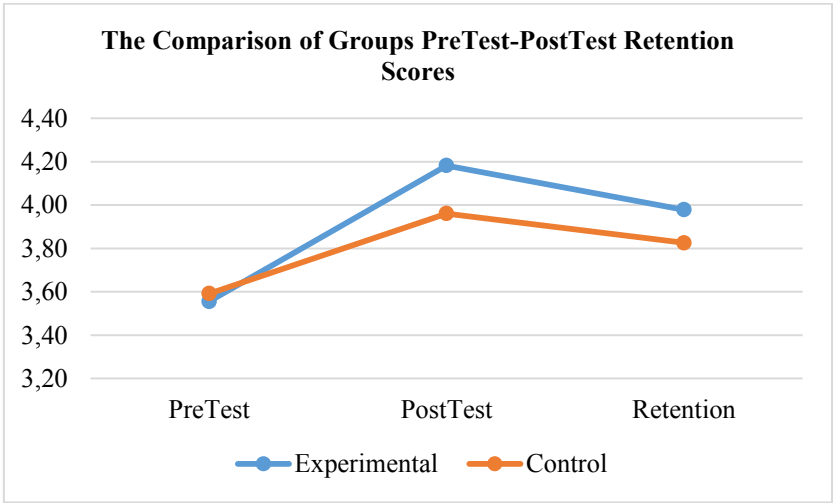

Figure 2. Groups' English Retention Total Scores

Discussion

The effect of ICT-enhanced blended learning applications on the achievement, attitude and retention of English among primary school 4th grade students was tested with an experimental model with a control group. Research findings showed that CIT-enhanced blended teaching application in the experimental group enabled the students to achieve higher levels of English than the students in the control group who received traditional teaching. The CIT-enhanced blended instruction applied in this study showed positive and significant effects on students' English language acquisition. These findings corroborate the findings of Avent (1994), Brown, Campbell & Weatherford (2008), Chhabrab & Dhamija 82013), Dunkel (1990), Fox (1992), Gobel (2008), Hu, Zeng & Wu (2020), Huang & Wu (2013), Joellen et al (2007), Kagaoan et al (2012), Kim, Cho & Lee (2014), Seage & Türegun (2020), Swan (1992), and Tresnawati (2011).

Contrary to traditional strategies and simple repetitions, students who interacted intensively with ICT-enhanced blended learning applications actively gained the target concepts and rules in English, caught the relationships between concepts and examples of topics through visual, auditory, etc. versatile sample applications for the outcomes. As Nolen (1990) stated, performance is higher when the lesson is taught with rich content. Sample events emphasizing the relationships between the subjects and the interpretations made in this rich environment provided students with a high level of learning. According to Hakuta (2009), one of the indicators of success in learning a foreign language is the increasing trend of development and change in language skills. The findings obtained in this study supported the findings of Hakuta's study. According to the findings obtained in this study, there was a significant improvement in the language levels of the students in the group who received ICT-enhanced blended teaching.

The learning content within the scope of the ICT-enhanced blended learning program is not limited to simple concepts, facts and repetition activities. Students receive a large amount and variety of related stimuli such as instruction, sound, picture, video, etc. For this reason, the use of strategies that include very rich stimuli and the use of daily language have influenced the achievement levels of students. In the implementation of the English teaching program based on the ICT-enhanced blended learning, individual differences of the students were taken into account and the examples and activities from their immediate environment were emphasized. During the experimental process, within the scope of the ICT-enhanced blended learning program, interactions were included in a way to keep students' thoughts and learning enthusiasm alive and to enable them to express their experiences. In order to enrich students' foreign language experiences, the following student-centered materials and activities were used extensively, including, visual and auditory materials such as activities, songs, virtual picture cards, photographs, short quatrains with audio rhymes, virtual games, virtual stories, English videos including daily life experiences, puppets, music, dance and cartoons.

Another variable examined in the study was the effects of computer-assisted blended instruction on primary school 4th grade students' attitudes towards English lesson. The findings showed that the students in the experimental group who received ICT-enhanced blended instruction had significantly higher and positive attitudes towards English lesson compared to the students who received traditional instruction. The ICT-

enhanced blended instruction applied in this study had positive effects on the students' affective attitudes towards English lesson. These findings are in line with research findings by Ayres (2002), Carballo-Calero (2004), Chang (2012), Erbas, Çipuri & Joni (2021), Ghaleb (2006), Saarni (2001) and Uslu (2020). Carballo-Calero (2004) found in his research that using computers in foreign language learning is a motivation-enhancing activity in many ways. Computer-assisted blended teaching practice was associated with emotional and affective features by Saarni (2001). The researcher stated that in the early stages, individuals paid more attention and developed a positive attitude towards them. It is thought that an important reason why the attitudes towards English lesson in the experimental group were higher than in the control group was the use of ICT-enhanced blended learning, which attracts the attention of the students and enables them to progress at their own learning pace. From this point of view, the most important function provided by the ICT-enhanced blended learning program was to bring together many cognitive, psychomotor, socio-emotional and affective processing steps during the planning and implementation of the program. As Merrill et al (1986) stated, any computer application would have a multifaceted effect on student attitudes. As the program was tailored to individual needs, the student experienced a sense of achievement and had a positive emotional response. Students were motivated to continue interacting with the program as the application included appropriate games, puzzles and fun activities. Therefore, the ICT-enhanced blended learning-based English instruction offered many options to the students, and the learning stimuli that were fun and suitable for their interests ensured their high participation in the activities and affected their attitudes positively.

The last finding was the effect of ICT-supported blended English teaching on students' retention in English. The study found that the students in the experimental group, in which ICT-enhanced blended instruction was administered, achieved significantly higher retention scores in English than their peers in the control group, where traditional instruction was administered. These results showed that teaching activities based on ICT-enhanced blended learning in primary school 4th grade English lessons were more effective in ensuring the retention of what was learned. This finding is supported by previous research examining the effect of ICT-enhanced blended learning on retention in a foreign language (Buehl, 1996; De Bot, Lowie & Verspoor, 2006; Gordani, 2013). It is thought that students who progress at their own learning pace had the opportunity to practice more than and as much as they need, receiving continuous feedback.

The retention test largely measures how much a learner can retain presented material or information. According to cognition theorists, information and stimuli obtained from the external environment are easier to bring back as long as they are turned into experience and interpreted. According to De Bot, Lowie, and Verspoor (2006), if students only heard words and sentences without understanding their intentions or meanings, of course, there would be no learning beyond saying words and phrases. In the ICT-enhanced blended learning program, the students associated the subjects with their own very rich experiences and tried to reinforce the subject with active learning activities. According to Brown (2007), rich learning contents and important subjects are better remembered. According to Buehl (1996), instead of using a strategy alone, using strategies together effectively according to its purpose has a high effect on retention and recall of the presented information. In this study, the combined use of ICT and blended learning in English teaching enabled the student to learn permanently. Contrary to the arguments presented above, Fergus et al. (1993) found repetitions made in short-term memory to

increase the retention of knowledge was not effective in terms of retention in long-term memory, in their research in which they used the traditional foreign language teaching strategy as an independent variable. The low retention level of the students in the control group supported the above-mentioned research results. The fact that the students in the control group were passive in the activities in the lessons and did not make versatile operations during the lessons, led to a low level of retention after a period of time. In this study, rich activities related to concrete and stimuli appealing to different senses were included within the scope of ICT-enhanced blended learning in the experimental group. In addition, the words taught and the activities performed were repeated on the basis of the program in order to make the foreign language learning permanent, and it was ensured that they consolidate what they learned.

Based on the results of this research, ICT-enhanced blended learning programs and effective teaching materials can be designed to facilitate foreign language learning in primary schools. In order for primary school students to contribute to their foreign language learning, in-service training courses and seminars on ICT-enhanced blended learning can be provided for teachers. Course software can be prepared in accordance with the basic principles of the ICT-enhanced blended learning-based foreign language-teaching program. Students in primary school are in a period where they can learn more easily, develop awareness, and have better results in foreign language acquisition regarding their developmental characteristics. The implementation of ICT-enhanced blended learning during this advantageous period will facilitate the learning of the language at higher levels. Researchers can conduct longitudinal studies based on long-term monitoring of the effects of ICT-enhanced blended learning on foreign language skills in primary school. In addition, experimental studies can be conducted on the effects of ICT-enhanced blended learning programs on various foreign language levels and groups. On the basis of ICT-enhanced blended learning, qualitative research can be conducted based on teacher opinions regarding the implementation of foreign language teaching in schools.

References

Abass, O. A., Arowolo, O. A., & Igwe, E. N. (2021). Towards Enhancing Service Delivery in Higher Education Institutions via Knowledge Management Technologies and Blended E-Learning. *International Journal on Studies in Education (IJonSE)*, 3(1), 10-21.

Alammary A. (2019). Blended learning models for introductory programming courses: A systematic review. *PloS one*, 14(9), e0221765. https://doi.org/10.1371/journal.pone.0221765

Alan, S., Sünbül, A.M. (2010). High school students' relationship between computer and internet use and reading habits in Konya. *The 4th International Computer & Instructional Technologies Symposium*, September 24th - 26th, Selçuk University in Konya, Turkey.

Al-Ghasab, G. B. (2022). Reality of Using Modern Teaching Methods in Teaching English Language among Teachers. *International Journal of Education in Mathematics, Science, and Technology (IJEMST)*, 10(2), 512-527. https://doi.org/10.46328/ijemst.2411

Alsowat. H. (2016). An Efl flipped classroom teaching model: effects on English language higher-order thinking skills, student engagement and satisfaction. *Journal of Education and Practice*, 7 (9), 108-121. (15.06.2018) https://files.eric.ed.gov/fulltext/EJ1095734.pdf

An, Z., Wang, C., Li, S., Gan, Z., & Li, H. (2021). Technology-Assisted Self-Regulated English Language Learning: Associations With English Language Self-Efficacy, English Enjoyment, and Learning Outcomes. *Frontiers in Psychology*, 11, 558466. https://doi.org/10.3389/fpsyg.2020.558466

Avent, J.H. (1994). A Study of Language Learning Achievement Differences Between Students Using The Traditional Language Laboratory and Students Using Computer-Assisted Language Learning Courseware. USA: University of Georgia.

Ayres, R. (2002). Learner Attitudes towards the Use of Call. *Computer Assisted Language Learning*. 15: 241-249.

Baek, Y. K. (2008). What hinders teachers in using computer and video games in the classroom? Exploring factors inhibiting the uptake of computer and video games. *Cyber Psychology & Behavior*, 11(6), 665-67

Baş, G., Kubiatko, M., Sünbül, A.M. (2016). Teachers' perceptions towards ICTs in teaching-learning process: Scale validity and reliability study. *Computers in Human Behavior*, 61, 176-185.

Bersin, J. (2004). The Blended Learning Book. Best Practices, Proven Methodologies and Lessons Learned. San Francisco: Pfeiffer.

Brown, H. D. (2007). Teaching by principles, an interactive approach to language pedagogy (3rd edition). Pearson Education, Inc. USA

Brown, I., Campbell, A., & Weatherford, Y. (2008). Using DynEd and ALC with low-level university freshmen. *JALT CALL Journal*, 4(3), 37-53.

Buehl, D. (1996). Improving students' learning strategies through self-reflection. *Teaching and Change*, 3(3), 227-243.

Butler, G. Y. (2009). Teaching English to young learners: The influence of global and local factor. J. Enever, J. Moon & U. Raman (Eds.), *Young Learner English Language Policy and Implementation: International Perspectives* (s. 23-29). Reading: Garnet Education.

Carballo-Calero, V. (2004). Does Familirization with CALL improve Students' Attitudes towards CALL? *Porta Linguarum*, 4, 69-75.

Chang, I. H. (2012). The effect of principals' technological leadership on teachers' technological literacy and teaching effectiveness in Taiwanese elementary schools. *Educational Technology & Society*, 15(2), 328–340.

Chehimi, G. & Alameddine, M. M. (2022). The Making of a 21st Century English Language Teacher during the Pandemic. *International Journal on Social and Education Sciences (IJonSES)*, 4(1), 101-120. https://doi.org/10.46328/ijonses.297

Chhabra, S. & Dhamija, N.. (2013). Comparatıve study of computer assisted instruction technique (CAI) and conventıonal teachıng (CT) on the achievement of pupil teachers in methods of teaching Englısh language. *Journal of Educational Studies Trends and Practices*, 3(1), 107–118. https://doi.org/10.52634/mier/2013/v3/i1/1559

Colis, B., Moonen, J. (2001). Flexible learning in a digital world: Experiences and expectations. London: Kogan Page

De Bot, K., Lowie, W., Verspoor, M. (2005). Second language acquisition. New York: Routledge, USA.

Demirer, V., Cintaş, D. & Sünbül, A.M. (2010). Primary school students' relationship between computer and internet use and reading habits in Konya. *The 4th International Computer & Instructional Technologies Symposium*, September 24th – 26th, Selçuk University in Konya, Turkey.

Driscoll, M. (1999). Web-Based Training in the Workplace. *Adult Learning/Technology*. 21-25.

Dunkel, P. (1990) Implications of the CAI Effectiveness Research for Limited English Proficient Learners. *Computers in the Schools*, 7:1-2, 31-52, DOI: 10.1300/J025v07n01_02

Enever, J. ve Moon, J. (2009). New global contexts for teaching Primary ELT: Change and challenge. J. Enever, J. Moon & U. Raman (Eds.), *Young Learner English Language Policy and Implementation: International Perspectives* (s. 5-21). Reading: Garnet Education

Erbas, İ., Çipuri, R., & Joni, A. (2021). The impact of technology on teaching and teaching English to elementary school students. *Linguistics and Culture Review*, 5(S3), 1316-1336. https://doi.org/10.21744/lingcure.v5nS3.1815

Fergus, Eudora E., Richardson, Arthur G. (1993). Learning styles and ability grouping in the high school system: some Caribean findings. *Educational Research*, 35, 1, 69-76.

Fox, J. (1992). Learning Languages With Computers: A History of Computer Assisted Language Learning From 1960 to 1990 In Relation To Education, Linguistics and Applied Linguistics. University of Anglia

Fraenkel, J. R., Wallen, N. E., Hyun, H. H. (2012). How to design and evaluate research in education (8th edition). New York: McGraw-Hill.

Garnham, C. ve Kaleta R. (2002). Introduction to hybrid courses. Teaching with Technology Today. University of Wisconsin-Milwaukee. http://www.uwsa.edu/ttt/articles/garnham.htm

Ghaleb, A. (2006). The effect of Computer Assisted Language Learning (CALL) on United Arab Emirates English as a Foreign Language (EFL) School Students' Achievement and Attitude. *Journal of Interactive Learning Research*, 17 (2), 121-142

Gobel, P. (2008). Student off-task behavior and motivation in the CALL classroom. *International Journal of Pedagogies and Learning*, 4(4), 4-18.

Golonka E. M., Bowles A. R., Frank V. M., Richardson D. L., Freynik S. (2014). Technologies for foreign language learning: a review of technology types and their effectiveness. *Comput. Assist. Lang. Learn.* 27 70–105. 10.1080/09588221.2012.700315

Gordani, Y. (2013). The Effect of the Integration of Corpora in Reading Comprehension Classrooms on English as a Foreign Language Learners' Vocabulary Development. *Computer Assisted Language Learning*, 26(5), 430-445.

Gurgenidze, M. (2018). Technology Assisted English Language Learning and its Possible Benefits in Georgia. *International Journal of Technology in Education and Science (IJTES)*, 2(1), 31-34.

Gürol, A. & Yıldız, E. (2015). The Effects of Computer Based Education on Initial Literacy Skills of First Grade Students. *International Journal of Field Education*, 1 (1), 1-18.

Hakuta, K. (2009). Guidelines for the assessment of English language learners. ETS, Listening, Learning, Leading- www.ets.org

Hu L., Zeng Q., Wu X. (2020). Simulation of English classroom effectiveness based on human–computer interaction and facial identification. *J. Intell. Fuzzy Syst*. 40, 1–12. doi: 10.3233/JIFS-189533

Huang, J., & Wu, B. (2013). A research on the effectiveness of DynEd computer-assisted English language learning–taking Ningbo Polytechnic as an example. *Pacific Rim Objective Measurement Symposium (PROMS) 2012 Conference Proceeding*, 155-177.

Hung, H. T. (2015). Flipping the classroom for English language learners to foster active learning. *Computer Assisted Language Learning*, 28 (1), 81-96. doi: 10.1080/09588221.2014.967701.

Jabali, M. & Walker, C. (2021). An Exploratory Cross-Sectional Study: FlipQuiz as a Digital Tool for Learning English Vocabulary in Language Classroom. *International Journal of Technology in Education (IJTE)*, 4(3), 516-526. https://doi.org/10.46328/ijte.149

Joellen E. Coryell & Dominique T. Chlup (2007) Implementing E-Learning components with adult English language learners: Vital factors and lessons learned. *Computer Assisted Language Learning*, 20(3), 263-278, DOI: 10.1080/09588220701489333

Kagaoan, A., Muya, G., Tibayan, C., & Tenorio, N. (2012). The effect of dynamic education intervention program in the fundamentals of English course. *Lyceum of the Philippines– Laguna Research Journal*, 2(1).1-9

Kaleli, Y. S. (2020). The Effect of Computer-Assisted Instruction on Piano Education: An Experimental Study with Pre-service Music Teachers. *International Journal of Technology in Education and Science (IJTES)*, 4(3), 235-246.

Kaleli, Y. S. (2021). The Effect of Individualized Online Instruction on TPACK Skills and Achievement in Piano Lessons. *International Journal of Technology in Education (IJTE)*, 4(3), 399-412. https://doi.org/10.46328/ijte.143

Kibici, V. B. (2022a). An Investigation into Music Teachers' Perceptions of Technological Competencies. *International Journal of Technology in Education and Science (IJTES)*, 6(1), 111-123. https://doi.org/10.46328/ijtes.344

Kibici, V. B. (2022b). Effects of Online Constructivist 5E Instructional Model on Secondary School Music Lessons. *International Journal of Technology in Education (IJTE),* 5(1), 117-131. https://doi.org/10.46328/ijte.241

Kibici, V. B. & Sarıkaya, M. (2021). Readiness Levels of Music Teachers for Online Learning during the COVID 19 Pandemic. International *Journal of Technology in Education (IJTE)*, 4(3), 501-515. https://doi.org/10.46328/ijte.192

Kerres, M. & Witt, C. (2003). A Didactical Framework for the Design of Blended Learning Arrangements. *Journal of Educatinol Me*dia, 28, (2-3), 1-13.

Kırkgöz, Y. (2010). Teaching English at primary education: From policy planning to practice. InB. Haznedar & H. H. Uysal (Eds.), *Hand book for teaching foreign languages to younglearners in primary schools* (s. 23-41). Ankara: Anı Yayıncılık.

Kim, J., Cho, Y., & Lee, Y. (2014). Exploring the effects of multimedia-based self-directed English speaking practice. *Multimedia-Assisted Language L*earning, 17(4), 61-87

Knowles, L. (2004). The Evolution of CALL. Journal of Communication & Education, 1-8, http://media.dyned.com/softwareupdates/download_dyned/doc/TGTHEORY.PDF

Krieger, D. (2005). Teaching ESL versus EFL: Principles and practices. English Teaching Forum, 43 (2), 8-16.

Kulik, C. L. C. ve Kulik, J. A., Effectiveness of computer-based ınstruction: an updated analysis, *Computers in Human B*ehavior, 7, 75-94, (1991).

Küçüktepe, C., Eminoğlu, S.& Küçüktepe, Y.B. (2014). An investigation of teachers' views on the second grade English course and curriculum. *Hasan Ali Yücel Education Faculty Journal*,11(22), 55-78

Lee C., Yeung A. S., Ip T. (2016). Use of computer technology for English language learning: do learning styles, gender, and age matter? *Comput. Assist. Lang. Learn.* 29 1035–1051.

Lee, K. W. (2000). English teachers' barriers to the use of computer-assisted language learning. *The Internet TESL Journal*, 6(12), 1-8.

Liang W. (2021). University teachers' technology integration in teaching English as a foreign language: evidence from a case study in mainland China. *SN Social Sciences*, 1(8), 219. https://doi.org/10.1007/s43545-021-00223-5

Morrison, G. R., Ross, S. M., Gopalakrishnan, M., ve Casey, J.(1995). The effects of feedback and incentives on achievement in computer-based instruction, *Contemporary Educational Psychology*, 20(1), 32–50.

Nolen, S. B., Haladyna, T. M. (1990). Personal and environmental ınfuences on students' beliefs about effective study strategies. *Contemporary Educational Psy*chology, 15, 116-130.

Orakcı, Ş. (2017). The effect of the application of learning activities based on learner autonomy on the 6th grade students' English achievements, attitudes, learning autonomy and retention of knowledge. (PhD Thesis) Gazi University, Ankara

Osguthorpe R. T. ve Graham, C. R. (2003). Blended Learning Environments Definitions and Directions. The Quarterly Review of Distance Education, 4(3), 227-233.

Paudel, P. (2021). Information and Communication Technology in Foreign Language Classes in English: Roles and Practices. *International Journal of Technology in Education and Science (IJTES)*, 5(1), 37-55. https://doi.org/10.46328/ijtes.179

Rasmussen, R. (2003). The Quantity and Quality of Human Interaction In a Synchronous Blended Learning Environment. UMI Number: 3091443.

Roblyer, M. D., Castine, W., & King, F. J. (1988). Assessing the impact of computerbased instruction: A review of recent research, The Haworth Press: NY, (

Saarni, C. (2001). Emotion communication and relationship context. *International Journal of Behavioral Development*, 25(4), 354-356.

Seage, S.J., & Türegün, M. (2020). The Effects of Blended Learning on STEM Achievement of Elementary School Students. *International Journal of Research in Education and Science (IJRES)*, 6(1), 133-140.

Shelly, G. B., Gunter, G. A., Gunter, R. E. (2010). Teachers discovering computers: integrating technology and digital media in the classroom, Course Technology.USA

Swan, P. (1992). Theory and Practice of Computer Assisted Language Learning. United Kingdom: Open University.

Tafazoli, D. ve Golshan, N. (2014).Review of computer-assisted language learning: History, merits & barriers. *International Journal of Language and Linguistics*, 2(5-1), 32-38.

Thaichay. T. ve Sitthitikul. P. (2016). Effects of the Flipped Classroom Instruction on Language Accuracy and Learning Environment: A Case Study of Thai EFL UpperSecondary School Students. *Rangsit Journal of Educational Studies*, 3 (2), 35-64. doi:10.14456/rjes.2016.10.

Thekes, I. (2021). The Impact of Xeropan: An Online Application Assisting Language Learning on the Processes of Foreign Language Learning. International Journal of Technology in Education (IJTE), 4(4), 624-643. https://doi.org/10.46328/ijte.127

Thompson, V. L. & McDowell, Y. L. (2019). A case study comparing student experiences and success in an undergraduate course offered through online, blended, and face-to-face instruction. *International Journal of Education in Mathematics, Science and Technology (IJEMST)*, 7(2), 116-136.

Tresnawati, F. (2011). The implementation of computer-assisted language learning (CALL) by using dynamic education (DynEd) program in improving english proficiency of vocational high school students. Bandung: Indonesian University of Education.

Uslu, B. (2020). From Preschool to Elementary 4th Grade: The Follow-up Study of the Effect of Life-focused Foreign Language Acquisition Program. *International Journal of Research in Education and Science (IJRES)*, 6(2), 273-283.

Vo, M.H., Zhu, C., & Diep, A.N. (2020). Examining Blended Learning Implementation in Hard and Soft Sciences: A Qualitative Analysis. *International Journal of Research in Education and Science (IJRES)*, 6(2), 250-272.

Yurt, E. & Sünbül, A.M. (2012). Effect of Modeling-Based Activities Developed Using Virtual Environments and Concrete Objects on Spatial Thinking and Mental Rotation Skills. Educational Sciences: Theory & Practice - 12(3), 1979-1992

Zhou, P., Wu, X., Xu, H., & Wang, G. (2021). The College Students' Oral English Education Strategy Using Human-Computer Interaction Simulation System From the Perspective of Educational Psychology. *Frontiers in Psychology*, 12, 723981. https://doi.org/10.3389/fpsyg.2021.723981

Author Information

Danagul Assylzhanova
https://orcid.org/0000-0002-9451-9107
Kazakh Ablai khan University of International Relations and World languages
Almaty, Kazakhstan
Contact e-mail: *Dn01@bk.ru*

Nurzhan Seisenbek
https://orcid.org/0000-0003-2490-631X
Science Innovations Group
Nur-Sultan, Kazakhstan

Sakhipzhamal Uzakbaeva
https://orcid.org/0000-0002-8593-1845
Kazakh Ablai khan University of International Relations and World languages
Almaty, Kazakhstan

Bizhomart Kapalbek
https://orcid.org/0000-0002-0679-1304
Institute for the Development of the State Language
Almaty, Kazakhstan