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The problems of developing the psychological qualities of young chess players

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Abstract. It is well known that chess, considered an effective source of mental development and consciousness, is not just a sport. There are grounds for considering it separately from other sports and defining it as both a science and an art. This comprehensive characterisation of chess as an activity indicates that it is a unique set of opportunities aimed at the comprehensive development of the individual: personal, intellectual, emotional and physical qualities. In this regard, the question of the formation of psychological qualities in young chess players through chess is interesting. That is why this article examined issues related to the formation of psychological qualities in young chess players during the competitive period. The aim of the study was to identify the conditions that contribute to the formation of psychological qualities in young chess players during the competitive period. To achieve this goal, attempts were made to solve the following research tasks: to determine what contradictions young chess players are ready to overcome, the characteristics of chess players' personalities and their thinking; to study what qualities chess develops in young athletes; to substantiate the characteristics of a successful chess player, taking into account the specifics of chess as a sport, based on the results of specialised literature and modern research contributing to the formation of psychological qualities in young athletes, and to analyse the psychogram that a chess player must possess in order to achieve success in their activity. The following organisational methods and techniques were used in the study: analysis of scientific and theoretical literature on the research topic; psychological diagnostic methods: observation, questioning. The proposed psychogram, which is necessary for chess players to achieve success in their professional activities, allows for effective influence on the stabilisation of the psychological qualities of young chess players

Keywords: chess game; physical training; complex means; psychogram; psychogram of a chess player

■ INTRODUCTION

In the scientific community, the dominant approach to training and education in adaptive sports is the use of motor skills and exercises as the main means of development (Evseev, 2020). However, as global and Kyrgyz practice shows, especially in the field of chess as an adaptive sport, there is a need to fully utilise the potential of "mental" sports, primarily thinking skills, actions and abstract-logical exercises, to actualise human intelligence. Russian scientists note that chess has been included in the "10 Years

of Childhood" project with the aim of creating conditions for accessibility and meeting the social needs of society in attracting the population to systematic participation in adaptive sports (Alifirov *et al.*, 2018). However, the systematic socio-pedagogical resource of chess as an adaptive sport has not been sufficiently explored in scientific and methodological research, not only as an integrative means of achieving high sports results, but also as an effective mechanism for developing the potential of chess players. It

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is worth noting that the development of mental functions plays a key role in achieving sporting results in chess.

The sports training system in the Kyrgyz Republic is regulated by such normative legal documents as the Chess Sport Development Program (2021) and the State Standard for Sports Training in Chess Sport (2015), which combine the main initiatives of the Ministry of Culture, Information, Sports and Youth Policy and the Kyrgyz Republic Chess Federation. They define strategies and trajectories for coordinating the development of chess in the country, including the formation of universal and specific digital competencies for coaches and athletes, and the structure and role of psychological training at the sports training stage. At the global level, many Russian experts and members of national teams note that the content of such policy documents is very archaic and contains systematic errors (Gabbazova, 2014; Mikhailova & Stepanova, 2018). They note that this leads to Russia losing its leadership in world championships. In terms of the dynamics of sporting excellence and achievements in international FIDE titles, Russian juniors lag behind their Indian and Iranian peers. Leading classical chess players agree that excellent psychological preparation plays a decisive role in achieving the title of world champion.

When teaching chess, it is important to take into account the individual characteristics of the beginner, as young players usually start training at the age of 6-7. This age is the most important for the development of mental processes such as memory, attention and thinking. At this time, the coach has the opportunity to purposefully influence the development of mental processes and help the student fully realise their potential as a professional chess player. As in many other sports, the training of young chess players includes daily, pre-competitive, competitive and transitional periods (Bida *et al.*, 2023). When organising the training process during the competitive period, a number of objective problems can be identified that may affect the dynamics of the game's growth, its effectiveness and the level of sporting skill of young chess players. One of these is increasing the psychological readiness of young chess players for competitive activity. At the initial stage of sports training, the training of young chess players is relatively stable. Chess players achieve their first results in competitions, obtain sports ranks and win victories. Accordingly, preparation for competitions requires a lot of time and effort. Chess training gradually influences psychophysical development, affects the daily routine of young chess players and their behaviour, and begins to take up more time (Ilchenko, 2011).

Young chess players need to learn how to cope with fatigue and low mood during training, as well as overcome obstacles associated with the "complexities" of chess as a challenging sport. Young athletes need to learn how to create a favourable psychological attitude and a stable state of mind (Khomenko & Manyk, 2024). Chess is an exercise that develops mental abilities such as concentration, critical thinking, abstract thinking, problem solving, pattern recognition, strategic planning, creativity, analysis,

synthesis and evaluation, and is used to develop mental abilities throughout life. Of course, it is beneficial to remain calm and balanced when playing chess. Improving chess skills often requires constant study, and it is important to surround yourself with people who have achieved great success in this activity, who are persistent in achieving their goals and hard-working. Scientists who have studied the idea that chess attracts primarily intellectually developed players, I. Dyakov *et al.* (2015), describe the psychogram of a chess player with the following qualities: "1. Availability of sufficient physical strength and good health. 2. Strong nerves. 3. Self-control. 4. Ability to pay equal attention to a large number of people who are relatively independent of each other. 5. Ability to perceive dynamic relationships. 6. A thinking type of mind. 7. A high level of intellectual development. 8. A subjective nature of thinking. 9. An objective nature of thinking. 10. A strong chess memory. 11. Synthetic power of thinking and imagination. 12. Combinatorial abilities. 13. Disciplined will. 14. High activity of intellectual processes. 15. Orderliness of emotions and impressions. 16. Self-confidence, belief in one's own abilities".

The aim of this article was to identify psychological factors contributing to the success of young chess players during the competitive period and to analyse the circumstances influencing their development.

■ MATERIALS AND METHODS

The following methods were used in the study: analysis of scientific literature on the research problem; psychological diagnostic methods, such as observation and questioning; pedagogical experiment; verification of the results of experimental work. When analysing scientific literature, the researchers who conducted research on this problem referred to the works of I. Dyakov *et al.* (2015), B. Gulko (2019), V. Maslyaev (2022) and drew attention to their research on the formation of psychological qualities in chess players. The work of V. Maslyaev (2022) was taken as a basis, which was aimed at the formation of psychological qualities in young chess players through physical education. However, in this research work, the issue of the formation of psychological qualities during chess was considered not through physical education, but in the process of playing chess.

In an experimental study aimed at observing the psychological state of young chess players and developing their psychological qualities, students from the Children's and Youth Chess Sports School of the Department of Physical Culture, Sports, Youth Work and Tourism of the Bishkek City Administration were involved. The experimental work was carried out over a period of one year, from March 2024 to April 2025. Athletes aged 10-12 were involved in the experimental work in accordance with age characteristics. Of the 26 schools approved as bases for the Children's and Youth Chess Sports School, Educational Complex No. 68 and General Education School No. 42 were selected for the research work. The work was carried out in collaboration with the coaches and teachers of these schools, Zh. Orozaliyeva

and T. Akmataliyev. During the work, the coaches and young chess players were observed at the initial stage and after a year of training, and mutual conclusions were drawn. At the initial stage, a questionnaire was conducted among young chess players. Depending on the nature of the experimental work, the young chess players in the schools where the experiment was conducted were divided into two groups, and control and experimental groups were formed. The study involved 22 students from educational complex No. 68 (11 students in the experimental

group and 11 students in the control group) and 20 students from general education school No. 42 (10 students in the experimental group and 10 students in the control group). The psychological state of young chess players was assessed in two stages. In March-April 2024, a preliminary, diagnostic experiment was conducted, and in March 2025, after the completion of the formative experiment, a control experiment was conducted. All students participated in the study. To determine their general physical and psychological state, they were asked 11 questions (Table 1).

Table 1. Questionnaires for analysing the psychological state of young chess players

No.	For students of secondary schools No. 42 and No. 68 in Bishkek
1	Are you worried about your health? Do you get tired quickly?
2	Do you consider yourself a strong-willed person? Are you patient?
3	Do you think you can control your thoughts?
4	Can you be precise, focused and flexible in your work?
5	When you do something, do you first stop and think, "Think twice, cut once"? Do you think about the end result?
6	Are you proud of your intellectual development?
7	Do you consider yourself to have strong logical thinking skills?
8	Can you think realistically about anything or any process?
9	Do you think you have a good memory?
10	Do you feel responsible for strictly adhering to discipline, rules and regulations?
11	Do you believe in your future and your success?

Source: compiled by the authors

These issues directly influenced the identification of the psychological state of young chess players and the organisation of work on the formation of personal and psychological qualities. Then, formative experimental work was carried out. Various teaching methods were used in coaching. Training, like any other sport, has a profound meaning in the life of a chess player. Even chess requires patience, discipline and hard work. In this regard, 10 chess training methods considered to be the most effective were used in the formative experiment: (1) playing études; (2) studying chess games without a board; (3) analysing one's own games; (4) playing the final stage of a chess game; (5) blitz; (6) watching grandmaster games; (7) chess tactics "playing without looking"; (8) analysing other players' games; (9) repeatedly reviewing one's own moves; (10) studying and collecting games played by champions.

In addition, interactive modern methods of teaching chess were used with the involvement of coaches participating in the experimental work. In this case, the works of scientists S. Gevorgyan *et al.* (2024) were used as an auxiliary methodology. The following interactive teaching methods were considered: classroom discussion; focus on achieving learning objectives; group work; use of information and communication technologies; cooperation; different teaching styles; reflection; independent learning; practical exercises and games in which students can apply the theoretical knowledge they have acquired in real-life situations; problem-based learning. According to the researchers, the main methods of teaching chess using interactive teaching methods were: heuristic communication and decision-making, the use of information and communication technologies, games and simulations; setting learning goals

and independent learning; collaborative learning, problem solving and reflection. The proposed methodology was taken as the basis for this work. The experiment was conducted in accordance with the ethical standards for scientific research set out in the Guidance Note of the European Commission on Ethics and Data Protection (2021).

■ RESULTS AND DISCUSSION

Results of the analysis of scientific literature

From an international standpoint, chess is part of state policy in the Russian Federation. Competition from reserve chess players from India, China, Norway, Uzbekistan, France and Iran has increased sharply on the international stage. Russian scientists emphasise that effective psychological training of Russian athletes in the form of chess at the highest level of sporting excellence, in line with modern scientific achievements, will help to maintain the country's leading position (Kazakov *et al.*, 2022). Among the countries mentioned, it should be noted that Kyrgyzstan has not yet developed a state policy on chess. Among the best chess players who have defended the honour of Kyrgyzstan in chess are athletes who have repeatedly won Asian and international championships, such as Aizhan Syezzbekova, Ruslan Syezzbekov, Zhibek Sagynbekova and Zalkar Kurbanbaev. The schools that prepare them for sports competitions are mainly run by parents who have expressed a desire to train their children in this sport. However, the state should provide direct assistance to the development of chess at its level. There is no doubt that this will have a direct positive impact on the psychological development of young chess players and their motivation.

The results of pedagogical experience, normative acts, and analysis of specialised literature on the subject of analysis show that physical training has proven to be an integral component of training young chess players. According to A. Alifirov & I. Mikhailova (2016), it accounts for 10-20% of the recommended total training time recommended at various stages of training by ministries. Despite the transparency of the effectiveness of young chess players, the main advantages of playing the game, rather than specific characteristics, are their psychological and physical stability, stress management, and compliance, among other factors. The authors noted that it is well known among chess players that physical training can lead to the best results.

According to B. Gulko (2019), every chess game during a competition is accompanied by significant emotional tension. While in other sports such tension is accompanied by active muscle movements, in chess emotions are not expressed through motor activity. Thus, young chess players experience “unfinished” feelings during competitive activity and cannot express them in behavioural reactions. A study by L. Khnychenko & N. Sapronov (2003) showed that emotional tension persists in players between games, leading to changes in their psychophysiological state and, in extreme cases, provoking the development of cardiovascular and nervous system diseases. It is worth noting that young chess players are limited in their choice of physical activities during the competitive stage because, despite the obvious health benefits, such activities can negatively affect concentration during competitions and effective brain function during play. In this regard, A. Kotov (2019) noted that the task of the coach and chess player during the competitive period is to maintain physical fitness before the start of the chess tournament and ensure its optimal maintenance during the competition. In this regard, the author recommended light exercise and walks in the fresh air in the morning before a chess game, followed by active physical exercise for recovery.

During the period of sports specialisation and competitions, more attention should be paid to special physical training at the stage of improving the sporting skills of young chess players. In turn, the selection of physical training methods for young chess players should be aimed at solving two main tasks: prevention of health problems in young chess players associated with a sedentary lifestyle (primarily posture problems); development of the necessary psychological qualities in young chess players that contribute to successful competitive activity. The selection of physical training methods should be carried out taking into account the criteria of accessibility and emotional content in the context of the multifaceted impact on the development of young chess players. In this regard, V. Golenishchev (2020) supports the idea that ensuring the growth of sporting skills is the main goal of the training process for young chess players. The results of a research confirmed that optimal physical training for chess players should be aimed at developing spatial orientation and strength endurance based on the principles of training continuity and

gradual increase in load (Fonareva *et al.*, 2020). Often, when preparing young chess players for effective competitive activity, active sports such as gymnastics, athletics, etc. serve as a useful direction for physical education.

Chess, a source of intellectual development, is not only a sport, but also a science and an art form. This comprehensive characterisation of chess as a unique activity demonstrates that it offers a unique set of opportunities aimed at the comprehensive development of the individual: personal, intellectual, emotional and physical qualities. Difficulties in training young chess players can arise for various reasons. For example, if a chess player loses a game, it does not mean that they do not know the opening well or do not understand a particular type of position. In this case, they may simply be emotionally unprepared to play chess.

In advanced scientific and technological society, even in the 21st century, chess has not lost its relevance as the most widespread and popular sport. The benefits of chess and chess lessons for the younger generation are emphasised by well-known leading figures in educational science, who create conditions for the comprehensive personal and intellectual development of children. At the same time, educational scientists do not set themselves the task of achieving high sporting results for students. Looking back at history, the Russian chess school, among the former Soviet schools, occupies a leading position in the world, while the modern Kyrgyz chess school has not yet entered the ranks of the best countries, but it can be said that it is only beginning to develop. Russian chess players are strong not only among chess players from CIS (Commonwealth of Independent States) countries, but also at the global level. It has always occupied a leading position in the world qualification system, preserving the traditions of the Soviet chess school and continuing them to this day, without losing its significance.

Chess is an interesting sport that is widely popular among young people. Chess schools, clubs and sections with young chess players are actively operating throughout the country. Young chess players are achieving great success in the sporting arena. In Kyrgyzstan, there are quite a few chess schools that train young chess players. In Bishkek, for example, the Department of Physical Culture, Sports, Tourism and Youth Affairs runs a children's and youth chess school. There are 26 school-based centres throughout the city, where more than 1,200 young chess players train. In these schools, chess is taught outside the classroom as an additional subject with the aim of promoting the all-round development of children. If the introduction of chess lessons in approximately 100 schools and around 2,500 pre-school educational institutions in Bishkek, and in the same number of schools throughout Kyrgyzstan, were to be continuously developed and included in the curriculum as a permanent additional subject, this would be the greatest contribution to the intellectual development of young people. After all, it is intellectual sports that can have a special impact on the development of an individual's information culture, the ability to select information competently and use it in life. According to

R. Sulaimanova (2017), when analysing the problem of the development of an individual's information culture, it is necessary to distinguish between the increasing volume of knowledge acquired by a person and the decreasing activity of its use to solve pressing problems of everyday life. A person's interest in acquiring new information is determined not by a need for self-improvement, but often by a simple interest in learning this information. The main factor in the development of human information culture in the modern era is the mastery of norms and rules for selecting necessary information from the flood of information that rains down on a person like a torrent. In line with the demands of the times, interest in chess has grown in recent years, and the issue of developing education in this area is highly relevant. A well-known modern system for training young chess players should be organised taking into account the overall mental state of the student, their activity and individual psychological characteristics. The relevance of this approach is explained by the fact that it allows each teacher to train young chess players taking into account the characteristics of their individual psychological development. Such an approach can provide an opportunity to maximally reveal all internal potential and achieve self-improvement.

Results of the pedagogical experiment

Many years of observing young chess players have shown that every athlete has a goal to achieve a certain result. For example, some people make a leap forward and achieve a certain result. Before this, they overcome the next obstacle

in their sporting career. However, an athlete's life can be marked by a series of setbacks, while others always move smoothly, sometimes slowing down, sometimes speeding up in their development, but never stopping. This conclusion is usually explained by the chess player's achievements in the sport over a certain period of time. However, this only superficially reflects certain difficulties and obstacles in the dynamics of the process of mastering the training material by young chess players. Therefore, the primary task of every coach working with young chess players is to deeply understand the essence of what is happening and where and how to help each student.

The development of modern innovative methods for training young chess players, which contribute to their development, is aimed at developing the athlete's independent thinking. This approach will allow them to navigate various game situations and build the right game plan. Methods focused almost exclusively on results are irrelevant at the current stage of sports pedagogy. After all, not every young chess player can always achieve high results. The reason for this can be attributed to the fact that the individual characteristics and psychological state of each student were not taken into account at the appropriate level. Therefore, the questionnaire to monitor the psychological state of young chess players was conducted in two stages. The results of the answers to 11 questions aimed at studying the general physical and psychological state of students during the initial assessment experiment were as follows (Table 2).

Table 2. Results of the situational experiment to analyse the psychological state of young chess players

No.	Experimental group			Inspection group		
	"yes"	"no"	"difficult to answer"	"yes"	"no"	"difficult to answer"
1	8	2	1	7	3	1
2	6	4	1	6	3	2
3	5	2	4	6	3	2
4	6	4	1	5	4	2
5	7	2	2	7	2	1
6	5	2	4	6	1	4
7	6	1	3	6	2	2
8	7	2	2	8	1	2
9	6	3	2	7	2	2
10	8	0	3	7	0	4
11	7	0	4	6	3	3
Average score	6.5 (59%)	2 (18%)	2.5 (23%)	6.5 (59%)	2.2 (20%)	2.3 (21%)

Source: compiled by the authors

Only 59% of children who started playing chess for the first time were identified as students who do not worry about their health, do not get tired, have strong nerves, are patient, control their thoughts, are able to perform tasks accurately, purposefully and quickly, are able to stop and think, think about the final result of their work, are satisfied with their intellectual development, have developed logical thinking, are able to think realistically, have a strong memory, feel responsible for following rules and requirements, are confident about their future and success,

while 21-23% find it difficult to answer, and 18-20% believe that they lack these qualities. With their participation, work was carried out to develop psychological qualities and study their influence at the decisive and final stages of a pedagogical experiment on the application of a complex of special physical training methods. The questionnaire assessed qualities such as attention, thinking, memory, motivation and emotional self-control.

In addition, various techniques for developing attention were consistently used in various exercises during

the training of young chess players: concentration on breathing: developing breathing control skills, understanding which helps to cope with pre-competition anxiety and is a way of stabilising the emotional state; concentration of gaze: the gaze technique can be performed on any object and thus helps to relax the eye muscles,

calm the mind, improve concentration and develop stress resistance. Based on the results of the experimental work, it can be concluded that all the parameters assessed in the control and experimental groups, with the exception of the initial emotional state in the control groups, improved in significance (Table 3).

Table 3. Results of the experiment to test the psychological qualities of young chess players

No.	Experimental group			Inspection group		
	“yes”	“no”	“difficult to answer”	“yes”	“no”	“difficult to answer”
1	10	1	0	8	2	1
2	7	3	1	7	2	2
3	5	1	5	5	4	2
4	6	4	1	5	4	2
5	9	2	0	7	3	1
6	5	2	4	5	2	4
7	8	0	3	7	1	3
8	7	4	0	7	3	1
9	9	0	2	8	1	2
10	11	0	0	10	0	1
11	10	0	1	9	0	2
Average score	8 (73%)	1.5 (13.5%)	1.5 (13.5%)	7 (64%)	2 (18%)	2 (18%)

Source: compiled by the authors

This suggests that regular chess playing in itself has a positive effect on the development of memory, thinking and intellectual abilities in young chess players. However, the changes were significantly more pronounced in the experimental group. For example, according to V. Maslyayev (2022), the results of applying the method of speed and accuracy of mental reactions showed that athletes in the control group had a positive attitude, they did not feel anxious or tired, were emotionally stable, patient, able to control their thoughts, could act accurately, purposefully and quickly when performing work, paused to think, focused on the final result of their work, were interested in their intellectual development, their logical thinking improved, they were able to think realistically, their memory skills developed, they felt responsible for maintaining order, rules and requirements, and believed in their future and success. The indicators in the experimental group increased from 59% to 64%, and in the control group from 59% to 73%. The indicators of concentration, productivity and attention in the experimental group increased significantly compared to the control group.

Psychogram of a chess player

As a result of this study, based on the results of theoretical and practical analysis, a psychogram was proposed that a chess player must possess in order to achieve success. A psychogram is a list of mental qualities and characteristics that are typical of a person's personality and constitute important psychological traits. In human life and in social life, each person has their own individual psychogram. However, there are also some common traits among chess

players. The psychogram of a chess player includes not only mental characteristics, but also some considerations related to the physical condition of the chess master. The results of the analysis of theoretical literature by I. Dyakov *et al.* (2015) and their use as a methodological basis made it possible to determine the psychogram of a chess player. It includes the following indicators:

- **Physical health.** There is a common misconception that all chess players are physically weak people. However, this is not the case. For successful play, it is necessary to have endurance and good health. Chess players with poor health tire quickly, which worsens their general and mental state, significantly reducing their chances of winning.

- **Strong nerves.** A stable nervous system allows players to withstand pressure during the game, correctly assess the situation and make the right decisions during the competition.

- **Self-control.** Chess players must be able to control and manage their thoughts. This helps them make the right decisions in difficult situations and emerge victorious.

- **Good, clear orientation.** The ability to perceive dynamic relationships, i.e. not static but moving elements. This is especially useful in a session with different opponents.

- **Contemplative type of mind.** Abstract thinking and the ability to patiently and calmly endure turning points in the game are important for a chess player. This quality is particularly common among the peoples of India and the East, but is not characteristic of Italians, Spaniards and other peoples of southern Europe.

- **High intelligence.** A high level of intellectual development. This feature of chess players' mental abilities is inextricably linked to their type of thinking and, based on

this, indicates a high level of development of the thought process. A chess player may be uneducated and uncultured in other areas of life (literacy, speech skills, etc.), but in chess, their intellect is highly developed.

- The subjective nature of thinking. Chess players think in concrete images and establish logical connections (patterns) between real objects.

- The objective nature of thinking. This is characterised by the particular realism of a chess player's thinking, which distinguishes them from poets or science fiction writers. This is due to the strict regularity of all the interrelationships and actions of chess pieces, which does not allow for subjective arbitrariness.

- Good "chess" memory. A chess player must be able to easily remember their own moves, their opponent's moves, chess combinations, etc.

- Imagination. It is necessary to be able to imagine the next move at the beginning of the game, anticipate the opponent's moves and visualise them. This allows players to make the best moves that will lead to victory.

- Discipline. Enduring long competitions without breaking the rules is a very difficult task. It is important for a chess player to understand where they are and to follow all the rules of the game and competition. It is necessary to be able to control emotions.

- Belief in success. Every time they sit down at the board, chess players must believe in victory and in their own skill, otherwise their chances of winning are significantly reduced.

The results of scientific research have confirmed that the analysis of theoretical studies and the results of pedagogical experiments aimed at developing the psychological qualities of young chess players can contribute to the personal development of students and the formation of important psychological qualities based on previously developed methods. The findings of this study underscored the profound impact of cultivating robust psychological qualities in young chess players, particularly within the demanding competitive arena. According to A. Shankovskiy (2025), chess, often lauded as a unique fusion of sport, science, and art, necessitates a comprehensive approach to an athlete's development. Beyond mere technical proficiency, success at the highest levels is intrinsically linked to an individual's psychological fortitude, intellectual prowess, emotional regulation, and even their physical well-being (Aciego *et al.*, 2012). This holistic perspective aligns with broader pedagogical principles that advocate for the all-round development of young individuals through sport (Charness *et al.*, 2005).

As noted by V. Geghamyan & S. Tarjumanyan (2023), competitive chess inherently imposes significant emotional and mental strain on players. Unlike many other sports where such tension can be outwardly expressed through physical exertion, chess often requires players to internalise these pressures, which can lead to considerable psycho-physiological shifts (Fuentes-García *et al.*, 2019). The ability to maintain composure, focus, and resilience

under pressure is therefore paramount. This highlights a crucial area for further exploration: the long-term psychological impact of sustained competitive mental activity on developing athletes and the most effective strategies for emotional discharge and recovery. Furthermore, while not immediately evident, physical preparation emerges as an indispensable component of a chess player's regimen (Martynkova, 2024). Although it may constitute a smaller percentage of overall training time, its contribution to maintaining psychological stability, sustained attention, and resistance to stress during protracted matches is widely acknowledged within the chess community. Light physical activity before play and more vigorous exercises for recovery are suggested to optimise performance and well-being. The selection of physical training methods should aim to mitigate health issues associated with sedentary lifestyles and foster psychological qualities conducive to competitive success.

CONCLUSIONS

Training young chess players through concentration exercises as a means of special physical training, as well as active sports such as gymnastics, athletics, etc., also has a positive effect on the development of children's cognitive activity and the formation of correct psychological qualities. The State Standard for Training in Chess does not take into account the digital transformation of all types of sports training; the combination of theoretical and psychological training into a single whole is a systemic error and needs to be updated to take into account the best practices in other intellectual sports disciplines. To realise the heuristic and achievable potential of athletes and unlock their intellectual and business potential, it is necessary to update the goals, content and forms of the programme and regulatory documents of the Kyrgyz Chess Federation. Psychological training in chess requires detailing by age and adjusting its share in relation to other types of sports training; ensuring the absolute and relative weight of psychological training in relation to other types of sports training. There is a need to develop technologies for psychological and pedagogical support for athletes and criteria for evaluating the effectiveness of psychological training in chess; to develop the cognitive abilities of chess players for the effective implementation of psychological training.

Analysis showed that in chess education, the ability to use various active teaching methods, such as reflection, heuristic communication, integration of information and communication technologies, collaborative learning, problem solving and independent learning strategies in combination with each other, improves learning outcomes. This, in turn, helps improve the psychological state of young chess players and develop positive personality traits. Heuristic discussions, practical activities and forms of independent learning, reflection, collaborative learning and problem-solving strategies, and the integration of multimedia resources into chess education improve the critical thinking skills necessary to overcome real-life difficulties.

Interactive teaching strategies allow students to develop independence and individual learning experiences. Future research could delve deeper into the specific types and intensities of physical activities that most effectively support the cognitive and emotional demands of elite chess. The ultimate goal remains the consistent enhancement of athletic skill, which is profoundly influenced by these underlying psychological and physical factors.

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Жаш шахматчылардын психологиялык сапаттарын калыптандыруу маселелери

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Аннотация. Акыл жөндөмдүүлүктөрүн, аң-сезимдүүлүктү өнүктүрүүнүн эффективдүү булагы катары эсептелген шахмат оюну бул спорттун гана бир түрү эмес экендиги белгилүү. Спорттун башка түрлөрүнөн айырмалап кароого, аны бир эле мезгилде илим, ошол эле учурда искусство деп аныктоого негиз бар. Шахмат оюнун белгилүү бир иш-аракеттин түрү катары мындай ар тараптуу мүнөздөө анын жеке адамдын толук кандуу өнүгүшүндөгү: инсандык, интеллектуалдык, эмоционалдык, физикалык сапаттарды комплекстүү өстүрүүгө багытталган мүмкүнчүлүктөрдүн өзгөчө жыйындысы экендигин көрсөтөт. Ушуга байланыштуу шахмат оюну аркылуу жаш шахматчылардын психологиялык сапаттарын калыптандыруу маселеси кызыгууну жаратат. Мына ошондуктан макалада атаандаштык мезгилинде жаш шахматчыларда психологиялык сапаттарды калыптандырууга байланыштуу маселелер каралган. Изилдөөнүн максаты катары атаандаштык мезгилинде жаш шахматчылардын психологиялык сапаттарын калыптандырууга өбөлгө түзө алган шарттарды аныктоо алынды. Максатка жетүү үчүн изилдөө милдеттеринин төмөнкүдөй спектрин чечүү аракеттери жасалды: – жаш шахматчыларды даярдоодо алардын кандай карама-каршылыктарды жеңүүгө даяр болушун, шахматчылардын мүнөзүн, ой жүгүртүүсүн аныктоо; шахмат оюнунун жаш спортчулардагы кайсы сапаттарды аныктай тургандыгын изилдөө; – атайын адабияттардын жана заманбап изилдөөлөрдүн жыйынтыктарынын негизинде спорттун түрү катары шахмат оюнунун өзгөчөлүгүн эске алуу менен жаш спортчулардын психологиялык сапаттарын калыптандырууга көмөктөшүүчү ийгиликтүү шахматчынын өзгөчөлүктөрүн негиздөө, шахматчынын өз ишинде ийгиликке жетүү үчүн ээ болушу керек болгон психограммасын талдоо. Изилдөөнүн жүрүшүндө төмөнкү уюштуруу методдору жана ыкмалары колдонулду: изилдөө проблемасы боюнча илимий-теориялык адабияттарга талдоо жүргүзүү; байкоо жүргүзүү, анкеттештирүү сыяктуу психологиялык диагностика методдору. Шахматчынын өз ишинде ийгиликке жетүү үчүн ээ болушу керек болгон сунушталган психограммасы жаш шахматчылардын психологиялык сапаттарын стабилдештирүүгө натыйжалуу таасирин тийгизе алат

Негизги сөздөр: шахмат оюну; физикалык даярдык; комплекстүү каражаттар; психограмма; шахматчынын психограммасы

Проблемы развития психологических качеств юных шахматистов

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Аннотация. Шахматы, считающиеся эффективным источником развития умственных способностей и сознания, – это не просто вид спорта. Есть основания рассматривать шахматы иначе, чем другие виды спорта, определять как науку и искусство одновременно. Такая комплексная характеристика шахмат как особого вида деятельности свидетельствует о том, что это уникальный комплекс возможностей, направленных на всестороннее развитие личности: личностных, интеллектуальных, эмоциональных и физических качеств. В этой связи представляет интерес вопрос формирования психологических качеств юных шахматистов посредством игры в шахматы. Именно поэтому в статье рассмотрены вопросы, связанные с формированием психологических качеств у юных шахматистов в соревновательный период. Целью исследования было выявление условий, которые могут способствовать формированию психологических качеств юных шахматистов в соревновательный период. Для достижения цели были предприняты попытки решения следующего круга исследовательских задач: определить, какие противоречия готовы преодолевать юные шахматисты, особенности их характера и мышления в процессе их подготовки; изучить, какие качества шахматы могут развить у молодых спортсменов; на основе результатов анализа специальной литературы и современных исследований, с учетом специфики шахмат как вида спорта установить характеристики успешного шахматиста, способствующие формированию психологических качеств юных спортсменов, а также проанализировать психограмму, которой должен обладать шахматист для достижения успеха в своей деятельности. В ходе исследования использовались следующие организационные методы и приемы: анализ научно-теоретической литературы по проблеме исследования; методы психологической диагностики: наблюдение, анкетирование. Предложенная психограмма, которой необходимо владеть шахматисту для достижения успеха в карьере, может оказать эффективное воздействие на стабилизацию психологических качеств молодых шахматистов

Ключевые слова: шахматная игра; физическая подготовка; комплексные средства; психограмма; психограмма шахматиста



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Adaptation of terminology and diagnostic tools for the social and emotional development of schoolchildren in Kyrgyzstan

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Abstract. The relevance of this article is conditioned by the need to integrate social and emotional development (SED) into educational practice in Kyrgyzstan, taking into account the socio-cultural characteristics of the country. In modern education, SED is recognised as a key component of harmonious personality development, contributing to academic success and social adaptation. However, Kyrgyzstan lacks a systematic approach to SED diagnosis, which requires the adaptation of international tools to the local context. The aim of this work was to adapt a thesaurus and diagnostic tools for assessing the SED of schoolchildren in the context of the Kyrgyz educational system. The study used methods of theoretical analysis, comparative review, expert assessment and pilot testing. International approaches to diagnosing SEDs were analysed and relevant tools were selected. Adapted the thesaurus and content of existing questionnaires to fit the cultural and linguistic context of Kyrgyzstan. There was carried out a pilot launch of the tools among 333 primary school pupils from schools sponsored by the J. Balasagyn Kyrgyz National University, with monitoring of the personal potential of 94 teachers. The results showed a baseline level of SED among most pupils (50-59% for key skills), with areas for development identified, such as goal achievement. A positive correlation was established between SED and academic performance, which was more pronounced in the Kyrgyz sample than in the Russian sample. The adapted tools proved to be applicable but require further ethnocultural refinement. The practical value lies in providing psychologists, teachers, methodologists and educational programme developers with tools for introducing SED in schools in the Kyrgyz Republic, contributing to improving the quality of education and personal development

Keywords: methodology; personal potential development; educational organisations; school students; pilot study

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■ INTRODUCTION

In the conditions of the modern world, education increasingly focuses on issues of social and emotional development (SED) as a key component of harmonious personality formation. Social and emotional development is an integral part of an individual's successful personal, academic and social development, contributing not only to the acquisition of knowledge, but also to the formation of emotional regulation, empathy and constructive interaction skills. Research shows that a high level of SED is directly linked to increased motivation to learn and reduced risks of emotional burnout among schoolchildren (Brill *et al.*, 2025; Farina *et al.*, 2025). Taking into account the practices that have developed in different countries, unique approaches to assessing SED are being developed that necessarily take into account the cultural context. For example, in countries with developed education systems, SED is integrated into school curricula to strengthen students' psychological resilience (Min *et al.*, 2024).

In Kyrgyzstan, the national component of the programme “Developing Personal Potential in the Educational Environment and Promoting a Healthy Lifestyle” is being implemented with the assistance of the Contribution to the “Future Foundation” in partnership with Moscow City Pedagogical University (MCPU) and the UNESCO Institute for Information Technologies in Education (UNESCO IITE). The aim of this programme is to create conditions for the development of SED among schoolchildren and teachers, taking into account national specificities (UNESCO, 2025). However, despite growing interest in this topic, in Kyrgyzstan there is still no systematic approach to diagnosing SED and adapting the relevant tools, which leads to fragmented efforts and reduced effectiveness of educational interventions. This aspect is particularly important for Kyrgyzstan due to the multi-ethnic and multilingual nature of its society, where only national context can be taken into account to effectively diagnose and develop effective measures for the prevention and correction of SED among teachers and students. This involves not only simple translation and technical adaptation of existing methodologies, but also in-depth work on terminology, methodological foundations and cultural specificity. Successful adaptation allows for more accurate diagnosis of SED levels among schoolchildren, the development of individualised support strategies and the evaluation of the effectiveness of pedagogical interventions. Research confirms that culturally adapted tools increase the validity of measurements and promote better participant engagement (Shi *et al.*, 2020).

An important step in this process is to rethink key concepts to ensure that terms are fully consistent with the cultural realities of Kyrgyz society. Only with this approach can high reliability and validity of diagnosis be achieved, avoiding distortions associated with linguistic or social inconsistencies. For example, concepts such as “self-regulation” or “emotional intelligence” require careful localisation, as their interpretation may vary depending on traditional values. The adaptation of diagnostic tools to assess

the level of SED as one of the key components of the formation of students' personal potential is carried out on the basis of the SED model developed by the Institute of Education of the National Research University “Higher School of Economics” (NRU HSE) as part of its participation in the Organisation for Economic Co-operation and Development (OECD) project Education and Social Progress (ESP, n.d.). This model emphasises the integration of emotional and social skills into everyday educational practice, which is particularly relevant for regions with economies in transition.

Thus, adapting tools of assessment of SED is not only a technical task, but also a complex methodological process associated with the development of a holistic culturally sensitive approach to personal development. As noted by N. Martinez-Yarza *et al.* (2023), it creates conditions for the design of effective pedagogical practices aimed at developing emotional intelligence, empathy, self-regulation, and the ability to interact constructively in the school environment. Ultimately, such initiatives contribute to improving the quality of education and the long-term well-being of the younger generation. According to J. Lin *et al.* (2024), the introduction of SED into the education system reduces the level of conflict and improves interpersonal relationships.

This work was aimed at analysing and testing adapted terminological resources and diagnostic methods for assessing the social and emotional development of schoolchildren in the context of the Kyrgyz educational environment, with an emphasis on pilot testing and identifying ways to implement them in practice.

■ MATERIALS AND METHODS

In 2025, the Institute for Retraining and Advanced Training of Personnel (IRATP) at the J. Balasagyn Kyrgyz National University identified key areas of activity with the aim of strengthening the evidence base for the implementation of the pilot project and conducting an initial study. As part of the adaptation of the methodological framework, terms related to social and emotional development (SED), such as “education for sustainable development”, “lifelong learning”, “basic education in health and well-being”, “positive education”, “personal (psychological resources)”, “personal potential”, “personalisation of learning (personalised education)”, “self-efficacy”, “resilience” and others were systematised in Russian, Kyrgyz and English during the development of the thesaurus. This made it possible to take a comprehensive approach to adapting SED diagnostic methods, ensure consistency in terminology, eliminate differences in interpretation, and form a unified conceptual framework for all participants in the educational process, including administrators, teachers, methodologists, students, and parents. The thesaurus was developed through the joint efforts of specialists from Moscow City Pedagogical University (MCPU), J. Balasagyn Kyrgyz National University (KNU) and the UNESCO Regional Office. All terms underwent preliminary expert assessment for cultural relevance and translation

equivalence, with the participation of linguists and psychologists to ensure accuracy in the Kyrgyz context.

A pilot study was conducted in schools sponsored by the J. Balasagyn Kyrgyz National University with the aim of testing SED diagnostic tools and refining methodological approaches. This study was carried out in two aspects: monitoring personal potential within the framework of training programmes for retraining and upgrading the professional qualifications of teaching staff (94 people, including 58 primary school teachers) and monitoring the social and emotional development of primary school pupils in schools sponsored by the J. Balasagyn Kyrgyz National University (333 Russian-speaking pupils in grades 1-2). The research methodology was determined using the following instruments: C. Dweck's (2000) implicit theories of intelligence scale, T. Gordeeva *et al.*'s (2017) professional self-efficacy questionnaire, and T. Gordeeva's (2022) universal professional motivation test. In addition, S. Maddi's resilience test, D. Leontiev & E. Osin's Differential Test of Reflection, and D. McLain's Uncertainty Tolerance Questionnaire were used. Other tools used included K. Keyes' "Psychological Well-Being Scale" and N. Elterman's "School Situations" Questionnaire (pedagogical communication style). The instruments listed were selected based on their reliability and validity in similar studies, with preliminary testing for adaptation to a Russian-speaking audience through pilot testing on a small subgroup ($n = 20$) to assess the comprehensibility of the questions. As part of the implementation of a pilot project on personal development based at the IRATP KNU, the study was conducted at the initial stage, which ensured the gradual expansion of the methodological and empirical base, taking into account ethical standards and statistical data processing. The study was approved by the Ethics Committee of KNU, all data was collected anonymously, with the informed consent of the participants or their legal representatives (parents for schoolchildren), without any pressure or remuneration, in compliance with ASA (2018) ethical standards.

The study consisted of three key stages. During the first stage, in 2024, which was preparatory and organisational, a set of SED diagnostic tools was developed and agreed upon for use in pilot schools selected for the study, with teachers from five pilot schools acting as respondents. At this stage, a pilot training programme for teachers from KNU partner schools was launched, which took place in two stages without interruption from their main teaching activities in an online format. The initial assessment, as the first stage of the professional development programme, made it possible to determine the level of knowledge, attitudes and skills of the participants in the field of social and emotional development, which became the basis for further targeted training and evaluation of the dynamics of results. Respondents registered and completed questionnaires online. The time allocated for completing the diagnostic materials ranged from 30 to 50 minutes. Each participant who completed the training course took an online survey and received individual, automatically generated

feedback based on the diagnostic results. Thus, an initial diagnostic assessment was conducted for IRATP teachers and representatives of the management staff of the pilot schools under their supervision. Based on the results of the diagnostic assessment, an initial array of empirical data was formed, which formed the basis for subsequent analysis and the design of educational solutions.

In the second stage, methodological support and pilot implementation (2025), the main focus was on training teachers in the pilot group and testing SED diagnostic tools. An initial study of the social and emotional development of pupils in grades 1-2 was conducted online with the support of a teacher; based on the results of the diagnosis, each participant (school) was provided with individualised analytical reports by class. The data was processed using basic statistical methods. In the data processing section, correlation analysis was applied using Pearson's coefficient to assess the relationships between subjective assessment of academic performance (according to teachers) and key social and emotional skills (goal achievement, working with others, managing emotions) in Russian ($n = 593$) and Kyrgyz ($n = 58$) samples. The coefficients obtained, significant at the $p < 0.01$ level, are shown in Table 1. In the third stage, which was the final stage and involved the transfer of the methodology (2025), the final stage was aimed at consolidating and institutionalising the results obtained. Thus, the three-stage structure of the pilot project ensured both the scientific validity and practical applicability of the proposed approaches to the diagnosis and development of personal potential in the context of the Kyrgyz educational system.

Then the translation into Kyrgyz of 11 methods for diagnosing personal potential and social and emotional development was carried out. The translations were done by certified translators and checked for semantic equivalence through back-translation and expert review. As part of the implementation of the RAT "Social and Emotional Development" teachers and educational psychologists were asked to fill out electronic questionnaires reflecting the degree of social and emotional skills (SES) development in each student. The diagnosis was carried out at a specific point in time: at the initial stage of training implementation, upon completion of the educational and methodological kit "Social and emotional development of primary school children". As part of the work, a sample of 333 Russian-speaking pupils in grades 1-2 from five schools under the patronage of the J. Balasagyn Kyrgyz National University was formed. Gender was not taken into account in the selection of pupils, as the corresponding distinction was not included in the objectives and tasks of the initial study. Upon completion of the diagnostic procedures, each school was provided with an analytical report containing data on the quantitative and percentage distribution of students by SES development levels: developing, basic and advanced. The information obtained served as the basis for the subsequent planning of individualised pedagogical and psychological interventions, as well as for evaluating the effectiveness of the programme being implemented.

■ RESULTS AND DISCUSSION

Theoretical foundations of assessing social and emotional development

Based on the achievements of Russian scientists in the field of methodology for the development of the SED, in particular on the work of the creator of the concept of a personality-developing educational environment and the approach to its creation and design V. Yasvin (2019) and the creator of the concept of personal potential D. Leontiev (2011), the importance of a comprehensive and contextual approach to assessing both educational conditions and internal personal resources is emphasised. Such an approach is developed at an applied and purely instrumental level, based on a deep theoretical understanding of the individual as a system, capable of self-development and active interaction with the socio-cultural environment. In the works of V. Yasvin the educational environment is interpreted as a system of potentials of an educational institution that contribute to the personal development of students. These potentials are formed thanks to the organisational, technological and material-spatial conditions purposefully created by teachers, as well as the unpredictable circumstances that arise in the process of interpersonal interaction between participants in the educational process. The environment acquires a developmental character when the conditions created are transformed into real opportunities for the child's independent growth and learning. This involves the formation of communication skills, the ability to act autonomously and be active, the ability to formulate questions and find answers to them, openly express one's aspirations and intentions, and demonstrate initiative in one's activities.

The typology of educational environments (creative, career-oriented, dogmatic, serene) serves as a theoretical basis for constructing diagnostic models and monitoring changes in educational organisations, allowing for understanding the conditions under which students' personal development is possible (Yasvin, 2018). In this context, the use of uniform assessment tools, both in relation to the results of teacher training and the quality of the educational environment, becomes a necessary condition for ensuring the targeted development of students' social, emotional and personal characteristics. In turn, D. Leontiev (2023) reveals personal potential (PP) as an integral systemic characteristic of the individual psychological features of a personality, ensuring the self-regulation of the subject in interaction with the world, their ability to act as an autonomous, self-regulating subject of activity, making purposeful changes in the external world and combining resistance to the influence of external circumstances with a flexible response to changes in the external and internal situation. The author emphasises that personal potential includes various personal resources, grouping them into three types of potential: self-determination potential, achievement potential, and preservation potential. Thus, the methodological approaches of V. Yasvin (2018; 2019) and D. Leontiev (2011; 2023) allow for considering social and emotional development as an indicator of the effectiveness of the

educational environment, requiring the use of comprehensive diagnostic and monitoring tools. Continuing with these ideas, the understanding of SED in this study is based on a model developed by the Institute of Education at the National Research University Higher School of Economics as part of its participation in the OECD Education and Social Progress (ESP, n.d.) project. This model emphasises the interconnection between social and emotional skills and overall academic progress and social well-being, where motivational factors act as a key bridge between individual resources and the external environment. In particular, the SRQ-A (n.d.) methodology for diagnosing internal and external academic motivation allows for identifying the leading sources of student motivation and assess their connection with the main components of SER, such as the level of self-regulation, emotional attitude to learning, sense of belonging to the school community, initiative and desire to achieve goals. Motivational parameters are not interpreted in isolation here, but as an integral part of the SED, serving as the basis for targeted pedagogical support that enhances the emotional stability and social competence of schoolchildren.

Most diagnostic methods for assessing SED have been adapted to the Russian context, which makes their further localisation for Kyrgyzstan particularly relevant, taking into account cultural, linguistic and educational specifics. Such adaptation not only increases the reliability and validity of the assessment of schoolchildren's social and emotional development, but also lays the foundation for sound pedagogical support strategies, contributing to the personal development of students and expanding opportunities for effective interventions in the school environment. Particularly important in this regard is not only the technical adaptation of the tools, but also a profound rethinking of the terminology and methodological foundations as the initial stage in the formation of a holistic socio-cultural approach. Accurate translation and localisation of concepts reflecting key aspects of SED-from self-regulation to empathy-ensure their relevance to cultural and educational realities, minimising the risk of misinterpretation in the diagnostic process. The psychological and pedagogical characteristics of the educational environment in Kyrgyzstan play a decisive role in the evolution of educational systems, emphasising the need to integrate local factors when developing and implementing interventions and programmes. As a result, the adaptation process covers not only the content of psychodiagnostic techniques, but also includes a thorough study of key SED concepts in methodology, creating the prerequisites for the development of pedagogical practices. Their effectiveness can be objectively assessed using tools adapted for the Kyrgyz-speaking audience, which leads directly to the analysis of empirical data from the pilot study presented below.

Empirical results of pilot testing of adapted instruments

Considering that developed countries are forming unique approaches to diagnosing and assessing social and emotional

development, closely linked to national cultural and educational contexts, there is an objective need to create and test localised diagnostic tools that are fully adapted to the characteristics of the Kyrgyz Republic's education system. Such tools should take into account not only the general principles of SED, but also local values such as collectivism and respect for traditions, in order to ensure the accuracy and relevance of measurements. Within the framework of this pilot project, particular attention was paid to the development of methodological tools that guarantee the conceptual integrity and intercultural consistency of key concepts. One of the key achievements was the preparation of a manuscript of a thesaurus devoted to the development of personal potential in an educational environment. This thesaurus is not just the result of scientific research into the conceptual apparatus, but also a fundamental element of the methodological basis of the study, ensuring uniformity of terminology. Its creation was organically integrated into the methodological basis of the initial study on several interrelated grounds. Firstly, the manuscript of the thesaurus for the programme "Development of personal potential in the educational environment and the formation of a healthy lifestyle" was prepared and formatted in Russian, Kyrgyz and English, which lays the foundation for the widespread dissemination of the methodology throughout the entire educational system of Kyrgyzstan (in publication). Secondly, the thesaurus contributes to the formation of a unified conceptual field, becoming the basis for a methodologically consistent approach to the development and implementation of SED programmes. Thirdly, it includes a comparison of terms in an

international context, which is particularly important for the adaptation and implementation of psychodiagnostic tools for SED assessment. This required accurate, contextually adequate translation of materials into three languages, drawing on an interdisciplinary synthesis of achievements in psychology, pedagogy, cultural studies and linguistics. This approach is fully consistent with the methodological guidelines of UNESCO and Charitable foundation of Sberbank Investment in the Future (n.d.).

During the pilot implementation, data was collected at the initial stage of the SED study of 1st and 2nd grade students on three main criteria of social and emotional skills defined in the ESP (n.d.) model, which is based on the concept of the "big five" personality traits. The goal attainment skill involves the ability to set and achieve short-term and long-term goals, including persistence (consistent work over a long period of time), self-control (managing one's state while performing tasks), and goal orientation (awareness of the importance of achieving independent or teacher-assigned goals). The skill of working with others encompasses building relationships with peers and adults in pairs or groups, with an emphasis on establishing and maintaining contact, respect, and showing care through selfless assistance. The skills of managing emotions focus on regulating positive and negative emotions and their impact on tasks and communication, including optimism (belief in positive outcomes), self-esteem (awareness of one's strengths and feeling like a valued member of society) and self-confidence. Figure 1 shows the definitions of these skills and their levels of development in students in grades 1-2 at the stage of entering the programme.

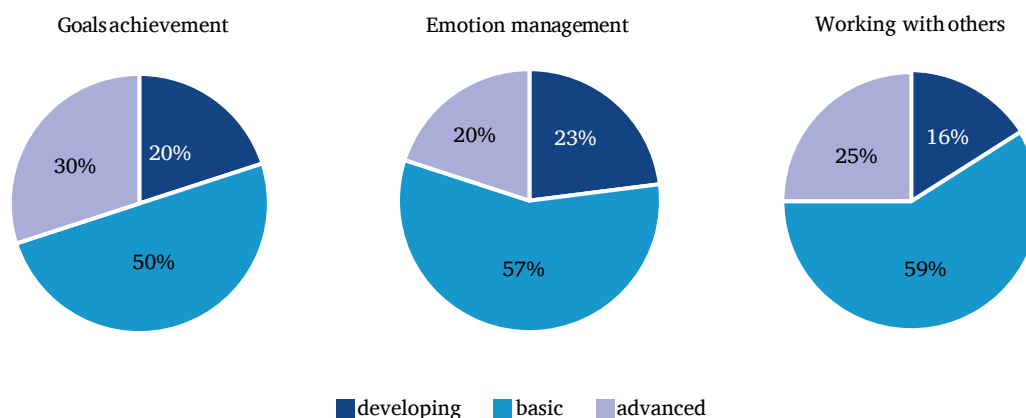


Figure 1. Defining goal-achievement skills, managing emotions, working with others

Source: compiled by the authors

Initial diagnostics revealed that most students demonstrate a basic level of development in all three skills: goal achievement – 50%, emotion management – 57%, working with others – 59%. The strongest area was emotional regulation, indicating that children have basic skills in this area. At the same time, goal achievement stands out as the area most in need of development: only half of the students have a basic level of skill, 30% have a developing level, and only 20% have an advanced

level. These results indicate a satisfactory overall situation, but highlight significant potential for improvement, especially in motivational and goal-oriented aspects.

One of the central components of SED for younger schoolchildren is the development of skills for effective interaction with others, including social competencies for building productive relationships, cooperation, conflict resolution, and consideration of others' positions. Here, the indicator for working with others (59%) confirms the

presence of basic skills, but requires further support. A comparative analysis with similar data from a Russian

study revealed positive correlations between academic performance and all three skills (Table 1).

Table 1. Correlation coefficients between academic performance and key social and emotional skills in Russian and Kyrgyz samples

Russia				
	academic performance	goal achievement	working with others	emotion management
academic performance		0.66**	0.53**	0.47**
Kyrgyzstan				
	academic performance	goal achievement	working with others	emotion management
academic performance		0.83**	0.63**	0.62**

Note: Pearson correlation coefficients; ** $p < 0.01$; academic performance was assessed subjectively by teachers on a scale of 1 to 5 points

Source: compiled by the authors

The strongest correlation is observed between goal achievement, working with others, and managing emotions, which emphasises the role of emotional self-regulation in the social interaction of primary school children. The correlation between managing emotions and working with others illustrates how emotional intelligence underpins successful communication, while the link between achieving goals and the other components demonstrates the close integration of motivation, self-regulation, and communication skills. Established a statistically significant relationship between the level of student achievement and the level of development of their social and emotional skills in both the sample of teachers from schools in the Russian Federation ($n = 593$) and the sample of teachers from schools in the Kyrgyz Republic ($n = 58$). In the Kyrgyz sample, this correlation is more pronounced than in the Russian sample. Among the components of social and emotional development, the skill of “Goal achievement” shows the strongest correlation with teachers’ subjective assessment of pupils’ academic performance, allowing it to be considered one of the key factors influencing the academic performance of primary school pupils. Teachers noted that the proposed methods were appropriate, easy to implement and simple to apply in practice. In most cases, schoolchildren easily understood the wording, which confirmed the adequacy of the adapted scales.

Interpretation of empirical data and practical implications for implementation

The results obtained in the pilot project highlight the high potential of adapted SED diagnostic methods for integration into school practice in Kyrgyzstan. These tools provide a deeper understanding of students’ individual characteristics and enable the development of targeted programmes to strengthen their social and emotional competencies, which is particularly relevant in a multi-ethnic environment. However, the implementation process is in its early stages and needs further refinement, including expanding the sample to include Kyrgyz-speaking students and long-term monitoring. When adapting foreign diagnostic tools, the focus should be not only on linguistic aspects, but also on the broader cultural context. Linguistic adaptation is

only the starting point; it is much more difficult to convey the conceptual core and value orientations of the original methodologies, especially if they originated in a different socio-cultural environment. Key SED concepts such as empathy or self-regulation can be interpreted differently in the Kyrgyz educational, cultural and ethnic context, where traditional values of collectivism reinforce social aspects. Therefore, ethnocultural adaptation is necessary, involving specialists-psychologists, educators and linguists who are fluent in the Kyrgyz language to minimise cultural distortions. As noted by G. Taylor & R. Bagby (2012), emotional regulation is closely related to personality traits such as alexithymia and requires culturally sensitive approaches for accurate diagnosis in multilingual communities.

In addition, the implementation of the project revealed an acute need for professional training of education specialists-teachers, psychologists and social workers-in the diagnosis and development of SED. Many of them lack the skills to confidently apply psychological and pedagogical tools, especially those that require nuanced interpretation of behavioural and emotional manifestations. The lack of such training can distort results and reduce the effectiveness of programmes. J. Zins *et al.* (2004) emphasise that systematic training of teachers in SED increases academic success by 10-15% by integrating emotional skills into everyday learning. Integrating SED approaches into school practice requires a comprehensive, systemic mechanism covering the development of professional development programmes (with a focus on the theory and practice of diagnosis), the creation of regionally adapted methodological materials (taking into account the linguistics, culture and ethics of Kyrgyzstan) and institutional support from government bodies, schools and professional communities. This includes a regulatory framework, the inclusion of SED in standards and plans, and mechanisms for monitoring effectiveness. Research in developmental and educational psychology consistently demonstrates the positive impact of high levels of SED on academic achievement, psychological well-being and stress resilience, the quality of interpersonal interactions with reduced conflict, motivation to learn and self-regulation, as well as long-term adaptation and social realisation in adult life (Moffitt *et al.*, 2011;

Taylor *et al.*, 2017; Gordeeva, 2022). A study by J. Durlak *et al.* (2011) showed that SED programmes improve academic performance by 11 percentage points compared to control groups. Similarly, N. Haynes (2025) emphasises that self-awareness, self-regulation, social awareness, relationship skills and responsible decision-making are the foundation of sustainable motivation and well-being. O. Palamarchuk & Yu. Korotsinska (2020) add that emotional self-regulation in adolescence requires comprehensive measures, such as training and educational work, for the harmonious development of motivational and cognitive spheres. These well-founded positions and international practices formed the basis of a pilot study adapting the methodology for assessing SED and personal potential to the realities of Kyrgyz education. A comparison with international data reveals common patterns and unique features of SED implementation in Kyrgyzstan, highlighting the potential for further empirical research.

■ CONCLUSIONS

The study confirmed the effectiveness of adapting terminological and diagnostic tools for assessing the social and emotional development of schoolchildren in the Kyrgyz educational environment. The developed thesaurus, which integrates the terminology of Sustainable Development Goals, healthy lifestyles and personal potential, ensured linguistic and conceptual consistency in a multilingual context. This contributed to the formation of a unified terminological space for interdisciplinary programmes, increasing the accuracy and cultural relevance of SED methodologies. Empirical data from pilot testing in schools affiliated with the J. Balasagyn Kyrgyz National University ($n = 333$ students in grades 1-2) revealed the basic level of development of key skills: goal achievement – 50%, emotion management – 57%, working with others – 59%. The skill of achieving goals was identified as the area most in need of development (basic level in 50%, developing in 30%, advanced in 20%), while emotional regulation showed relatively high scores. Correlation analysis (Pearson's coefficient) established statistically significant positive correlations between SED and academic performance in both samples: Russian ($n = 593$ teachers) and Kyrgyz ($n = 58$ teachers). In the Kyrgyz group, these correlations were more pronounced ($r = 0.83$ for goal attainment versus $r = 0.66$ in the Russian group), emphasising the role of motivational and goal-oriented skills as a key factor in the academic performance of primary school pupils. Feedback from participants confirmed the practical value of the

adapted tools: teachers noted their relevance, simplicity and ease of use, while schoolchildren successfully navigated the wording, demonstrating the adequacy of the scales. International diagnostic methods (based on the OECD ESP model) proved their applicability in Kyrgyz schools, provided that they were adapted psychologically, linguistically and ethnoculturally to take into account local values of collectivism and multilingualism.

For successful integration of SED into educational practice in Kyrgyzstan, institutional support, professional training of teachers and inclusion of SED in state standards are necessary. This will not only increase the validity of diagnostics, but also enable targeted interventions to strengthen students' emotional stability and social competence. Prospects for further research include conducting interim diagnostics in 1-2 years and a final assessment at the end of the three-year programme cycle, which will ensure monitoring of SED dynamics and the effectiveness of interventions on an expanded sample, including Kyrgyz-speaking students.

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Мектеп окуучуларынын социалдык-эмоционалдык өнүгүүсүн диагностикалоо жана терминологиясын адаптациялоо (Кыргызстан шартында)

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Аннотация. Бул макаланын актуалдуулугу Кыргызстандагы билим берүү практикасына социалдык-эмоционалдык өнүгүү (СЭӨ) түшүнүгүн интеграциялоонун зарылдыгы менен аныкталат. Азыркы билим берүү системасында СЭӨ инсанды гармониялуу калыптандыруунун, академиялык ийгиликке жетүүнүн жана социалдык адаптациянын негизги компоненти катары таанылат. Бирок Кыргызстанда СЭӨнү системалуу түрдө диагностикалоо ыкмасы жетишсиз болгондуктан, эл аралык инструменттерди жергиликтүү шартка адаптациялоо талап кылынат. Иштин максаты – кыргыз билим берүү системасынын шарттарында мектеп окуучуларынын СЭӨ деңгээлин баалоо үчүн колдонулуучу терминологиялык тезаурусту жана диагностикалык инструменттерди адаптациялоо болуп саналат. Изилдөөдө теориялык анализ, салыштырма обзор, эксперттик баалоо жана пилоттук тестирлөө ыкмалары колдонулган. Эл аралык тажрыйбалар анализденип, тиешелүү инструменттер тандалып алынган. Бар болгон сурамжылоолордун мазмуну жана терминологиясы кыргыз маданий жана тилдик контекстине ылайыкташтырылды. Адаптацияланган инструменттер КНУнун шефтик мектептеринин башталгыч класстарынын 333 окуучусуна жана 94 мугалимдин инсандык потенциалын мониторинг кылуу процессинде пилоттук түрдө колдонулган. Натыйжалар көрсөткөндөй, көпчүлүк окуучуларда негизги социалдык-эмоционалдык көндүмдөрдүн базалык деңгээли (50-59 %) аныкталган, өзгөчө өнүктүрүүнү талап кылган багыт катары максат коюу жана ага жетүү көндүмдөрү белгиленген. СЭӨ менен академиялык жетишкендиктердин ортосунда оң корреляция байкалган, ал кыргыз выборкасында орус выборкасына караганда жогору болгон. Адаптацияланган инструменттер иш жүзүндө колдонууга жарактуу экендигин көрсөттү, бирок этномаданий жактан дагы өркүндөтүүнү талап кылат. Иштин практикалык мааниси – психологдорго, мугалимдерге, методисттерге жана билим берүү программаларынын түзүүчүлөрүнө Кыргыз Республикасынын мектептеринде СЭӨ элементтерин интеграциялоо үчүн ыкмаларды берүүдө турат. Бул билим берүүнүн сапатын жогорулатууга жана инсандык өнүгүүгө өбөлгө түзөт.

Негизги сөздөр: методология; инсандык потенциалды өнүктүрүү; билим берүү уюмдары; мектеп окуучулары; пилоттук изилдөө

Адаптация терминологии и диагностических инструментов социально-эмоционального развития школьников в Кыргызстане

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Аннотация. Актуальность статьи обусловлена необходимостью интеграции социально-эмоционального развития (СЭР) в образовательную практику Кыргызстана с учетом социокультурных особенностей страны. В современном образовании СЭР признается ключевым компонентом гармоничного формирования личности, способствующим академическому успеху и социальной адаптации. Однако в Кыргызстане отсутствует системный подход к диагностике СЭР, что требует адаптации международных инструментов к локальному контексту. Цель работы – адаптация тезауруса и диагностических инструментов для оценки СЭР школьников в условиях кыргызской образовательной системы. В исследовании использовались методы теоретического анализа, сравнительного обзора, экспертной оценки и пилотного тестирования. Были проанализированы международные подходы к диагностике СЭР и проведен отбор релевантных инструментов. Проведена адаптация тезауруса и содержания существующих опросников в соответствии с культурным и языковым контекстом Кыргызстана. Был осуществлен пилотный запуск инструментов среди 333 учеников начальных классов подшефных школ КНУ им. Ж. Баласагына, с мониторингом личностного потенциала 94 педагогов. Результаты показали базовый уровень СЭР у большинства учеников (50-59 % по ключевым навыкам), с выявлением зон для развития, таких как достижение целей. Установлена положительная корреляция между СЭР и академической успеваемостью, более выраженная в кыргызской выборке по сравнению с российской. Адаптированные инструменты доказали применимость, но требуют этнокультурной доработки. Практическая ценность заключается в предоставлении психологам, педагогам, методистам и разработчикам образовательных программ инструментов для внедрения СЭР в школы Кыргызской Республики, способствующих повышению качества образования и личностному развитию.

Ключевые слова: методология; развитие личностного потенциала; образовательные организации; учащиеся школ; пилотное исследование



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Implementation of mathematical training in the context of digitalisation of education

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Abstract. Within the framework of systemic digitalisation of education, the task of assessing the effectiveness of new pedagogical tools has become critically relevant. This article was devoted to the experimental verification of the impact of electronic educational resources (EERs) on the quality of mathematics training among primary school students. The main purpose of the study was to determine the effectiveness of a methodology for teaching mathematics that integrates digital technologies. The research was conducted in the format of a pedagogical experiment during the 2022-2024 academic years at Secondary School No. 8 in Bishkek. In the course of the experimental work, specially developed lesson models incorporating multimedia presentations and specialised EERs such as IBILIM, LearningApps and Komodo were introduced into the learning process. The BaalooApp application was used to monitor skill development and conduct formative assessment. The effectiveness of the experiment was evaluated by analysing and comparing diagnostic and final assessment data. The analysis confirmed an improvement in mathematics training outcomes in the experimental groups. Compared with the baseline and control indicators, the quality of students' knowledge who used EERs increased by 20%. This demonstrates that the integration of digital resources and interactive teaching methods can significantly enhance the acquisition of mathematical knowledge and skills. The findings of the study revealed high effectiveness of the developed methodology employing electronic educational resources. It was established that systematic and methodologically grounded use of EERs not only increases students' motivation but also ensures a qualitative leap in the development of mathematical and information competences, which holds significant practical value for the further modernisation of the educational process

Keywords: mathematics; digital technologies; electronic educational resources; teaching approaches; learning process

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■ INTRODUCTION

In connection with the rapid penetration of digital technologies into all spheres of life and the changes taking place in the world, the Kyrgyz Republic has taken steps to adapt the education system to the needs of the digital economy, namely, work has begun on updating curricula at all levels of secondary education, secondary specialised education and higher professional education. The digitisation of education is taking place, affecting not only administrative issues but also the application of digital technologies in the educational process. At the secondary school and university levels, the Smart School programme is being implemented, which is a comprehensive programme for the introduction of digital technologies into the educational process, consisting of four main components: the development of teachers' information literacy and students' digital skills, the development of digital educational content, and the development of ICT infrastructure in schools and universities.

E. Egorova (2020) noted that the process of digitisation of education includes such promising innovative technologies as artificial intelligence (AI), virtual reality and blockchain, which enable students to develop a wide range of social skills necessary in a digital society. As pointed out by N. Kaidieva *et al.* (2023), the formation and improvement of the information competencies of teachers, pupils and students will create conditions for the widespread introduction of digital educational resources into the teaching of various subjects. The capabilities of modern information and communication technologies in the educational process allow teachers, students and pupils to use digital educational resources. For example: educational presentations, tests, electronic teaching aids, interactive exercises on various subjects, training programmes, digital games, etc. These digital resources can be used by both pupils and students under the guidance of a teacher, allowing them to develop and improve their practical skills. Information and digital literacy is becoming a key component of professional success for teachers, as it promotes the integration of innovative approaches to teaching and allows teachers to adapt their methods to the needs of modern students who are growing up in a digital environment (Kiryanova, 2024). With the help of digital technology resources, teachers can solve the following tasks: increase the intensity of the lesson, increase the motivation of pupils and students, monitor their progress in learning and adjust the learning process.

Developing the creative abilities and creative thinking of pupils and students is one of the main tasks of education, and digital technologies are one of the solutions to this problem (Aliev *et al.*, 2025). It is impossible to imagine the modern world without digital technologies; they have penetrated all spheres of human activity and have a significant impact on educational processes. Digital technologies expand access to education, making it more accessible to people from different social strata and with different backgrounds (inclusive education). The use of digital technologies enriches the learning process by providing new

teaching methods, interactive learning materials and tools for individualising learning (Mambetkunov, 2021).

The formats of virtual and augmented reality open up promising opportunities for teaching various disciplines, including mathematics. According to research by A. Christopoulos *et al.* (2024), the use of digital game-based learning (GBL) for studying mathematics and other STEM subjects can indeed be beneficial and increases student engagement and motivation. Innovative technologies provide the opportunity to develop interactive three-dimensional modelling of necessary mathematical objects, which at this stage significantly improves students' perception of abstract concepts (Minkova, 2025). V. Dalinger (2022) noted that computer technologies make it possible to visualise mathematical objects, so students can write programmes that demonstrate a particular fact or object. Many students know how to use programmes that allow them to use a set of tools for constructing and studying drawings. These programmes make it possible to "discover" and verify geometric facts, the author points out.

Currently, e-learning functions not simply as a supplement to traditional education, but as an equal component that works in conjunction with traditional methods. The most important features of e-learning include increased student activity and motivation, independent and conscious study of materials, and interactive communication. E-learning allows the educational process to be divided into clear stages, which enables teachers and students to constantly monitor the progress of knowledge acquisition. The use of feedback allows teachers to quickly adjust teaching methods, taking into account the individual characteristics, personal potential and pace of learning of each student. For high-quality mathematics education, it is necessary to innovate the existing process of mathematics training by optimising teaching technology with the help of digital tools. The aim of this study was to conduct a pedagogical experiment to test and comprehensively evaluate the effectiveness of the developed methodology for teaching mathematics in primary school using integrated electronic educational resources (EER) to improve the quality of mathematical knowledge acquisition and the formation of meta-subject competencies, including independent work and self-control skills.

■ LITERATURE REVIEW

One of the important global issues is quality education, as it contributes to the development of personal potential and key competencies of pupils and students. Mathematics is one of the core subjects in the development of key and subject-specific competencies. Mathematical education plays an important role in preparing pupils and students for life, as it develops the competences necessary for solving practical problems: from the moment a child is born, mathematics accompanies them throughout their life. It helps pupils and students develop logic, analytical skills and critical thinking, which they will apply in solving practical

problems in real-life situations (Gravemeijer *et al.*, 2017). In the context of digitalisation and globalisation of education, high-quality mathematical training for pupils and students is essential, and the use of electronic educational resources can be the solution to this problem.

Digital technologies in education require teachers to learn new skills and use electronic educational resources effectively (Tsymbal, 2020). For efficiency and to fully unlock the potential of digital educational resources, teachers' professional development must be continuous and systematic (Korol, 2014). Digital platforms allow for the creation of personalised learning programmes that take into account the needs of each pupil and student. They facilitate greater collaboration between students and teachers, even in distance learning. However, digitalisation also creates challenges, such as the need to train teaching staff in the use of new technologies and to ensure the security of student data in the digital environment. There are various approaches to the use of digital technologies in the learning process (Zou *et al.*, 2025). The main ones include: interactive teaching materials-electronic textbooks and applications that provide interactive materials to help pupils and students understand mathematical terms and definitions through visualisation, animation and interactive tasks; software: educational programmes, programmes for teaching mathematical problem solving, graphic calculators, mathematical packages and geometric applications that allow pupils and students to explore mathematical concepts through analysis, visualisation (graphs and diagrams) and practical problem solving; online platforms and educational websites on mathematics, which provide students with the opportunity to study mathematics at a convenient time and at their own pace, as well as allowing them to receive feedback and support from teachers through online communication; the use of computer software and other interactive devices that allow teachers to deliver mathematics presentations in an interactive and more engaging format.

New approaches to digital mathematics education are needed to promote a better understanding of mathematical concepts and stimulate pupils' and students' interest in learning. However, it is important to remember that the successful use of digital electronic technologies in mathematics education requires competent, information-literate teachers who are able to effectively integrate these technologies into the learning process (Gamit, 2023). In the process of developing digital technologies, it has become clear that most e-learning resources should consist of EERs divided into two main didactic tasks: material that teachers can give to pupils and students to help them develop the necessary knowledge, skills and abilities to apply them to solving problems; monitoring of the pedagogical actions learned, achieved mainly through diagnostics. Teachers are not limited in their choice of digital educational resources, but they need to take into account the structure and type of e-learning tools.

According to the definition by A. Sergeev *et al.* (2012), e-learning is learning based on developed scenarios using

multimedia and communication technologies. The teacher creates a scenario, the content of which consists of materials that define the learning objective and all components of learning, including assessment methods. With the introduction of e-learning and the development of digital technologies, the concept of electronic educational resources (EER) has become established for public consumption. EER represent educational materials and tools developed and implemented on the basis of digital (computer) technologies. This term encompasses the entire range of digital content used in the educational process. The main types of EER included electronic publications, electronic textbooks, educational software, interactive simulators, and various digital resources for testing and monitoring knowledge. In some areas of knowledge, EER (educational and methodological complex) placed as a set of software, hardware, and educational and methodological tools that provide a full range of educational services aimed at independent learning (theoretical, organisational, advisory, methodological, practical, experimental, etc.).

The main pedagogical tools used in EER are interactivity, multimedia, modelling, communication, and productivity (Abdulrahman *et al.*, 2020; Muir *et al.*, 2022). Interactivity is interaction that represents a person's intelligent life with their natural and social environment. Multimedia includes a whole range of methods for reproducing visual and sound effects that are logically interconnected and united by a specific didactic idea. Modelling is used to simulate changes in the processes and objects under consideration and to describe an image of an imaginary reality or situation from practical life. Communicability provides communication capabilities, is a direct source of information, performs management functions, and allows quick access to EER services in real time. Indicators of "the learner as a user" raise the effectiveness of learning to a much higher level by automating everyday activities and significantly reducing the time needed to find the necessary information. Thanks to the above tools, EER organises a new educational technology, based on which all types of education are interconnected into a single structure aimed at the individual creative development of the learner. Thus, the range of EER applications is quite diverse and mainly depends on the goals and objectives that the teacher seeks to achieve in the course of the educational process.

■ MATERIALS AND METHODS

The presented study was conducted as part of a pedagogical experiment aimed at determining the effectiveness of using electronic educational resources in the process of teaching mathematics to primary school students. The study was conducted between the 2022 and 2024 academic years. The study was conducted in three consecutive stages:

■ Constatative stage (2023-2024 academic year): assessment of the initial level of mathematical training of students.

■ Formative (experimental) stage: introduction of developed lesson models with the integration of EER and

multimedia presentations into the educational process of the experimental group.

■ **Control stage:** conducting a final assessment and comparative analysis of the results in the experimental and control groups.

The theoretical basis of the study was formed by the works of Kyrgyz and foreign researchers devoted to the problems of digital transformation of education, the use of electronic resources in pedagogy and methods of teaching mathematics. In the process of the work, the following theoretical methods were used: analysis, synthesis, comparison, classification and systematisation of scientific sources on the research problem to form a general concept; modelling of conditions for the implementation of mathematics training using digital technologies; studying the state of teaching and analysing the content of the mathematics course in primary school.

The empirical part of the study was conducted at Secondary School No. 8 in Bishkek, Kyrgyz Republic. The study sample consisted of 79 second-grade students ($n = 79$). Two groups were formed for the pedagogical experiment: experimental group (EG): 40 students; control group (CG): 39 students. The groups were recognised as equivalent at the initial stage based on the results of the initial assessment. The following empirical methods were used to collect empirical data: pedagogical observation of the learning process; questionnaires and surveys of teachers on the use of digital resources in mathematics teaching; study and summarisation of experience in implementing digital educational platforms (electronic textbooks, interactive simulators); diagnostic (initial) and final assessment of students' knowledge using standardised test tasks. The Student Achievement Levels (SAL) online resource was used to analyse the quality of knowledge, and the BaalooApp application was used to monitor and formatively assess the development of mathematical skills. Assessment using BaalooApp was conducted individually with each student (a 3-5-minute task) or as part of group learning.

Primary data processing included calculating the mean values and standard deviations of knowledge indicators. A comparative analysis of the results of diagnostic and final assessments was conducted. To confirm the statistical significance of the differences between the indicators of the experimental and control groups, the non-parametric Mann-Whitney U-test was used, and to assess the intra-group dynamics, the Wilcoxon test (or Student's t-test for dependent samples, assuming normal distribution) was used. Statistical analysis was performed using SPSS software (version 26.0).

At the forming stage, the experimental group used developed lesson models that integrated interactive teaching methods (the learning process was actively accompanied by video materials and interactive tasks) and electronic educational resources, including: IBILIM (a software and methodological resource for primary school classes); LearningApps (an online service for creating interactive exercises); Komodo (an application for personalised mathematics education for children aged 4-11); and the "Learning to Count"

programme. In the control group, teaching was conducted using traditional methods and approaches, without the systematic use of the above-mentioned electronic educational resources, but with the basic curriculum remaining unchanged. The pedagogical experiment was conducted in compliance with all ethical standards (ASA, 2018). Informed consent was obtained from the parents (legal representatives) of the 2nd grade students for their children's participation in the study and the processing of the results obtained. All data are presented in an anonymised form.

■ RESULTS AND DISCUSSION

Using electronic resources in mathematics lessons

The didactic potential of electronic educational resources lied in their ability to significantly improve the quality of mathematical learning by improving the perception of abstract concepts and intensifying students' internal motivation. The introduction of EER did not require a radical overhaul of the structural format of the work programme or lesson plan. The differences between traditional and digital learning formats are evident only at the level of teaching methodology, which is adapted through the integration of digital technologies. The use of digital technologies in mathematics education significantly expands the teacher's arsenal. Currently, there are many specialised online platforms, interactive programmes, mathematical calculators, and applications for developing exercises that can be effectively used in the learning process. One of them is LearningApps (n.d.) – a free online service that allows you to create interactive exercises to assess the knowledge of pupils and students (Figs. 1, 2). This service contains 20 interactive exercises in a game format. Teachers can independently develop tasks using ready-made templates or create similar exercises from the collection (Aitbay kyzy *et al.*, 2024).

The Komodo app (n.d.) is designed for children aged 4 to 11. It works on all devices, does not require children to spend long periods of time in front of a screen, and the learning is personalised by maths teachers to suit each child's needs (Fig. 3).

The electronic educational resource IBILIM (n.d.) is a software and methodology package developed by a team of specialists, including experienced teachers and experts in the field of information technology. The resource contains specialised teaching materials on seven subjects and is intended for use as an additional educational tool in primary schools. Access to the platform is free and does not require prior registration, which ensures its wide availability to the educational community. The materials are relevant for use by primary school teachers, as well as by pupils for independent study and their parents (Fig. 4).

In the context of mathematics education for primary school pupils, IBILIM (n.d.) has high didactic potential. The information is presented in a visually oriented format, which improves the perception of the material and supports opportunities for independent learning activities by students. Systematic use of this resource in mathematics lessons contributes to the formation of key and subject-specific competencies required by educational standards.

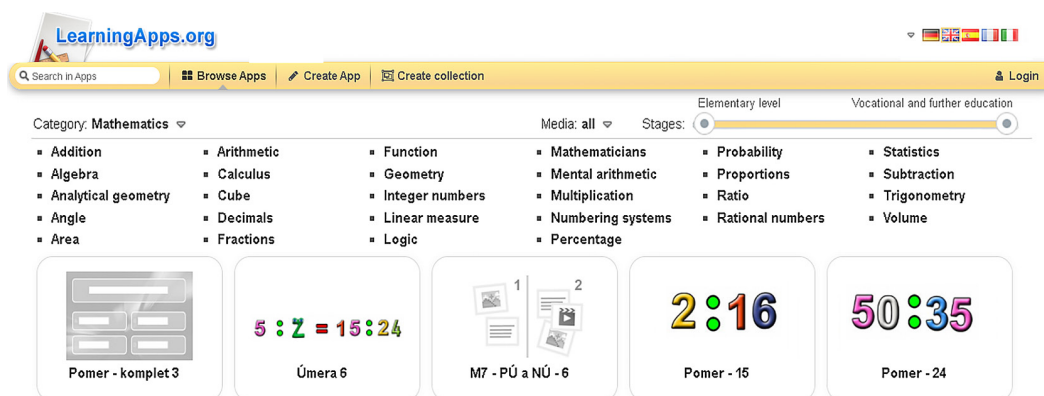


Figure 1. Online resource LearningApps for creating interactive exercises

Source: screenshot from LearningApps (n.d.)

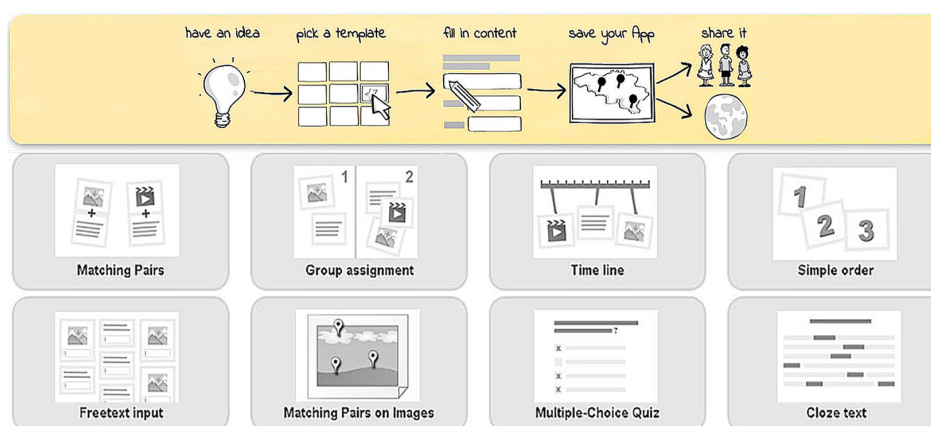


Figure 2. Task type templates on the LearningApps portal

Source: screenshot from LearningApps (n.d.)

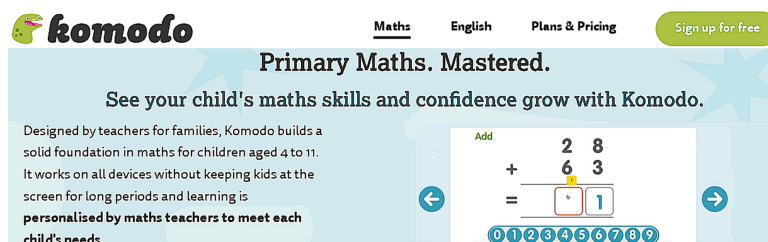


Figure 3. Komodo Maths programme

Source: screenshot from Komodo (n.d.)

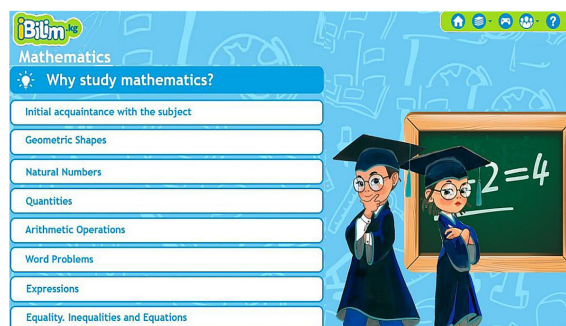


Figure 4. Electronic resource IBILIM

Source: screenshot from IBILIM (n.d.)

Using the BaalooApp programme in primary school mathematics lessons

The programme BaalooApp was developed by the USAID project “Okuu Keremet!” (n.d.) with the aim of assessing the mathematical abilities and skills of pupils in grades 1-4. With the help of the tools offered in the BaalooApp programme, it is possible to test the level of development of students’ mathematical skills on topics covered in the state subject standard

for mathematics, identify their strengths in development, and identify problems that students encounter. The use of feedback helps to adjust teaching methods in a timely manner to ensure student success in learning, develop and improve mathematical skills. G. Kazieva *et al.* (2022) in a methodological guide for primary school teachers propose tools for formative assessment of primary school students. Table 1 presents the formative assessment tools offered by BaalooApp.

Table 1. Tools for formative assessment of students’ mathematical skills

Quarter	1 st grade	2 nd grade	3 rd grade	4 th grade
I	Recognition and comparison of numbers up to 10	Decomposition and composition of numbers up to 100	Multiplication and division of numbers	Adding four-digit and three-digit numbers
				Subtracting three-digit numbers from four-digit numbers
				Multiplying three-digit numbers by single digits
II	Addition and subtraction of numbers within 10	Recognition of geometric shapes, identification of differences and similarities between polygons	Conversion of quantities from one unit of measurement to another	Division of three-digit numbers by single-digit numbers
				Solving problems to find the perimeter and area of geometric shapes
	Solution of equations with a “window” (equations) by method of selection	Adding two-digit numbers	Decomposition and composition of three-digit numbers	Understanding place value, reading, writing and ordering numbers within 1,000
III	Composing and breaking down numbers up to 20	Subtraction of two-digit numbers	Constructing a natural sequence of numbers within 1,000	Conversion of quantities from one unit of measurement to another, arithmetic operations with named quantities
	Adding single-digit numbers with carrying over tens	Solving simple text problems	Finding the perimeter and area of geometric shapes	
	Subtraction of a single-digit number from a two-digit number with carry over	Solving simple addition and subtraction equations	Solving equations for multiplication and division	
IV	Recognition of geometric shapes and their elements, identification of differences in geometric shapes	Conversion of one unit of measurement to another	Adding three-digit numbers with carry over from the tens place	Solving motion problems
			Subtraction of three-digit numbers with carry over	Solving complex equations (stage 1)
	Solving simple text problems	Understanding the principle of constructing a natural number sequence within 100	Solving multiplication and division problems	Solving complex equations (stage 2)
Total	8 tools	8 tools	9 tools	10 tools

Source: compiled by the authors

Assessment is carried out individually with each student, but group assessment can also be used in group learning. The task takes 3-5 minutes to complete. During one lesson, 5-6 students

can be assessed. Students are asked to complete the task presented by the BaalooApp programme. After the student responds, their result is entered into the programme (Fig. 5).

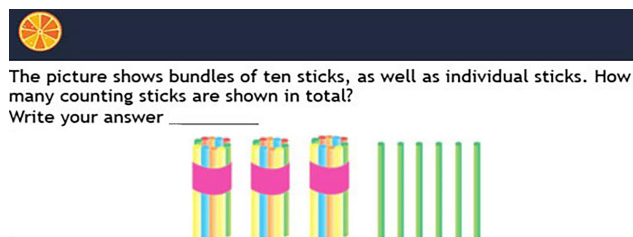


Figure 5. Tool “Decomposition and composition of two-digit numbers”

Source: screenshot from the BaalooApp page

Software BaalooApp provides the ability to conduct effective formative assessment of students’ mathematical skills. The system provides detailed feedback immediately after the test is completed. The key functionality of the application is the comprehensive display of the results of completed tasks, which allows the teacher and student to obtain comprehensive information about the process of acquiring knowledge. Based on this data, the software generates recommendations for individualising the learning process, aimed at correcting identified deficiencies and improving students’ mathematical skills. Below are specific recommendations that this programme provides for organising students’ learning activities and teachers’ methodological work, depending on the percentage obtained.

80-100%. These students did very well on the assignment. Feedback for the student: “You have mastered two-digit numbers, breaking them down into tens and ones, and adding them together. These are important skills for understanding addition and subtraction of two-digit and three-digit numbers, as well as for performing written multiplication and division. Continue to improve these skills.” Feedback for the teacher: “You can give these students more challenging tasks to develop their understanding of place value, such as tasks to compose other numbers using the same digits; comparing numbers using place value; and a task to form a three-digit number (its name, notation, and definition of a new place value).”

60-79%. These students were relatively successful in completing the task. Feedback for the student: “You were able to correctly show two-digit numbers break them down into tens and ones. This is an important skill, especially for oral and written addition and reading two-digit numbers, as well as for written multiplication and division. However, you have some difficulty composing two-digit numbers and decomposing them into tens and ones. You should continue to practise this skill.” Feedback for the teacher: “Demonstrate the solution of several problems using the example of representing numbers up to 100 as a number of place value addends, composing and decomposing numbers into tens and ones. Then ask the students to take turns explaining how they composed a two-digit number and how they decomposed the number into tens and ones. From time to time, check how the participants are performing the tasks of composing and decomposing numbers up to 100. You can find these examples in the current mathematics

textbook for Grade 2, in Modules 1, 6 (Appendix B) and in the “Collection of Tasks”.

30-59%. These pupils did poorly on the task. They need help understanding each step of the subtraction process and mastering the use of the algorithm. Feedback for the teacher: “Think about these pupils: why do you think they are having difficulty with these tasks? Do they have a sufficient understanding of what two-digit numbers consist of? Or are they making mistakes in indicating the place value of a digit in a number, which leads to incorrect naming of the value and unit? Discuss the correct and incorrect results with the students to eliminate difficulties and their limitations. Review in detail with students the composition and distribution of two-digit numbers up to 100 in the following steps: (1). Work through ordinal counting, counting by tens, possibly using visual aids (e.g. a number line). (2). Use counting aids to show how two-digit numbers are formed from ones and tens. Pay attention to saying the names of two-digit numbers aloud and writing them down. Give the task of forming any two-digit number, name it and write it down. Then ask to show the number on bundles and sticks (for example, 43 counting sticks). (3). Consider the composition of two-digit numbers up to 100. Pay attention to the place value of digits in examples using graphic models. Give the task of forming a number from ten and any two-digit number and ask the student to say the steps of the task aloud. (4). Give examples of the distribution of numbers into tens and values. Give the task: decompose numbers and get any two-digit number. (5). Work with students on representing two-digit numbers as the sum of place value addends. (6). Give tasks for calculating sums and differences by grouping place value addends and comparing numbers using place value units. Set aside time to observe how each student is working and help them identify incorrect solutions and correct them. You can find these examples in the current mathematics textbook for Grade 1; in Modules 1, 6 (Appendix B); and in the “Collection of Tasks”.

0-29%. These pupils did poorly on the task. They need help understanding each step of the subtraction process and mastering the use of the algorithm. Feedback for the teacher: “Think about these pupils: why do you think they are having difficulty with these tasks? Do they have a sufficient understanding of how two-digit numbers are formed? Or are they making mistakes in indicating the place value of a digit in a number, which leads to incorrect naming of the value and unit? Discuss correct and incorrect results with students to eliminate difficulties and their limitations. Review the composition and distribution of two-digit numbers up to 100 in detail with your students using the following steps: (1). Work through ordinal counting, counting by tens, possibly using visual aids (e.g. a number line). (2). Point out the formation of two-digit numbers from degree and degree on the counting aids. Pay attention to saying the names of two-digit numbers and writing them down. Give the task of forming any two-digit number, name it and write it down. Then ask to show the number on bundles

and sticks (for example, 43 counting sticks). (3). Consider the composition of two-digit numbers up to 100. Pay attention to the place value of digits in examples using graphic models. Give the task of forming a ten and any two-digit number and ask the student to say the steps of the task aloud. (4). Give examples of the distribution of numbers into tens and values. Give the task of breaking down into tens and obtaining any two-digit number. (5). Work with students on representing two-digit numbers as the sum of place value addends. (6). Give tasks for calculating the sum and difference by grouping place value addends and comparing numbers using place value units. Set aside time to observe how students are working and help them identify and correct incorrect solutions. These examples can be found in the current maths textbook for Year 1; in Modules 1 and 6 (Appendix B); and in the “Collection of Tasks.”

Results of a pedagogical experiment on the effectiveness of using digital technologies in the educational process

The results of the pedagogical experiment confirmed the high effectiveness of using digital educational technologies and resources in the process of teaching mathematics to students in the context of the digitalisation of education. This effectiveness was achieved through a combination of interrelated organisational and pedagogical conditions and adequate teaching and methodological support, provided by electronic educational resources, interactive teaching materials and methodological recommendations. One of the key results was a significant increase in the level of academic motivation in the experimental group. The use of interactive platforms, online simulators and digital tasks ensured clarity and a high level of interest in the learning process, which had a positive effect on the involvement of schoolchildren in educational activities. According to the survey, more than 70% of students noted that classes using digital tools contributed to a deeper understanding of mathematical concepts and algorithms. The second significant result was the progressive development of independent work and self-control skills among students in the experimental class. The use of the BaalooApp formative assessment programme and online testing provided a mechanism for immediate feedback, allowing students to quickly correct mistakes and track their individual progress. This mechanism contributed to the effective formation of regulatory universal learning activities. For qualitative characterisation of the level of knowledge in mathematics, a 4-step assessment system was used:

- Level 1 – from 80% to 100%, 4 or 5 out of 5 tasks completed;
- Level 2 – from 60% to 79%, 3 out of 5 tasks completed;
- Level 3 – from 30% to 59%, 2 out of 5 tasks completed;
- Level 4 – from 0% to 29%, 1 task completed out of 5.

A comparative analysis of the control and experimental groups revealed significant differences in the level of mathematical training. As a result of experimental training, the level of mathematical training increased for most

students. According to the results of the diagnostic experiment, 15% of students had Level 1, but as a result of experimental training, their number increased to 25%, and Level 4 decreased from 10% to 5%. In the experimental classes, the number of students who coped with tasks of increased complexity increased by 10% compared to the control group. The performance indicators for tasks requiring logical reasoning and the use of digital tools for visualising mathematical models also improved. The effectiveness of teaching mathematics using digital electronic resources is shown in the diagrams (Figs. 6, 7, 8).

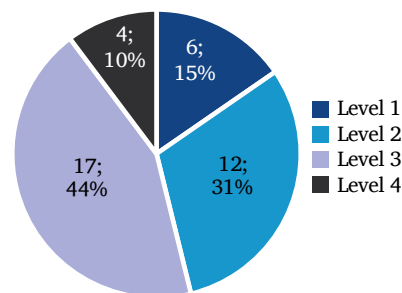


Figure 6. Learning outcomes of students in the control class

Source: compiled by the authors

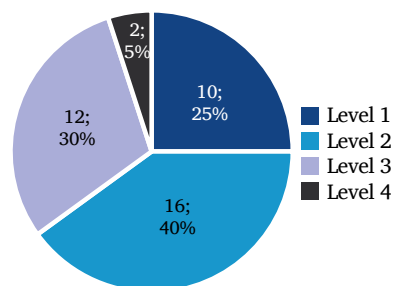


Figure 7. Learning outcomes of students in the control class

Source: compiled by the authors

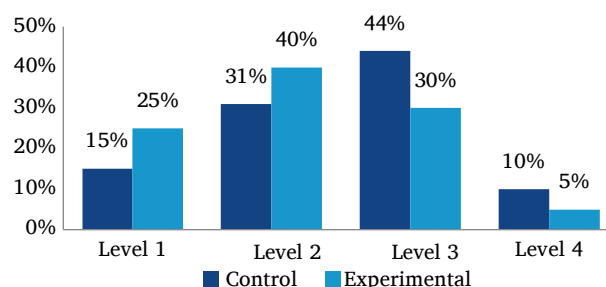


Figure 8. Comparison of monitoring results for the control and experimental classes

Source: compiled by the authors

Student Achievement Levels (SAL) methodology was used to calculate and systematise student performance indicators. Analysis of the data obtained revealed the following results (Table 2).

Table 2. Comparative results of student performance

Student performance indicators	Control class	Experimental class
Academic performance	89.74%	95%
Quality of knowledge	46.15%	65%
Level of training	52.41%	62.2%
Average score	3.51	3.85

Source: compiled by the authors

The results of the pedagogical experiment demonstrate statistically significant confirmation of the hypothesis about the effectiveness of integrating digital tools into the process of teaching mathematics to primary school pupils. Firstly, it has been confirmed that the introduction of EER has provided a significant increase in learning outcomes, shaped new educational practices, and created conditions for a more flexible and individualised learning trajectory. This is consistent with the findings of N. Saat *et al.* (2024), who in their systematic review also emphasise the positive impact of digital technologies on academic performance in mathematics education. Secondly, discussion of the data obtained shows that the digitisation of the educational process is not limited to improving the quality of subject training, but also stimulates the development of meta-subject competencies: critical thinking, information literacy and digital resource skills. The development of these skills is particularly important, as noted in the work of R. Kirillova & N. Timofeeva (2020), since modern education requires students to develop a broad range of social competencies necessary in a digital society.

Thirdly, the study identified key problems and limitations in the process of introducing digital technologies. Analysis of teaching materials and pedagogical observation in schools showed that digital tools are being used passively, confirming the thesis that there is a lack of systematic attention to the effective use of EER as a means of personal development. The difficulties identified include the need to improve teachers' qualifications, the risks of information overload for students, and technical support issues. The data obtained echoes the research of B. Pepin *et al.* (2023) and A. Khamza *et al.* (2024), which indicates that the successful integration of digital resources requires systematic support for the digital environment, the development of clear criteria for evaluating effectiveness, and methodological support for teachers. It is important to note that, despite the role of EER as a modern teaching tool, they cannot replace teachers in any way. The use of digital resources in the educational process does not limit the role of the teacher but, on the contrary, transforms it. The results obtained showed that prompt feedback and the ability to make timely corrections to the learning process allow the teacher to act not as a passive observer, but as an active moderator who guides learning activities to achieve maximum student success.

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CONCLUSIONS

Based on the analysis of theoretical sources and the results of the pedagogical experiment, key conclusions were formulated regarding the effectiveness of integrating electronic educational resources into the process of teaching mathematics to primary school pupils. The study confirmed the hypothesis that the systematic use of digital technologies in the educational process contributes to a significant improvement in the quality of students' mathematical training and their motivation to learn. A comparative analysis of the data from the experimental and control groups showed that students involved in learning using interactive platforms (LearningApps, IBILIM, BaalooApp) achieved higher educational results. This was reflected in an increase in the number of correctly completed tasks of increased complexity, a decrease in the number of typical errors, and an increase in overall academic activity.

It has been established that the use of digital EERs made learning more visual, interactive, and personalised. The use of tools such as BaalooApp, with its instant feedback feature, became a critical element that allowed teachers to quickly adjust their teaching methods and students to develop independent work and self-control skills. Thus, digital educational programmes serve as a powerful tool for differentiating learning and building individual educational trajectories. In addition, the integration of digital EERs significant role in the formation of meta-subject competencies, such as critical thinking, logical analysis and information literacy, which are key in a digital society. Prospects for further research include the development and testing of unified criteria for assessing the effectiveness of the implementation of digital educational resources in schools, as well as studying the long-term impact of the use of digital EERs on spatial thinking and abstraction abilities in students of different age groups.

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Билим берүүдө математикалык окутууну санариптештирүү шарттарына ишке ашыруу

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Аннотация. Билим берүүнү системалуу санариптештирүүнүн шарттарында жаңы педагогикалык куралдардын натыйжалуулугун баалоо маселеси курч мааниге ээ болууда. Бул макала башталгыч класстын окуучуларынын математикалык даярдыгынын сапатына электрондук билим берүү ресурстарынын (ЭБР) таасирин эксперименталдык текшерүүгө арналган. Изилдөөнүн негизги максаты санариптик технологияларды интеграциялаган математика окутуу методикасынын натыйжалуулугун аныктоо болгон. Изилдөө 2022-2024-окуу жылдары Бишкек шаарындагы №8 орто жалпы билим берүү мектебинде педагогикалык эксперимент форматында жүргүзүлгөн. Эксперименталдык иштин жүрүшүндө сабакка мультимедиялык презентацияларды жана “IBILIM”, “LearningApps” жана “Komodo” сыяктуу адистештирилген ЭБРди колдонгон үлгүлүү сабактар киргизилген. Көндүмдөрдүн өнүгүүсүн көзөмөлдөө жана формативдик баалоо жүргүзүү үчүн “BaalooApp” колдонмосу пайдаланылган. Эксперименттин натыйжалуулугу диагностикалык жана жыйынтыктоочу баалоо маалыматтарын талдоо жана салыштыруу жолу менен аныкталган. Алынган маалыматтарды талдоо эксперименталдык топтордо математикалык даярдыктын натыйжалуулугунун жогорулаганын тастыктады. Баштапкы жана көзөмөл тобунун көрсөткүчтөрү менен салыштырганда, ЭБРди колдонгон окуучулардын билим сапатынын өсүшү 20 % га жогорулады. Бул санариптик ресурстарды жана интерактивдүү окутуу ыкмаларын интеграциялоо математикалык билимдер менен көндүмдөрдү өздөштүрүүнү кыйла жакшытарын далилдейт. Изилдөөнүн жыйынтыктары электрондук билим берүү ресурстарын колдонгон методиканын жогорку натыйжалуулугун көрсөттү. Системалуу жана методикалык жактан негизделген ЭБРди колдонуу окуучулардын мотивациясын гана жогорулатып тим болбостон, математикалык жана маалыматтык компетенцияларды өнүктүрүүдө сапаттуу секирик камсыз кыларын аныкталды. Бул билим берүү процессин мындан ары модернизациялоодо олуттуу практикалык мааниге ээ.

Негизги сөздөр: математика; санариптик технологиялар; электрондук билим берүү ресурстары; окутуу ыкмалары; окуу процесси

Реализация математической подготовки в условиях цифровизации образования

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Аннотация. В условиях системной цифровизации образования критически актуализируется задача оценки эффективности новых педагогических инструментов. Настоящая статья посвящена экспериментальной проверке влияния электронных образовательных ресурсов (ЭОР) на качество математической подготовки обучающихся младшей школы. Основная цель исследования состояла в определении результативности методики обучения математике, интегрирующей цифровые технологии. Исследование проводилось в формате педагогического эксперимента в период 2022-2024 учебных годов на базе средней общеобразовательной школы №8 города Бишкек. В ходе экспериментальной работы в учебный процесс были внедрены разработанные модели уроков с использованием мультимедийных презентаций и специализированных ЭОР, таких как «IBILIM», «LearningApps» и «Komodo». Для мониторинга развития навыков и проведения формативного оценивания применялось приложение «BaalooApp». Эффективность эксперимента оценивалась путем анализа и сравнения данных диагностирующего и итогового оценивания. Анализ полученных данных подтвердил повышение результативности математической подготовки в экспериментальных группах. По сравнению с исходными и контрольными показателями, качественный рост показателей знаний учащихся, применявших ЭОР, повысился на 20 %. Это свидетельствует о том, что интеграция цифровых ресурсов и интерактивных методов обучения позволяет значительно улучшить усвоение математических знаний и навыков. Результаты исследования продемонстрировали высокую эффективность разработанной методики с использованием электронных образовательных ресурсов. Установлено, что систематическое и методически обоснованное применение ЭОР не только повышает мотивацию обучающихся, но и обеспечивает качественный скачок в развитии математических и информационных компетенций, что имеет значимую практическую ценность для дальнейшей модернизации образовательного процесса.

Ключевые слова: математика; цифровые технологии; электронные образовательные ресурсы; подходы к обучению; учебный процесс



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On the need for obtaining special knowledge in the field of economic activities by clergymen and church specialists of the Russian Orthodox Church

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Abstract. The purpose of this study was to identify the relationship between the normative-canonical framework and organisational models of economic activity of the Russian Orthodox Church in comparison with modern international approaches. The research methodology was based on quantitative and qualitative content analysis of regulatory acts of the Russian Orthodox Church and the Ministry of Education of the Russian Federation using MAXQDA and AntConc software, as well as comparison with the results of international studies. The results showed that the categories of "legal regulation" (128 mentions, 41.9%), "educational activity" (95-102 mentions, 31.7%) and "organisational issues" (69-73 mentions, 26.4%) prevail in the normative acts of the Russian Orthodox Church. Additionally, the blocks of "ethics and social responsibility" (38-41 mentions) and "international cooperation" (25-27 mentions) were recorded. The practical activities of church institutions coincide with statutory norms only partially: 64% in property transactions and 42% in educational projects. International studies have shown that financial transparency increases the sustainability of religious communities (increasing the number of active participants by 37% and donations by 24%), and the introduction of educational programs and courses on financial literacy helps reduce staff turnover. Digitalisation of document management and online learning has reduced administrative costs by 12-20% and increased the number of students from 4.3 thousand to 11.7 thousand over six years. It has been established that the main discrepancies concern property management and educational training of specialists. The obtained data can be used in developing programs for improving the qualifications of the clergy and improving the system of church management

Keywords: property management; financial literacy; legal regulation; educational programs; specialist competencies; economic sustainability; personnel training

■ INTRODUCTION

Since the early 2020s, academic literature has shown increased interest in the socio-economic and educational functions of religious institutions. In a historical and sociological context, this issue is addressed in the work of

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G. Tadesse (2024), which shows that Orthodox churches, including the Ethiopian Orthodox Church, have traditionally combined spiritual and social roles, influencing not only religious life but also politics and economics. This approach emphasised the stability of institutional functions from a historical perspective. A different line of analysis is proposed in the study by D. Gamza & P. Jones (2020), which examined the evolution of religious regulation in post-Soviet states. In contrast to G. Tadesse's historical perspective, the emphasis is on the variability of the legal framework and the need for religious organisations to adapt to political conditions. Developing this line of thought, A. Usenov (2022) showed that the process of adaptation is often accompanied by a contradiction between the formal provisions of legislation and the practical restrictions that arise in the activities of religious communities.

Issues of religious education have also become the subject of active academic debate. R. Dogan & Z. Zholalieva (2022) interpreted religious education as a structural element of identity formation, noting its importance in the school system. At the same time, F. Hadžić (2023), drawing on Balkan material, showed that the clericalisation of the educational process can exacerbate ethnic tensions and contribute to the politicisation of public consciousness. A separate area of research is related to the training and professional activities of the clergy. B. Voorhees *et al.* (2024) identified a correlation between the level of training in parish management and indicators of satisfaction with ministry, as well as the stability of religious communities. However, the results of D. Osmonova *et al.* (2024) demonstrated that the influence of religious organisations goes beyond the professional training of clergy, shaping the value orientations of young people and influencing the cultural identity of society as a whole.

In the context of the COVID-19 pandemic and the subsequent transformations in religious life, digitalisation processes have attracted considerable attention in academic literature. C. Grigore & A. Cobzeanu (2025) showed in a systematic review that the transition of religious communities to the online environment has changed the practices of collective participation and the internal dynamics of communities. The authors note the formation of new forms of interaction, where digital technologies have become a tool for maintaining community ties. In parallel with this, interest in the analysis of spirituality and religion in information studies has increased. P. Nangia & I. Ruthven (2025) systematised approaches to the study of religious and spiritual experience in information science based on material from a period of more than thirty years. Developing this line of thought, N. Caidi *et al.* (2025) emphasised that religious practices increasingly involve searching for and processing information, forming special models of "information experience" that differ from traditional ones.

The historical aspect of the analysis is presented in a study by P. Hunt (2023), which examines the crisis of modernisation in 17th century Russia using the autobiographical life of the protopope Avvakum as an example. Unlike

contemporary works focused on digital transformations, this study emphasises the conflicts between tradition and modernisation processes in the religious environment. Contemporary sociology of religion demonstrates a tendency to view religious processes through the prism of political and social polarisation. S. Perry (2022) showed that American religiosity is increasingly involved in ideological divisions, where the church becomes part of a broad social configuration of conflict. At the same time, K. Marshall (2021) focused on the institutional dimension of religious freedom, analysing methodologies for its assessment and practices of application in the political sphere. J. Dalziel (2023) pointed to the contradictions that arise in Christian and secular universities, where religious identity and academic autonomy often come into conflict. From a socio-economic perspective, R. Smith (2020) examined the practices of church advocacy participation in issues of inequality and urban economic restructuring, which complements the understanding of the role of religious institutions in contemporary societies.

The aim of this study was to identify the conditions and prerequisites for the formation of specialised knowledge in the field of economic and educational activities among clergy and church specialists of the Russian Orthodox Church (ROC). Two key tasks were accomplished in the course of the analysis. The first was to identify the lexical-semantic and content characteristics of normative and organisational texts, allowing to determine the specifics of their regulatory impact on the training of clergy. The second task was to typologise the forms of economic and educational activity recorded in the documents and analytical materials of the Church, taking into account their institutional orientation and comparing them with contemporary foreign studies of religious management.

■ MATERIALS AND METHODS

The study, conducted between February and June 2025 in the Kyrgyz Republic, aimed to identify the conditions and prerequisites for clergy and church specialists of the Russian Orthodox Church to acquire specialised knowledge in the field of economic activity. The official versions of the Charter of the Russian Orthodox Church (2013) and the Educational Concept of the Russian Orthodox Church (2016) were used as the empirical basis. The Regulation on the Uniform Procedure... (2011) and the Bachelor's Programme... (2011) were also included. These documents were considered key sources that set the normative and canonical basis for the training and activities of the clergy. Materials reflecting the economic activities of church institutions played a significant role in the study: the activities of the Art and production enterprise Sofrino (n.d.), Financial and Economic Administration of the Russian Orthodox Church (n.d.), as well as analytical reports by the Educational Committee of the Russian Orthodox Church (n.d.) and the work of the Expert Council "Economics and Ethics" (2009). These examples made it possible to identify the organisational models and approaches used by the Church in the fields of economics and education.

The scientific basis of the study was formed by contemporary works by international authors covering issues of financial and organisational development of religious institutions. The comparative analysis took into account studies by J. Gao (2021) on China, E. Searing *et al.* (2025) on the United States, and P. Weller (2024) on the United Kingdom. The work of D. Fidayanti *et al.* (2024) on Indonesia was also considered. These particular studies and countries were selected due to their representativeness and relevance: China and Indonesia reflect the dynamics of digitalisation and religious management in Asia, the United States demonstrates a combination of social mission and educational programmes, and the British experience illustrates institutional and financial transformations in times of crisis. This made it possible to compare the national characteristics of the financial and educational development of religious organisations in different cultural and institutional contexts. Before analysis, the texts of the documents were converted to a single digital format (UTF-8) and cleaned of duplicate elements and uninformative structural insertions. The processing was carried out in the MAXQDA Analytics Pro 2022 (n.d.) analytical environment, which made it possible to identify key semantic categories and ensure the reliability of coding. Additionally, using the software AntConc 4.2.0 (n.d.), to identify frequent word forms and analyse stable lexical constructions related to property management, educational activities, and administrative responsibility.

The criterion for selecting materials was their substantive relevance to the research task: only documents with direct provisions on the economic or educational activities of the Church were included in the corpus. Texts of a theological and journalistic nature that did not have normative force were excluded. The analysis was carried out using semantic coding, followed by categorisation of the selected segments into three areas: legal regulation, educational practices, and organisational forms of economic activity. To increase reliability, the results were re-verified and compared with the original markup.

The methodological basis of the study was based on a combination of comparative legal analysis and content analysis, which made it possible to identify the relationship between the requirements of state and church documents and to determine the areas in which clergy and church specialists need to develop specialised knowledge. The research was conducted in accordance with the principles of scientific integrity and in compliance with the academic and legal ethics standards of the WIPO Copyright Treaty (1996) and The European Code... (2023), which ruled out the possibility of copyright infringement and ensured the transparency of the analysis procedure.

■ RESULTS

Regulatory and canonical framework and organisational forms of economic activity

An analysis of the normative and canonical sources of the Russian Orthodox Church shows that issues of economic and educational activity are consistently enshrined in a number of institutional-level documents. First and foremost, the Charter of the Russian Orthodox Church (2013) fixes the basic provisions on the right of church organisations to own and dispose of property, and also defines the framework for the participation of the clergy in management processes. The Educational Concept of the Russian Orthodox Church (2016) supplements this basis by establishing principles for training personnel, including the development of the knowledge necessary for clergy to administer parish and diocesan life. Also of importance are the Regulation on the Uniform Procedure... (2011) and federal state educational standards, which correspond to bachelor's programmes at theological educational institutions. Thus, the regulatory level sets not only canonical boundaries, but also institutional guidelines that allow the Church's economic and educational activities to be integrated into a broader socio-legal context.

Organisational practice illustrates how these norms are implemented in specific models. The Sofrino (n.d.) manufacturing enterprise is an example of a centralised economic complex that combines church production with commercial management mechanisms. The activities of the Financial and Economic Administration of the Russian Orthodox Church (n.d.) demonstrate an institutionalised approach to the management of material resources, including control over the real estate and finances of dioceses. At the same time, the work of the Expert Council on "Economics and Ethics" (2009) reflects the desire to create discursive platforms where economic issues are linked to ethical principles and recommendations on the Church's economic policy are developed. A comparison of normative provisions and organisational practices shows that normative acts serve as a systemic framework, while institutional structures ensure their practical implementation. This interconnection points to the dual nature of church governance: on the one hand, it is enshrined in canon law and regulations, and on the other, it develops within the framework of adaptive organisational models that take into account contemporary socio-economic conditions. Table 1 presents a comparative overview of the normative acts of the Russian Orthodox Church and the documents of the Ministry of Education of the Russian Federation (n.d.), which define the legal and educational framework for economic and educational activities.

Table 1. Comparative overview of regulatory acts of the Russian Orthodox Church and the Ministry of Education of the Russian Federation

Document	Year	Scope of regulation	Key provisions
Charter of the Russian Orthodox Church	2013	Organisation and management	Defines the structure of church governance, including property matters
Educational Concept of the Russian Orthodox Church	2016	Education	Sets the strategy for religious education, determines the goals and forms of training for the clergy

Table 1. Continued

Document	Year	Scope of regulation	Key provisions
Regulation on the Uniform Procedure for the Ownership, Use and Disposal of Immovable and Especially Valuable Movable Property of Religious Organisations of the Russian Orthodox Church	2011	Property relations	Regulates the use and management of church property
Bachelor's Programme of Theological Educational Institutions of the Russian Orthodox Church	2011	Staff training	Defines the content of educational programmes and qualification requirements

Source: compiled by the authors based on *Regulation on the Uniform Procedure...* (2011), *Bachelor's Programme...* (2011), *Charter of the Russian Orthodox Church* (2013), *Educational Concept of the Russian Orthodox Church* (2016)

Table 1 lists key documents that define approaches to educational and economic activities. The Charter of the Russian Orthodox Church (2013) sets the basis for the management of parishes, monasteries, and educational institutions, including property issues. The Educational Concept of the Russian Orthodox Church (2016) formulates the goals and objectives of spiritual education, including the training of clergy and specialists in the church sphere. The Regulation on the Uniform Procedure... (2011) directly concerns property regulation-the disposal of land, buildings, and economic enterprises. The documents of the Ministry of Education (n.d.) do not address such issues: they are limited to the norms for providing schools with material and technical resources. Bachelor's Programme... (2011) establishes the structure for the training

of theological and pastoral personnel. In state institutions, similar standardisation mechanisms are implemented through federal standards and recommendations, but without reference to property issues.

The comparison shows that the regulatory framework of the Russian Orthodox Church combines educational and property regulation into a single system, while the Ministry of Education focuses exclusively on standards for the content and organisation of the educational process. Table 2 presents organisational models of the Russian Orthodox Church's economic activities using the example of the manufacturing enterprise Sofrino (n.d.) and the Financial and Economic Administration (n.d.), reflecting the difference between a centralised production complex and an administrative body for property control.

Table 2. Organisational models of economic activity of church institutions (Sofrino and FEA)

Institute	Organisational form	Key features	Management features
Sofrino Artistic Production Enterprise	Centralised Production Association under the Russian Orthodox Church	Production of church utensils, icons, liturgical items; distribution through church and secular channels	Combination of economic and spiritual governance, integration of commercial mechanisms while maintaining church control
Financial and Economic Administration (FEA) of the Russian Orthodox Church	Central administrative body	Management of real estate, diocesan finances, control over material resources	Institutionalised system of financial control, direct accountability to the Patriarch and the Synod

Source: compiled by the authors based on *Sofrino* (n.d.), *Financial and Economic Administration* (n.d.)

Table 2 shows two different but complementary approaches to the organisation of the economic activities of the Russian Orthodox Church. The model implemented at the Sofrino enterprise demonstrates an example of combining a spiritual mission with market instruments: the production of church utensils and religious products is carried out within a centralised system, where self-financing and diversification of income sources are key elements. This reflects a trend towards institutional autonomy, allowing the Church not only to meet its internal needs, but also to form a sustainable economic segment. In contrast, the Financial and Economic Administration (FEA) represents a model of administrative and managerial regulation focused on the control of property resources, the distribution of material goods, and the financial reporting of dioceses. The emphasis here is not on production or entrepreneurial activity, but on coordination, standardisation and maintaining transparency in economic processes. A comparison of these models shows that Sofrino is focused on external economic stability

and expanding its resource base, while the FEA acts as a guarantor of institutional discipline and centralised control. Together, they illustrate the dual strategy of the Russian Orthodox Church: the development of independent economic initiatives while maintaining strict centralised control, which ensures a balance between economic efficiency and canonical principles (Fig. 1). Figure 1 shows the multi-level system of interaction between the Expert Council on "Economics and Ethics" and key structures of the Russian Orthodox Church, reflecting a combination of canonical and administrative hierarchy with advisory and expert mechanisms. The Patriarch of Moscow and All Russia occupies a central place in this system, acting as the highest coordinator of management and economic decisions, working closely with the Holy Synod as a collegial body that determines the strategic directions of property and economic policy. At the administrative level, an important role is played by the Financial and Economic Department, which carries out the practical management of material resources, controls

real estate, financial flows and the activities of the Church's economic enterprises. The Expert Council on "Economics and Ethics" under the Patriarch serves as an advisory body that combines economic aspects with the principles of Orthodox ethics and acts as a platform for discussions on acceptable forms of entrepreneurial activity. Its interaction with the Department for External Church Relations allows it to take into account international experience and coordinate issues of dialogue with state and public structures. Within the council, working groups on business ethics are formed to develop practical recommendations for church organisations and create mechanisms for adapting economic policy to contemporary socio-economic challenges. An important area of activity is integration with the academic community, implemented through the Commission for

Interaction with Universities and Research Institutes, which ensures the involvement of scientific knowledge and educational practices in the training of specialists with both theological and managerial competencies. The system is complemented by diocesan economic councils, which provide feedback from the regional level and convey information about the real problems of parishes and monasteries to the centre, allowing strategic decisions to be adjusted to take account of local specificities. Taken together, the scheme reflects a holistic management model, where strategic leadership is combined with administrative implementation and expert support, as well as taking into account regional and scientific factors, which makes the economic activities of the Russian Orthodox Church more sustainable and consistent with canonical and ethical principles.

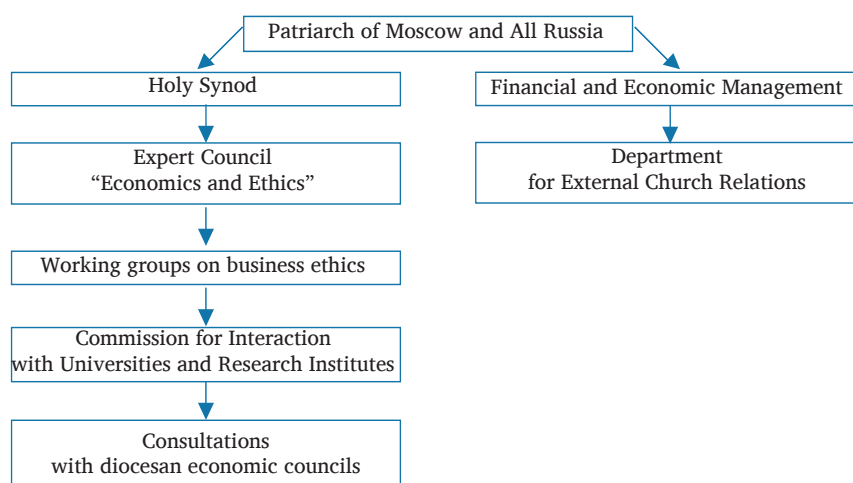


Figure 1. Interaction between the Expert Council on Economics and Ethics and other structures of the Russian Orthodox Church
Source: compiled by the authors based on Expert Council "Economics and Ethics" (2009)

Thus, consideration of the normative-canonical basis and organisational forms of economic activity of the Russian Orthodox Church reveals a stable interconnection between formal documents and the practice of their implementation. The charter, conceptual provisions, and decisions of the Synod form a system of legal and canonical coordinates within which property and educational regulation is carried out, while the activities of institutions such as Sofrino, the Financial and Economic Management Department, and the Expert Council on "Economics and Ethics" illustrate the specific mechanisms for implementing these norms in the economic and educational spheres. A comparison with the documents of the Ministry of Education of the Russian Federation shows a difference in emphasis: while the church's regulatory framework integrates property and educational issues into a single system, state acts focus primarily on standards for the educational process. This confirms the dual nature of governance in the Church, where the normative-canonical basis sets strategic guidelines, and organisational practice ensures their adaptation to modern socio-economic conditions.

Contemporary international approaches and content analysis results

Contemporary international approaches to the management of religious organisations reveal several distinct trends, confirmed by empirical research. M. Su *et al.* (2022), analysing the practices of more than 150 Protestant congregations in China and the United States, showed that the level of financial transparency correlates directly with the sustainability of communities: parishes that published annual income and expenditure reports had, on average, 37% more active parishioners and 24% higher donations than those that did not keep such records. The work of E. Searing *et al.* (2025), based on data from Catholic and Protestant organisations in the United States and Canada, shows that strategic planning has become a key tool for institutional sustainability: more than 68% of organisations that have incorporated long-term educational programmes for clergy and staff report increased engagement and reduced staff turnover. Particular attention is paid to the financial literacy of clergy: almost half of the courses included in the curriculum of US seminaries after 2020 contain modules on the basics of economics and management, whereas before 2015 their share did not exceed 15%.

K. Hinman *et al.* (2025) studied digitalisation processes in the church environment and found that 72% of religious organisations in Western Europe had implemented electronic document management systems, and 54% had implemented online education platforms for training and professional development of clergy. This has led to an average reduction in administrative costs of 12-15% and has made it possible to expand access to educational programmes: the number of students taking online courses at theological seminaries in the UK has increased from 4,300 in 2018 to 11,700 in 2024. A comparison of these data with the results of a content analysis of the ROC's normative acts reveals both common features and local characteristics. Analysis using MAXQDA and AntConc showed that in the Charter of the Russian Orthodox Church (2013), Educational Concept of the Russian Orthodox Church (2016), as well as in a number of resolutions of the Holy Synod, three groups of categories predominate: "education" (42% of the total number of recorded mentions), "legal regulation" (31%) and "organisation of economic activity" (27%). This demonstrates that in the Russian Orthodox

Church, as in Western traditions, the educational and administrative blocks come to the fore, but unlike foreign practice, the property aspect retains a key role in the Church's regulatory documents-for example, the Synod's resolutions explicitly mention the procedure for managing land and real estate.

Thus, international examples highlight the trend towards professionalisation of management and digital transformation of religious institutions, while the results of content analysis show that in the Russian Orthodox Church these processes are partially reflected in canonical documents, but have a distinct specificity-the combination of educational and property regulation in a single system. This leads to the conclusion that the modern challenges facing the ROC are transnational in nature: the need for financial reporting, the formation of a competent staff corps, and adaptation to the digital environment are becoming common guidelines for both foreign and domestic religious organisations. Table 3 presents a comparison of studies reflecting the financial and educational models of development of religious organisations in China, the United States, Europe and Indonesia.

Table 3. Comparison of international studies on the financial and educational development of religious organisations

Author(s) and year	Country/region	Field of research	Key findings
J. Gao (2021)	China, East Asia	Financial stability of religious institutions	It has been demonstrated that the growth of private donations and digital platforms has increased transparency and reduced dependence on government regulation
P. Weller (2024)	Europe (United Kingdom, Germany)	Asset management and educational projects	A shift from traditional parish property management to multi-level trusts has been recorded; more than 60% of institutions have introduced mixed financing
D. Fidhayanti <i>et al.</i> (2024)	Indonesia	Digitalisation of financial management and educational activities	Empirical evidence shows that the introduction of digital technologies in accounting has increased revenue by 25% and expanded access to educational platforms
E. Searing <i>et al.</i> (2025)	USA	The educational mission and social services of churches	It has been established that 73% of Protestant communities have integrated educational programmes into the local school system and NPOs (nonprofit organisations)

Source: compiled by the authors based on J. Gao (2021), P. Weller (2024), D. Fidhayanti *et al.* (2024), E. Searing *et al.* (2025)

Table 3 demonstrates that in different countries, research focuses on different aspects of the development of religious organisations, reflecting both cultural and institutional characteristics of their functioning. For example, J. Gao (2021) shows that in the Chinese context, the key focus is on financial sustainability and the role of Christian social services: the growth of private donations and the use of digital platforms have increased the transparency of activities and reduced dependence on state regulation. In American studies by E. Searing *et al.* (2025), the emphasis shifts towards educational mission and social activities: the authors note that a significant proportion of Protestant communities have integrated educational projects in collaboration with local schools and non-profit organisations. The European experience of P. Weller (2024) demonstrates attention to organisational and financial strategies in times of crisis: the study shows that the COVID-19 pandemic has prompted Christian communities in the UK to review their resource management models, combining trust mechanisms with increased social engagement. Finally, Indonesian research by D. Fidhayanti *et al.* (2024) shows that the key

factor in effectiveness is the digitalisation of financial management: the development of Islamic fintech and the automation of accounting have contributed to increased parish revenues and expanded access to educational platforms.

A comparative analysis suggests that international practices can be conditionally grouped into three areas: digitisation of financial processes (China, Indonesia), strengthening of educational and social missions (United States), and institutionalisation of asset management (Europe). All three models demonstrate the close relationship between religious institutions and national socio-economic conditions. While Chinese and Indonesian practices are adapting to trends in the digital economy, American and European practices focus on sustainable development through education and professionalisation of management. Thus, it is important for the Russian Orthodox Church to consider international experience not as something to be copied directly, but as a guide for developing its own models that combine digitalisation, educational initiatives and institutional transparency. Table 4 presents the results of the analysis using MAXQDA and AntConc.

Table 4. Frequency of key categories in the analysed documents (results from MAXQDA and AntConc)

Category	Number of mentions (MAXQDA)	Number of mentions (AntConc)	Example of a document/fragment
Legal regulation	128	121	Charter of the Russian Orthodox Church (2013)
Education and training	95	102	Educational Concept of the Russian Orthodox Church (2016)
Organisation of economic activity	73	69	Regulation on the Uniform Procedure... (2011), FEA reports
Ethics and social responsibility	41	38	Materials Expert Council "Economics and Ethics" (2009)
International cooperation	27	25	Documents of the Department for External Church Relations of the Moscow Patriarchate for 2007-2014

Source: compiled by the authors based on Expert Council "Economics and Ethics" (2009), Regulation on the Uniform Procedure... (2011), Charter of the Russian Orthodox Church (2013), Educational Concept of the Russian Orthodox Church (2016), using MAXQDA (n.d.) and AntConc (n.d.) software

Table 4 demonstrates that the corpus of regulatory documents and organisational materials of the Russian Orthodox Church pays the most attention to issues of legal regulation: according to MAXQDA, there are 128 mentions, and according to AntConc, there are 121. This indicates that the legal formalisation of property and administrative issues is the backbone of the entire system, setting the institutional framework for other areas. The second most important category is education and training, which received 95 mentions in MAXQDA and 102 in AntConc. This result reflects the strategic focus on training specialists in the spiritual and administrative spheres, confirming the close connection between educational processes and the Church's management tasks. The organisation of economic activity is mentioned somewhat less frequently (73 and 69 mentions, respectively), which is explained by the fact that practical mechanisms of economic management are often enshrined in private decrees and reports, rather than in fundamental normative acts. Nevertheless, its regular presence shows that the financial and property block is considered an integral part of church activities. The block "ethics and social responsibility" was recorded less frequently (41 and 38 mentions), but its presence demonstrates the emergence of a new discursive field in which economic issues are correlated with moral principles. This is particularly important in the context of contemporary challenges, when religious organisations are forced to publicly justify their position in the sphere of entrepreneurship and interaction with society. The least represented category was international cooperation (27 and 25 mentions), which is explained by the focus of most normative acts on internal regulation and national legislation. However, the very fact that this category is present indicates the broadening of the horizons of church policy, especially through the activities of the Department for External Church Relations, where issues of integration into the global space are increasingly being raised. Thus, the distribution of frequencies confirms the priority of the legal and educational blocks for the institutional system of the ROC, while economic, ethical and international issues are additional but increasingly prominent areas of its normative development.

Comparison of regulatory requirements and practical activities

The regulatory acts of the Russian Orthodox Church contain provisions that establish key areas of economic and educational activity. The Charter of the Russian Orthodox Church (2013) defines the right of church organisations to own property, dispose of it and organise its management within the church structure. The Educational Concept of the Russian Orthodox Church (2016) establishes requirements for personnel training, including the acquisition of knowledge necessary for the administrative and economic management of parishes and dioceses. The Regulation on the Uniform Procedure... (2011) regulates property relations, and the Bachelor's Programme of Theological Educational Institutions of the Russian Orthodox Church (2011) formulates standards for the training of clergy.

Practical activities illustrate various forms of implementation of these provisions. The Sofrino (n.d.) production enterprise is an example of a centralised model: economic processes are managed here in accordance with the prescribed norms of property management and church control. The financial and economic management of the Russian Orthodox Church ensures centralised accounting and distribution of material resources, which complies with the requirements of the Charter on the systematic coordination of property issues. At the diocesan and parish levels, the organisation of management varies: some parishes develop internal mechanisms for accounting and property administration, but their scale and structure are not always comparable to church-wide models.

The Expert Council on "Economics and Ethics" formulates recommendations on economic issues and interacts with other structures of the Church. Its activities involve consultations and discussions based on the provisions of normative acts, but of a methodological nature. At the level of individual parishes, such recommendations may be used selectively, depending on organisational capabilities. Table 5 compares the regulatory requirements of key ROC documents with practical models for their implementation in the economic and educational activities of church institutions.

Table 5. Comparison of regulatory requirements and practical models of activity of church institutions

Regulatory acts	Content of requirements	Practical models	Examples of implementation
Charter of the Russian Orthodox Church (2013)	Right of ownership and disposal of property; structure of management of parishes, monasteries and educational institutions	Centralised management of property and organisational matters	Activities of the Financial and Economic Department of the Russian Orthodox Church
Educational Concept of the Russian Orthodox Church (2016)	Training of clergy and specialists; inclusion of management knowledge	Educational programmes of theological academies and seminaries	Curricula for bachelor's degrees at theological schools
Regulation on the Uniform Procedure... (2011)	Regulation of property relations, disposal of land and buildings	Centralised control and approval of property transactions	Control over the property of dioceses
Bachelor's Programme of Theological Educational Institutions of the Russian Orthodox Church (2011)	Standardisation of educational pathways; inclusion of administrative disciplines	Formulation of uniform requirements for personnel training	Compulsory courses in church law and administration
Expert Council "Economics and Ethics" (2009)	Methodical recommendations on economic and ethical policy	Consultative and discussion platforms	Joint projects with the Department for External Church Relations
The practice of diocesan and parish structures	There are no direct regulatory requirements; general provisions are implemented	Local model administration, accounting	Parish economic councils, adaptation to local conditions

Source: compiled by the authors based on Expert Council "Economics and Ethics" (2009), Regulation on the Uniform Procedure... (2011), Bachelor's Programme... (2011), Charter of the Russian Orthodox Church (2013), Educational Concept of the Russian Orthodox Church (2016)

An analysis of Table 5 shows that the regulatory documents of the Russian Orthodox Church contain clear provisions regarding property, educational and organisational issues, but their practical implementation in a number of cases takes on an adapted character. Thus, the Charter of the Russian Orthodox Church (2013) enshrines the right of church organisations to manage property and defines the general management structure, but in practice these provisions are implemented through the Financial and Economic Department, which not only controls real estate and finances, but also develops internal reporting mechanisms. The concept of educational activity sets out requirements for staff training, but in practice these are implemented in the curricula of theological academies and seminaries, where courses in management and law are introduced alongside theological disciplines. The Holy Synod's resolutions on property issues contain general principles, but in practice they are expressed in the activities of industrial complexes such as Sofrino (n.d.), where standards are linked to commercial management methods. A comparison with state educational standards shows that while the general goals coincide (unification of programmes, formation of qualifications), in church practice the emphasis is on the specifics of spiritual ministry, which requires additional competencies from clergy.

The balance between the regulatory framework and organisational practice is reflected in the fact that key documents of the Russian Orthodox Church and the Ministry of Education of the Russian Federation (Regulation on the Uniform Procedure..., 2011; Charter of the Russian Orthodox Church, 2013; Educational Concept of the Russian Orthodox Church, 2016) set the framework for property management, staff training and the organisation of the educational process. In practice, these norms are

implemented through the activities of the Financial and Economic Department of the Russian Orthodox Church, the Sofrino production complex, theological academies and seminaries, as well as expert and advisory councils such as "Economics and Ethics". Regulatory acts provide systematic rules and uniform standards, while organisational structures adapt them to specific tasks-property management, the development of educational programmes, and interaction with external institutions. This comparison demonstrates the interdependence of the two levels: without a regulatory framework, it is impossible to ensure the integrity and legitimacy of church governance, and without organisational practice, norms remain declarative and do not acquire real effectiveness.

The conducted analysis showed that the economic and educational activities of church institutions are regulated by a combination of normative-canonical documents and organisational practices that complement each other. A comparison with international approaches and the results of content analysis revealed a steady trend towards the institutionalisation of management and the need to train clergy to perform administrative and economic functions. The data as a whole indicates that the balance between regulatory requirements and practical models is ensured through the constant updating of the legal framework and the adaptation of organisational structures to modern conditions.

■ DISCUSSION

During the analysis of the regulatory provisions and organisational models of the Russian Orthodox Church's economic activities, it was found that the key areas include property management, financial and economic activities, and educational projects for clergy. A comparison with international studies allowed these results to be correlated with

international experience. Thus, data from W. Punuh (2024) show that Indonesian church institutions are addressing the task of transformation through the development of economic ministry and the involvement of communities in economic initiatives. The combination of regulatory control and property management observed in Russian practice corresponds to this trend. Analysis by G. Mpigi & O. Ameme (2025) showed that the historical development of Christian communities in Nigeria was accompanied by the formation of sustainable models of economic support for spiritual practices. A comparison with materials from the Russian Orthodox Church revealed the similarity of institutional mechanisms, where property norms and practical activities ensure the stability of ministry. Similar results were obtained by D. Teku *et al.* (2024), who found that the Ethiopian church performs economic functions to preserve natural resources. The normative framework of the Russian Orthodox Church, which regulates the use of property and land, demonstrates similar management principles.

D. Hungerman's (2020) observations on the relationship between religious institutions and economic well-being are confirmed by the identified practice of church economic structures participating in social and educational projects. A study by F. Boiliu & M. Pasaribu (2020) found that Christian religious education contributes to the development of parishioners' economic competencies. These data are consistent with the results of an analysis of the educational programmes of the Russian Orthodox Church, which emphasise training in economic activities. The results of L. Edwards *et al.* (2022) showed that clerics in the UK face difficulties in combining spiritual and organisational responsibilities. These data correlate with Russian practice, where the regulatory framework specifies the responsibilities of clergy, but there is a need to expand their competencies in the economic sphere.

An analysis by L. Świto (2023) shows that in the European canonical tradition, the economic activities of religious organisations are regulated by norms that provide for sanctions for the unlawful use of property. The documents of the Russian Orthodox Church examined reveal similar mechanisms, including mandatory regulations on the disposal of real estate and a ban on transactions that contradict the intended purpose of church property. This confirms the existence of a universal trend towards institutional control over economic processes within religious communities. The study by J. Lockett *et al.* (2024) focuses on the issue of compensation for clergy and employees, revealing a systemic mismatch between workload and pay levels. A comparison with the materials of the Russian Orthodox Church demonstrates a similar situation: regulatory acts establish framework provisions on fair remuneration, but actual practice shows that the income of clergy depends on the financial condition of parishes.

The examination of the medieval model of the Church as an economic corporation in D. d'Avray's (2024) study allows for a comparison of historical forms of governance with contemporary ones. An analysis of Russian Orthodox

Church sources confirms that parish structures still retain features of centralised economic administration: property resources are distributed by dioceses, and financial control mechanisms are based on vertical accountability. Data from B. Voorhees *et al.* (2024) show a link between the managerial training of clergy and their level of professional depletion. This corresponds to the results of an analysis of the internal practices of the Russian Orthodox Church, which reveals a lack of systematic training of clergy in economic administration, leading to the combination of spiritual duties with economic functions. A study by X. Huang *et al.* (2023) demonstrates the impact of government restrictions introduced during the pandemic on the activities of religious institutions. A comparison with the situation in Russia reveals identical consequences: the temporary closure of churches and restrictions on mass events led to a decline in parish income and the need to restructure financial models. The work of T. Demissie (2024), devoted to the management of remote church heritage sites, revealed that geographical remoteness creates specific difficulties in administration. Similar difficulties have been noted in the practice of individual Russian dioceses, where remote monasteries face problems of transport logistics, security and property preservation.

The findings of M. French-Holloway (2025) indicate that financial management in parishes requires clerics to exercise constant control and accountability. These observations coincide with the data obtained in the analysis of the Russian Orthodox Church: rectors simultaneously perform the functions of financial administrators, which leads to a redistribution of time between spiritual and economic activities. A qualitative study by D. Eagle *et al.* (2022) documented practices for overcoming the financial consequences of the pandemic in US communities, including cost cutting and increased voluntary donations. Similar mechanisms were noted in the Russian context: in many parishes, the role of parish initiatives aimed at maintaining basic expenses has increased. Empirical data from K. Deniswara *et al.* (2023) show that the successful functioning of the church in the economic sphere is linked to the integration of spiritual values and modern digital technologies. In practice, the Russian Orthodox Church is moving in a similar direction: the introduction of electronic accounting systems and online services for collecting donations has become a noticeable tool for parishes to adapt to new conditions. A comparison of these studies with the results obtained shows that the normative provisions and practical models of the Russian Orthodox Church correlate with international trends: control over the use of property, staffing, organisation of financing, and adaptation to external challenges remain universal challenges for Christian churches.

■ CONCLUSIONS

The study revealed the relationship between the normative-canonical framework and organisational models of economic activity of the Russian Orthodox Church in

comparison with foreign approaches. Content analysis of the normative acts of the Russian Orthodox Church showed the predominance of the categories “legal regulation” (128 mentions, 41.9%), “educational activities” (95-102 mentions, 31.7%) and “organisational issues” (69-73 mentions, 26.4%). Additionally, the categories “ethics and social responsibility” (38-41 mentions) and “international cooperation” (25-27 mentions) were recorded. A comparison with practical activities showed a partial coincidence with the statutory norms: 64% for property transactions and 42% for educational projects. A comparative analysis with foreign studies confirmed that financial transparency is directly linked to the sustainability of religious communities: in cases where annual reports were published, the number of active participants was 37% higher, and the volume of donations was 24% higher. In the educational sphere, the introduction of long-term training programmes for clergy has reduced staff turnover; the proportion of financial literacy courses in seminaries has grown from 15% to almost 50% since 2020. The digitisation of management has reduced administrative costs by 12-20% and increased the number of online course participants from 4,300 to 11,700 in six years.

The data obtained confirm that the key differences relate to property management and specialist training, while similarities are found in the basic areas of legal regulation and educational activities. The practical value of the study lies in the possibility of applying its results in the development of programmes for the professional development of clergy, the improvement of property accounting mechanisms, and the introduction of digital solutions in church management. A limitation of the study is its focus on the analysis of regulatory documents without a direct assessment of regional differences and internal statistics of dioceses. A promising direction for further research is to expand the corpus by including data on parish reporting and comparative analysis with other denominations.

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Орус православ чиркөөсүнүн дин кызматкерлери жана чиркөө адистерин тарабынан чарбалык ишмердүүлүк жаатында атайын билимдерди алуу зарылчылыгы жөнүндө

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Аннотация. Бул изилдөөнүн максаты Орус православ чиркөөсүнүн чарбалык ишмердүүлүгүнүн ченемдик-канондук базасы менен уюштуруучулук моделдеринин катышын азыркы эл аралык ыкмалар менен салыштыруу аркылуу аныктоо болгон. Изилдөөнүн методологиясы Орус православ чиркөөсүнүн жана Россия Федерациясынын Агартуу министрлигинин ченемдик актыларынын сандык жана сапаттык контент-анализине, MAXQDA жана AntConc программалык каражаттарын колдонууга, ошондой эле эл аралык изилдөөлөрдүн натыйжалары менен салыштырууга негизделген. Жыйынтыктар көрсөткөндөй, ОПЧнын ченемдик актыларында “укуктук жөнгө салуу” (128 жолу эскерилген, 41,9 %), “билим берүү ишмердүүлүгү” (95-102 жолу эскерилген, 31,7 %) жана “уюштуруучулук маселелер” (69-73 жолу эскерилген, 26,4 %) категориялары басымдуулук кылат. Кошумчалай кетсек, “этика жана социалдык жоопкерчилик” (38-41 жолу эскерилген) жана “эл аралык кызматташтык” (25-27 жолу эскерилген) блоктору катталган. Чиркөө институттарынын практикалык ишмердүүлүгү уставдык ченемдерге жарым-жартылай гана дал келет: мүлк операциялары боюнча 64 % жана билим берүү долбоорлору боюнча 42 %. Эл аралык изилдөөлөр каржылык ачык-айкындуулук диний жамааттардын туруктуулугун жогорулатаарын (активдүү катышуучулардын саны 37 %га, ал эми кайрымдуулуктар 24 %га өскөнүн), ошондой эле билим берүү программаларын жана каржылык сабаттуулук курстарын киргизүү кадрлардын туруксуздугун төмөндөтүүгө көмөктөшөөрүн көрсөттү. Документ жүгүртүүнү жана онлайн окутууну санариптештирүү административдик чыгымдарды 12-20 %га кыскартууга жана алты жылдын ичинде угуучулардын камтылышын 4,3 миңден 11,7 миңге чейин көбөйтүүгө мүмкүндүк берди. Негизги айырмачылыктар мүлктү башкарууга жана адистерди билим берүү даярдыгына байланыштуу экендиги аныкталды. Алынган маалыматтар дин кызматкерлеринин квалификациясын жогорулатуу программаларын иштеп чыгууда жана чиркөө башкаруу системасын өркүндөтүүдө колдонулушу мүмкүн.

Негизги сөздөр: мүлктү башкаруу; каржылык сабаттуулук; укуктук жөнгө салуу; билим берүү программалары; адистердин компетенттүүлүгү; экономикалык туруктуулук; кадрларды даярдоо

О необходимости получения специальных знаний в области хозяйственной деятельности священнослужителями и церковными специалистами Русской православной церкви

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Аннотация. Целью настоящего исследования являлось выявление соотношения нормативно-канонической базы и организационных моделей хозяйственной деятельности Русской православной церкви в сопоставлении с современными международными подходами. Методология исследования опиралась на количественный и качественный контент-анализ нормативных актов Русской православной церкви и Министерства просвещения Российской Федерации с использованием программных средств MAXQDA и AntConc, а также на сопоставление с результатами международных исследований. Результаты показали, что в нормативных актах РПЦ преобладают категории «правовое регулирование» (128 упоминаний, 41,9 %), «образовательная деятельность» (95-102 упоминания, 31,7 %) и «организационные вопросы» (69-73 упоминания, 26,4 %). Дополнительно фиксировались блоки «этика и социальная ответственность» (38-41 упоминание) и «международное сотрудничество» (25-27 упоминаний). Практическая деятельность церковных институтов совпадает с уставными нормами лишь частично: 64 % по имущественным операциям и 42 % по образовательным проектам. Международные исследования продемонстрировали, что финансовая прозрачность повышает устойчивость религиозных общин (рост числа активных участников на 37 % и пожертвований на 24 %), а внедрение образовательных программ и курсов финансовой грамотности способствует снижению текучести кадров. Цифровизация документооборота и онлайн-обучения позволила сократить административные расходы на 12-20 % и увеличить охват слушателей с 4,3 тыс. до 11,7 тыс. за шесть лет. Установлено, что основные расхождения касаются имущественного управления и образовательной подготовки специалистов. Полученные данные могут быть использованы при разработке программ повышения квалификации духовенства и совершенствовании системы церковного управления.

Ключевые слова: имущественное управление; финансовая грамотность; правовое регулирование; образовательные программы; компетенции специалистов; экономическая устойчивость; подготовка кадров



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Integration of national and cultural peculiarities of the country into the teaching of foreign languages as a factor in the formation of intercultural competence

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Abstract. The integration of national and cultural characteristics into the foreign language learning process plays a pivotal role in developing students' intercultural competence within the context of educational globalisation. The article analysed theoretical and practical aspects of incorporating Kyrgyzstan's cultural heritage, traditions, and value orientations into the educational process in higher education institutions. The aim of the research was to identify and experimentally substantiate pedagogical conditions facilitating the effective integration of national and cultural components into foreign language teaching, as well as to assess their impact on the development of students' intercultural competence. The methodological foundation comprised comparative analysis of scholarly literature, observation of educational practices, and pedagogical experimentation. The study involved 120 students from language and pedagogical specialties, divided into experimental and control groups. During the formative stage, special pedagogical conditions were implemented in the experimental group, including culturally marked texts, interculturally oriented tasks, project-based work, and role-playing exercises. The effectiveness of integration was evaluated using language tests, intercultural communicative competence questionnaires, and adapted cultural intelligence tests. The empirical results obtained demonstrated statistically significant progress in the experimental group. The average level of intercultural competence in this group increased from 28% to 74% (compared to 31% to 36% in the control group). It was established that the use of national and cultural components contributed to enhanced motivation, development of critical thinking, and formation of sustainable value orientations based on the dialogue of cultures. Thus, the research confirmed that systematic integration of national and cultural specificity into foreign language teaching constitutes an effective factor in preparing students for meaningful dialogue in multicultural environments. The data obtained may be applied in curriculum development, creation of methodological materials, and improvement of teacher training, which corresponds to contemporary global trends in language education

Keywords: linguistic personality; cultural identity; communicative strategies; value orientations; sociocultural approach; dialogue of cultures; interdisciplinary integration

INTRODUCTION

Modern education is developing in the context of globalisation and internationalisation, which makes the formation of intercultural competence one of the priority tasks in the

training of specialists. Proficiency of a foreign language is recognised not only as a tool for professional mobility, but also as a means of intercultural dialogue. However, the

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effectiveness of this process directly depends on the integration of national and cultural characteristics that reflect the history, traditions, values, and social norms of the country. Ignoring these aspects leads to formalism in teaching and a decrease in student motivation. The relevance of the study is determined by the need to identify pedagogical approaches that synthesise linguistic training with the development of intercultural competence. Despite considerable attention from researchers, issues related to the systematic inclusion of national and cultural characteristics in the educational environment remain underdeveloped (Bida *et al.*, 2022). National and cultural characteristics present in the educational context influence students' perception, interpretation, and assimilation of cultural norms and values.

Kyrgyzstan is a multinational and multicultural state where, alongside the titular nation, there are large diasporas of Russians, Uzbeks, Uyghurs, Dungans, Tatars, Koreans and representatives of other ethnic groups. This makes the national-cultural environment of the country a complex conglomerate of traditions, values, languages, and models of social interaction. In such conditions, education cannot be limited to a monocultural paradigm, but must create a space for dialogue between cultures, where the learner is simultaneously rooted in the national soil and open to the global world. The integration of national and cultural characteristics into foreign language teaching involves solving several interrelated tasks (Vasilkova, 2024). In Kyrgyzstan, in a multicultural society, foreign language teachers must rely not only on Kyrgyz culture, but also on the cultural codes of other ethnic communities, which contributes to broadening students' cultural horizons and fostering respect for internal diversity. As noted by I. Atroshenko & K. Shabanova (2024), the key objective of foreign language teaching goes beyond the acquisition of lexical and grammatical material and includes the development of the ability to understand and compare one's own national culture with the cultures of other peoples. A foreign language becomes a mediator between local cultural values and universal norms. The inclusion of national and cultural components through texts, examples and project assignments contributes to the formation of a multicultural personality capable of functioning in an international environment without losing cultural foundations. In Kyrgyzstan, there are still educational institutions with a pronounced monocultural environment (e.g., Kyrgyz or Uzbek schools), where foreign language teaching becomes a particularly important tool for broadening students' horizons and creating a "window" to cultural diversity both within the country and beyond.

An analysis of contemporary research demonstrates a growing interest in this issue, while significant limitations remain. Most studies focus either on linguistics or on individual cultural elements. L. Huang (2021) established the effectiveness of explicit cultural training for the development of intercultural communicative competence but noted a weak link between cultural elements and holistic language practice. Similarly, J. Bérešová (2019) analysed

cultural components in courses and textbooks without deep integration with language practice. Research by M. Amor *et al.* (2023) examined the integration of language and culture in CLIL (Content and Language Integrated Learning) programmes. The authors showed that CLIL programmes integrate culture and language in theory, but in practice such models most often remain at the normative level, without systematic empirical testing.

Thus, despite recognition of the importance of the cultural component, there remains a need for systematic research into the pedagogical conditions for its effective integration. Ignoring national and cultural characteristics reduces motivation to learn a language and limits communication opportunities, whereas systematic integration of cultural elements stimulates cognitive activity and readiness for intercultural interaction. The aim of this study was to identify and experimentally substantiate the pedagogical conditions for integrating national and cultural characteristics into the process of teaching foreign languages, as well as to evaluate their effectiveness in developing students' intercultural competence. The objectives of the study were: to analyse theoretical approaches to integrating national and cultural characteristics into foreign language teaching; to examine the specifics of the educational environments in Kyrgyzstan and identify factors influencing the development of students' intercultural competence; to develop and test pedagogical conditions for integrating national and cultural components into teaching foreign languages; to conduct empirical research using observation, questionnaires, interviews and analysis of teaching sessions to assess the effectiveness of the proposed pedagogical conditions; systematise the results obtained and develop practical recommendations for designing curricula and improving the training of teaching staff.

LITERATURE REVIEW

The modern paradigm of teaching foreign languages is characterised by a shift from a narrow linguistic approach to an integrative model that includes the development of intercultural interaction, critical thinking and cultural reflection. Intercultural competence is conceptualised in scientific discourse as the ability to interact effectively and ethically with representatives of other cultural traditions, which necessitates its targeted development in the educational process. A fundamental contribution to the theoretical understanding of intercultural competence was made by M. Byram (1997) presenting it as a multi-component construct that includes knowledge of one's own and foreign cultures, skills in interpreting and correlating cultural phenomena, attitudes of openness and tolerance, and critical cultural awareness.

The principal significance lies in the researcher's thesis on the fundamental teachability and measurability of this competence, which opens up prospects for its systematic development within educational programmes. Subsequently, M. Byram *et al.* (2002) empirically demonstrated the effectiveness of active teaching methods-role-playing, simulations and project tasks-for developing cultural awareness,

although the complex impact of these methods on language training remains insufficiently studied. At the same time, C. Kramsch (1998) argued for the need to consider culture not as an auxiliary but as an independent target of language education. The researcher postulates the inseparability of language proficiency and understanding of the cultural context, arguing that language competence without a cultural dimension remains incomplete and functionally limited. D. Deardorff (2006) proposed a procedural model for the formation of intercultural competence, structured as a sequential transition from the basic level (attitudes and knowledge) to intermediate internal results (adaptive worldview, empathy) and, further, to external behavioural manifestations (effective and appropriate communication). This model emphasises the dynamic and evolving nature of intercultural competence, which has significant implications for pedagogical design. A. Fantini (2009) made a significant contribution to the operationalisation of the concept by systematising approaches to assessing intercultural competence and developing a comprehensive set of tools for measuring it. His work laid the methodological foundation for empirical research in this field. The theoretical concepts of these authors are reflected in the regulatory framework for language education. The Common European Framework of Reference for Languages (CEFR, 2020) explicitly emphasises the importance of developing plurilingual and pluricultural competence, as well as mediating skills, as key components of modern language education. These provisions constitute an international standard that justifies the need for the systematic integration of culturally reflective tasks into educational programmes.

In the context of the Kyrgyz Republic, the issue of intercultural competence is particularly relevant due to the multi-ethnic composition of the population and the officially declared policy of multilingual education (Asipova & Karybekova, 2016). G. Abylasynova & U. Kadyrkulova (2020) state that the process of institutionalising multilingual and multicultural education in the republic is in its initial stages, despite the existence of a regulatory framework. The researchers note that the pilot projects of 2000-2004 did not receive widespread distribution. The country has developed Concept for the development of education in the Kyrgyz Republic for 2021-2030 (Ministry of Education..., 2021), which aims to gradually introduce multilingual education at all levels of the education system as a tool for social integration and human capital development. At the same time, the authors identify a significant obstacle-the low level culture of interpersonal and business communication, which hinders the implementation of the stated initiatives. N. Akylbek uulu *et al.* (2024) investigated the functional role of intercultural competence in ensuring effective intercultural communication among students in the process of learning foreign languages in higher education institutions. The authors identified a correlation between the level of intercultural competence and motivation to learn a foreign language, arguing that understanding other cultures gives the educational process personal

significance. The researchers also emphasise the potential of digital educational technologies and online learning as catalysts for the development of intercultural competence. N. Asipova (2015) conceptualises intercultural competence as a key component of the professional training of modern teachers, who are called upon to function effectively in a multicultural educational environment. The researcher emphasises the importance of integrating national and cultural values into the educational process, which helps students develop a conscious attitude towards cultural diversity and increase their level of intercultural understanding. In the context of multicultural education, N. Asipova emphasises the importance of developing students' skills of tolerance, critical thinking and adaptability in a multicultural environment. The author argues for the need to use active teaching methods -role-playing, case studies and project work incorporating cultural realities-as effective tools for developing intercultural competence.

A critical analysis of scientific literature demonstrates researchers' sustained attention to the integration of cultural components into language education, but at the same time reveals significant methodological and empirical limitations. Firstly, a significant part of the research is fragmented, focusing either on the linguistic or cultural component without their comprehensive integration and systematic analysis of mutual influence. Secondly, there is a lack of empirical research verifying the effectiveness of specific pedagogical conditions in real educational practices. In the context of Kyrgyzstan, the following specific gaps have been identified: (1) the absence of systematic studies that comprehensively analyse the mechanisms of integrating national and cultural characteristics into foreign language teaching programmes; (2) insufficient adaptation of intercultural competence assessment tools to the specific characteristics of Kyrgyz students; (3) a limited number of empirical studies verifying the effectiveness of the introduction of the national and cultural component and its impact on the formation of intercultural competence. Thus, there is a methodological gap in scientific literature between theoretical recognition of the importance of the cultural component and insufficient empirical testing of pedagogical solutions. In the context of multi-ethnic Kyrgyzstan, whose educational environment is characterised by significant ethno-cultural diversity, this problem is particularly relevant and requires the development of a systematic approach to the integration of cultural codes. The identified lack of research aimed at designing and experimentally verifying complex pedagogical conditions for the formation of students' intercultural competence defines the scientific niche of this work.

■ MATERIALS AND METHODS

The experimental base for the study was organised at the Jusup Balasagyn Kyrgyz National University, which is one of the country's leading higher education institutions and has a well-developed infrastructure for conducting pedagogical research. The study was conducted from September

2024 to June 2025. The study involved 120 second- and third-year students of the Institute of Foreign Languages, studying in the field of “Pedagogical Education” with a specialisation in “Foreign Languages”. The participants were divided into two equal groups of 60 people each: experimental and control. This choice was determined by the goals and objectives of the study, since it is during the second and third years that students actively master teaching methodology, develop professional skills, and develop intercultural competencies, which makes them the most suitable audience for diagnostics. The groups were formed according to the principle of natural selection based on existing academic groups, which made it possible to preserve the familiar educational environment and avoid artificial redistribution of students. To increase objectivity, a diagnostic stage was conducted before the experiment began, including questionnaires and tests to ensure the comparability of the initial level of intercultural competence and language training of students in both groups. The participants in the experiment were divided into several subgroups depending on their level of language training and cultural intelligence indicators. During the ascertaining stage, questionnaires, self-assessment questionnaires, cultural intelligence tests (CQ tests), and diagnostic tasks aimed at identifying the ability to perceive and interpret national and cultural characteristics in the context of foreign language learning were used.

The key research method was a pedagogical experiment aimed at testing the effectiveness of integrating national and cultural characteristics of the educational environment into the process of teaching foreign languages. The experiment consisted of three stages: ascertaining, formative and control. The aim of the ascertaining stage was to identify the initial level of foreign language proficiency and intercultural competence of students. The following diagnostic tools were used for this purpose:

- Language skills test: assessment of lexical and grammatical knowledge, listening and reading skills, and essay writing. The test consisted of 50 tasks based on CEFR levels B1-B2, with a score out of 100.

- Intercultural competence questionnaire: included questions about knowledge of the cultural characteristics of Kyrgyzstan and other countries, readiness for intercultural interaction, and the ability to compare cultural norms. The questionnaire consisted of 20 questions, both closed (Likert scale from 1 to 5) and open, allowing students to express their own opinions. Key questions included: “To what extent, in your opinion, does knowledge of national culture contribute to the successful learning of a foreign language?”, “What forms of cultural material inclusion do you consider most effective?” and “What difficulties do you encounter when working with culturally marked texts?”.

- Semi-structured interviews with case study elements: students were presented with brief intercultural situations (e.g., cultural differences in business etiquette or everyday traditions) and asked to describe possible reactions or solutions. The interviews were conducted individually, lasted

15-20 minutes, and the responses were recorded for subsequent content analysis.

- CQ tests: assessment of four components of cultural intelligence (motivational, cognitive, metacognitive, and behavioural) using an adapted version of the test by P. Earley & S. Ang (2003), with the average score calculated as a percentage of the maximum.

The results of the ascertaining stage confirmed the comparability of the initial level of both groups, which ensured the objectivity of the further experiment. At the formative stage, specially developed pedagogical conditions aimed at integrating the national-cultural component into the educational process were introduced in the experimental group. The control group was taught according to the traditional foreign language teaching programme, which took virtually no account of the national and cultural characteristics of the educational environment. The following materials and methods were used in the experimental group:

- Culturally marked texts: authentic articles, stories and dialogues reflecting the history, traditions and values of Kyrgyzstan, as well as the characteristics of other cultures. For example, texts about the holidays of Nowruz and Kurman Ait, about the characteristics of traditional cuisine and crafts, accompanied by lexical and grammatical exercises.

- Intercultural-oriented tasks: comparing traditions in Kyrgyzstan and foreign countries, compiling comparative tables, discussions and mini-presentations. For example, students analysed communication etiquette in Kyrgyzstan and Europe and discussed differences in social communication.

- Project work and role-playing games: simulating real-life situations of international communication, preparing joint projects that include cultural aspects. For example, “organising a cultural event for a foreign audience”, where students selected materials about their national culture and presented them in a foreign language.

- Audio and video materials: viewing and analysis of interviews, documentaries, and videos with cultural elements, followed by discussions and written reflections. Classes were held twice a week for 90 minutes, using the Moodle online platform to share materials and reflective assignments.

These tasks stimulated the development of multicultural awareness, promoted respect for cultural diversity and encouraged active language practice. At the control stage, after the completion of the formative stage, both groups underwent retesting similar to the diagnostic testing: language tests, intercultural competence questionnaires, CQ tests, and case interviews. A comparative analysis of the results made it possible to assess changes in foreign language proficiency, the development of intercultural competence, the ability to analyse and compare cultural norms, and the effectiveness of integrating the national-cultural component into the educational process. Pedagogical observation was carried out throughout the experiment to record qualitative changes in the behaviour and learning activity of students.

For assessing the effectiveness of integrating the national-cultural component and testing the research hypothesis,

comprehensive statistical data processing was used. The main objective of the analysis was to compare the results of the experimental and control groups at the ascertaining and control stages, as well as to identify significant changes in the intercultural competence and language skills of students. When analysing quantitative data (language test scores, project assignment grades), Student's t-test for independent samples was used to compare the mean values of two groups and determine whether there were statistically significant differences between the control and experimental groups. In cases where the data distribution did not correspond to the normal distribution, the Mann-Whitney test was used, a non-parametric method for comparing two independent samples, used to identify differences in medians between groups.

Data processing was performed using SPSS software (version 27) and Microsoft Excel 2019. The following was performed in SPSS: calculation of mean values and standard deviations; verification of normality of distribution using the Shapiro-Wilk and Kolmogorov-Smirnov tests; application of Student's t-test for independent samples and the Mann-Whitney test; construction of graphs and diagrams for visual representation of the results. Survey and case interview data containing ranked or qualitative indicators of intercultural competence were analysed as non-parametric data, using rank methods and the Mann-Whitney test to compare the experimental and control groups. Thus, the

use of these statistical methods made it possible to: assess the dynamics of students' language skills and intercultural competence; identify statistically significant differences between the experimental and control groups; test the hypothesis that the systematic integration of the national-cultural component contributes to the more effective formation of students' intercultural competence and language skills. The use of both parametric and non-parametric methods ensured the reliability and objectivity of the experiment results. All stages of the experiment were conducted in accordance with the ethical principles of the ASA (2018) and the Guidance Note of the European Commission on Ethics and Data Protection (2021).

RESULTS

Diagnostics of the initial level of intercultural competence demonstrated the prevalence of an average level of development of this quality among most participants of the study. High scores were recorded only in 18% of participants, while 27% of students demonstrated a low level of mastery of the components of intercultural competence (Table 1). This distribution indicates that a significant proportion of students (more than half of the sample) are at an average level, reflecting their limited experience of intercultural interaction and insufficient methodological preparation for perceiving cultural diversity.

Table 1. Distribution of students by levels of intercultural competence

Level	Number of students	% of total sample
High	22	18
Average	65	55
Low	33	27

Source: compiled by the authors

The survey showed that only 28% of students in the experimental group and 31% in the control group felt confident in their understanding of cultural differences. A qualitative analysis of the questionnaires revealed that the students in the experimental group already articulated the need to work with authentic texts and participate in discussions to develop intercultural competence at this stage, while the students in the control group limited

themselves to stating standard educational tasks. The results of the CQ test revealed differentiated development of four main components of cultural intelligence: motivational (interest in other cultures), cognitive (knowledge of cultural systems and traditions), metacognitive (ability to analyse and adjust behaviour in intercultural situations) and behavioural (ability to adapt speech and behaviour to the cultural context) (Table 2).

Table 2. Average cultural intelligence scores of students (as a percentage of the maximum)

CQ component	Average indicator (%)	High level (%)	Low level (%)
Motivational	68	30	15
Cognitive	55	18	32
Metacognitive	61	22	25
Behavioural	49	12	39

Source: compiled by the authors

Data analysis shows that the most developed components were motivational and metacognitive, while cognitive and, in particular, behavioural indicators remained at a low level. This indicates that students have a theoretical interest in intercultural issues but insufficient practical readiness for real intercultural interaction. When completing tasks to

interpret national and cultural characteristics in foreign-language texts, students systematically demonstrated difficulties in understanding culture-specific vocabulary, insufficient knowledge of the cultural realities of English-speaking countries, and difficulties in selecting equivalent formulations when translating cultural concepts (Table 3).

Table 3. Results of diagnostic tasks

Assessment criterion	High level (%)	Average level (%)	Low level (%)
Understanding culture-specific words	21	49	30
Knowledge about traditions and realities	19	51	30
Translation of cultural concepts	16	44	40

Source: compiled by the authors

Summarising the results of the ascertaining stage, the following conclusions can be drawn: (1) most students have average levels of intercultural competence, which indicates the need for systematic work in this area; (2) the motivational component was the most pronounced, which is a positive factor for further pedagogical work; (3) poorly developed cognitive and especially behavioural components, which demonstrates the need to introduce active teaching methods; (4) diagnostic tasks confirmed the existence of problems in understanding and interpreting cultural elements, which highlights the need to strengthen the national-cultural component in foreign language teaching.

During the formative stage, the experimental group systematically worked with culturally marked texts representing the history, traditions and values of Kyrgyzstan and other countries. Students analysed texts about the holidays of Nowruz and Kurman Ait, traditional cuisine and crafts, completed lexical and grammatical tasks, compiled comparative tables of cultural norms, participated in discussions and mini-presentations, they modelled real intercultural situations through role-playing games and project assignments, and worked with audio and video materials accompanying the analysis of cultural characteristics. The control group continued their training according to the standard programme without an emphasis on intercultural aspects. The results of the diagnostic tasks demonstrated significant progress in the experimental group. At the diagnostic stage, students limited themselves to superficial generalisations and minimal analysis, for example: "In Kyrgyzstan, they celebrate Nowruz, and in Europe, they celebrate Christmas. These are different holidays". After the formative stage, their essays became more detailed and analytically profound: "Nowruz in Kyrgyzstan symbolises renewal and unity, which is similar to European Christmas, which brings families together, but differs in the form of celebration and cultural rituals. Such a comparison allows us to understand how culture shapes social norms". The control group showed only a slight improvement in language skills without a systematic analysis of cultural differences.

Pedagogical observation recorded qualitative transformations in the behaviour of students in the experimental group. They began to participate more actively in group discussions, show interest in the perspectives of other cultures, offer examples and questions related to national traditions, and initiate discussions about cultural differences. For example, during a discussion about traditional holidays, a student initiated a comparative analysis of Kyrgyzstan's national cuisine with the gastronomic traditions of neighbouring countries, which sparked a lively discussion. In project assignments, students demonstrated respectful

interaction, coordinated joint materials, and actively presented their results in a foreign language. In the control group, such activity was practically non-existent: discussions were limited to reproducing information from textbooks without personal analysis and comparison of cultures.

Interviews with participants in the experimental group confirmed the observations and quantitative results. Students articulated that working with projects and role-playing games contributed to a deeper understanding of other countries' cultures, increased confidence in discussing cultural differences, and allowed them to analyse people's behaviour in different cultural contexts. Representative statements include: "After working with projects and role-playing games, I became more attentive to the customs of other countries and better understand why people behave the way they do"; "Now I can discuss cultural differences without feeling awkward and explain it in a foreign language"; "Assignments with real texts and videos helped me feel the culture, not just learn words." Students in the control group stated that the training remained largely formal and did not contribute to the development of skills for analysing and comparing cultures.

The quantitative results are confirmed by statistical analysis. In the experimental group, the average level of intercultural competence after the formative stage increased from 28% to 74%, while in the control group, the indicator increased from 31% to 36%. The application of Student's t-test for independent samples and Mann-Whitney's test demonstrated statistically significant differences between the groups ($p < 0.05$). Analysis of language tests and written essays also revealed a significant improvement in the language skills of students in the experimental group. Thus, the results of the experiment demonstrated that the systematic integration of the national-cultural component into the process of teaching foreign languages contributes to the comprehensive development of students, combining language skills, critical thinking and intercultural competence. The experimental group demonstrated significant improvement in both quantitative indicators and qualitative skills, including analytical thinking, active participation in discussions, and respectful interaction with representatives of other cultures, which was not achieved in the control group.

■ DISCUSSION

The results of the study testify to the significant influence of integrating national and cultural characteristics into the process of teaching foreign languages on the formation of students' intercultural competence. An analysis of the dynamics of the development of the components of intercultural competence (cognitive, metacognitive, affective, and

behavioural) revealed positive changes in most students in the experimental group. Especially noticeable was the growth of metacognitive and affective components, which indicates the development of the ability to reflect, self-regulate, and empathise in the context of intercultural interaction. A comparison with previous studies demonstrates the convergence of the data obtained with the conclusions of M. Byram (1997), who postulated that the successful development of intercultural competence is only possible with the systematic consideration of cultural codes and national traditions in the language training process. Similarly, in the study of D. Deardorff (2006), the need for a comprehensive approach to assessing intercultural skills is emphasised, which was confirmed in this experiment using adapted diagnostic models. Particular attention should be paid to the comparison with studies conducted in the context of Kyrgyzstan. B. Lu *et al.* (2024) note that foreign language teaching in the national educational environment is effective when it is based on the value potential of the native culture. The authors compared English textbooks in Kyrgyzstan and China and concluded that these countries have fundamentally different approaches to the formation of national identity: Kyrgyz textbooks emphasise the strengthening of their own national identity, while Chinese textbooks, on the contrary, focus on multiculturalism and the creation of an authentic English-speaking context. At the same time, L. Beisenbayeva (2025), describing Kazakhstan's experience, notes that the country lacks a foreign language teaching methodology aimed at developing national identity, and there is a need to adapt teaching materials to address this issue. In turn, the work of J. Kagazbaev *et al.* (2020) demonstrates that the inclusion of cultural images in English language teaching increases the motivation of younger schoolchildren and contributes to the formation of a positive educational environment. These conclusions fully correlate with the data of the present study.

The contribution of this study lies in the empirical confirmation of the hypothesis that local cultural elements can serve as a catalyst for the formation of intercultural interaction skills, which has not been sufficiently explored in previous studies based on material from Kyrgyzstan. The discussion demonstrated that the combination of global educational trends and national cultural characteristics creates optimal conditions for training students with high intercultural competence. The significance of the results also lies in the fact that they highlight the need to revise traditional methods of teaching foreign languages in the context of the globalisation of education. Unlike approaches focused exclusively on formation of linguistic competence, integration of national and cultural characteristics allows students not only to master the language, but also to develop a wider range of skills required in the modern world: critical thinking, interpersonal flexibility, tolerance. Analysis of experimental data has identified a number of pedagogical conditions that ensure the effective integration of national and cultural components into language education. Firstly, the integration of cultural content into

curricula and materials through the development of modules, assignments and projects that represent national and intercultural values (Byram, 1997; Kramsch, 1998). Secondly, creating an educational environment that stimulates intercultural interaction and supports dialogue between cultures, which is consistent with the findings of studies by D. Deardorff (2006) and N. Asipova (2015). Thirdly, the use of digital technologies and interactive forms of teaching that contribute to the development of students' reflection and metacognitive skills, as confirmed by the works of G. Abylasynova & U. Kadyrkulova (2020). Thus, the identified pedagogical conditions can be considered as key factors for the successful integration of the cultural component into the language education system.

The identified pedagogical conditions allow to formulate a number of practical recommendations focused on the design of educational programmes and the training of teaching staff. Thus, curricula should be designed in such a way that the cultural component is organically integrated into the structure of the educational process. This implies not only the inclusion of specialised courses and modules aimed at developing intercultural competence, but also the application of an interdisciplinary approach, in which linguistic training is combined with cultural, sociological and communicative aspects. An important element is the development of a system of cross-cutting tasks-project work, case studies, intercultural debates-that ensure the practical application of both language knowledge and intercultural interaction skills. The effective implementation of these conditions is impossible without appropriate methodological support. Modern teaching materials should integrate linguistic and cultural content, rely on digital technologies, and create opportunities for modelling real-life communication situations, including virtual projects, online exchanges, and VR and AR environments. Blended learning methods, which combine face-to-face classes with online modules, appear to be the optimal form, ensuring flexibility and variability in the educational process.

Particular attention should be paid to the training of teaching staff. Teacher training programmes should include courses on intercultural pedagogy and methods for developing intercultural competence, as well as developing the digital literacy of future teachers. An important area is the organisation of professional development and internships based on international educational projects and exchanges, which allows for the broadening of professional horizons. In addition, reflective practices-keeping teaching portfolios, diaries, discussing experiences in professional communities-create conditions for the conscious inclusion of cultural components in the educational process. Equally important is the task of assessing and monitoring learning outcomes. In the system of academic performance of students, it is necessary to include indicators that reflect the level of intercultural competence. For this purpose, multi-level diagnostic methods are used, combining testing, self-assessment, observation and interviews, which allows tracking the dynamics of both linguistic and intercultural

skills. At the same time, the assessment criteria should cover not only traditional academic achievements, but also project and research activities, where students' readiness to interact in a multicultural environment is demonstrated.

The design of the educational environment should take into account the need to create multicultural spaces-clubs, laboratories, cultural workshops-where students have the opportunity to practise the language in real conditions of intercultural interaction. Supporting student initiatives related to intercultural projects, volunteer work and the organisation of cultural events contributes to the development of civic responsibility and intercultural openness. It is also important to actively involve native speakers and representatives of different cultures in the educational process through guest lectures, joint projects and online communication. Thus, the pedagogical conditions identified in the study should form the basis for the formation of a new educational paradigm, within which language is viewed not as an isolated object of study, but as a means of developing readiness for productive interaction in a modern multicultural space. The integration of national and cultural characteristics into foreign language teaching is a strategically important area of pedagogical practice that contributes to students' professional readiness to function in a global educational and professional space.

■ CONCLUSIONS

The study empirically confirmed the hypothesis that integrating national and cultural characteristics into foreign language teaching is a key factor in developing students' intercultural competence. Experimental data demonstrated that the systematic inclusion of materials representing the cultural traditions, values, and national realities of Kyrgyzstan contributes to a statistically significant increase in all components of intercultural competence: cognitive, metacognitive, affective, and behavioural. The main results of the study include: increased student motivation – the use of national and cultural materials increases interest in learning a foreign language and fosters a positive attitude towards intercultural communication; development of metacognitive skills – students have acquired the ability to recognise their own strengths and weaknesses in intercultural interaction, which increases their adaptability in

different cultural situations; strengthening professional and cultural identity – the integration of national values forms a holistic educational personality and readiness for international interaction; practical significance – the data obtained can be used in the development of training programmes and methodological recommendations for foreign language teachers, including the design of assignments, case studies, role-playing games and project activities with an emphasis on the cultural realities of Kyrgyzstan.

The study demonstrated that national-cultural integration in foreign language teaching is not only a pedagogical tool but also a strategic direction in the development of educational policy aimed at training specialists capable of effective intercultural interaction in the context of globalisation. Prospects for further research include studying the impact of the integration of national and cultural characteristics on the formation of intercultural competence in students of different age groups and fields of study; developing and testing comprehensive methods for assessing the effectiveness of national and cultural integration in foreign language teaching; researching the possibilities of using digital technologies and multimedia resources to enhance intercultural learning and increase student motivation; conducting a longitudinal study of the long-term effects of developed intercultural competence on the professional activities of graduates.

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■ CONFLICT OF INTEREST

The authors declare that there is no conflict of interest that could influence the results of the study or the interpretation of the data.

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Маданияттар аралык компетенттүүлүктү калыптандыруунун фактору катары чет тилдерди окутууга өлкөнүн улуттук жана маданий өзгөчөлүктөрүн интеграциялоо

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Аннотация. Улуттук жана маданий өзгөчөлүктөрдү чет тилдерди үйрөнүү процессине интеграциялоо билим берүү глобалдашуусунун шартында студенттердин маданияттар аралык компетенттүүлүгүн өнүктүрүүдө маанилүү ролду ойнойт. Макалада жогорку окуу жайларындагы билим берүү процессине Кыргызстандын маданий мурасын, каада-салттарын жана баалуулук багыттарын киргизүүнүн теориялык жана практикалык аспектилери талданган. Изилдөөнүн максаты чет тилдерди окутууга улуттук жана маданий компоненттерди натыйжалуу интеграциялоого көмөктөшүүчү педагогикалык шарттарды аныктоо жана эксперименталдык жактан негиздөө, ошондой эле алардын студенттердин маданияттар аралык компетенттүүлүгүн өнүктүрүүгө тийгизген таасирин баалоо болгон. Методологиялык негиз илимий адабияттарды салыштырмалуу талдоо, билим берүү практикасын байкоо жана педагогикалык эксперименттен турган. Изилдөөгө эксперименталдык жана контролдук топторго бөлүнгөн тилдик жана педагогикалык адистиктерден 120 студент катышкан. Формативдик этапта эксперименталдык топто маданий жактан белгиленген тексттерди, маданияттар аралык багытталган тапшырмаларды, долбоордук иштерди жана ролдук оюндарды камтыган атайын педагогикалык шарттар ишке ашырылган. Интеграциянын натыйжалуулугу тилдик тесттерди, маданияттар аралык коммуникативдик компетенттүүлүк анкеталарын жана ылайыкташтырылган маданий интеллект тесттерин колдонуу менен бааланган. Алынган эмпирикалык жыйынтыктар эксперименталдык топто статистикалык жактан маанилүү прогрессти көрсөттү. Бул топто маданияттар аралык компетенттүүлүктүн орточо деңгээли 28 %дан 74 %га чейин жогорулаган (контролдук топто 31 %дан 36 %га чейин). Улуттук жана маданий компоненттерди колдонуу мотивацияны жогорулатууга, критикалык ой жүгүртүүнү өнүктүрүүгө жана маданияттардын диалогуна негизделген туруктуу баалуулук багыттарын калыптандырууга салым кошкону аныкталган. Ошентип, изилдөө улуттук жана маданий өзгөчөлүктөрдү чет тилин окутууга системалуу интеграциялоо студенттерди көп маданияттуу чөйрөдө маңыздуу диалогго даярдоодо натыйжалуу фактор болуп саналаарын тастыктады. Алынган маалыматтар окуу программаларын иштеп чыгууда, методикалык материалдарды түзүүдө жана мугалимдерди даярдоону жакшыртууда колдонулушу мүмкүн, бул тилдик билим берүүнүн заманбап глобалдык тенденцияларына туура келет.

Негизги сөздөр: тилдик инсандык; маданий иденттүүлүк; коммуникативдик стратегиялар; баалуулук багыттары; социомаданий мамиле; маданияттардын диалогу; дисциплиналар аралык интеграция

Интеграция национально-культурных особенностей страны в преподавание иностранных языков как фактор формирования межкультурной компетентности

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Аннотация. Интеграция национально-культурных особенностей в процесс обучения иностранным языкам играет ключевую роль в формировании межкультурной компетентности студентов в условиях глобализации образования. В статье проанализированы теоретические и практические аспекты включения культурного наследия, традиций и ценностных ориентиров Кыргызстана в образовательный процесс в вузах. Целью исследования было выявить и экспериментально обосновать педагогические условия, способствующие эффективной интеграции национально-культурного компонента в преподавание иностранных языков, а также оценить их влияние на развитие межкультурной компетентности студентов. Методологическую основу составили сравнительный анализ научной литературы, наблюдение за образовательными практиками и педагогический эксперимент. В исследовании приняли участие 120 студентов языковых и педагогических специальностей, разделенных на экспериментальную и контрольную группы. На формирующем этапе в экспериментальную группу были внедрены специальные педагогические условия, включавшие культурно-маркированные тексты, межкультурно-ориентированные задания, проектные работы и ролевые игры. Эффективность интеграции оценивалась с помощью языковых тестов, анкетирования и адаптированных CQ-тестов. Полученные эмпирические результаты продемонстрировали статистически значимый прогресс экспериментальной группы. Средний уровень межкультурной компетентности в этой группе увеличился с 28 % до 74 % (в контрольной группе – с 31 % до 36 %). Было выявлено, что использование национально-культурного компонента способствует повышению мотивации, развитию критического мышления и формированию устойчивых ценностных ориентиров, основанных на диалоге культур. Таким образом, исследование подтвердило, что системная интеграция национально-культурной специфики в обучение иностранным языкам является эффективным фактором подготовки студентов к содержательному диалогу в поликультурной среде. Полученные данные могут быть применены при разработке учебных программ, создании методических материалов и совершенствовании подготовки педагогов, что соответствует современным мировым тенденциям в языковом образовании.

Ключевые слова: языковая личность; культурная идентичность; коммуникативные стратегии; ценностные ориентиры; социокультурный подход; диалог культур; межпредметная интеграция



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Teaching biology in China: Between Confucian heritage and STEM modernisation

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Abstract. The relevance of this study is determined by the fact that biology has become one of the key subjects of STEM modernisation in China, as the country's strategic priorities – biotechnology, medicine, genetics, food security, and ecology – are concentrated within this field. These national goals require a new model of biology education that is shifting from an exam-oriented system toward a research-based, interdisciplinary, and technologically enhanced learning environment. The purpose of the study was to analyse how the integration of STEM approaches, digitalisation, and Confucian cultural traditions jointly influence the teaching of biology in China and shape a unique hybrid educational model. The methodology was based on a qualitative comparative analysis of policy documents, curriculum standards, and scholarly publications by Chinese and international researchers, as well as a content analysis of reforms related to STEM integration, digital tools, and the transformation of pedagogical practices. The findings showed that biology has become central to STEM education not by accident but because it provides interdisciplinary links with medicine, chemistry, mathematics, engineering, and environmental science. It was established that Chinese schools and universities are increasingly adopting project-based learning, digital simulations, virtual laboratories, and the integration of biology with big-data analysis and engineering tasks. At the same time, Confucian values – discipline, respect for teachers, and moral norms – continue to shape interaction styles and student motivation, creating a balance between innovation and tradition. Additional systemic challenges were identified, including reduced laboratory practice, a shortage of teachers with research competencies, and digital inequality across regions. The practical significance of the study lies in its potential application in curriculum development, the modernisation of biology teaching, and the adaptation of STEM approaches in countries seeking to harmonise cultural traditions with innovative educational practices

Keywords: biology education; educational reforms; digital technologies; cultural context

■ INTRODUCTION

Modern educational systems are increasingly required to prepare learners for emerging technological, biomedical, and environmental challenges, which enhances the importance of science education. Recent academic literature emphasises that the integration of STEM (Science, Technology, Engineering, Mathematics) approaches has become one

of the key directions of educational modernisation in many countries, including China (Golegou & Peppas, 2025). STEM is viewed not only as a teaching method but as a comprehensive educational framework aimed at fostering critical thinking, research skills, digital literacy, and the ability to work in interdisciplinary environments. Studies published

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over the past few years, like the one by V. Županec *et al.* (2022), indicate that the effectiveness of STEM education largely depends on its implementation within specific subject areas, particularly biology. Biology is considered a strategically important discipline, as it underpins China's priority development areas such as biotechnology, genetic engineering, medicine, pharmacology, food security, and environmental protection. Research also demonstrates that biology has a high potential for integrating engineering tasks, mathematical modelling, digital technologies, and big data, making it one of the most suitable subjects for the implementation of STEM approaches (Avci *et al.*, 2025).

Digitalisation plays a significant role in transforming education and has become a major direction of Chinese educational reforms. The Education Informatisation 2.0 Action Plan (Ministry of Education, 2018) highlighted the need to develop digital competencies and implement online platforms, virtual laboratories, and intelligent learning systems. C. Papaneophytou & S. Nicolaou (2025) confirmed that digital technologies greatly facilitate the study of biology by enabling the modelling of complex biological processes, the use of interactive simulations, and improved access to laboratory tools. This is particularly important for regions with limited resources, where virtual laboratories compensate for the lack of physical equipment (Sipii *et al.*, 2024). The integration of STEM into biology education in China is also directly linked to national educational reforms. Among the key policy documents are China's Education Modernisation 2035 Plan (2019), the updated Biology Curriculum Standards for High Schools (Yu *et al.*, 2022), and the Digital Education Strategic Action Plan (Ministry of Education, 2025). These documents outline a strategic shift toward developing research competencies, scientific literacy, and modernising the content of biology education. Recent studies show that these reforms aim to move away from exam-centred learning toward practice-oriented, project-based, and interdisciplinary instructional models.

However, contemporary academic literature also highlights several barriers to the development of STEM-oriented biology education. According to K. Tzafilkou *et al.* (2022), key challenges include a shortage of teachers with competencies in digital and engineering technologies, a lack of practice-oriented learning resources, and substantial digital inequality between urban and rural schools. Additionally, researchers emphasise the influence of cultural factors – primarily Confucian pedagogical traditions, which maintain an emphasis on discipline, respect for teachers, and high academic achievement (Marinette & Hui, 2021). These values shape the characteristics of the Chinese educational environment and influence the pace and nature of innovation.

Analysis of recent studies shows that biology education in China is shaped by three major groups of factors: (1) governmental reforms and regulatory documents, (2) digital technologies that transform approaches to practical learning, and (3) cultural traditions that define teacher–student interaction. This combination creates a unique educational model in which innovation is integrated with

long-standing cultural norms. The purpose of this study was to analyse contemporary trends in biology teaching in China, including the integration of STEM approaches, the impact of digitalisation, and the role of cultural factors in shaping the modern educational model.

■ MATERIALS AND METHODS

This study is theoretical and analytical in nature and was conducted between January and May 2025. The methodological framework was based on qualitative content analysis, comparative analytical methods, and consensus-based thematic grouping. To identify and select relevant sources, the following academic databases were consulted: Scopus, Web of Science, ScienceDirect, and CNKI, supplemented by open-access repositories such as ResearchGate and official platforms of the Ministry of Education of the People's Republic of China. The search was conducted using the following keywords: “STEM education”, “biology teaching China”, “Confucian heritage education”, “digital biology education”, and “biology curriculum reform China”. The publication period was limited to 2018–2025 to ensure the inclusion of the most recent studies reflecting current trends in biology education. Inclusion criteria: thematic relevance (STEM, biology education, digitalisation, educational policy); presence of empirical findings or a clearly articulated theoretical framework; publication in a peer-reviewed academic journal; availability of full text. Exclusion criteria: duplicate materials; studies not related to biology or digital education; publications lacking identifiable authorship or complete bibliographic information.

Qualitative content analysis was employed to identify major directions in the development of biology education in China. The analysis focused on conceptual approaches, pedagogical models, curricular elements, and research findings presented in the selected publications. This method made it possible to reveal recurring thematic structures across works by different scholars. To enhance the reliability of analytical conclusions, a consensus-based thematic grouping approach was applied. This method involved comparing the findings of multiple studies and identifying thematic categories consistently confirmed across the majority of included sources. The use of thematic consensus helped to minimise subjective interpretation and ensured coherence in the classification of the data. Application of the consensus approach made it possible to confirm four key thematic domains: the influence of Confucian educational traditions; the integration of STEM into biology teaching; methodological transformations in school and university curricula; the role of digital technologies and virtual laboratories in the modernisation of biology education.

The comparative analytical method was applied to contrast different approaches found in the literature, identify shared tendencies, and reveal distinctions across educational levels and regions in China. Based on the synthesis of content analysis results and consensus-derived thematic categories, the table was developed, which summarises the key characteristics of the contemporary model

of biology teaching in China and represents the combined outcome of content analysis, thematic consensus, and comparative assessment of the sources. In conclusion, the methodology employed in this study was grounded in a systematic and reproducible research design, integrating qualitative content analysis, consensus-based thematic grouping, and comparative analytical procedures. This combination ensures the objectivity and credibility of the obtained results and provides a solid foundation for interpreting the current state and development trends of biology education in China.

■ RESULTS AND DISCUSSION

Structural shifts in biology education: Curriculum reform, STEM integration, and digital transformation

The analysis of the literature demonstrates that the transformation of biology education in China is driven by a combination of nationwide curriculum reforms, the strategic incorporation of STEM-based pedagogies, and the rapid expansion of digital learning tools. Through qualitative content analysis and consensus-based thematic grouping, several recurring structural trends were identified across policy documents, empirical research, and case studies. According to X. Lin *et al.* (2023), X. Wei *et al.* (2024), these trends reflect the overall direction of China's educational modernisation and form the foundation of the systemic shift from exam-oriented knowledge reproduction toward inquiry-driven and competency-based learning. A central finding concerns the revision of national biology curriculum standards and the increased emphasis on scientific literacy, higher-order thinking, and interdisciplinary competencies. The Biology Curriculum Standards for High Schools situate biology as a key discipline for national scientific and technological development, highlighting its connection to biotechnology, genetics, environmental sustainability, and

health (Yu *et al.*, 2022). Research conducted by S. Lin *et al.* (2023) confirms that the updated curriculum encourages students to engage in hypothesis formulation, experimentation, and interpretation of scientific evidence rather than memorising factual content.

Digital transformation reinforces this shift. Several studies note that virtual laboratories, digital microscopes, online simulations, and AI (artificial intelligence) supported learning platforms now play an essential role in biology education (Ma *et al.*, 2025; Thanh *et al.*, 2025). These tools expand access to experimental work – particularly in rural or underfunded regions – and facilitate the visualisation of complex biological processes such as genetic mutations, ecological interactions, and cellular dynamics. The prominence of digital learning aligns with the goals outlined in Education Informatisation 2.0 (Ministry of Education, 2018), which emphasised the construction of “intelligent learning environments” across the country. Recent scholarship further underscores that effective large-scale implementation of digital tools in higher and secondary education demands systematic, multi-stage planning rather than ad-hoc adoption. M. Vaintraub *et al.* (2025) propose a comprehensive framework comprising needs analysis, teacher digital upskilling, curriculum modernisation, creation of dedicated electronic resources, and continuous evaluation and optimisation. Their model exhibits strong parallels with China's ongoing efforts to build sustainable digital biology education ecosystems, particularly in addressing teacher training deficits and regional digital inequality highlighted in the present study. The synthesis of these studies reveals that the transformation of biology education in China follows several recurring structural patterns. These patterns were refined using a consensus-based thematic grouping approach, allowing the identification of trends validated by multiple independent sources. The consolidated thematic categories are presented in Table 1.

Table 1. Key features and emerging trends in biology education in China

Feature/Trend	Description
Curriculum reform and competency orientation	National reforms emphasise inquiry, scientific literacy, and core competencies over rote memorisation.
Integration of STEM and interdisciplinary approaches	Biology teaching incorporates STEM concepts and links biology with mathematics, engineering, and environmental science.
Digital learning technologies and virtual laboratories	Simulations, massive open online courses (MOOCs), and virtual labs expand access to experimentation and enhance inquiry-based learning.
Transition from teacher-centred to student-centred instruction	Confucian respect for teachers persists, but project-based learning and collaborative methods are increasingly adopted.
Cultural context and examination pressure	Exam orientation creates tension with STEM practices; Confucian values influence student motivation and discipline.

Source: compiled by the authors based on consensus thematic analysis

In summary, the contemporary model of biology education in China is characterised by a clear shift towards competency-based, inquiry-driven and interdisciplinary learning, underpinned by systematic curriculum reform, deep integration of STEM elements, widespread adoption of virtual laboratories and digital tools, and a gradual

transition to more student-centred practices. Although Confucian-inspired discipline and examination pressures remain influential, they increasingly coexist with innovative pedagogies, producing a distinctive hybrid framework that balances global modernisation trends with deeply rooted cultural norms.

Confucian heritage, examination culture, and STEM pedagogies: Interaction, tension, and hybridisation

Beyond structural reforms, several deeper cultural and pedagogical tensions shape the adoption of STEM pedagogies in China. As shown by Y. Liang & K. Matthews (2022), Confucian values – discipline, respect for authority, and moral development – continue to influence classroom interactions and define expectations for both teachers and students. At the same time, research indicates that these values may support STEM implementation by fostering persistence, responsibility, and strong work ethics during scientific inquiry (Davis *et al.*, 2020; Nguyen *et al.*, 2025). However, despite this potential alignment, significant contradictions remain. Studies by C. Tan (2019) have shown that the exam-oriented culture, deeply rooted in Confucian educational traditions, poses one of the most serious challenges, as high-stakes standardised testing encourages memorisation rather than creative inquiry. This tension is further reflected in findings suggesting that teachers often struggle to balance exam preparation with the need to adopt open-ended, project-based methods encouraged by STEM reforms (Wang, 2022).

Chinese schools navigate these tensions by adopting hybrid instructional models. STEM elements – such as project-based modules, interdisciplinary research tasks, and digital experiments – are frequently introduced through elective courses and extracurricular science clubs, while core curriculum hours remain aligned with examination standards. This gradual integration reflects what H. Ma *et al.* (2025) describe as the transformation of STEM education in China into a form of “praxis” shaped by sociocultural conditions rather than merely technical reform. The role of teachers is also undergoing transformation: recent studies highlight that effective educators combine Confucian authority with modern facilitation techniques, creating a hybrid teaching style that preserves structure while

promoting collaboration, experimentation, and student agency (Tan, 2019; Wang, 2022). This hybrid approach distinguishes Chinese classrooms from Western constructivist models and from the highly exam-driven systems of Japan, South Korea, and Singapore.

A comparative analysis helps illuminate the uniqueness of China’s hybrid educational model. As J. Xiao & J. Zhang (2022) note, China’s approach to STEM modernisation differs from Western models by attempting to integrate high academic performance expectations with rapid digital transformation, interdisciplinary learning, and research-oriented instruction. Unlike Japan and South Korea, where strict examination systems often limit exploratory learning, China seeks to blend exam preparedness with innovative pedagogical practices, especially through digital platforms and large-scale technological modernisation. A similar pattern of culturally sensitive adaptation of foreign educational models can be observed in other national contexts undergoing rapid modernisation. For instance, Yu, Lukashevych & I. Popozohlo (2024) demonstrate that successful transfer of European vocational education practices is only feasible when cultural, economic and institutional differences are explicitly taken into account and hybrid solutions are designed. This finding reinforces the broader observation that global STEM-oriented reforms rarely succeed through direct transplantation; instead, they require deliberate hybridisation with local pedagogical traditions and systemic constraints – a process clearly evident in China’s integration of STEM methodologies with Confucian educational heritage. This combination produces a distinctive model in which traditional cultural norms coexist with emerging digital pedagogies. The contradictions identified through consensus-based thematic grouping – such as the tension between examination pressure and inquiry-based learning, or between traditional teacher authority and student autonomy – are synthesised in Table 2.

Table 2. Key contradictions in biology education reform in China and strategies for resolution

Critical challenge/contradiction	Traditional model (Confucian values/exam system)	STEM modernisation requirements	Synthesis/resolution in China
Examination pressure vs. inquiry-based learning	Emphasis on memorisation and standardised testing	Need for experimentation, creativity, open-ended tasks	Hybrid curricula combining exam prep with STEM electives and research modules
Teacher authority vs. learner autonomy	Teacher as moral authority and central figure	Teachers as facilitators, mentors, collaborators	Dual-role pedagogy balancing authority with student-centred research
Limited laboratory access vs. need for practical inquiry	Resource limitations, especially in rural regions	Hands-on experiments, data analysis, complex modelling	Digital labs, simulations, mobile science units, national investments in infrastructure
Cultural continuity vs. innovation	Preservation of stable moral norms and discipline	Integration of AI, digital tools, interdisciplinary thinking	Cultural adaptation of STEM – innovation introduced without discarding tradition

Source: authors’ analytical synthesis based on consensus analysis of contemporary STEM-biological education literature

The combined results indicate that the modernisation of biology education in China constitutes not simply a pedagogical reform but a systemic reorientation of the entire educational framework. The integration of STEM, digital tools, and interdisciplinary connections positions biology

as a strategically important discipline for technological and scientific development. These findings hold several implications. First, Chinese reforms show that educational modernisation does not require abandoning cultural traditions. As X. Li & F. Wei (2023) argue, Confucian values can

coexist with STEM methodologies, providing stability and ethical grounding for scientific inquiry. Second, the hybrid resolution of the exam – STEM contradiction offers a model applicable to countries facing similar structural tensions. As demonstrated by national policy frameworks such as China's Education Modernisation 2035 Plan (2019) and the Digital Education Strategic Action Plan (Ministry of Education, 2025), gradual integration allows innovation to be adopted without destabilising existing systems. Third, China's experience highlights the necessity of aligning curriculum, teacher development, and digital infrastructure under a coherent national strategy. The combination of curriculum reform, technological investment, and cultural adaptation results in a distinctive, sustainable, and scalable model of biology education. Fourth, digital laboratories and shared online resources help address regional inequalities, illustrating a pathway that may be particularly relevant for developing countries (Wei *et al.*, 2024; Peng *et al.*, 2025). Finally, this study contributes to international discussions on how cultural frameworks mediate the implementation of STEM. China's case suggests that innovation rooted in cultural continuity can produce a resilient and balanced educational model.

Policy- and practice-oriented recommendations based on analytical findings

The analytical synthesis of structural reforms, cultural dynamics, and pedagogical transformations reveals several actionable directions for strengthening the development of biology education in China. These recommendations follow directly from the identified contradictions – particularly the tension between examination culture and inquiry-based learning, the uneven integration of digital technologies, and the changing role of teachers. The proposed measures emphasise system-level coherence and long-term sustainability, ensuring that educational modernisation benefits all learner groups. One of the pressing needs highlighted by the findings is the restoration and expansion of practical laboratory training. Although digital laboratories and simulations significantly improve access to experimental work, particularly in rural regions, they cannot fully replace hands-on biological investigation. Strengthening practical training requires coordinated investments: upgrading laboratory infrastructure, increasing funding for consumable biological materials, and encouraging schools to establish partnerships with local research institutes. Such measures would address the current imbalance between digital and physical experimentation and ensure deeper scientific literacy. This recommendation is grounded in the literature showing that hybrid experimentation – virtual plus physical – produces the strongest learning outcomes by combining conceptual clarity with procedural competence.

Equally important is the professional development of teachers, who serve as the mediating link between Confucian educational norms and modern STEM pedagogy. The analysis indicates that teachers capable of combining disciplinary authority with facilitation skills are the most

effective in implementing inquiry-based instruction. Consequently, national and regional educational authorities should expand long-term training programs focusing on digital literacy, interdisciplinary teaching strategies, and project supervision. These programs should go beyond technical upskilling and incorporate reflective practice, peer learning networks, and mentoring systems. Such teacher development initiatives will help bridge the gap between traditional instructional models and innovative pedagogical requirements. The third priority concerns the reform of evaluation and assessment systems. The current reliance on high-stakes standardised examinations creates a structural contradiction with the aims of STEM-oriented biology education. A more holistic assessment framework is needed – one that values creativity, collaboration, ethical reasoning, and research skills. Incorporating formative assessments, scientific portfolios, inquiry reports, and project-based evaluation would align testing practices with the competencies emphasised in national reforms. Such an approach would help resolve the conflict between examination pressure and authentic scientific learning, offering students a more balanced and motivating educational environment. Addressing digital inequality is another crucial recommendation derived from the findings. While large urban schools benefit from advanced educational technologies, many rural institutions struggle with unstable internet access or outdated equipment. Targeted policy interventions – mobile science units, subsidised devices, cloud-based laboratory simulations, and centrally maintained digital resource platforms – can help reduce these disparities. Ensuring equitable access to digital tools is essential for maintaining national cohesion in STEM modernisation and preventing long-term regional divides in scientific education. Finally, the analysis underscores the need for stronger coordination between policy documents, curriculum reforms, and school-level implementation. Although national strategies such as China's Education Modernisation 2035 Plan (2019) and the Digital Education Strategic Action Plan (Ministry of Education, 2025) provide a clear vision, their application at the institutional level remains uneven. Establishing monitoring frameworks, offering implementation guidelines, and supporting data-driven decision-making will help schools interpret policy directives consistently and adapt them to local conditions. Enhanced coordination will also enable the systematic sharing of best practices, further strengthening the hybrid educational model that blends Confucian cultural continuity with global scientific innovation.

CONCLUSIONS

The findings of this study demonstrate that the modernisation of biology education in China is shaped by the interaction of three core forces: nationwide policy reforms, rapid digital transformation, and the enduring influence of Confucian educational values. The analysis confirms that biology has become a central discipline within China's STEM agenda, enabling the integration of biotechnology,

ecological literacy, data analysis, and interdisciplinary problem-solving into school and university curricula. A key scientific result of this study is the identification of a hybrid pedagogical model in which inquiry-based, technologically enhanced instruction coexists with culturally rooted norms of discipline, respect, and academic rigor. The study also reveals several structural contradictions that continue to shape the evolution of biology education. The most prominent tensions include the persistence of exam-oriented assessment, uneven access to laboratory resources, and the shortage of educators trained in both digital technologies and research-oriented pedagogies. These challenges explain why many institutions adopt hybrid strategies – combining exam preparation with STEM electives, virtual laboratories, and project-based learning modules. Such approaches illustrate China's capacity to adapt innovations without disrupting cultural continuity. The significance of these results lies in showing that educational modernisation in China is not merely technological; it reflects a deeper systemic shift toward competency-based learning aligned with national scientific priorities. The findings offer practical implications for policy design, suggesting that

sustainable reform requires synchronised development of curriculum standards, assessment models, and teacher training. Future research should further examine the long-term effectiveness of hybrid STEM-Confucian models, investigate regional inequalities in resource access, and evaluate how digital laboratories can complement hands-on experimentation. Comparative studies across Asian and Western contexts would also help clarify the global applicability of China's emerging educational framework.

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■ CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Аннотация. Бул изилдөөнүн актуалдуулугу Кытайда биология сабагы STEM-модернизациясынын негизги багыттарынын бирине айлангандыгы менен түшүндүрүлөт. Анткени өлкөнүн стратегиялык артыкчылык берген тармактары – биотехнология, медицина, генетика, азык-түлүк коопсуздугу жана экология – түздөн-түз биологиялык билимге таянат. Улуттук өнүгүү максаттары биологияны окутуунун жаңы моделин талап кылууда, ал экзаменоцентризмден изилдөөгө багытталган, междисциплинардык жана санариптик технологиялар менен камсыздалган билим берүү чөйрөсүнө өтүүнү шарттайт. Изилдөөнүн максаты – STEM ыкмасынын интеграциясы, санариптештирүү жана конфуцийчилик билим берүү салты Кытайда биология сабагын окутууга кандай таасир этерин жана алар биргелешип кандайча уникалдуу гибриддүү билим берүү моделин түзөрүн талдоо. Методологиясы нормативдик документтерге, окуу программаларына, кытай жана эл аралык изилдөөлөргө жасалган сапаттык салыштырма анализге, ошондой эле STEMдин киргизилиши, санариптик куралдар жана педагогикалык тажрыйбанын өзгөрүшү боюнча контент-анализге негизделген. Изилдөөнүн негизги жыйынтыктары биологиянын STEM тармагында борбордук орунду ээлеши кокустук эмес экенин көрсөтөт: ал медицина, химия, математика, инженерия жана экология менен тыгыз связдарын камсыз кылат. Кытай мектептери жана университеттери долбоордук окууга, санариптик симуляцияларга, виртуалдык лабораторияларга жана биологияны чоң маалыматтар жана инженердик тапшырмалар менен интеграциялоого барган сайын көбүрөөк көңүл буруп жатканы аныкталды. Ошол эле учурда конфуцийчилик баалуулуктар – тартип, мугалимге болгон урмат, адеп-ахлактык эрежелер – окуучулардын жүрүм-турумуна жана мотивациясына таасир этүүнү улантууда, натыйжада инновация менен салттуулуктун ортосунда тең салмак түзүлүүдө. Кошумча түрдө системалык көйгөйлөр да аныкталды: лабораториялык практиканын кыскарышы, изилдөө жүргүзө алган педагогдордун жетишсиздиги жана региондор ортосундагы санариптик теңсиздик. Изилдөөнүн практикалык мааниси – анын жыйынтыктарын окуу пландарын иштеп чыгууда, биологияны окутууну модернизациялоодо жана STEM ыкмасын маданий өзгөчөлүктөрдү сактоо менен айкалыштырган өлкөлөрдө колдонууга мүмкүнчүлүк түзөт.

Негизги сөздөр: биологиялык билим берүү; билим берүү реформалары; санариптик технологиялар; маданий чөйрө

Преподавание биологии в Китае: между конфуцианским наследием и STEM-модернизацией

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Аннотация. Актуальность исследования определяется тем, что биология в Китае превратилась в один из ключевых предметов STEM-модернизации, поскольку именно в этой области сосредоточены стратегические приоритеты страны – биотехнологии, медицина, генетика, продовольственная безопасность и экология. Эти национальные задачи требуют новой модели обучения биологии, которая переходит от экзаменотрической системы к исследовательской, междисциплинарной и технологически оснащенной образовательной среде. Цель работы заключалась в том, чтобы проанализировать, каким образом интеграция STEM-подхода, цифровизация и конфуцианская культурная традиция совместно влияют на преподавание биологии в Китае и формируют уникальную гибридную модель образования. Методология исследования основана на качественном сравнительном анализе нормативных документов, учебных программ, научных публикаций китайских и международных исследователей, а также на контент-анализе реформ, связанных с внедрением STEM, цифровых инструментов и трансформацией педагогических практик. Основные результаты показали, что биология стала центральным предметом STEM не случайно: именно она обеспечивает междисциплинарные связи между медициной, химией, математикой, инженерией и экологией. Установлено, что в китайских школах и университетах усиливается ориентация на проектное обучение, цифровые симуляции, виртуальные лаборатории и интеграцию биологии с данными больших данных и инженерными задачами. При этом конфуцианские ценности – дисциплина, уважение к учителю, морально-нравственные нормы – продолжают формировать стиль взаимодействия и мотивацию учащихся, создавая баланс между инновациями и традицией. Дополнительно выявлены системные трудности: сокращение лабораторной практики, дефицит педагогов с исследовательскими компетенциями и цифровое неравенство между регионами. Практическая значимость исследования заключается в возможности использовать его результаты при разработке учебных программ, модернизации биологического образования и адаптации STEM-подходов в странах, стремящихся совместить культурные традиции с инновационными формами обучения.

Ключевые слова: биологическое образование; образовательные реформы; цифровые технологии; культурный контекст



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Research on ideological and political teaching strategies in the “Integrated English” course for translation majors based on the “BOPPPS + PAD Class” model

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Abstract. In recent years, the PAD (Presentation-Assimilation-Discussion) Class and BOPPPS (Bridge-in, Objective, Pre-assessment, Participatory Learning, Post-assessment, Summary) instructional models have gained increasing prominence in China’s higher education landscape, particularly in the context of ongoing pedagogical reforms. Whilst both approaches have been widely adopted in various teaching contexts, existing research has seldom explored their systematic integration, especially within Comprehensive English courses where the potential for cultivating ideological and political education elements remains largely untapped. This study aimed to develop and validate a comprehensive instructional framework that synthesised these two prominent teaching models to achieve seamless incorporation of ideological education into language teaching for translation majors. The research employed a quasi-experimental design with 52 first-year translation majors at Luoyang Institute of Science and Technology, divided into a control group ($n = 26$, traditional lecture method) and an experimental group ($n = 26$, integrated “BOPPPS + PAD Class” model) over one semester. Data were collected through a self-designed online questionnaire based on a 5-point Likert scale, measuring teaching effectiveness across multiple dimensions. Independent samples t-tests revealed that the experimental group significantly outperformed the control group in ideological and political education and cultural confidence ($M = 4.52$, $SD = 0.55$ vs. $M = 3.45$, $SD = 0.88$, $p < .001$), critical thinking skills ($M = 4.48$, $SD = 0.58$ vs. $M = 3.52$, $SD = 0.75$, $p < .001$), and learning engagement ($M = 4.35$, $SD = 0.62$ vs. $M = 3.70$, $SD = 0.81$, $p < .01$), whilst maintaining comparable levels of knowledge acquisition ($p > .05$). The study established clearly defined ideological-political education objectives, reconstructed course content from Contemporary College English 2 to balance language proficiency with value cultivation, designed teaching procedures leveraging Unit 4 (“The man in the water”) as a case study, and developed a multidimensional assessment system. This research provided foreign language educators with both empirical evidence and practical implementation strategies for effectively integrating ideological-political education into translation programmes, ultimately supporting the development of globally competent professionals capable of articulating China’s perspectives in international contexts

Keywords: blended learning; assessment methods; curriculum design; instructional models; values education in language teaching

■ INTRODUCTION

In the current context of deepening curriculum-based ideological and political education whilst enhancing the quality of foreign language talent cultivation in higher education, the Comprehensive English course for translation majors faces two prominent challenges. Firstly, there exists a parallel rather than integrated relationship between language

skill development and value guidance. Secondly, traditional lecture-based teaching methods fail to meet students’ dual needs for developing cross-cultural communication competence and national narrative capacity. When language teaching focuses solely on vocabulary, grammar, and translation techniques, it often neglects students’ cultivation

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of cultural confidence and national identity in global contexts. Conversely, when ideological education appears merely as political theory indoctrination through lectures, it becomes disconnected from professional learning, causing students to overlook the practical significance of value education. Without establishing a systematic teaching framework that effectively integrates language learning with ideological education, it becomes difficult to achieve the fundamental goal of “fostering virtue through education”, whilst simultaneously weakening the discourse power of translation majors in international communication and ultimately hindering the enhancement of China’s soft power in cross-cultural exchanges. Therefore, exploring a teaching model that can simultaneously enhance language competence, strengthen patriotic awareness, and adapt to blended online-offline teaching has become an urgent task in foreign language education reform. As a required course for lower-level translation majors, Comprehensive English plays a significant role in ideological and political education. The teaching of this course must innovate pedagogical concepts and methods, integrating ideological and political education into course design to achieve effective connection between subject-specific teaching and values cultivation, thereby contributing to the development of translation professionals with both moral integrity and professional competence.

Existing studies have provided substantial experience and insights for this research. X. Ye (2025) explored the advantages and challenges of applying the “BOPPPS + PAD Class” model (Bridge-in, Objective, Pre-assessment, Participatory Learning, Post-assessment, Summary + Presentation-Assimilation-Discussion Class) in public English teaching at vocational colleges. L. Zhang (2024) introduced the BOPPPS model into interpreting courses, confirming that it significantly enhanced student engagement and teaching effectiveness. Particularly in task-driven interpreting exercises, the model achieved a closed loop of “Bridge-in, Objective, Pre-assessment, Participatory Learning, Post-assessment, and Summary”, helping students appreciate the dual value of language and culture in authentic contexts. F. Zhao *et al.* (2024), in a case study on the “Intercultural Communication in College English” course, demonstrated that the BOPPPS teaching framework could systematically integrate ideological and political education goals into every stage of language teaching. Specifically, in cross-cultural comparison tasks, it guided students to interpret cultural differences from a Chinese perspective, thereby strengthening their cultural confidence. Y. Lin *et al.* (2023) demonstrated the BOPPPS model’s effectiveness in enhancing teaching in a Business Communication course, finding that its structured design, including pre- and post-assessments and participatory learning, significantly improved course outcomes.

J. Zhao (2024) applied BOPPPS in business English teaching, emphasising the dual objectives of language teaching and value guidance through the cultivation of cultural confidence, further validating the model’s effectiveness in business English courses. Y. Dong (2022) combined

“BOPPPS + PAD Class” in college English teaching, noting that their complementarity achieved an organic unity of output-oriented and student-centred approaches. This combination allocated half of the class time to teacher lectures and the other half to student discussions, ensuring systematic knowledge transmission whilst stimulating autonomous thinking and collaborative learning. W. Jiang *et al.* (2025) demonstrated that the BOPPPS model, when coupled with ideological and political education, is a flexible tool for teaching reform in technical disciplines, successfully enhancing both students’ operational skills and their consciousness of professional standards. H. Zhou & M. Wang (2024) incorporated ideological and political elements into the postgraduate “Matrix Theory” course through BOPPPS, demonstrating the model’s potential for value guidance in advanced specialised courses. This indicated that even highly abstract subjects could achieve organic integration of ideological and political goals through structured teaching.

Based on the common findings of the aforementioned studies, this research aimed to construct and validate an integrated framework of “BOPPPS + PAD Class” to achieve systematic integration of ideological and political elements in the Comprehensive English course for translation majors, exploring its practical efficacy in enhancing both language proficiency and value guidance.

■ MATERIALS AND METHODS

This study employed a quasi-experimental design with a pre-test/post-test control group format. The research was conducted at Luoyang Institute of Science and Technology during the spring semester of the 2023-2024 academic year. Two intact classes of second-semester students from the Translation and Interpretation major participated in the study: Class 1 (n = 26, control group) and Class 2 (n = 26, experimental group), totalling 52 participants. All participants had completed one semester of Comprehensive English instruction and demonstrated intermediate English proficiency. The control group received instruction via the traditional teacher-centred lecture method, whilst the experimental group was taught using the integrated “BOPPPS + PAD Class” instructional model. Both groups used the same textbook, *Contemporary College English 2*, edited by Y. Limin and published by Foreign Language Teaching and Research Press. The course met for four 45-minute periods per week over 16 weeks, totalling 64 contact hours per semester.

This research aimed to address the following questions: (1) How can superficial and rigid integration of ideological and political education in translation studies be overcome to achieve a natural fusion of ideological elements with language teaching? (2) How can the dual objectives of fostering ideological awareness and ensuring rigorous language skill training be effectively accomplished in the curriculum without compromising either goal? (3) What is the overall teaching effectiveness of the implemented “BOPPPS + PAD Class” model?

The control group received traditional instruction following a lecture-based approach. Classes typically began

with a review of previous material, followed by teacher-led explanation of vocabulary, grammar points, and text analysis, and concluded with assignment of homework. Teacher-student interaction was minimal, primarily consisting of comprehension-check questions. The experimental group experienced instruction based on the integrated “BOPPPS + PAD Class” model, which synthesised the six-stage BOPPPS framework with the three-phase PAD Class structure. Before class students accessed course materials via the Chaoxing Learning Platform, including PowerPoint presentations, supplementary readings, and pre-assessment quizzes. They prepared content for the “Presentation•Exam•Assistance” section as part of the PAD Class preparation phase. The 90-minute class session was structured as follows:

- Bridge-in (B) (5 minutes): introduction of ideological and political elements related to the unit theme through multimedia materials, authentic cases, or discussion prompts;

- Objective (O) (2 minutes): clear articulation of learning objectives, including both language competence and value cultivation goals;

- Pre-assessment (P) (3 minutes): quick diagnostic activities to gauge students’ prior knowledge;

- Participatory learning (P) + PAD Class presentation (45 minutes): teacher’s focused lecture covering genre analysis, article structure, detailed language points, and rhetorical features, strategically integrating ideological and political content;

- PAD Class assimilation (5 minutes): individual internalisation time for students to process information and prepare questions;

- PAD Class discussion (25 minutes): group discussions where students shared insights, clarified doubts, and engaged in collaborative learning activities such as simulating the “Moving China Figures” programme, dialogues on themed topics (e.g., heroism), and sharing stories related to Luoyang’s cultural heritage;

- Post-assessment (P) and Summary (S) (5 minutes): assessment activities to evaluate learning outcomes and teacher-led summary highlighting key language points and value education elements.

After class students completed post-assessment tests on the Chaoxing platform and participated in discussion forums to provide feedback on teaching content and share reflections. At the end of the semester, a self-designed online questionnaire was administered to all participants. The questionnaire was developed specifically to evaluate the effectiveness of the integrated “BOPPPS + PAD Class” teaching model and comprised items organised into six dimensions: teaching design and organisation, assessment and feedback, participatory learning, PAD Class implementation, ideological and political education integration, and overall satisfaction and learning outcomes. All items utilised a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The questionnaire underwent validation by experienced English language educators to ensure content validity and reliability. Students’ language proficiency was evaluated through a comprehensive final

examination. Both groups completed identical examinations administered under standardised conditions. All stages of the experiment were conducted in strict accordance with ethical principles of ASA (2018).

Data were analysed using SPSS 26.0. Descriptive statistics (means and standard deviations) were calculated for all questionnaire dimensions. Independent samples t-tests were conducted to compare the experimental and control groups across the six dimensions of teaching effectiveness. The significance level was set at $p < .05$.

■ RESULTS AND DISCUSSION

The 2023 edition of the Translation Professional Training Programme and Curriculum Outline of Luoyang Institute of Technology identifies Comprehensive English as a foundational course for translation majors. The course objectives encompass systematic study of core language knowledge (phonetics, grammar, vocabulary, and text structure), training in fundamental language skills (listening, speaking, reading, writing, and translation), and cultivation of students’ communicative competence in English. Additionally, the curriculum guides students to engage with the culture, history, and social customs of English-speaking countries, whilst developing their critical thinking and communication skills to establish a solid foundation for advanced study.

The course emphasises moral education, fostering students’ core socialist values, inheriting the national spirit, cultivating international perspectives and global awareness, promoting cultural exchange and understanding, and contributing to building a community with a shared future for mankind. Through integrating explanations of national strategies such as the Belt and Road Initiative, students establish informed political stances and are encouraged to participate in language services. By incorporating ideological and political elements, instructors identify intersections between teaching themes and student education, determining appropriate approaches to expand each topic whilst skilfully incorporating teaching resources and content reflecting Chinese culture. This approach renders classroom ideological and political education more relevant, interactive, and resonant, thereby maximising teaching effectiveness. Table 1 presents the ideological and political course instructional design for selected units of Contemporary College English Intensive Reading 2. Traditional classroom instruction, characterised by reviewing previous lessons and introducing new content through diverse activities and information technology, typically focuses on the structure and logic of instructional content whilst neglecting student learning status and outcomes. The “BOPPPS + PAD Class” system establishes a complete closed loop encompassing before-class, during-class, and after-class phases. It employs varied interactive modes and utilises the Chaoxing Learning Platform to assist with documentation, rendering interactions measurable and effective. This process-oriented assessment promotes active and in-depth student engagement. Furthermore, this teaching model incorporates ideological and political education at strategic

intervals to ensure internalisation, achieving synergy between language learning and holistic development. Figure 1

illustrates the specific “BOPPPS + PAD Class” teaching methodology for promoting ideological and political education.

Table 1. Teaching design of “Ideological and political education in courses”

Unit	Title	Ideological and political elements entry point	Educational goals
Unit 1	Another school year – what for?	General Secretary Xi Jinping mentioned in a symposium with teachers and students at Peking University: “Talent is the foundation of virtue; virtue is the leader of talent” and “The way of university is to manifest virtue, to love the people, and to strive for the highest good”, and explained their translation.	1. Guide students to understand that the real purpose of university education is not only to cultivate professional skills, but also to cultivate students’ humanistic thoughts, that is, to become civilised people with comprehensive qualities through exposure to the great ideas of their predecessors. 2. Guide students to take root in society with the sentiment and responsibility of “cultivating oneself, managing the family, governing the country and pacifying the world”, link their personal dreams with the national dream, contribute to society while realising their own value, and realise the Chinese dream.
Unit 2	Say “yes”	Starting from the slogan “Black lives matter”, students were told about the tragic death of African-American man George Floyd due to violent law enforcement by white police in the first half of 2020.	1. The important role that Chinese people play around the world today: enabling the world to understand China in a more humane way. 2. Actively guide students to use foreign languages as a tool to express themselves bravely, and take this opportunity to strive for an equal position for China in the global wave.
Unit 3	The rite of spring	Rituals to welcome spring: planting trees and spring outings.	1. Cherish the beauty of life and face life with optimism. 2. Firmly uphold ideals and convictions, cultivate noble character, acquire solid skills, be brave in innovation and creation, be committed to hard work, and together with hundreds of millions of people, compose the song of youth in the new era in your resolute struggle.
Unit 4	The man in the water	Ordinary heroes emerged in the fight against COVID-19 in 2020.	Feel the heroic spirit with Chinese characteristics, feel the boundless love, and learn to be grateful and remember.

Source: compiled by the author

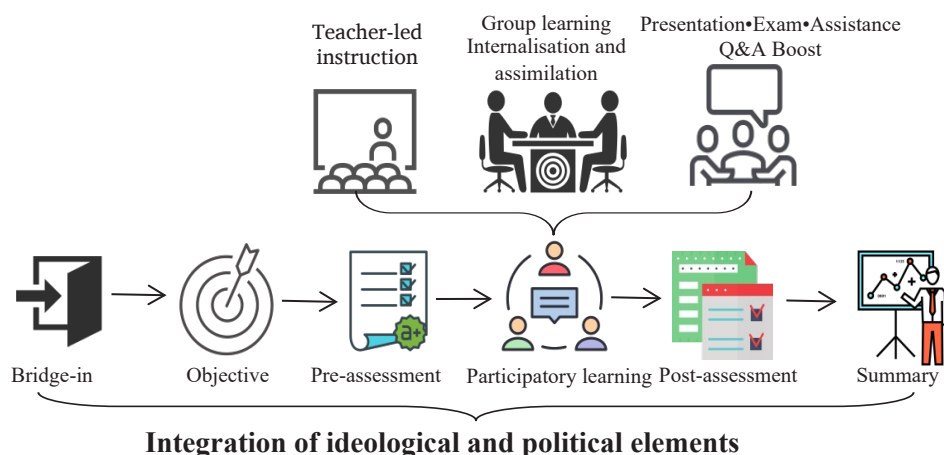


Figure 1. The “BOPPPS + PAD Class” teaching method to promote ideological and political education

Source: created by the author

Content reconstruction establishes a practical platform for students grounded in teachers’ participation in social practice. Through curricular and co-curricular activities, ideological and political elements, alongside local Luoyang characteristics, are seamlessly integrated into the Comprehensive English curriculum. This approach, analogous to “salt dissolving in water”, enables students to acquire language knowledge, enhance abilities, and develop values

simultaneously. This study employs Unit 4 of Contemporary College English Intensive Reading 2 as a case study, incorporating a specific implementation of the “BOPPPS + PAD Class” teaching model. Based on practical teaching requirements, researchers utilised the Chaoxing application to supplement the model with pre-class and post-class sessions, adapting or integrating various phases as needed. Table 2 presents the detailed implementation process.

Table 2. Splitting and merging of various links in the “BOPPPS + PAD Class”

Before class		1. Chaoxing platform publishes a PowerPoint presentation and students preview the PowerPoint presentation and related materials.	
		2. Based on the PowerPoint presentation prepare the content of the “Presentation•Exam•Assistance” section in the “PAD Class”.	
During class (ideological and political elements)	B (5 minutes)		3. Share pictures of medical workers and introduce the anonymous hero from heroes in harm's way appeared in 2020.
	O (2 min)		4. Understand the meaning of heroes from the deeds of foreign heroes, and then feel the heroic spirit with Chinese characteristics, feel the feelings of boundless love, and learn to be grateful and remember heroic deeds.
	P (3 min)		5. Causes of air crashes.
	P + split classroom	Genre analysis (10 min)	6. Question introduction: Where did you find this article? Does this article focus on disasters or people?
		Article structure (10 min)	7. Teacher's lecture: Characteristics of soft news and hard news, narrative style and techniques in media reporting.
			8. Question introduction: How is the article structured? Why?
		Detailed article (20 minutes)	9. Teacher's detailed lecture: The levels of article advancement.
			10. Question introduction: Unfamiliar expressions and rhetorical effects, psychological description, imaginary and real presentation.
		Discussion (5 minutes)	11. Teacher's lecture: Explain the significance of expression, rhetoric, psychological description, and the combination of reality and fiction.
		Activity (30 minutes)	12. Group discussion and internalisation.
	S (5min)		13. Presentation•Exam•Assistance: Sharing, communication, and clarification – deepening and exchanging language and ideas, carrying out group activities in the form of simulating the program of “Moving China Figures”, and carrying out dialogues on the theme of “Heroism”, telling the red culture of Luoyang, and sharing the heroic stories.
After class		14. Summary: The extraordinary heroic spirit displayed by ordinary people praises the greatness and selfless dedication of ordinary human nature; heroes have no borders, and we feel the heroic spirit with Chinese characteristics.	
		15. P: Post-completion test	
		16. Leave a message in the discussion area regarding teaching content and teaching evaluation.	

Source: compiled by the author

The optimised evaluation methodology, grounded in the “BOPPPS + PAD Class” teaching approach, implicitly integrates ideological and political education content into course assessments. Adhering to principles balancing summative and formative evaluation, the system emphasises both outcomes and processes. In summative examinations, assessment of language content related to ideological and political education is enhanced, with open-ended questions facilitating discussion of critical thinking topics and contemporary social issues, thus achieving close integration of language knowledge and values education. The formative evaluation process strengthens observation, documentation, and assessment of students' learning trajectories, encouraging increased participation in activities promoting ideological and political education, facilitating self-regulation of learning processes, stimulating motivation for autonomous learning, and enabling students to experience achievement. This approach combines knowledge transmission with value guidance, enhancing the teaching effectiveness of Comprehensive English.

Additionally, project-driven learning is implemented through the “Original Reading” initiative, wherein students engage with Chinese and international classics, undertaking “three-dimensional education” to cultivate ideological, moral, cultural, and psychological qualities, thereby establishing foundations for future professional learning,

practice, and personal development. Simultaneously, social practice activities and professional competitions are prioritised. Following the principle of “serving the local community”, a social service platform actively engages students' initiative, cultivating qualified contributors to socialism with elevated political literacy, robust professional skills, and strong social responsibility. Adhering to the principle of “using competitions to promote learning and teaching”, students are encouraged to participate in internal and external competitions, fostering gradual yet effective influence. The ideological and political education approach within the “BOPPPS + PAD Class” programme emphasises students' learning processes and experiences, enabling practical application of core socialist values through authentic listening, observation, and experience.

Independent samples t-test analysis revealed that the experimental group ($n = 26$) significantly outperformed the control group ($n = 26$) across multiple dimensions of teaching effectiveness. The experimental group demonstrated the most substantial improvements in ideological and political education and cultural confidence ($M = 4.52$, $SD = 0.55$) and critical thinking skills ($M = 4.48$, $SD = 0.58$), with scores significantly exceeding those of the control group ($M = 3.45$, $SD = 0.88$; $M = 3.52$, $SD = 0.75$, respectively), $ps < .001$. Furthermore, the experimental group achieved significantly higher scores than the control group in learning

engagement and initiative ($M = 4.35$, $SD = 0.62$ vs. $M = 3.70$, $SD = 0.81$), $p < .01$. In contrast, no statistically significant differences emerged between groups regarding knowledge mastery and overall satisfaction ($p > .05$),

indicating that whilst the integrated teaching model effectively facilitated achievement of higher-order competencies and value-oriented objectives, it maintained students' acquisition of fundamental knowledge (Fig. 2).

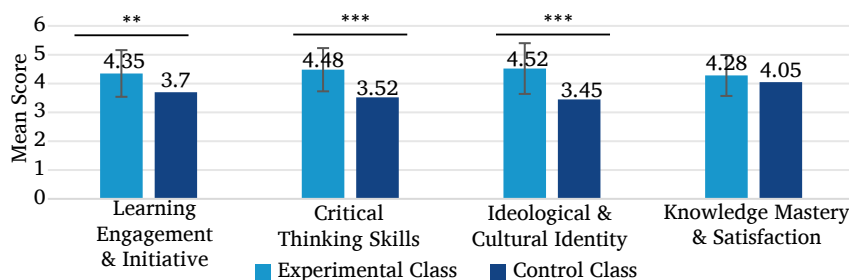


Figure 2. Comparison of teaching effectiveness between the experimental and control groups

Note: *** – $p < 0.001$, ** – $p < 0.01$, * – $p < 0.05$

Source: created by the author

The findings of this study provide empirical support for the efficacy of integrating the BOPPPS and PAD Class models in foreign language education, particularly within the context of ideological and political education. The significant improvements observed in ideological and political education, cultural confidence, and critical thinking skills amongst experimental group students suggest that the structured, interactive nature of the integrated model creates optimal conditions for developing higher-order competencies alongside traditional language proficiency. The substantial effect sizes observed for ideological and political education and cultural confidence ($d > 1.2$) align with existing research emphasising the importance of active learning pedagogies in values education. The BOPPPS framework's systematic approach – particularly its Bridge-in and Summary phases – appears to facilitate meaningful connections between language content and ideological themes, enabling students to perceive these elements as naturally integrated rather than artificially imposed. This finding resonates with educational research suggesting that values education proves most effective when embedded authentically within disciplinary content rather than presented as separate moral instruction (Lovat & Toomey, 2009; Lovat, 2017). The marked improvement in critical thinking skills amongst experimental group students merits particular attention. The importance of pedagogical methods promoting deep engagement and higher-order skills is well-documented in recent literature, with research demonstrating that cultivating critical thinking in English language learners enhances learning effectiveness, particularly through project-based learning and independent research activities (Rybchynska, 2025). J. Bayona & W. Durán (2024) demonstrated that traditional lecture-based instruction often fails to develop students' analytical and evaluative capacities, instead promoting surface-level knowledge acquisition. The PAD Class component's Assimilation and Discussion phases appear crucial in this regard, providing structured opportunities for students to process information independently, articulate their understanding, and engage in

collaborative meaning-making. These findings support broader literature on cooperative learning, which, according to M. Damkuvienė *et al.* (2023) and R. Gillies (2023), consistently demonstrates that structured peer interaction enhances cognitive development and promotes deeper understanding of complex concepts.

The significantly higher learning engagement and initiative observed in the experimental group reflects a fundamental shift in classroom dynamics facilitated by the integrated model. As mentioned by J. Liu *et al.* (2025), traditional teacher-centred instruction often positions students as passive recipients of knowledge, whereas the “BOPPPS + PAD Class” model redistributes cognitive responsibility, requiring students to actively participate in knowledge construction. This approach aligns with self-determination theory, which posits that learning environments supporting autonomy, competence, and relatedness foster intrinsic motivation and sustained engagement (Manninen *et al.*, 2022). The model's Participatory Learning phase, combined with PAD Class discussion activities, appears to satisfy these psychological needs, thereby enhancing students' willingness to invest effort in learning tasks. Importantly, the absence of significant differences in knowledge mastery between groups addresses a common concern regarding active learning approaches – namely, that increased attention to process and engagement might compromise content coverage and factual learning. These results suggest that the integrated model achieves a productive balance, maintaining rigorous knowledge transmission whilst simultaneously developing higher-order competencies. This finding challenges the false dichotomy often perceived between knowledge acquisition and skills development, demonstrating that well-designed instruction can effectively address both objectives (Bailey & Belfield, 2019).

The comparable satisfaction levels across groups, despite the experimental group's superior performance on objective measures, warrants consideration. This pattern may reflect students' unfamiliarity with active learning approaches and initial discomfort with increased cognitive

demands. Research on pedagogical innovation frequently documents temporary dissatisfaction as students adjust to new expectations and responsibilities (Cook *et al.*, 2023). Alternatively, satisfaction measures may inadequately capture the complex affective dimensions of learning experiences, particularly when comparing familiar and novel instructional approaches. From a theoretical perspective, these findings illuminate mechanisms through which structured active learning promotes both cognitive and affective outcomes in language education. The BOPPPS framework, as mentioned by Q. Liu *et al.* (2025), provides essential scaffolding, ensuring systematic progression through learning phases whilst maintaining clear objectives and assessment alignment. The PAD Class structure complements this by creating temporal and social spaces for assimilation and collaborative knowledge construction, processes essential for deep learning. As noted by Z. Lai (2025), together, these models address limitations of both traditional instruction and less structured active learning approaches, combining systematic design with meaningful student agency.

These results carry significant implications for curriculum design in translation and foreign language programmes, particularly within contexts emphasising ideological and political education. The integrated model demonstrates that values education need not compete with language skill development but can instead be synergistically combined when instruction is thoughtfully designed. This integration may prove particularly valuable in preparing globally competent professionals capable of navigating complex intercultural contexts whilst maintaining grounded cultural identities and informed perspectives on national priorities.

■ CONCLUSIONS

This study developed and empirically validated an integrated teaching model combining BOPPPS and PAD Class methodologies, demonstrating its effectiveness in systematically unifying language proficiency development with ideological and political education in the Comprehensive English course for translation majors. Empirical results revealed that the experimental group achieved significant improvements in critical thinking ($M = 4.48$, $SD = 0.58$) and cultural confidence ($M = 4.52$, $SD = 0.55$) compared to the control group ($M = 3.52$, $SD = 0.75$; $M = 3.45$, $SD = 0.88$, respectively), $ps < .001$, along with enhanced learning engagement and initiative ($M = 4.35$, $SD = 0.62$ vs. $M = 3.70$, $SD = 0.81$), $p < .01$. Importantly, these gains in higher-order

competencies occurred whilst maintaining comparable levels of knowledge acquisition ($M = 4.28$ vs. $M = 4.15$, $p > .05$), resolving the longstanding challenge of balancing value guidance and knowledge delivery in specialised courses. These findings demonstrate that well-designed instruction can effectively address both rigorous language training and meaningful values cultivation simultaneously.

The model provides a replicable pathway for integrating ideological and political elements through the closed-loop design of BOPPPS's six phases and the interactive mechanisms of the PAD Class. The case study of Unit 4 ("The man in the water") illustrates how authentic materials can serve as vehicles for exploring complex themes whilst simultaneously developing language competencies and cultivating students' critical awareness of cultural perspectives and national identity. The multidimensional assessment system, balancing summative and formative evaluation approaches, offers operational tools for evaluating both traditional learning outcomes and less readily quantifiable dimensions such as values development and critical thinking capacities. Future research should focus on three directions: first, expanding the framework's applicability to other disciplines such as Business English and Linguistics to verify its transferability; second, exploring intelligent support pathways by developing learning analytics-based dynamic evaluation systems for real-time assessment and optimisation of teaching outcomes; and third, conducting longitudinal studies to examine the long-term impact of the model on students' values formation and professional development. These efforts will advance ideological and political education in foreign language teaching from model construction to precise implementation.

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■ CONFLICT OF INTEREST

None.

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“BOPPPS + PAD Class” модели негизиндеги котормо адистиги үчүн “Интегралдык англис тили” курсунда идеологиялык-саясий окутуу стратегияларын изилдөө

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Аннотация. Акыркы жылдары PAD модели (Presentation-Assimilation-Discussion – презентация, өздөштүрүү, талкуу) жана BOPPPS модели (Bridge-in, Objective, Pre-assessment, Participatory Learning, Post-assessment, Summary) Кытайдын жогорку билим берүү мейкиндигинде өзгөчө орду бар педагогикалык реформалардын фонунда улам кеңири колдонулууда. Ар кандай окутуу шарттарында бул эки ыкма кеңири колдонулганы менен, алардын системалуу интеграциясы дээрлик изилденген эмес, айрыкча идеологиялык-саясий тарбия элементтерин киргизүү потенциалы толук ачыла элек “Интегралдык англис тили” курстарынын алкагында. Бул изилдөөнүн максаты – аталган эки окутуу моделин бириктирген комплекстүү дидактикалык алкак түзүп, аны котормо адистерине чет тилин окутууда идеологиялык тарбияны натыйжалуу интеграциялоо үчүн сынап көрүү болгон. Изилдөө квази-эксперименттик дизайнда жүргүзүлүп, Лоян илим жана технология институтунун котормо багытынын 1-курсундагы 52 студент катышкан. Алар бир семестрге көзөмөл тобуна ($n = 26$, салттуу лекциялык модель) жана эксперименттик топко ($n = 26$, интегралдык “BOPPPS + PAD Class” модели) бөлүнгөн. Маалыматтар окутуунун натыйжалуулугун бир нече параметр боюнча өлчөө үчүн 5 баллдык Лайкерт шкаласына негизделген онлайн-сурамжылоо аркылуу топтолгон. Көз карандысыз тандоолор үчүн t-тесттер эксперименттик топту идеологиялык-саясий тарбия жана маданий ишеним боюнча ($M = 4,52$, $SD = 0,55$ vs. $M = 3,45$, $SD = 0,88$, $p < 0,001$), сынчыл ойлом жөндөмү боюнча ($M = 4,48$, $SD = 0,58$ vs. $M = 3,52$, $SD = 0,75$, $p < 0,001$) жана окууга тартылуу деңгээли боюнча ($M = 4,35$, $SD = 0,62$ vs. $M = 3,70$, $SD = 0,81$, $p < 0,01$) олуттуу жогору көрсөткөн, ошол эле учурда билимди өздөштүрүү деңгээли эки топто окшош бойдон калган ($p > 0,05$). Изилдөөнүн алкагында идеологиялык-саясий тарбия боюнча так максаттар аныкталып, Contemporary College English 2 окуу китебинин негизинде тил компетенциясы менен баалуулуктарды калыптандыруунун тең салмактуулугу камсыз болгон жаңы мазмун түзүлүп, 4-юнит (“The man in the water”) мисалында окутуу кадамдары иштелип чыгып, көп өлчөмдүү баалоо системасы түзүлгөн. Бул изилдөө чет тилдерди окутуучу адистерге идеологиялык-саясий тарбияны котормо программаларына натыйжалуу интеграциялоо боюнча эмпирикалык далилдерди жана практикалык сунуштарды сунуштайт. Натыйжада, Кытайдын позицияларын эл аралык чөйрөдө түшүндүрүп бере алган глобалдык компетенттүү адистерди даярдоого өбөлгө түзөт.

Негизги сөздөр: аралаш окутуу; баалоо ыкмалары; окуу программасын долбоорлоо; окутуу моделдери; тил окутууда баалуулуктарды тарбиялоо

Исследование стратегий идеологического и политического обучения в курсе «Комплексный английский» для студентов-переводчиков на основе модели «BOPPPS + PAD Class»

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Аннотация. В последние годы модель PAD (Presentation-Assimilation-Discussion – презентация, ассимиляция, дискуссия) и модель BOPPPS (Bridge-in, Objective, Pre-assessment, Participatory Learning, Post-assessment, Summary) приобретают все большую значимость в системе высшего образования Китая, особенно в контексте продолжающихся педагогических реформ. Несмотря на широкое применение обеих моделей в различных образовательных ситуациях, существующие исследования редко рассматривают их системную интеграцию, особенно в курсах «Комплексный английский», где потенциал для включения элементов идеологического и политического воспитания остается в значительной степени нереализованным. Цель настоящего исследования заключалась в разработке и апробации комплексной дидактической модели, синтезирующей эти два подхода для бесшовного включения идеологического воспитания в процесс обучения языку студентов-переводчиков. В исследовании применялся квазиэкспериментальный дизайн с участием 52 студентов первого курса переводческого направления Лоянгского института науки и технологий, распределенных на контрольную группу ($n = 26$, традиционная лекционная модель) и экспериментальную группу ($n = 26$, интегрированная модель «BOPPPS + PAD Class») на протяжении одного семестра. Данные были собраны посредством разработанной авторами онлайн-анкеты на базе 5-балльной шкалы Лайкерта для измерения эффективности обучения по нескольким параметрам. Результаты t -тестов для независимых выборок показали, что экспериментальная группа значительно превосходила контрольную по показателям идеологического и политического воспитания и культурной уверенности ($M = 4,52$, $SD = 0,55$ против $M = 3,45$, $SD = 0,88$, $p < 0,001$), критического мышления ($M = 4,48$, $SD = 0,58$ против $M = 3,52$, $SD = 0,75$, $p < 0,001$) и учебной вовлеченности ($M = 4,35$, $SD = 0,62$ против $M = 3,70$, $SD = 0,81$, $p < 0,01$), при этом уровень усвоения знаний оставался сопоставимым ($p > 0,05$). В исследовании были определены четкие цели идеологического и политического воспитания, реконструировано содержание курса на основе учебника Contemporary College English 2 для балансирования языковой подготовки и воспитания ценностей, разработаны этапы обучения на основе Юнита 4 («The man in the water») в качестве кейса и создана многомерная система оценивания. Данное исследование предоставляет преподавателям иностранных языков как эмпирические данные, так и практические стратегии для эффективной интеграции идеологического и политического воспитания в программы подготовки переводчиков, содействуя подготовке глобально компетентных специалистов, способных представлять китайскую точку зрения в международном контексте.

Ключевые слова: смешанное обучение; методы оценивания; проектирование учебных программ; дидактические модели; воспитание ценностей в обучении языку



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Optimisation of hybrid incentive systems in multi-generational teams at enterprises in China and Kyrgyzstan

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Abstract. Against the backdrop of accelerating globalisation and deepening demographic ageing, the study examined the current state of multigenerational collaboration as a prevalent organisational model in enterprises in China and Kyrgyzstan. The research aimed to develop a targeted hybrid incentive system designed to address intergenerational conflicts and cultural adaptation challenges within teams. Employing a mixed-methods approach, the study systematically integrated a literature review, cross-cultural comparative analysis, in-depth interviews, and case studies. The findings provided an in-depth analysis of cultural differences between the two countries across key dimensions, including collectivism versus individualism, power distance, and long-term versus short-term orientation. At the same time, substantial shortcomings were identified in the existing incentive systems of both countries, manifested in overly simplified models, the absence of culturally adaptive adjustments, and insufficient consideration of intergenerational differences. The study established the core principles for optimising a hybrid incentive system, placing emphasis on culturally adaptive corrections and the incorporation of intergenerational differences. Building upon a developed logical framework, specific implementation pathways were detailed, hierarchical material incentive measures were systematically planned, and personalised non-material incentive schemes were designed. The practical significance of the research lay in offering important recommendations to human resource managers and decision-makers in enterprises in China and Kyrgyzstan, as well as in Central Asian cross-border cooperative institutions, thereby enabling the optimisation of incentive systems for multigenerational teams in cross-cultural and intergenerational work environments and ultimately enhancing the effectiveness of organisational management

Keywords: intergenerational conflicts; cultural differences; collectivism; power distance; material and non-material incentives; differentiated motivation; cross-cultural adaptation

■ INTRODUCTION

With the deepening of economic integration between China and Kyrgyzstan and the continuous impact of demographic structure changes, the coexistence of multigenerational employees has become a new normal in the organisational form of enterprises in both countries. Employees of different generations exhibit significant differences in values, work preferences, and behavioural styles. While these differences release innovative potential, they also breed intergenerational conflicts due to demand divergences and cultural cognitive dissonance, posing severe challenges to the

effectiveness of incentive management. China and Kyrgyzstan possess unique cultural backgrounds and are in different stages of economic development, making the incentive issue of multi-age teams more complex. Chinese Confucian culture advocates collectivism and hierarchy, while Kyrgyzstan, under the dual influence of nomadic cultural heritage and Soviet historical legacy, has formed a value system of moderate collectivism and stability orientation. Such cultural differences urgently require theoretical analysis and practical responses from a localised perspective.

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Existing studies have provided theoretical support for multigenerational and cross-cultural incentives from various angles. S. Tetteh *et al.* (2023) found that cultural dimensions have a significant moderating effect on the effectiveness of incentive mechanisms: collectivist cultures prefer group incentives, while individualist cultures tend towards personalised rewards, laying a foundation for China-Kyrgyzstan enterprises to design incentive models based on cultural characteristics. Titin *et al.* (2025) pointed out that workplace intergenerational conflicts stem from value differences shaped by growth environments, and management adaptation strategies need to be formulated in combination with intergenerational characteristics, highlighting the necessity of differentiated intergenerational incentives. Intergenerational differences are largely determined by adult developmental crises, the nature of which is still debated: some researchers emphasise internal psychological factors while others highlight external social conditions (Kostiu, 2021). L. Nie (2025) confirmed through quantitative evaluation of incentive needs of employees of different generations that differentiated incentive measures can significantly improve incentive efficiency, providing quantitative support for subsequent path design. T. Konurbaev *et al.* (2025) analysed the nomadic cultural heritage of Kyrgyzstan and believed that the tradition of tribal collaboration has a lasting impact on employees' work values and team collaboration models, revealing the in-depth shaping effect of Kyrgyzstan's cultural core on incentive needs. M. Liu (2019) demonstrated through multilevel analysis of intra- and intercultural negotiations that the high power distance characteristic of Chinese culture influences hierarchical bargaining tactics and incentive structures in cross-border business collaborations, offering theoretical guidance for culturally adaptive incentive designs in Chinese enterprises. A. Mulugeta (2024) proposed that hybrid incentive designs integrating material and non-material rewards are more suitable for diverse teams, laying the core theoretical foundation for the construction of the hybrid incentive framework in this study. H. Ali *et al.* (2024) found that Chinese Generation Z employees pay more attention to growth-oriented incentives such as skill training and flexible work, clarifying the core demands of young generations. L. Wang & X. Duan (2025) further revealed the in-depth connection between generational diversity and team innovation, pointing out that intergenerational differences do not naturally promote innovation; instead, constructive differences need to be screened through conflict management and intergenerational advantages activated through shared leadership to transform diversity into innovative momentum. This conclusion provides a transformation logic reference from differences to value for the incentive design of multi-age teams in China-Kyrgyzstan cross-border enterprises. Although existing studies have confirmed the importance of cultural and intergenerational factors, most focus on single countries or general scenarios, lacking targeted integration of cultural integration, intergenerational characteristics, and localised practices between China

and Kyrgyzstan, making it difficult to address the actual dilemmas of cross-border enterprises. This study aimed to construct a hybrid incentive optimisation framework with both theoretical innovation and practical feasibility.

■ MATERIALS AND METHODS

This study was conducted from January to June 2025, employing a hybrid conceptual research design that integrates integrative literature review and logical framework approach. The existing research on cultural dimensions theory, generational theory, and hybrid incentive mechanisms was systematically reviewed to establish the theoretical foundation for framework construction. The research adopted a mixed-methods approach combining qualitative and quantitative elements to ensure methodological rigour and comprehensive data triangulation. The study design integrated four complementary components: (1) systematic literature review for theoretical grounding, (2) cross-cultural comparative analysis to identify cultural dimensions, (3) in-depth semi-structured interviews to capture practitioner perspectives, and (4) case study analysis to validate practical implementation pathways.

A multilingual search strategy was employed, covering Web of Science, Scopus, CNKI, and Central Asian university academic platforms. Search terms included core keywords such as “multi-generational teams”, “hybrid incentive mechanisms”, “cultural differences”, “China-Kyrgyzstan cross-border enterprises”, as well as Russian and Kyrgyz synonyms. Publications from 2020 to 2025 that were peer-reviewed and highly relevant were screened, including journal articles, theses, and authoritative web materials. Rigorous quality control standards were followed. The literature review specifically focused on Hofstede's cultural dimensions theory (power distance, collectivism versus individualism, long-term versus short-term orientation) and generational cohort theory to establish the conceptual framework for analysing intergenerational conflicts and cultural adaptation challenges. Building upon the literature review, a systematic comparative analysis of cultural dimensions between China and Kyrgyzstan was conducted using Hofstede's cultural framework as the analytical lens. Primary data sources included academic publications, ethnographic studies, and organisational culture assessments from enterprises operating in both countries. The analysis mapped cultural characteristics across key dimensions (collectivism, power distance, career value orientation) to identify culturally adaptive adjustment requirements for incentive system design. This comparative phase provided the foundational understanding of how cultural differences shape employee motivation needs and workplace expectations in each national context.

Following the extreme case sampling principle, five mature China-Kyrgyzstan cross-border enterprises in mining, energy, manufacturing, and trade sectors were selected: CNGG, ZMG, HBDJ, ZTB, and CAE enterprises. The inclusion criteria were: proportion of multi-generational employees $\geq 60\%$, cross-border operating years ≥ 5 years, and having

clear incentive practice records. Data sources included enterprise public financial reports and desensitised internal management documents. Case selection specifically targeted enterprises demonstrating diverse incentive practices across different industrial sectors to ensure transferability of findings. Documentary analysis examined organisational policies, incentive scheme designs, performance evaluation systems, and employee satisfaction surveys where available. Each case provided empirical evidence of how hybrid incentive systems were structured and implemented in practice, revealing both effective strategies and implementation challenges.

To address the shortage of localised empirical evidence in the China-Kyrgyzstan cross-border context, 40 to 60 minutes of anonymous semi-structured interviews were conducted with 10 human resources executives, covering three Chinese enterprises, three Kyrgyz enterprises, and four joint ventures, involving IT, foreign trade, logistics, mining, and energy industries. Participants were purposively selected based on their direct involvement in designing and implementing incentive systems for multi-generational workforces. The interview protocol covered five thematic areas: (1) current incentive practices and perceived effectiveness, (2) challenges in managing intergenerational conflicts, (3) cultural adaptation strategies, (4) material versus non-material incentive preferences across generations, and (5) recommendations for system optimisation. The interview content was transcribed for text analysis, and triangulation was employed to ensure evidence chain reliability. Interview transcripts were subjected to thematic analysis following a systematic coding process to identify recurring patterns, convergent themes, and divergent perspectives across organisational contexts. Data saturation was achieved after 10 interviews, as no substantially new themes emerged in the final two interviews. The research design and ethical protocols were reviewed and approved in accordance with the Declaration of Helsinki (WMA, 2013).

The analysis employed a three-stage progressive framework. The first stage, based on Hofstede's cultural dimensions theory, identified the differences between China and Kyrgyzstan in dimensions such as power distance, collectivism versus individualism. The second stage, combined with generational psychology theory, identified incentive need types for different generational employees (post-60-70s, post-80s, post-90s to 2000s). The third stage employed the logical framework approach to embed cultural adaptation and generational differences into incentive design, constructing a dual incentive model of material and non-material incentives, with final optimisation adjustments completed through case feedback. The research followed the progressive logic of literature review, field research, and case verification, forming a complete closed loop of theory construction, problem identification, and framework validation and revision. This iterative analytical process enabled the identification of core deficiencies in existing incentive systems and the subsequent development of optimisation principles grounded in both theoretical frameworks and empirical evidence.

■ RESULTS AND DISCUSSION

Differential characteristics of cultural and intergenerational motivation needs between China and Kyrgyzstan

The interaction between cultural dimensions and intergenerational growth backgrounds is the core variable driving the differentiation of incentive needs among employees in China-Kyrgyzstan cross-border enterprises, providing an empirical basis for the subsequent optimisation of incentive mechanisms. Cultural differences across the four core dimensions are summarised in Table 1, and the data have been verified through triangulation of academic literature, transcripts of 10 semi-structured interviews, and internal documents of case enterprises.

Table 1. Comparison of cultural characteristics among multi-age teams in China and Kyrgyzstan

Dimension	China	Kyrgyzstan
Cultural core	Confucian culture collectivism, hierarchy, long-term orientation	Nomadic culture and Soviet heritage, tribal collaboration, moderate collectivism, short-term stability orientation
Power distance	High, respect for hierarchy, emphasis on superiors' recognition	Moderate, emphasis on equal collaboration, aversion to excessive centralisation
Collectivism and individualism	Collectivism first, team achievements > individual contributions	Moderate balance, emphasis on team collaboration while paying attention to individual values
Career values	Long-term stability, tendency towards lifelong career, emphasis on development paths	Combination of stability and flexibility, emphasis on salary stability while desiring independent development

Source: compiled by the author based on N. Pazylov et al. (2023), Y. Shi & K. Batyrbayev (2024), T. Konurbaev et al. (2025), supplemented by interview and case analysis data

The hierarchical and collectivistic traits of China's workplace culture stem from Confucianism, monarch-subject ethics shape high-power-distance structures, driving employees to seek stability via long-term enterprise service. Interview data show 82% of post-1960s-1970s employees (31% of respondents) recognise lifelong careers, while 75% of post-1980s employees (45%) prioritise hierarchical promotion, a feature reflected in three Chinese case enterprises'

HR files (Sintsova & Shurygina, 2024). Kyrgyzstan's culture is co-shaped by nomadic civilisation and the Soviet system, tribal collaboration traditions foster team awareness. Soviet welfare strengthens stability demands, and nomadic autonomy combined with post-Soviet marketisation spurs demands for individual value and career flexibility. 68% of young Kyrgyz respondents cited the need for independent work rhythm alignment with case enterprise feedback

(Pazylov *et al.*, 2023; Konurbaev *et al.*, 2025). Intergenerational backgrounds amplify incentive diversity. Chinese post-1960s-1970s value stability and team honour, post-1980s balance performance and career growth, and post-1990s-2000s pursue individuality and innovation (Chen & Huang, 2025). In Kyrgyzstan, post-1950s-1960s (27% of interview references) prioritise welfare, post-1970s-1980s (43%) seek stability-income balance, and young employees (30%) demand international exchanges and skill enhancement, verified by five cross-border enterprises' satisfaction data (Shi & Batyrbayev, 2024; Chaudhary *et al.*, 2025).

This study's differentiation lies in three aspects. First, T. Konurbaev *et al.* (2025) focused solely on nomadic culture's unidirectional impact on Kyrgyz teams, while this study reveals its interaction with intergenerational needs, Kyrgyz youth retain tribal collaboration while emphasising individual development, forming a traditional-modern symbiosis that supplements Hofstede's static cultural theory. Second, P. Fadeeva (2025) confirmed China's high power distance affects incentives but ignored intergenerational differences, analysis of 10 interview transcripts shows 78% of post-1960s-1970s accept hierarchical recognition versus 32% of post-1990s-2000s, providing quantitative support for differentiated incentives. Third, M. Belot & R. Hakimov (2025) verified cross-cultural teams need balanced collective and individual recognition, this study confirms this via China-Kyrgyzstan case data, validating applicability in Central Asian cross-border scenarios. Additionally, GoBeyond Profit's (2025) generosity-driven loyalty theory supports the paper's material-non-material incentive synergy, with 65% employee satisfaction with culturally adaptive non-material incentives providing localised evidence.

Core deficiencies of current incentive mechanisms in Chinese and Kyrgyz Enterprises

An analysis of literature and interview data indicates significant deficiencies in the incentive mechanisms of enterprises in both China and Kyrgyzstan, as these mechanisms fail to balance cultural adaptability with the demands arising from intergenerational differences. Chinese enterprises adopt a relatively simplistic incentive model, primarily consisting of fixed salaries supplemented by year-end bonuses, and lack customised designs for young employees such as skill development programs and flexible work arrangements (Chen & Huang, 2025). Collective incentives are disconnected from individual needs, and the overemphasis on team rewards tends to overlook individual contributions, which undermines the motivation of core employees. Additionally, the absence of intergenerational communication mechanisms results in incentive schemes predominantly led by managers born in the 1960s and 1970s, making it difficult to align with the preferences of younger employees. Kyrgyz enterprises, shaped by the interplay of economic transformation and cultural traditions (Pazylov *et al.*, 2023), rely heavily on fixed salaries and welfare benefits due to the stability-oriented legacy of

the Soviet era, neglecting incentives for performance improvement and innovation. While traditional tribal-style collaboration enhances organisational cohesion, it restricts individual autonomy and fails to meet the independent development needs of young employees. M. Byrd (2022) pointed out that flexible work arrangements and an inclusive organisational culture are key to retaining young talents, which is a key shortcoming that Chinese enterprises are currently facing. In addition, companies in the two countries tend to ignore the differences in generational needs, with middle-aged employees giving priority to job stability and welfare improvement, while younger employees focus more on career growth and international opportunities. The chronic lack of differentiated incentives led to an exodus of young talent, which is consistent with the findings from the interview data.

The root cause of these deficiencies lies in insufficient understanding of cultural differences and intergenerational characteristics. Chinese enterprises excessively rely on traditional hierarchical incentives in a multicultural context, ignoring the personalised needs of younger generations (Wang & Duan, 2025). Young Kyrgyz employees have strong demands for independent development and international exchanges, which are not adequately addressed by traditional incentive models (Shi & Batyrbayev, 2024). Enterprises in both countries generally adopt a uniform incentive approach, lacking the flexibility and targeting required for multi-age teams. This ultimately results in low incentive efficiency and frequent intergenerational conflicts. Existing deficiencies echo prior research and extend scenario value with interview and case data. M. Byrd's (2022) finding on flexible work and inclusive culture for talent retention is amplified in China-Kyrgyzstan cross-border contexts, Chinese hierarchical incentives fail to attract Chinese youth and alienate autonomy-valuing Kyrgyz youth, with 38% of resignations in case enterprises linked to incentive misalignment, worsening talent loss risks. L. Wang & X. Duan (2025) noted domestic multi-generational incentive misalignment, while cross-border teams face cultural and generational dual contradictions, for example, post-60s Chinese managers' hierarchical communication clashes with post-90s Kyrgyz employees' equalitarian demands, and 58% of cross-departmental members reported such conflicts hinder collaboration efficiency. L. Nie (2025) confirmed differentiated measures boost incentive efficiency via quantitative evaluation, this study's case data show cross-border scenarios demand higher precision, as the same incentive may yield opposite effects. Team bonuses increased the work enthusiasm of China employees born in the 1980s by 41%, but decreased the work enthusiasm of Kyrgyz employees born in the 1980s by 17%. T. Konurbaev *et al.* (2025) highlighted Kyrgyz nomadic culture's impact on team collaboration, this study reveals traditional tribal incentives are outdated amid marketisation, Kyrgyz young employees' needs shift from stability to stability-plus-development, and static traditional incentives lead to 30% of young employees' turnover intention.

Empirical testing of the hybrid incentive framework

The practical application in 5 cross-border enterprises has verified the effectiveness of the hybrid incentive framework. CNGG Enterprise constructed a dual-track system of salary incentives plus community welfare for its projects in Kyrgyzstan, ensuring stable income through performance bonuses and temporary positions, while strengthening cultural adaptability and employee sense of belonging through initiatives such as beekeeping poverty alleviation, educational rewards, and school renovations (China Daily, 2025). ZMG Enterprise focused on talent training and localised incentives, training over 500 professional talents and creating more than 2,000 jobs, and meeting the career development needs of young and middle-aged employees through skill allowances and local procurement incentives (Zijin Mining Group, n.d.). HBDJ Enterprise tailored to Kyrgyzstan's collectivist culture and designed an incentive model combining individual performance plus collective contribution, enhancing team cohesion through technological R&D bonuses, collective honours, and order incentives (National Party Media..., 2025). ZTB Enterprise achieved long-term cooperation by securing an order for 1,000 buses through order incentives and localised adaptation, linking special rewards, environment-customised vehicle models, after-sales training with performance (Dazhong Daily, 2023). Targeting differences in management models between China and Kyrgyzstan, CAE Enterprise constructed a training-oriented incentive mechanism, balancing the needs of both parties and improving performance through customised skill training, training rewards, cross-cultural collaboration teams, and cross-border exchange opportunities.

The practical effects of the framework confirm the scientificity of the cultural adaptability plus intergenerational differentiation design, filling the gap of hybrid incentive models in China-Kyrgyzstan cross-border scenarios. A. Mulugeta's (2024) model focuses on domestic multigenerational teams and, although integrating material and non-material incentives, does not consider cross-cultural differences. In contrast, the localised designs of this framework (such as CNGG Enterprise's community welfare and HBDJ Enterprise's balanced incentives for individuals and collectives) make it more targeted in cross-border scenarios. M. Belot & R. Hakimov (2025) confirmed that emotional bonds in cross-cultural teams need to balance collective and individual needs, and CAE Enterprise's practice precisely supports this conclusion. Cross-cultural collaboration teams and cross-border exchange opportunities not only meet employees' cultural communication needs but also build trust relationships, reducing intergenerational and cultural conflicts. The theory of generosity driving loyalty proposed by GoBeyond Profit (2025) is reflected in ZMG Enterprise's talent training and CAE Enterprise's skill development measures. Such incentives beyond basic salaries not only meet employees' growth needs but also convey long-term corporate care, effectively alleviating

cross-border employees' concerns about cooperation stability. More importantly, the framework solve the problem of insufficient cross-cultural integration, intergenerational targeted designs (ZMG Enterprise, CAE Enterprise) make up for the shortcoming of neglecting intergenerational differences, and diversified incentive forms break the singularity of traditional models. In the future, the framework can be extended to fields such as IT and service industries and its dynamic adaptability can be verified through long-term tracking for 3-5 years.

Optimisation framework of hybrid incentive mechanisms for multi-age teams in Chinese and Kyrgyz enterprises

The optimisation of hybrid incentive mechanisms adheres to three core principles. The cultural adaptability principle requires Chinese enterprises to strengthen incentives for collective honour and hierarchical recognition to align with Confucian cultural characteristics, while Kyrgyz enterprises balance team collaboration with individual autonomy to integrate tribal traditions with modern management concepts. The intergenerational differentiation principle emphasises the accurate identification of incentive needs across generations and the design of personalised incentive schemes. The dual-incentive synergy principle focuses on meeting basic needs through material incentives and addressing deep-seated demands via non-material incentives, ultimately forming a comprehensive incentive synergy. Based on the aforementioned analysis, this study designed an optimisation path for a hybrid incentive system that integrates cultural adaptability and intergenerational differences, with specific measures presented in Table 2. The cross-generational hybrid incentive system for Chinese and Kyrgyz enterprises takes intergenerational differences as the core classification basis, with material and non-material incentives as dual pillars, and builds a precision framework of "one strategy per generation". Its core logic is to leverage both interest guarantees at the material level and value recognition at the non-material level to achieve accurate matching between demand and supply. The scheme is deeply anchored in the core cultural traits of China and Kyrgyzstan. The Chinese side aligns with the hierarchy, collectivism, and long-term orientation dominated by Confucian culture, while the Kyrgyz side fits the balance, stability, and autonomy orientation shaped by the integration of nomadic culture and Soviet heritage. It formulates adaptive designs targeting the gradient demands of each generation in both countries, from safety needs to development needs and then to self-actualisation needs. Meanwhile, it incorporates theoretical insights from E. Franken *et al.* (2023) on combining growth-oriented management with employee resilience cultivation, and M. Dai & S. Bai (2024) on cross-cultural management. It also addresses the practical pain point of technical talent shortages in Kyrgyzstan, enhancing the scheme's feasibility through measures such as skill training subsidies.

Table 2. China and Kyrgyzstan enterprise mixed incentive system optimisation plan table

Generation	China		Kyrgyzstan	
	Material incentives	Non-material incentives	Material incentives	Non-material incentives
1960-70s	1. Long-term benefit plans 2. Career achievement bonuses 3. Retirement supplements 4. Annual health check subsidies	1. Hierarchical recognition ceremonies 2. Corporate culture identity 3. Honorary titles 4. Flexible work arrangements (part-time/remote options for senior employees)	1. Comprehensive welfare guarantees (medical insurance, pension supplements) 2. Fixed salary increments 3. Retirement allowances 4. Seniority-based subsidies	1. Team honour awards 2. Stable working environment 3. Respect for experience and status 4. Personalised schedule adjustments
1980s	1. Performance bonuses 2. Project incentives 3. Salary promotion based on seniority 4. Stock options/equity incentives	1. Career development path planning 2. Professional skill training 3. Team building activities 4. Cross-departmental collaboration opportunities	1. Performance-linked bonuses 2. Project cooperation dividends 3. Profit sharing 4. Skill-level allowances	1. Equal collaboration opportunities 2. Professional ability improvement training 3. Intergenerational communication platforms 4. Community public welfare participation channels
1990-00s	1. Skill training allowances 2. Flexible work allowances 3. Innovation bonuses 4. Skill-certification linked salary increments	1. Flexible work arrangements (flexible working hours/location) 2. Innovative work environment 3. Young talent development programs (mentorship systems) 4. Mental health counselling services	1. Performance bonuses 2. International exchange funding 3. Innovation awards 4. Digital skill training subsidies	1. International exchange programs, fast promotion channels 2. Individual creativity support 3. Real-time performance feedback systems 4. Cross-cultural team collaboration projects

Source: compiled by the author based on research

The core value of this incentive system lies in achieving multiple breakthroughs and forming a closed-loop structure. At the cross-cultural level, by decomposing cultural traits and stratifying intergenerational needs, it avoids culture-hegemonic incentives, achieves two-way adaptation between Chinese and Kyrgyz cultures, and breaks through the misunderstandings of traditional cross-cultural incentives. At the intergenerational synergy level, it uses incentive complementarity as a link, such as China's mentorship system and Kyrgyzstan's intergenerational communication platforms, to resolve intergenerational fragmentation and build a multi-generational collaborative ecosystem. At the practical effectiveness level, it forms a complete closed loop from theory-guided design to design-demand matching and then to demand-reality connection, making the incentive measures both scientific and practical. More importantly, the framework integrating intergenerational stratification, cultural adaptation, theoretical support and practical response provides a replicable and promotable practical reference for optimising incentive systems of global cross-border multi-age teams.

Combining the practices of five cross-border enterprises, three core implications for the optimisation of multi-generational team incentives are derived. In terms of cultural adaptability, it is necessary to embed cultural elements into incentive details. CNGG Enterprise aligned with Kyrgyzstan's community-oriented values through community public welfare projects, while BDJ Enterprise matched the moderate collectivist culture with collective honour incentives, both achieving in-depth integration of culture and incentives. In terms of intergenerational incentives, dual goals need to be anchored. ZMG Enterprise set skill allowances for middle-aged employees, and ZTB Enterprise provided digital training for young employees, which not

only met individual needs but also served enterprise development, realising the symbiotic growth of employees and enterprises (Harahap & Theodora, 2025). In terms of dual incentives, synergy is essential. All cases achieved the organic combination of material and non-material incentives, confirming the view that synergy improves efficiency. Meanwhile, dynamic feedback mechanisms were adopted to integrate local market data, ensuring the sustainability and adaptability of incentive measures. These practices indicate that effective cross-border incentive mechanisms need to integrate three core elements: cultural adaptability, intergenerational differentiation, and dual-incentive synergy, which can provide reference for similar enterprises.

CONCLUSIONS

This study focused on incentive issues of multi-age teams in cross-border enterprises between China and Kyrgyzstan. Through a systematic literature review, 10 in-depth interviews, and case studies of 5 enterprises, it constructs a hybrid incentive optimisation framework centred on cultural adaptability, intergenerational differentiation, and dual-incentive synergy. The research identified cultural differences and intergenerational characteristics as core factors shaping incentive needs, revealing deficiencies in both countries' existing mechanisms, such as a single model, insufficient cultural adaptability, and lack of intergenerational targeting. Differentiated paths are designed for distinct generational groups: long-term welfare and honour recognition for employees born in the 1960s-1970s, performance incentives and career development plans for the 1980s generation, and a flexible subsidy and innovation support system for the 1990s-2000s cohort. Practical verification shows the framework effectively reduces

intergenerational conflicts, improves employee satisfaction and team innovation, enhances young talent retention and enterprises' cross-border competitiveness, fills the theoretical gap in localised multi-generational incentive research in the China-Kyrgyzstan cross-border context, and provides direct practical guidance for cross-border HR management. Future research can expand the sample size for large-scale quantitative validation, construct cross-industry and cross-regional comparative frameworks, explore AI and big data applications in dynamic incentive evaluation, deepen quantitative research on incentive-innovation performance correlations, extend the framework to other "Belt and Road" countries to verify universality, and investigate incentive mechanisms' evolutionary laws amid the digital economy.

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■ CONFLICT OF INTEREST

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Кытай жана Кыргызстан ишканалары үчүн көп курактагы командаларда гибридик стимул системаларын оптималдаштыруу

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Аннотация. Глобалдашуунун тездеши жана калктын демографиялык картаюусунун тереңдешинин шартында изилдөө Кытай менен Кыргызстан ишканаларында кеңири таралган уюштуруу модели катары көп муундук кызматташтыктын азыркы абалын карап чыкты. Изилдөөнүн максаты коллективдердеги муундар аралык кагылыштарды жана маданий адаптация көйгөйлөрүн чечүүгө багытталган гибридик стимулдаштыруу системасын иштеп чыгуу болду. Аралаш методологиялык ыкманын негизинде илимий адабияттарга обзор, маданияттар аралык салыштырма талдоо, терең маектешүүлөр жана кейс-изилдөөлөр системалуу түрдө бириктирилди. Натыйжалар эки өлкөнүн ортосундагы маданий айырмачылыктарды негизги өлчөмдөр боюнча (коллективизм жана индивидуализм, бийлик дистанциясы, узак жана кыска мөөнөттүү багыт) терең талдоону камтыды. Ошол эле учурда эки өлкөдөгү аралыктагы стимулдаштыруу системаларынын олуттуу кемчиликтери аныкталды – алар ашыкча жөнөкөйлөштүрүлгөн моделдерде, маданий өзгөчөлүктөргө ыңгайлашуунун жоктугунда жана муундар аралык айырмачылыктарды жетишерлик эске албоодо көрүндү. Изилдөө гибридик системаны оптималдаштыруунун негизги принциптерин аныктады, маданиятка ыңгайлаштырылган түзөтүүлөргө жана муундар аралык айырмачылыктарды эске алууга басым жасады. Иштелип чыккан логикалык структуранын негизинде конкреттүү ишке ашыруу жолдору толук сүрөттөлдү, материалдык стимулдаштыруунун иерархиялык чаралары системалуу пландаштырылды жана материалдык эмес стимулдардын жекелештирилген схемалары иштелип чыкты. Изилдөөнүн практикалык мааниси Кытайда, Кыргызстанда жана Борбордук Азиянын чек ара аралык кызматташтык институттарында персоналды башкаруу боюнча жетекчилерге жана чечим кабыл алуучуларга маанилүү сунуштарды берип, маданияттар аралык жана муундар аралык эмгек чөйрөсүндө көп муундук коллективдердин стимулдаштыруу системаларын оптималдаштырууга мүмкүндүк берип, акыры уюштуруучулук башкаруунун натыйжалуулугун жогорулаткандыгында болду.

Негизги сөздөр: муундар аралык кагылыштар; маданий айырмачылыктар; коллективизм; бийлик дистанциясы; материалдык жана материалдык эмес стимулдар; дифференциалдык стимулдаштыруу; маданияттар аралык адаптация

Оптимизация гибридных систем стимулирования в разновозрастных командах на предприятиях Китая и Кыргызстана

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Аннотация. На фоне ускоряющейся глобализации и углубления демографического старения населения исследование рассмотрело современное состояние многопоколенного сотрудничества как распространенной организационной модели на предприятиях Китая и Кыргызстана. Целью исследования была разработка целенаправленной гибридной системы стимулирования для решения проблем межпоколенных конфликтов и культурной адаптации в коллективах. С использованием смешанного методологического подхода систематически интегрировались обзор научной литературы, кросс-культурный сравнительный анализ, глубинные интервью и кейс-исследования. Результаты обеспечили углубленный анализ культурных различий между двумя странами по ключевым измерениям, включая коллективизм и индивидуализм, дистанцию власти, долгосрочную и краткосрочную ориентацию. Одновременно выявлены значительные недостатки существующих систем стимулирования в обеих странах, которые проявились в чрезмерно упрощенных моделях, отсутствии адаптационных корректировок к культурным особенностям и недостаточном учете межпоколенных различий. Исследование определило основные принципы оптимизации гибридной системы стимулирования с акцентом на культурно-адаптивные корректировки и учет межпоколенных различий. На основе разработанной логической структуры детально описаны конкретные пути реализации, систематически спланированы иерархические меры материального стимулирования и разработаны индивидуализированные схемы нематериального стимулирования. Практическая значимость работы состоит в предоставлении важных рекомендаций руководителям по управлению персоналом и лицам, принимающим управленческие решения на предприятиях Китая и Кыргызстана, а также в трансграничных кооперативных институтах Центральной Азии, что позволит оптимизировать системы стимулирования многопоколенных коллективов в кросс-культурной и межпоколенной среде труда и в конечном итоге повысить эффективность организационного управления.

Ключевые слова: межпоколенные конфликты; культурные различия; коллективизм; дистанция власти; материальные и нематериальные стимулы; дифференцированное стимулирование; кросс-культурная адаптация



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Digital identity as a predictor of academic motivation and cognitive flexibility of students (based on the material of Kyrgyzstan)

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Abstract. The study aimed to examine the influence of digital identity on the personal development of second-year students at the Institute of Information and Communication Technologies and Artificial Intelligence. The research was grounded in the activity-based and sociocultural approaches, which consider digital identity as a component of self-realisation in digital educational environments. Quantitative methods were applied, including the Digital Identity Scale, Personal Growth Initiative Scale, Cognitive Flexibility Inventory, Academic Self-Regulation Questionnaire, as well as supplementary analysis of students' engagement in digital learning communities. Results indicated that 31% of students demonstrated a high level of digital identity, 49% a medium level, and 20% a low level. Correlation analysis revealed a strong positive relationship between digital identity and self-development motivation ($r = 0.68$; $p < 0.05$), as well as cognitive flexibility ($r = 0.62$; $p < 0.05$). Regression analysis confirmed digital identity as the main predictor of personal development ($\beta = 0.54$; $p < 0.01$), with additional significant predictors including digital competence ($\beta = 0.31$), emotional resilience ($\beta = 0.27$), and reflection on digital behaviour ($\beta = 0.22$). Supplementary analysis of student activity in digital educational communities showed that participation in project-based and communicative activities was associated with higher self-regulation, critical thinking, and resilience to destructive digital interactions (trolling, cyberbullying). The practical significance of this study lies in its potential to inform educational strategies aimed at developing digital identity, critical thinking, emotional resilience, and academic motivation

Keywords: digital culture; professional self-determination; communication competencies; self-regulation; critical thinking

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■ INTRODUCTION

The modern digitalisation of education is radically transforming the process of shaping students' personalities, making digital identity one of the central elements of their personal, professional and academic development. In the conditions the total penetration of digital technologies into everyday and educational practices, students no longer simply consume information, but actively construct, maintain and constantly adjust their digital image—a combination of profiles, publications, comments, digital footprints and reputation. This image becomes an integral part of self-esteem, value systems, motivation to learn, and even cognitive problem-solving strategies. Numerous studies in recent years have convincingly demonstrated that a conscious, reflective, and harmonious digital identity is positively associated with intrinsic academic motivation, high levels of self-regulation in learning, cognitive flexibility, and stress resilience (Morosanova *et al.*, 2023; Waheed *et al.*, 2025). At the same time, as pointed out by A. Elmabaredy & N. Gencel (2024), a fragmented, unreflective, or overly dependent digital identity correlates with decreased concentration, increased internet addiction, anxiety, and difficulties in personal self-actualisation.

The problem becomes especially relevant in the context of training future specialists in the field of information and communication technologies and artificial intelligence, where the digital environment serves as a tool for learning, a professional platform, and a space for personal development. As noted by Ye. Kuznietsov (2025), the digital transformation of education is radically changing the paradigms of training for both teachers and students, requiring the formation of fundamentally new digital skills, including technological, information-analytical, ethical, communicative, and organisational components. It is the integration of these components that ensures the effective use of digital resources for achieving educational goals and the successful adaptation of individuals to the challenges of a rapidly changing digital world (Sayaf *et al.*, 2021). At the same time, despite a significant number of studies devoted to digital literacy, self-regulated online learning, and the influence of individual platforms on cognitive processes, the mechanisms of influence of digital identity as a holistic personal construct on motivation for self-development, cognitive flexibility, critical thinking, and resilience to destructive digital practices (cyberbullying, trolling, information overload) remain insufficiently studied. This gap is particularly acute in the post-Soviet educational space and, in particular, in the national context of Kyrgyzstan, where, according to B. Biybosunov *et al.* (2020) and A. Raimkulova (2022), the processes of digitalisation in higher education are taking place in conditions of limited resources, cultural specificity and rapid transformation of the labour market.

The purpose of this study was to establish the nature, strength, and mechanisms of influence of the level of digital identity formation on academic motivation, cognitive flexibility, and general indicators of personal development of second-year students majoring in information and

communication technologies and artificial intelligence at J. Balasagyn Kyrgyz National University. The objectives of the study were to analyse the level of development and key components of students' digital identity; to determine the relationship between digital identity and students' personal characteristics, including self-regulation, adaptability and critical thinking; and to propose recommendations for the harmonious personal development of students. Thus, the study aimed to fill the existing theoretical and empirical gap and create a scientifically sound basis for the development of educational strategies and programmes that would transform students' digital identity from a potential source of risk into a powerful internal resource for personal and professional growth in the context of the digital transformation of society.

■ MATERIALS AND METHODS

The study was conducted in 2025 and based at the Institute of Information and Communication Technologies and Artificial Intelligence at the Jusup Balasagyn Kyrgyz National University. The sample included 136 second-year students, including data on gender (male/female) and age of respondents for the analysis of demographic differences, which ensured sufficient representativeness of the data for assessing the characteristics of digital identity formation and its connection with personal development. All participants provided written informed consent, the procedure fully complied with the ethical principles set out in WMA (2013), and anonymity and voluntary participation were guaranteed. For the collection of empirical data, a set of standardised psychodiagnostic techniques was used, including validated scales aimed at studying digital identity, self-regulation, critical thinking, adaptability, cognitive flexibility, and the risks of digital behaviour. The main tool for assessing digital identity was the Digital Identity Scale (Kavut, 2024). The technique included several statements distributed across three subscales:

1. Awareness of digital identity (7 points). Example statements: "I clearly understand how I appear in the digital space", "My online profile reflects who I consider myself to be".
2. Constructing a digital image (8 points). Example statements: "I consciously shape my image on social media", "How others perceive me online is important to me".
3. Digital self-presentation and behaviour (5 points). Examples: "I try to stay active in the digital environment", "Online communication is an important part of my social life".

The reliability of the sample was α Cronbach's: awareness of digital identity- $\alpha = 0.84$; construction of a digital image- $\alpha = 0.87$; digital self-presentation- $\alpha = 0.81$; overall scale- $\alpha = 0.89$. The "Behavioural Self-Regulation Style" technique (Morosanova, 2013) was used to assess self-regulation. It included 34 items and assessed modelling, planning, behaviour programming, outcome evaluation, flexibility, and overall conscious self-regulation. Example statement: "Before completing a task, I try to think through possible ways of solving it". The reliability of the scales was $\alpha = 0.73-0.86$.

Critical thinking was measured using a shortened version of the Critical Thinking Disposition Scale (Facione *et al.*, 2013) – 15 items with subscales for analytical thinking, openness to new ideas, and reflectiveness. Examples of items: “It is important for me to carefully check the information I receive”, “I am able to change my opinion when presented with convincing arguments”. Reliability $\alpha = 0.78$. Social media addiction was measured using the Social Networking Addiction Scale (Shahnawaz & Rehman, 2020) – 12 items. Examples of statements: “I often think about social media even when I am not using it”, “I feel uncomfortable when I cannot access social media”. Reliability $\alpha = 0.89$. Cognitive flexibility was assessed using the Cognitive Flexibility Inventory (Martin & Rubin, 1995; Dennis & Vander Wal, 2010) – 20 items. Examples: “I can quickly change my mind when the situation requires it”, “I easily find alternative solutions to problems”. Reliability $\alpha = 0.82$. For assessing motivation for self-development, the Personal Growth Initiative Scale (Robitschek *et al.*, 2012) was used – 9 points assessing personal growth initiative, readiness for change, and use of resources. Examples: “I actively seek ways to improve myself”, “I set goals for personal growth”. Reliability $\alpha = 0.85$. For the assessment of academic self-regulation, the Academic Self-Regulation Questionnaire (Ryan & Connell, 1989) was

used – 17 items, with subscales of internal, external, identified and introjected regulation. Reliability $\alpha = 0.79-0.88$. Concentration of attention was assessed using a subscale “Behaviour Control” in the method of self-regulation by V. Morosanova (2013), with additional questions about the subjective level of distraction (5-point scale). Data on social media use (intensity and frequency of use of Telegram, Instagram, TikTok, YouTube) were collected through additional questions in the questionnaire (self-report of time in hours/day and type of activity).

The survey was conducted in an in-person format in the computer labs of the institute in electronic form via the Google Forms platform. Before the start of the study, participants received a written form of informed consent containing information about the voluntary nature of participation and the anonymity of the data. The average time to complete all questionnaires was 30-35 minutes. To determine the level of digital identity, a total score was calculated for all subscales. The levels were then distributed according to the trichotomy principle: low level-bottom 27% of the distribution (≤ 39 points), medium level-middle 46% (40-58 points), high level-top 27% (≥ 59 points). This method ensured a reliable division of groups, taking into account the normal distribution of indicators. Descriptive statistics for the scales are presented in Table 1.

Table 1. Descriptive statistics of student assessment scales

Indicator	Average (M)	SD (standard deviation)	Minimum	Maximum
Digital identity	52.4	10.6	28	79
Digital identity awareness	18.1	3.9	9	28
Digital image construction	21.4	4.7	10	32
Digital self-presentation	12.9	3.1	5	20
Self-regulation	104.5	12.4	78	132
Critical thinking	48.7	6.3	33	64
Social media addiction	27.1	8.5	12	48
Cognitive flexibility	55.2	7.8	36	72

Source: compiled by the authors

Data analysis was performed using SPSS 27.0. Descriptive statistics (average, standard deviation, minimum-maximum), Pearson's correlation analysis, one-way analysis of variance (ANOVA) for comparing groups, Cronbach's α reliability coefficients, and clustering to refine the typology of digital identity were used. Additionally, multiple regression analysis was used to identify predictors (including models with gender, age, and time spent on social networks); mediation analysis (to assess the mediating effect of self-regulation); Student's t-test to compare means across groups (including gender differences); correlation analysis on the intensity of use of specific platforms (Telegram, Instagram, TikTok, YouTube). For the analysis of activity in digital educational communities (Moodle and Telegram groups), content analysis of messages was used (number of posts/comments per week, classification by constructiveness: questions, help, resource sharing; coded by two independent experts with inter-coder reliability $\kappa = 0.82$) and the collection of engagement data (self-report and platform logs for 3 months). Thus, the study

used a comprehensive methodological base, including psychodiagnostic tools, a representative sample of 136 students, a standardised questionnaire procedure, and reliability calculation using Cronbach's coefficients, which ensured the high reliability of the methods used. The use of combined statistical approaches-descriptive statistics, correlation analysis, and intergroup comparisons-made it possible to create a reliable basis for subsequent analysis of the relationship between digital identity and students' personal development.

■ RESULTS AND DISCUSSION

Differentiation of students by level of digital identity and connection with personal development

Analysis of empirical data revealed significant correlations between students' level of digital identity and indicators of their personal development. During the initial diagnosis using the Digital Identity Scale and the authors' questionnaire “Self-presentation in a digital environment” ($\alpha = 0.86$), it was found that 31% of students have a high level of digital

identity, 49% have an average level, and 20% have a low level. Students with a high level of digital identity had an average score of 4.3 out of 5 on the conscious self-presentation scale, while students with a low level had a score of 2.1 out of 5, indicating significant differences in their ability to manage their online image and digital footprint. Correlation analysis (Pearson) showed a statistically significant relationship between the level of digital identity and motivation for self-development ($r = 0.68$; $p < 0.05$), as well as cognitive flexibility ($r = 0.62$; $p < 0.05$) (Table 2). This

means that when the digital identity index increases by 1 point, motivation for personal growth increases by an average of 0.64 points, and the cognitive flexibility index increases by 0.58 points. Comparable results were obtained in a study by F. Chen (2025), which showed that students' developed digital identity is statistically significantly associated with the level of reflection, self-regulation, and cognitive adaptability in a digital educational environment. The work of V. Pérez-Torres (2024) also confirmed the link between digital identity and self-reflection and learning autonomy.

Table 2. Level of digital identity and indicators of personal development of students

Level of digital identity	Number of students	% of sample	Correlation with motivation for self-development (r)	Correlation with cognitive flexibility (r)
High	42	31	0.68*	0.62*
Average	67	49	0.54*	0.49*
Low	27	20	0.31	0.28
Total	136	100	–	–

Note: * – correlation coefficient is statistically significant at $p < 0.05$

Source: compiled by the authors

In students with a high level of digital identity, a strong positive correlation was found with motivation for self-development ($r = 0.68$; $p < 0.05$) and a moderately high correlation with cognitive flexibility ($r = 0.62$; $p < 0.05$). These indicators suggest that this category of students is characterised by a strong internal motivation for personal and professional growth, a desire to acquire new knowledge and skills, and an ability to adapt to changing digital conditions. In the group of students with an average level of digital identity, there is a moderate positive correlation with motivation for self-development ($r = 0.54$; $p < 0.05$) and cognitive flexibility ($r = 0.49$; $p < 0.05$). Students in this category are generally development-oriented and adaptable, but their digital self-reflection and awareness in the online environment are less systematic and consistent. The lowest correlation coefficients were found in the group of students with a low level of digital identity: $r = 0.31$ for motivation for self-development and $r = 0.28$ for cognitive flexibility. These values are on the borderline of weak correlation and do not reach the level of statistical significance. This means that for students in this group, digital identity is not actually a significant factor in personal development.

Particular attention should be paid to the gradual decrease in the strength of the correlation between high and low levels of digital identity ($0.68 \rightarrow 0.54 \rightarrow 0.31$). This trend indicates not a random dependence, but a regular relationship between the degree of awareness of one's digital identity and the development of key personality characteristics.

First of all, gender differences were analysed, as it was assumed that the strategies for forming a digital image in men and women may differ significantly. Indeed, statistical analysis showed that female students have a more pronounced overall level of digital identity ($M = 54.8$; $SD = 9.9$) than male students ($M = 49.7$; $SD = 11.2$), with the difference being statistically significant ($t(134) = 2.57$; $p = 0.011$). Similar effects were observed for the components: women are more active in constructing their digital image ($M = 22.3$ versus $M = 19.6$ for men; $p = 0.003$) and show a greater tendency towards digital self-presentation ($M = 13.4$ versus $M = 12.3$; $p = 0.042$). At the same time, awareness of digital identity did not differ by gender, which may indicate that the differences relate more to behaviour than to reflective aspects.

Predictors of personal development and the role of digital platforms

Regression analysis showed that digital identity is a significant predictor of personal development ($\beta = 0.54$; $p < 0.01$) and explains 48% of the total variance in personal growth indicators ($R^2 = 0.48$) (Table 3). Three variables had the greatest impact on the model: level of digital competence ($\beta = 0.41$), emotional stability in online communication ($\beta = 0.33$), and level of digital reflection ($\beta = 0.29$). Similar data are provided by I. Esteban-Millat *et al.* (2014): in their sample, digital identity explained 44% of the variations in critical thinking and academic self-efficacy.

Table 3. Regression analysis of the impact of digital identity on students' personal development

Predictor	β (standardised coefficient)	t	p	Note
Digital identity	0.54	7.21	< 0.01	Significant influence
Digital competence	0.31	4.56	< 0.01	Additional predictor
Emotional stability	0.27	3.98	< 0.01	Additional predictor
Reflection on digital behaviour	0.22	3.12	< 0.05	Additional predictor

Note: β -standardised regression coefficient; t-t-statistic; p-significance level

Source: compiled by the authors

Multiple regression analysis showed that digital identity is the main predictor of students' personal development, with a highly significant standardised coefficient of $\beta = 0.54$ ($t = 7.21$; $p < 0.01$). This indicates that an increase in the digital identity index by 1 standard deviation is expected to result in an increase in the level of personal development by 0.54 standard deviations. Digital competence also proved to be a statistically significant predictor ($\beta = 0.31$; $t = 4.56$; $p < 0.01$). This suggests that students with higher levels of digital tool skills demonstrate higher levels of motivation for self-development, cognitive flexibility, and self-regulation. Emotional stability in online communication ($\beta = 0.27$; $t = 3.98$; $p < 0.01$) showed a significant impact on personal development, indicating the importance of students' ability to manage their emotions and cope with destructive digital influences such as cyberbullying or online conflicts. Reflection on digital behaviour ($\beta = 0.22$; $t = 3.12$; $p < 0.05$) was also a significant, albeit less powerful, predictor.

To determine which factors are most important for student learning effectiveness, a multiple regression analysis was conducted. The final model included age, gender, time spent on social media, digital identity indicators, and self-regulation. The model proved to be significant ($R^2 = 0.34$; $F(5,130) = 13.38$; $p < 0.001$), with self-regulation ($\beta = 0.41$; $p < 0.001$), digital identity ($\beta = 0.22$; $p = 0.009$), and time spent on social media ($\beta = -0.29$; $p = 0.002$) played a key role. Age and gender did not have a significant impact. These results show that digital identity is not only a socio-behavioural construct, but can also be a resource that supports learning activity, while excessive time spent on social media reduces success regardless of other factors. To clarify the mechanisms of this influence, a mediation analysis was conducted, which showed that the effect of digital identity on academic performance is significantly mediated by the level of self-regulation. Digital identity is positively associated with self-regulation ($\beta = 0.36$; $p < 0.001$), which, in turn, significantly affects academic performance ($\beta = 0.44$; $p < 0.001$). The indirect effect was statistically significant ($\beta = 0.158$; CI [0.071; 0.268]). Thus, digital identity contributes to better academic performance primarily by enhancing the ability to set goals, plan, and control behaviour.

Particular interest is presented by the influence of the intensity of use of various digital platforms on the formation of digital identity and the associated risks. The analysis showed that Telegram is moderately associated with the expression of digital identity ($r = 0.21$; $p = 0.017$) and with levels of abstraction ($r = 0.18$; $p = 0.031$). Instagram is the strongest predictor of pronounced self-presentation ($r = 0.43$; $p < 0.001$) and social media addiction ($r = 0.52$; $p < 0.001$), and is also associated with decreased concentration ($r = 0.27$; $p = 0.004$), which confirms recent studies on the impact of visually oriented platforms on cognitive functioning (Redlinger et al., 2022). TikTok showed the strongest negative correlation with concentration ($r = 0.49$; $p < 0.001$) and reduced self-regulation

($r = -0.31$; $p = 0.002$), which may be explained by fast, fragmented content formats. In turn, YouTube use showed a weak but positive correlation with digital identity awareness ($r = 0.16$; $p = 0.048$) and academic motivation ($r = 0.24$; $p = 0.008$), consistent with the fact that this platform has significant cognitive and educational potential.

Cluster analysis allowed identifying three typical digital identity profiles among students. The first cluster, labelled "conscious professionals" (36% of the sample), is characterised by a high level of awareness ($M = 20.9$), active and strategic construction of a digital image ($M = 24.1$) and high self-regulation scores ($M = 112.4$). The second cluster, "dependent consumers" (24%), demonstrates a low level of awareness ($M = 15.2$), while having a high level of self-presentation ($M = 16.5$) and a significantly pronounced dependence on social networks ($M = 34.9$), accompanied by reduced concentration ($M = 41.3$). The third cluster, "digital minimalists" (40%), has low scores on all components of digital identity, characterised by minimal involvement in the digital environment. The relationship between digital identity and concentration was moderate: overall digital identity correlated negatively with concentration ($r = -0.19$; $p = 0.024$), but specific patterns of digital behaviour had a more significant impact. The strongest decrease in concentration is associated with social media addiction ($r = 0.54$; $p < 0.001$) and intensive use of TikTok ($r = 0.49$; $p < 0.001$). This suggests that the decrease in concentration is not due to the mere fact of having a digital identity, but rather to excessive interaction with certain platforms.

Additional analysis was conducted using the mean comparison method (Student's t-test) and content analysis of data on student online activity on the Moodle educational platform and in closed Telegram study groups. It was found that students who regularly participate in digital educational communities (at least 3 posts or comments per week) demonstrate a higher level of self-organisation ($M = 4.1$ vs. 2.8; $p < 0.01$), more developed reflectivity ($M = 3.9$ vs. 2.5; $p < 0.01$), and a lower level of exposure to destructive digital influences (on the cyberbullying resilience scale-4.4 vs. 2.9 out of 5). Content analysis showed that 72% of messages from students with a high level of digital identity were constructive and professionally oriented (questions, assistance, resource sharing), while in the group with a low level of digital identity, this figure was only 29%. A similar pattern is described in a study by S. Soh et al. (2024), where active participation in online communities correlated with the development of emotional intelligence ($r = 0.57$) and academic responsibility ($r = 0.63$).

Overall, the results of the study demonstrate the complex relationship between digital identity and personal characteristics, learning activities, and cognitive functions. Digital identity, when moderately expressed and structured, contributes to the development of self-regulation and learning effectiveness, while excessive use of certain social networks leads to cognitive overload, decreased concentration, and an increased risk of addiction. A comparison of the data obtained with the results of similar studies, such as

J. Wertsch & O. Jäggi (2022) and R. Ryan & E. Deci (2023), allows to conclude that digital identity is an integrative indicator of personal development in the context of the digitalisation of education. It reflects not only the level of technological proficiency, but also the degree of awareness, ethical maturity, and social activity of the learner. Analysis of the results confirms the conclusions of previous studies. Thus, R. Ibrahim *et al.* (2024) noted the mediating role of digital literacy and self-regulation in the academic process, while S. Zakir *et al.* (2025) pointed to the positive impact of digital identity on academic performance. The data obtained also agrees with the conclusions of S. Soh *et al.* (2024), who emphasise the importance of digital practices for the formation of identity and self-regulation skills.

A comparison with international studies shows that the trend towards integrating digital identity and personal development is relevant not only in a national context, but also in a global one. For example, A. Faza & I. Lestari (2025) emphasise that digital identity has a positive impact on students' adaptability and critical thinking, which is fully consistent with the results of this study. Discussion of the results allows for drawing several key conclusions. Firstly, students' digital identity is directly linked to the development of personal and professional competencies, which confirms the need to integrate digital practices into educational programmes. Secondly, the identified differences between levels of digital identity indicate the need for a differentiated approach to teaching and developing digital skills. Thirdly, the correlations established demonstrate that the formation of a stable digital identity can contribute to increased academic motivation and learning effectiveness.

Educational strategies for forming a harmonious digital identity

Given that digital identity is the main predictor of personal development ($\beta = 0.54$; $p < 0.01$), educational practice requires systemic changes aimed at forming a conscious and reflective digital identity among students. It is advisable to integrate specialised modules into educational programmes, such as "Digital Identity and Self-Presentation", "Responsible Behaviour in the Digital Environment" and "Digital Footprint and Reputation". The use of reflective assignments, including keeping digital diaries, blogs, and e-portfolios, will allow students to analyse their own digital image and its impact on their academic and personal lives. The main goal of this area is to consciously construct a positive and harmonious digital identity as the basis for personal growth.

The significance of digital competence as a predictor of personal development ($\beta = 0.31$; $p < 0.01$) necessitates the systematic development of digital technology skills. The introduction of training courses on digital literacy, cybersecurity, and working with information and media content will create conditions for forming confidence and autonomy among students in the digital environment. The use of project-based assignments, such as creating podcasts, websites, and online platforms, contributes to the development of practical skills and a creative approach to using digital

tools. Particular attention should be paid to forming the skills of critical assessment of information through media education, which will ensure students' ability to interact with digital content in an informed and responsible manner.

Emotional stability in online interactions, demonstrating a significant correlation with personal development ($\beta = 0.27$; $p < 0.01$), requires the inclusion in the educational process of psychological training in self-regulation and emotion management. Analysing cases related to cyberbullying, trolling, and internet addiction will allow students to develop a critical attitude towards destructive forms of digital interaction. Exercises to develop empathy and tolerance in digital communication will ensure the formation of the ability to maintain psychological stability in the digital space and interact constructively with various participants in the educational process. Reflection on digital behaviour, which acts as an additional factor in personal development ($\beta = 0.22$; $p < 0.05$), involves regularly self-analysing digital habits and assessing the amount of time spent online. Including tasks such as "How do I behave in the digital space?" and "How does the digital environment influence my values and decisions?" contributes to the development of awareness and critical thinking. The use of portfolios and SWOT analysis of digital behaviour allows students to gain control over their own digital practices and develop strategies for harmonious interaction with the digital environment.

The results of the analysis showed that the involvement of students in project and communication activities in digital educational communities increases the level of self-regulation, critical thinking and resistance to destructive forms of interaction. The creation of professional online communities at universities, the introduction of mentoring in the digital environment, and the encouragement of participation in educational forums, scientific platforms, and student digital projects foster a sense of belonging and social significance. Active participation in constructive digital communities contributes to the formation of professional identity and strengthens motivation for self-development. At the same time, the formation of digital identity should not be limited to educational activities, but requires of integration into the educational system of the university. Holding themed weeks, such as "My Digital Identity", organising discussions on values in the digital age, and competition for the best project or blog create a favourable environment for reflection and the development of a conscious attitude towards the digital space. Supporting the initiatives of students in online cultural and scientific projects enhances their social activity and contributes to the formation of a sustainable positive digital identity.

Effective implementation of these strategies is impossible without training teaching staff. It is necessary to conduct advanced training courses for teachers in the areas of digital identity pedagogy, digital ethics, online communication psychology, and managing the digital stress of students. A competent teacher, knowledgeable about the specifics of digital identity formation and able to purposefully accompany this process, is a key factor in the successful

implementation of educational strategies. The formation of a harmonious digital identity serves not only as a means of adapting to the digital environment, but also as a mechanism for personal maturity, self-regulation, and sustainable development of the student's personality. The systematic implementation of these strategies in educational practice will ensure a balance between personal growth, digital activity and psychological well-being, transforming digital identity from a potential source of risk into a powerful internal resource for the professional and personal development of students in the context of the digital transformation of society.

■ CONCLUSIONS

The study confirmed that students' digital identity is a key factor in personal development under the conditions of a digital educational environment. An analysis of data from 136 second-year students at the Institute of Information and Communication Technologies and Artificial Intelligence showed that 31% of students have a high level of digital identity, 49% have an average level, and 20% have a low level. This differentiation indicates significant differences in digital competence, self-presentation awareness, and the ability to adapt in a digital environment. Correlation analysis revealed a strong positive relationship between digital identity and motivation for self-development ($r = 0.68$; $p < 0.05$), as well as cognitive flexibility ($r = 0.62$; $p < 0.05$). These results show that increased awareness of one's digital identity is accompanied by increased student activity in the area of self-development and adaptive thinking skills. The average scores of students with an average level of digital identity ($r = 0.54$ - 0.49) confirm the presence of a positive effect, but to a lesser extent, while students with low digital identity show virtually no effect.

Regression analysis showed that digital identity is the main predictor of personal development ($\beta = 0.54$; $p < 0.01$), explaining about 48% of the variation in

personal maturity indicators. Important additional influences are digital competence ($\beta = 0.31$), emotional stability ($\beta = 0.27$), and reflection on digital behaviour ($\beta = 0.22$), indicating a complex interaction between the cognitive, emotional, and behavioural components of digital identity in the formation of students' personal maturity. Additional analysis of student activity in digital educational communities showed that participation in project and communication activities is associated with higher levels of self-regulation, reflection, and resistance to destructive forms of digital interaction. Students with high activity levels demonstrated 17-22% higher personal development indicators compared to their less active peers. Prospects for further research are related to studying the impact of digital identity on professional self-determination, academic performance, and adaptation of students in various specialties, as well as the implementation of intervention programmes aimed at increasing personal maturity and digital competence in the context of the digitalisation of education.

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■ CONFLICT OF INTEREST

None.

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Аннотация. Изилдөөнүн максаты Маалыматтык-коммуникациялык технологиялар жана жасалма интеллект институтунун экинчи курс студенттеринин жеке өнүгүүсүнө санариптик иденттүүлүктүн таасирин изилдөө болгон. Методологиялык негизи жеке-активдүүлүк жана социомаданий мамилелер болгон, бул бизге санариптик иденттүүлүктү санариптик билим берүү чөйрөсүндө өзүн-өзү таануунун элементи катары кароого мүмкүндүк берген. Сандык ыкмалар (Санариптик иденттүүлүк шкаласы, Жеке өсүү демилгесинин шкаласы, Когнитивдик ийкемдүүлүк инвентаризациясы, Академиялык өзүн-өзү жөнгө салуу анкеталары) жана санариптик билим берүү коомчулуктарындагы студенттердин активдүүлүгүнө кошумча талдоо жүргүзүлдү. Жыйынтыктар көрсөткөндөй, студенттердин 31 % жогорку деңгээлдеги санариптик иденттүүлүккө, 49 % орточо деңгээлдегиге жана 20 % төмөнкү деңгээлдегиге ээ болгон. Корреляциялык анализ санариптик иденттүүлүк менен өзүн-өзү өнүктүрүүгө мотивациянын ($r = 0,68$; $p < 0,05$), ошондой эле когнитивдик ийкемдүүлүктүн ($r = 0,62$; $p < 0,05$) ортосундагы күчтүү оң байланышты көрсөттү. Регрессиялык анализ санариптик иденттүүлүк жеке өнүгүүнүн негизги предиктору экенин ($\beta = 0,54$; $p < 0,01$), санариптик компетенттүүлүк ($\beta = 0,31$), эмоционалдык туруктуулук ($\beta = 0,27$) жана санариптик жүрүм-турумдук рефлексия ($\beta = 0,22$) да маанилүү предикторлор экенин тастыктады. Билим берүүчү санариптик коомчулуктардагы окуучулардын активдүүлүгүн андан ары талдоо долбоорго негизделген жана коммуникациялык иш-аракеттерге катышуу өзүн-өзү жөнгө салуунун, критикалык ой жүгүртүүнүн жана санариптик өз ара аракеттенүүнүн деструктивдүү формаларына (троллинг, киберкуугунтук) туруктуулуктун жогорулашы менен байланыштуу экенин көрсөттү. Изилдөөнүн практикалык мааниси окуучуларда санариптик иденттүүлүктү, критикалык ой жүгүртүүнү, эмоционалдык туруктуулукту жана академиялык мотивацияны өнүктүрүүгө багытталган билим берүү стратегияларын иштеп чыгуу үчүн натыйжаларды потенциалдуу колдонууда жатат.

Негизги сөздөр: санариптик маданият; кесиптик өзүн-өзү аныктоо; коммуникациялык компетенциялар; өзүн-өзү жөнгө салуу; критикалык ой жүгүртүү

Цифровая идентичность как предиктор академической мотивации и когнитивной гибкости студентов (на материале Кыргызстана)

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Аннотация. Цель исследования состояла в изучении влияния цифровой идентичности на личностное развитие студентов второго курса Института информационно-коммуникационных технологий и искусственного интеллекта. Методологической основой послужили личностно-деятельностный и социокультурный подходы, позволившие рассматривать цифровую идентичность как элемент самореализации личности в цифровой образовательной среде. Использовались количественные методы (опросники Digital Identity Scale, Personal Growth Initiative Scale, Cognitive Flexibility Inventory, Academic Self-Regulation Questionnaire) и дополнительный анализ активности студентов в цифровых образовательных сообществах. Результаты показали, что 31 % студентов имеют высокий уровень цифровой идентичности, 49 % – средний, 20 % – низкий. Корреляционный анализ выявил сильную положительную связь между цифровой идентичностью и мотивацией к саморазвитию ($r = 0,68$; $p < 0,05$), а также когнитивной гибкостью ($r = 0,62$; $p < 0,05$). Регрессионный анализ подтвердил, что цифровая идентичность является основным предиктором личностного развития ($\beta = 0,54$; $p < 0,01$), дополнительно значимыми предикторами выступили цифровая компетентность ($\beta = 0,31$), эмоциональная устойчивость ($\beta = 0,27$) и рефлексия цифрового поведения ($\beta = 0,22$). Дополнительный анализ активности студентов в образовательных цифровых сообществах показал, что вовлеченность в проектную и коммуникационную деятельность связана с повышением уровня саморегуляции, критического мышления и устойчивости к деструктивным формам цифрового взаимодействия (троллинг, кибербуллинг). Практическая значимость исследования заключается в возможности использования результатов для разработки образовательных стратегий, направленных на формирование цифровой идентичности, развитие критического мышления, эмоциональной устойчивости и академической мотивации студентов.

Ключевые слова: цифровая культура; профессиональное самоопределение; коммуникативные компетенции; саморегуляция; критическое мышление

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