# RUPKATHA JOURNAL
## ON INTERDISCIPLINARY STUDIES IN HUMANITIES

Research article

# Digital Literacy as a Meta-Cognitive Component of Younger Students' Intellectual and Creative Potential in Foreign Language Lessons

Aliya E. Balgabayeva[1]  ✉, Tatiana O. Karataeva[2]  ✉, Irina S. Karabulatova[3]  ✉, Roza M. Aitzhanova[4]  ✉, Aigul A. Zhumadullayeva[5]  ✉ & Dina M. Zharylgapova[6]  ✉

[1]Department of Preschool and Psychological-Pedagogical Preparation, Faculty of Pedagogy, Academician E.A. Buketov Karaganda University, Karaganda, Kazakhstan.
[2]PhD, Senior Lecturer of the Department of Pedagogy and Psychology, Altynsarin Arkalyk Pedagogical Institute, Arkalyk, Kazakhstan.
[3]Dr of Philological Sciences, Professor, RUDN-university, Lomonosov MSU, Bauman MSTU, Moscow, Russia.
[4]Candidate of Pedagogical Sciences, Associate Professor, Department of Preschool and Psychological-Pedagogical Preparation, Faculty of Pedagogy, Academician E.A. Buketov Karaganda University, Karaganda, Kazakhstan.
[5]Candidate of Pedagogical Sciences, Associate Professor, Department of Preschool and Primary Education, Faculty of Social Sciences and Humanities, Khoja Akhmet Yassawi International Kazakh-Turkish University, Turkistan, Kazakhstan,
[6]Candidate of Pedagogical Sciences, Associate Professor, Department of Physics and Mathematics, Institute of Natural Sciences, Korkyt Ata Kyzylorda University, Kyzylorda, Kazakhstan.

**Abstract**
The article reflects on the results of the study of digital literacy in the structure of the meta-cognitive component of the intellectual and creative potential of younger schoolchildren in foreign language lessons. The team of authors substantiates the relevance of approaches to understanding digital literacy as an element of meta-cognitive skills and its increasing role in the development of language education in modern conditions of electronic information society. The scientific and analytical baggage of scientific and pedagogical research of Kazakhstani and foreign authors made it possible to identify the features of universality and meta-subjectivity inherent in the psychological and pedagogical phenomenon of digital literacy. Self-mastery of a foreign language in the modern information and communication space acquires the features of meta-subjects under the influence of the digital literacy of students. The revealed similarity of skills and knowledge of speech-thinking activity and digital literacy as metacognitive categories and aspects of meta-knowledge form the intellectual and creative potential of a student's personality. The results of the study prove that digital literacy as an element of the meta-cognitive component of the intellectual and creative potential of students has an intensifying effect on the development of speech-thinking skills in younger schoolchildren. The results obtained are based on experimental data confirming that the integration of techniques, methods, and means for the development of digital literacy acts as an intensifier of speech-thinking processes, increasing the effectiveness of teaching a foreign language in primary school. Among the defiantly difficult is the task set by the authors' team: to create a universal

psychological and pedagogical algorithm to improve the meta-cognitive component of the intellectual and creative potential of a younger student with the actualization of the methodology of digital literacy in the humanities of the language cycle (state languages, literature, foreign languages, social studies, history, etc.). The training sample consisted of data obtained in the course of ascertaining and modeling experiments from real texts written by schoolchildren. Each text was checked and marked up by two experts in accordance with the levels of psychological, pedagogical, and subject competencies, which made it possible to determine the dynamics of digital literacy of younger schoolchildren in the structure of metacognitive activity of students learning foreign languages, which makes it possible to verify it as the core of the intellectual and creative potential of the student. The digital literacy of a modern student is a "soft power" of a new type of linguodidactics since it allows reformatting the speech and behavioral value matrix of the younger generation under the influence of the translation of priority standards of behavior in a particular ethnic society. Digital literacy is an unconditional way to expand the possibilities of developing an individual system of metacognition, determining the significant potential of its integration with the content of the foreign language teaching program in elementary grades.

**Keywords:** digital literacy, meta-knowledge, meta-knowledge, intersubject, intellectual and creative potential, language education, "soft power"

SUSTAINABLE DEVELOPMENT GOALS    **Better Education**

## Introduction

The global strategy of education in the 21st century determines the long-term trend of actualization of authentic culture (Aipova et al., 2021; Bérešová, 2022). At the same time, the idea of forming a multicultural society in the educational space remains relevant (Karasheva et al., 2021). All this creates a dynamic in the trends of modern psychological and pedagogical theory and practice, allowing the use in linguodidactics and pedagogy of achievements from other humanities related to social engineering, neurotargeting, taking into account factors affecting the psycho-emotional sphere of recipients of different ages, social strata to improve the quality of mastering a particular academic subject (Andrushchenko, et al., 2022; Kurebayeva et al., 2023; Temirgalinova et al., 2021). The boom in the use of digital technologies is due to their high level of efficiency, acting as a communicative means of high technologies in the field of education as a revolutionary tool for the development of the global digital educational space (Alaimo, Kallinikos 2017; Boronenko et al., 2019; Harracá et al., 2023).  At the same time, multicultural education is based on global processes of integration and synthesis of social and cultural environments.

The global trend towards the formation of a multicultural society also reflects the demand of the Kazakh society for the development of tools for the active and effective promotion of linguistic tools for the adaptation of the younger generation to the multicultural information and communication space. As a result, the psychological and pedagogical sphere acquires a qualitatively new tool for the development of cooperation and creativity, teaching subject-expert skills, without which communicative interactions in the digitized world are impossible. Digital media platforms with new educational technologies are gaining popularity in the psychological and pedagogical space, which makes educational tools more flexible, which makes it possible to

adjust pedagogical methods taking into account the new digital reality, putting the field of education at the center of the networked social world, being an effective tool of "soft power" in the field of education.

In this regard, the study of digital literacy in the structure of the meta-cognitive component of the intellectual and creative potential of younger schoolchildren makes it possible to deepen the theoretical and practical aspects of teaching a foreign language in primary school. Multilingual education today has more than one year of successful implementation of advanced pedagogical methods and technologies that are firmly entrenched in the primary school curriculum.

In turn, being in the complex of meta-subject skills, digital literacy acts as one of the fundamental elements of the meta-cognitive component of intellectual and creative potential, the importance of which will only grow in light of the increasing role of digital technologies.

Being a relatively new direction in practice-oriented pedagogical research, the study of the meta-cognitive component and its elements to teaching in various subject areas at the moment seems to be quite promising, but little-studied topic in both domestic and foreign pedagogical literature. Accordingly, the lack of research on digital literacy as a component of the meta-cognitive component of the intellectual and creative potential of a younger student, the lack of research on the role of this set of skills in teaching a foreign language, and the applied importance of developing the theoretical and applied foundations of this issue to improve the quality of language education reflect the relevance of our research.

The significance of this research is predetermined by the public demand for high-quality language education in primary grades, which provides motivation, the effectiveness of the development of speech-thinking processes, and the integration of acquired knowledge, skills, and abilities into the process of comprehensive personality development of younger schoolchildren.

The spiral form of education, the integration of digital technologies into the space of learning and communication, as well as the introduction of cross-cutting cross-subject topics into the content of the foreign language teaching program in elementary grades, presupposes sufficiently developed meta-subject knowledge, which presupposes an inextricable link between knowledge and the practice of their application. Today, the development of speech-thinking processes and the development of communication skills in a foreign language are unthinkable without taking into account the peculiarities of the modern, digital communication environment. That is why in the Concept of Education development until 2029, a special place is given to functional literacy – a meta-subject component of intellectual and creative potential, including the skills of using digital technologies in teaching (Resolution of the Government of the Republic of Kazakhstan. On approval of the Concept of Science Development in the Republic of Kazakhstan for 2023-2029, electronic source).

The passport of the National Project "Quality Education – an Educated Nation" also states that one of the priorities is to increase the quality of primary education by national priorities and global trends, which is unthinkable without improving language learning, taking into account the peculiarities of the predominance of the digital format of the information and communication space (Resolution of the Government of the Republic of Kazakhstan. On the approval of the National Plan "Quality Education – an educated nation: approved on October 12, 2021, electric

source). Based on this, the purpose of our study is to identify the significance of digital literacy in the structure of the metacognitive component of the intellectual and creative potential of a younger student in foreign language lessons as a tool of "soft power" in the transformation of the paradigm of metacognition in the dialogue of linguistic cultures.

**Materials and methods**

The materials for the study were data collected from interviews and experiments conducted in Northern Kazakhstan among elementary school students studying English, as well as an explanatory interview among English teachers in junior classes. The basis was a semi-structured guide for conducting interviews among experts who were selected purposefully (n = 10).

The members of the team of authors received permission from the schools of Arkalyk and Karaganda to collect data and further theoretical and analytical understanding with the publication of the results. The data was evaluated according to the topics that were extracted from the combined results.

The presented tables and graphs display the metric information obtained during the experiments. Participation in experimental surveys was stipulated by the conditions of the possibility of evasion at individual steps and stages, taking into account the anonymity of the data. In addition, each participant had the right to choose a pseudonym.

Before data collection, the subjects were tested and received informed consent. The results of the study demonstrate the effectiveness of using storytelling to improve listening skills. Working with digital applications that allow you to show simulation video clips to improve competencies in foreign languages in linguoculturological and other aspects, acts as an effective tool for virtual immersion in the reality of another linguoculture. New digital tools allow the use of prepared and spontaneous exercises to form and strengthen students' reading and speaking skills in a foreign language, teaching spelling and syntax rules while developing students' writing skills.

The results of the experiments made it possible to identify dependent and independent variables presented on graphs, which integrate four basic language skills in foreign language lessons.

The developed characteristic of digital literacy in the structure of the meta-cognitive component of the intellectual and creative potential of a younger student in foreign language lessons based on the structural characteristics of digital literacy is carried out in the coordinates adopted at the G20 summit in 2017 (Table 1).

**Tab. 1.** The importance of digital literacy as an element of the metacognitive component of the intellectual and creative potential of a primary school student in foreign language lessons

| Levels of digital literacy | Goals | | |
|---|---|---|---|
| | **Knowledge** | **Skills** | **Abilities** |
| Informational | Acquisition of knowledge about the | Recognition, identification, and | The use of linguistic units, differentiation of |

| | basics of linguistics, phonetics | verification of markers of features in linguistic material | phonetic features of a foreign language, the ability to reproduce phonetic differentiations in one's speech |
|---|---|---|---|
| Computing | Strengthening of linguistic and cultural knowledge: expansion and consolidation of knowledge about the peculiarities of a foreign language | Introspection as recognition of own peculiarities of perception of foreign language material | Reproduction with subsequent structuring of new knowledge based on previously obtained practical tasks (speaking, reading, writing) |
| Technological | Identification of technological skills with the poly-linguistic space of the digital environment | Identification of sources and verification of ways to obtain and consolidate knowledge about the language | The use of information space data and technological tools for the independent development and expansion of the system of language knowledge and skills |
| Communicative | Awareness of the possibilities and goals of using digital technologies as a means of communication in a multilingual environment | Identification of ways to expand the possibilities of information exchange in a foreign language through digital technologies | The use of digital technologies as a means of teaching a foreign language through associative-mediated mechanisms |
| Media | Recognition and analysis of information in a foreign language | Determination of the degree of expediency and semantic value of information in a foreign language | Creating and sharing information in a foreign language |

To identify the importance of digital literacy in foreign language lessons in the context of modern trends in the development of education in Kazakhstan, we conducted a study designed to supplement the empirical data of the scientific and applied approach to the development of intellectual and creative potential in a multilingual society. The research horizon was 6 months (from September 5 to March 7, 2022).

The basis of the study was the secondary school No. 2 in the city of Arkalyk. The study covered:

–students of the 3rd "A" class – 34 people;

–students of the 3rd "B" class – 31 people;

–students of the 3rd "B" class – 33 people.

Accordingly, the sample size was 98 people. The sample size meets the requirements for the validity and representativeness of the input data for an empirical study.

 The implementation of this research was based on three pillars of modern education: the psychological and pedagogical basis, the legal basis, and the information and digital basis.

The methodology of the psychological and pedagogical basis is based on the ideas of environmental and personality-oriented approaches. In this regard, the main research methods were theoretical and analytical screening of educational and methodological, scientific literature and Internet content in the field of digital literacy, accumulation and generalization of practical experience in the formation of digital literacy, as well as the results of experiments conducted by the author's team to study digital literacy among students of schools in Kazakhstan in conjunction with the results of digital literacy in neighboring countries (Russia and China) according to the scientific literature.

 The theoretical analysis was based on theoretical, methodological, and practical studies reflected in the works of Kazakhstani and foreign authors regarding certain aspects of the problem addressed in this study.

The regulatory framework of the study was:

-Resolution of the Government of the Republic of Kazakhstan dated March 28, 2023 No. 249 "On approval of the Concept of development of preschool, secondary, technical and vocational education of the Republic of Kazakhstan for 2023-2029;

–Resolution of the Government of the Republic of Kazakhstan dated October 12, 2021 No. 726 "On approval of the national project "Quality Education – an Educated Nation".

These documents of modern Kazakhstan were compared with the relevant legislative acts of Russia and China. However, because the emphasis is on the analysis of digital literacy among younger schoolchildren in Kazakhstan, Kazakh documents have become a priority and fundamental for our research.

The empirical analysis was based on the data of pedagogical experiments conducted in the student environment in comparison with the interviewing of school teachers. In the course of the study, general scientific methods, methods of scientific analysis, methods of empirical research (pedagogical experiment), and mathematical and statistical methods (correlation and regression analysis) were used. The general scientific methods used in this study include analysis and synthesis, deduction, and induction.

The methods of scientific analysis are presented by a comparative method of analyzing scientific sources and open data and a descriptive method of analyzing scientific literature.

To achieve scientifically significant results, we used epistemological, axiological, and integrative principles of pedagogical research.

**Results**

At the present stage, language education is a tool for the successful adaptation of a person in society and determines his ability to integrate into the information and professional space. At the same time, it is proved that teaching a foreign language is most productive to begin at the stage of primary classes. The period of 7-8 years is optimal for the implementation of the tasks of developing linguistic abilities in the process of comprehensive development of schoolchildren (Dzhumanova, Tugambekova, 2017).

Psychological, neurophysiological, and social characteristics of younger schoolchildren provide significant advantages for starting to learn a foreign language, since at this age children absorb linguistic features indirectly, through the development of a system of thinking skills. This is facilitated by the fact that the development of long-term memory in younger schoolchildren is in a peak phase and the acquired knowledge is firmly and reliably integrated into the metacognition system.

Teaching a foreign language (primarily English as the language of international communication at the global level) is integrated into continuous end-to-end learning at all levels of education (Bondareva et al., 2016; Veenman, et al., 2003). Teaching a foreign language ensures the realization of the informational, communicative, and intellectual needs of the younger students' personalities in mastering skills that allow them to successfully act in conditions of intercultural communication. In addition, through the study of foreign languages, a basic model of cognitive activity is created in a multilingual information space, and its boundaries are expanded for further intellectual and creative development. The openness and globality of the modern information space, the vastness and versatility of the modern knowledge system predetermines the study of a foreign language not just as an instrument of intercultural interaction, but also as an instrument for expanding and developing one's knowledge system, increasing the number of sources of acquiring this knowledge and skills for their analysis.

In the context of this study, digital literacy is of the greatest interest as a relatively new element of the meta-cognitive component of the intellectual and creative potential of the younger student, whose role in the development of both subject and interdisciplinary knowledge and skills is growing rapidly. In turn, it is advisable to determine the place of teaching a foreign language in the process of metacognitive activity of a younger student.

Modern science has proved that teaching a foreign language contributes to the development of associative thinking, and the improvement of brain structures and has a positive effect on the intellectual sphere of the child through the intensification of speech-thinking skills.

The modern system of knowledge itself and the needs of society in their manifestation by a person through professional activity presupposes the ability to both analyze and synthesize, interpret and create solutions to multicomponent and rather complex interdisciplinary and intersectoral tasks. Thus, the intellectual and creative potential in its structure contains a meta-cognitive component as the root element of the development of flexible and adaptive thinking. In turn, in the structure of the meta-cognitive component at the present stage, digital literacy as the predominant tool for integrating the cognitive process of the individual into the global information space occupies almost a leading role.

At the same time, language knowledge and skills are also universal in the modern knowledge system and cognition model, acting as a tool for integrating a person into the global information environment, as well as allowing to expand the sources of obtaining and expanding knowledge.

Defining the role of digital literacy in teaching a foreign language in the complex conditions of intellectual and creative development of a younger student, it should also be noted the increasing importance of information technology as a means of teaching communication and knowledge exchange. The realities of today are such that the digital space is becoming the leading source of knowledge and the main field for communication among the younger generation. Technological convenience, versatility, and global openness of information and communication technologies give every reason to believe that digital literacy is already a meta-subject and necessary, basic skills integrated into the meta-cognitive component.

Moreover, in the coming decades, the role of information and communication technologies in the educational environment and the issue of professional development and adaptation will only grow, displacing previously familiar forms of transmission, exchange, and storage of information. The meta-cognitive component itself is the leading one in the structure of the "soft power" mechanism, determining the degree of influence and transformation of one linguistic culture on another.

The current situation in this regard can be called a unique, historically unparalleled precedent. Thanks to the development of the global Internet, and the ease and speed of information exchange, the information field is becoming comprehensive, universal, and accessible as never before. But the breadth and depth of the available knowledge system and their exchange implies the need to assimilate and integrate vast amounts of information into one's knowledge system faster, to be able to find and use the necessary data to solve problems that, as a rule, are at the junction of various branches and areas of school knowledge.

In the very system of approaches to the acquisition, use of knowledge, and management of the process of cognition, the global community has come to a stage where the narrower the professional specialization, the wider the set of intersectoral knowledge and skills a specialist should possess.

Therefore, teaching a particular subject in primary school today is built around creating conditions for the development of not only subject but also interdisciplinary connections for the balanced and progressive development of the intellectual and creative potential of the younger student. Teaching a foreign language, by itself having metacognitive and intersectoral characteristics, in turn, needs appropriate tools to intensify speech-thinking processes due to similar metacognitive skills.

Digital literacy is such a method that has sufficient versatility. The metacognitive nature of digital literacy as a universal element of the metacognitive component of intellectual and creative potential also confirms its entry into basic functional literacy, the development of which ensures the holistic and progressive improvement of cognitive processes of human thinking (Bondareva et al., 2016a).

An important initial condition and the main assumption of the study was the fact that the level of digital literacy of primary school students, both at the starting point of the experiment and during

the experimental work, exceeds the level of development of speech-thinking skills in a foreign language (English).

The reason for this is:

1) Early formation of some aspects of digital literacy as a basic and universal set of skills in modern realities;

2) The relative unconditionality of the perception of new digital literacy skills due to the mentioned universality and integration into the basis of the development of metacognition in the modern primary school education program;

3) The meta-subject of digital literacy, thanks to which its development is more intensive than special speech-thinking processes.

The study was conducted in three stages:

– stage 1 – measurement of the initial level of digital literacy development;

–stage 2 – the development of speech-thinking processes in foreign language lessons with the strengthening of the meta-cognitive component of intellectual and creative potential through increasing the level of digital literacy.

–stage 3 – measurement and comparison of the dynamics of speech-thinking processes and the level of digital literacy.

In English lessons, to intensify the development of speech-thinking skills, the use of techniques, methods, and means of integrating digital literacy into training corresponded to the content of the standard training program and the main speech-thinking processes being developed (Table 2).

**Tab.2 –** Techniques, methods, and means used in the research

| Elements of speech-thinking activity | Methods | Techniques | Tools and technologies |
|---|---|---|---|
| Audition | Informational and receptive | Technical. Teaching the basics of computer literacy in a foreign language: using a browser, entering simple search queries, watching videos and listening to audio files, learning the capabilities of embedded dictionaries and machine-embedded translation | Interactive presentations, educational videos, Audio recordings, Computer, Interactive Whiteboard, Projector, Smartphone, Messengers (What's App), Email, TikTok, Likee |
| Talking | Reproductive heuristic | | |

| Reading/Writing | | Organizational: repetition of the listened material, answers during an interactive lesson, written tasks (sending short sentences via messengers, mail, comments on a social network) | |
|---|---|---|---|

Various forms of presentation of information in a foreign language, especially with the use of a video series with subtitles, as well as schemes with explanatory texts, and creolized elements, aim for students to successfully master the educational material by strengthening certain neurocognitive operations that correspond to specific educational goals (memorization, understanding, analysis, synthesis, evaluation, application).

At the same time, it must be recognized that digital literacy skills manifest themselves differently in students with a humanitarian dominant and mathematical priority, which, in our opinion, is due to differences in the form of encouragement at early school age due to hyperstimulation of developed brain areas and stigmatization of lagging areas. It should be taken into account that early childhood and primary school can balance the influence of physiological factors in the direction of increasing neurocognitive connections between different areas of the brain.

As a result of the study, data were obtained that demonstrate the transformation of digital literacy indicators during experimental measurements (Table 3).

**Tab.3 –** Dynamics of the level of digital literacy before and after the experiment

| | The level of development of digital literacy and its elements (points) from the total number of samples | | | | | |
|---|---|---|---|---|---|---|
| | *1-5* | | *6-8* | | *9-10* | |
| *Measurement time during experimental work* | *Before* | *After* | *Before* | *After* | *Before* | *After* |
| **Digital literacy and its elements** | | | | | | |
| Development of information literacy | 21% | 75% | 22% | 61% | 3% | 18% |
| Development of computer literacy | 34% | 67% | 28% | 52% | 5% | 14% |

| | | | | | |
|---|---|---|---|---|---|
| Development of technological literacy | 17% | 65% | 24% | 61% | 11% | 22% |
| Development of communicative literacy | 27% | 57% | 32% | 53% | 11% | 20% |
| Development of media literacy | 15% | 68% | 26% | 71% | 6% | 14% |
| **Total score of general digital literacy** | **23%** | **66%** | **26%** | **60%** | **7%** | **18%** |

Modern technologies have led to the introduction of mobile technologies. Mobile context-dependent learning via smartphone allows students to send and receive information, interact with other participants in the learning process, receive feedback or advice, and participate in a learning event and/or lesson anywhere and anytime, just using their mobile phone (Sun, Chang, 2016).

Digital literacy allows you to immerse yourself in the chronotype of a specific event, therefore, the events used by the teacher must be reliable, realistic, and relate to a specific group of participants who will use a particular case. This can be either an event from the media, Internet channels, or a constructed situation without reference to a real event, the so-called interactive gaming event-simulacrum (Emelin 2016).

Similarly, the assessment of changes in the development of speech-thinking skills in foreign language lessons was carried out. The results obtained demonstrate the progress of speech-thinking skills provided that methodologically justified digital communication techniques are used that do not suppress natural communication (Table 4).

**Tab.4 –** Dynamics of the level of speech-thinking activity before and after the experiment

| | The level of development of speech-thinking activity and its elements (points) from the total number of samples | | | | | |
|---|---|---|---|---|---|---|
| | *1-5* | | *6-8* | | *9-10* | |
| *Measurement time during experimental work* | *Before* | *After* | *Before* | *After* | *Before* | *After* |
| **Elements of speech-thinking activity** | | | | | | |
| Audition | 32% | 97% | 3% | 51% | 0% | 17% |
| Talking | 24% | 87% | 8% | 62% | 5% | 14% |

| Reading | 38% | 98% | 2% | 51% | 0% | 11% |
|---|---|---|---|---|---|---|
| ***The total score of the general development of speech-thinking processes in a foreign language*** | *31%* | *94%* | *4%* | *55%* | *2%* | *14%* |

At the same time, the teacher should take into account not only the level of possession of digital skills but also the psychological characteristics of younger schoolchildren, since individual neurocognitive features have a dominant influence on the quality of teaching the material and on the selection of respectful digital strategies for obtaining information.

Based on the data obtained as a result of the experiment, it was noted that the use of digital literacy techniques allows to intensification of the main speech-thinking processes in foreign language lessons for younger schoolchildren (Fig. 1).
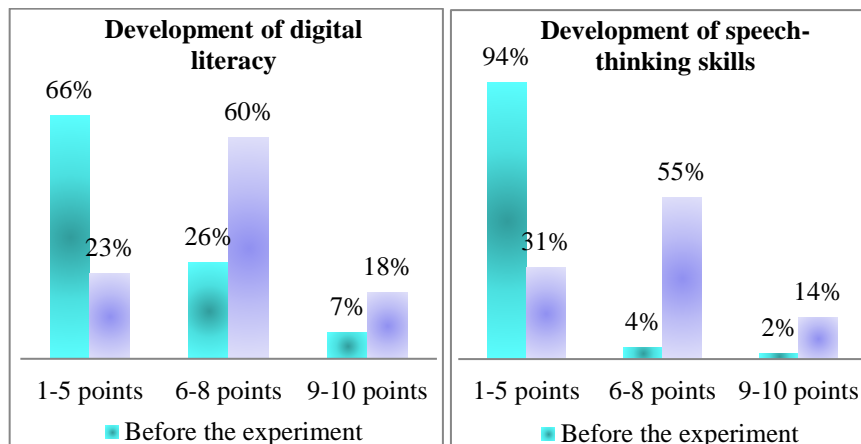


**Fig. 1** – Proportion of primary school students according to the level of digital literacy and development of speech-thinking skills before and after the experiment

The considered communicative situations also have problem fields that require immediate solutions, and have an implicit dramatic conflict of plot development for the formation of pluralism of opinions and critical thinking among elementary school students.

To summarize the results of the experiment, we needed to determine the presence (or absence) of a direct linear relationship between the dynamics of digital literacy and the dynamics of the development of speech-thinking processes. For statistical confirmation, a correlation and regression analysis were carried out, as a result of which data were obtained confirming the presence of the influence of digital literacy on the development of speech-thinking skills (Fig. 2).
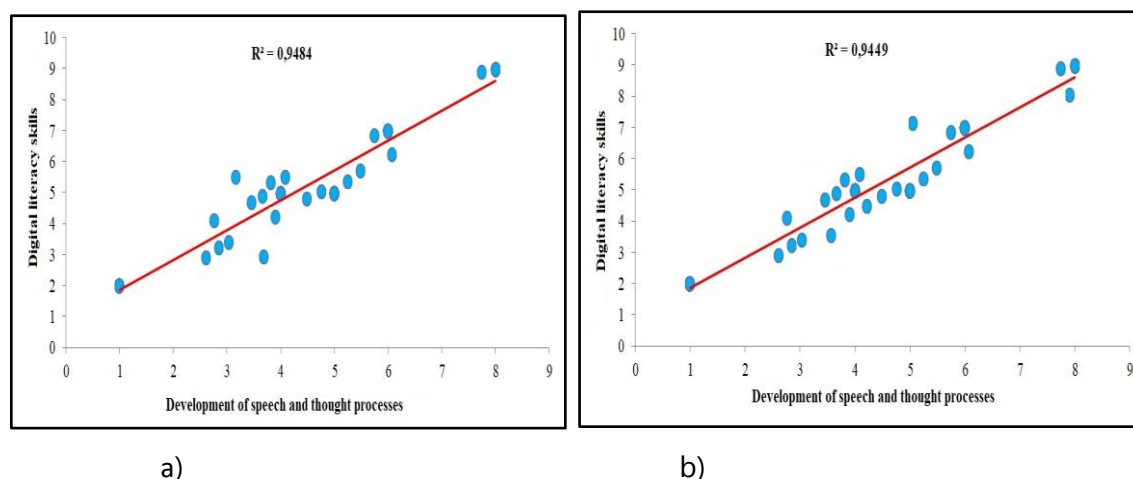
a)                                                    b)

**Fig. 2** – The discovered correlation between the dynamics of digital literacy and the dynamics of speech-thinking skills: a) before the experiment and b) after the experiment

The correlation coefficient found between the dynamics of digital literacy and the dynamics of speech-thinking skills ≥ 0.9, respectively 90% of the cases of changes in the dynamics of speech-thinking processes, is determined by the level of digital literacy.

Correlation analysis confirmed that digital literacy has a significant, statistically determined, and numerically significant direct impact on the development of speech-thinking skills of younger schoolchildren.

Further regression analysis determined that the regression coefficient before and after the experiment is equal to 1, which also confirms the numerically linear relationship between the level of digital literacy and the dynamics of the development of speech–thinking processes in younger schoolchildren. The criteria for the adequacy of the constructed model are presented below (Table 5).

Tab.5 – Criteria for the adequacy of a correlation-regression model

| Criteria | Before the experiment | After the experiment |
|---|---|---|
| Multiple R | 0,971 | 0,972 |
| $R^2$ | 0,948 | 0,944 |
| Normalized R | 0,944 | 0,943 |
| Standard error | 0,47 | 0,45 |
| F-criteria | 6,58 | 6,56 |

Thus, as a result of the experiment described above, we identified:

1)     The introduction of elements of digital literacy training increases the intensity of the development of speech-thinking skills (within the age criteria and criteria of the foreign language

teaching program in elementary grades), which is confirmed by these models both before and after the experiment;

2) Digital literacy acts as a leading element of the meta-cognitive component of intellectual and creative potential, providing a comprehensive and interdisciplinary development of the main components of speech-thinking processes in teaching a foreign language.

Meta-cognitive ability is due to meta-subject analytical activity that expresses the skills of understanding and analyzing one's thought processes and their results when studying subjects as an integral system of knowledge (Bondareva, et al., 2017).

However, such an assessment will always be somewhat fragmentary, while we consider the following to be a more reliable criterion for the dynamics of the development of intellectual and creative potential:

- the presence of a desire for cognition, independence in cognition (as a manifestation of the self–regulating aspect of metacognition or metacognitive control);

– the manifestation of individual reflection in relation to the experience of cognition (as a manifestation of meta-knowledge);

– manifestation of the ability to identify and analyze ways to solve educational problems (as a manifestation of a metacognitive strategy);

– the manifestation of the ability to analyze and interpret one's own experience to realize intersubject connections (as a metacognitive experience).

Metacognition is a very complex and multidimensional concept that defines the process of acquiring, accumulating, and interpreting cognitive experience, with the subsequent possibility of using it to develop and expand the system of meta–subject knowledge, which can later be formalized using metagraph theory for more successful training of both natural and artificial intelligence (Yao, Qin, 2022). The content of metacognition is knowledge, skills, and information about cognition; at the same time, the content of cognition is the objects of the external (objects, people, physical phenomena, events, signs, etc.) or the inner world (images, emotions, sensations, etc.).

Metacognition is characterized by both universality and individuality. The universality of metacognition is expressed to the extent that knowledge and methodological conditions for obtaining it are universal, scientifically grounded, and systematized. The individuality of metacognition is determined by subjective abilities to reflect cognitive experience and its interpretation in solving practical problems based on understanding one's own capabilities and awareness of one's own cognition strategy.

Accordingly, metacognitive skills determine the degree of involvement of a younger student in the process of cognition and his individual style of cognitive activity, providing the solution of complex tasks with the use of complex, meta-subject knowledge.

In turn, the acquired possibilities of solving problems through the appeal to one's own experience of cognitive activity determine the integrativity of creativity and rationality in educational

activities, which creates the basis for the development of individual intellectual and creative thinking, as cognitive experience accumulates, it transforms into intellectual and creative potential.

As the system of knowledge and experience of obtaining and applying them develops, an understanding of the relationship between the phenomena of the surrounding reality and the possibilities of using this knowledge to solve educational problems is formed as the school curriculum becomes more complex. In turn, the accumulation of knowledge and experience ensures the development of intellectual and creative potential. Accordingly, the development of metacognition and the development of intellectual and creative potential are cyclical and identical processes, since metacognitive skills are an integral component and a link between obtaining subject knowledge and building it into a system of metacognition.

**Discussion**

Modern conditions of positioning the Internet as a habitat for "digital aborigines" (Grekova, 2019), a source of development of society (Grishina, Abakumova, 2020), culture with implementation in new forms of activity (Zubanova et al., 2021; Aipova et al., 2021), linguodidactic digital practices, socio-cultural phenomena in the digital Education (Karabulatova et al., 2021) is a critical need to understand the phenomenon of digital literacy.

It is the universality and over-subjectivity of digital literacy and its increasing importance in teaching, including foreign languages, that allows us to talk about its meta-subject nature. Today, multilingual education is the most important integrative tool of the world community, as well as strengthening the intercultural ties of people in the situation of globalization and migration.

According to M. D. Lagutkina (2022), the format of the impact of "soft power" may be different, but it affects the speech-memory matrix of a junior schoolboy whose personality is not yet mature enough to draw the boundaries of "his" and "someone else's culture" (Karabulatova et al., 2021a), while erasing the boundaries of historical memory (Karabulatova, Kopnina, 2023). At the same time, the power of a foreign language as a "soft power" integrating with another linguistic culture was previously considered from a political science standpoint (Winkler, Nye, 2004), in the aspect of introducing a different civilizational paradigm into meta-knowledge.

Metacognition is both the basis and the result of the development of the intellectual and creative potential of the individual, including the younger student (Fleur, et al., 2021). Psychological, neurophysiological, and social characteristics of younger schoolchildren provide significant advantages for starting to learn a foreign language, since at this age children absorb linguistic features indirectly, through the development of a system of thinking skills (Gutierrez de Blume et al., 2023; Fu et al., 2023; Sengul et al., 2022). Moreover, the effectiveness in this case is very conditional, since the effectiveness of the development of metacognitive skills in a particular case can be revealed by a formalized assessment.

The very concept of "intellectual and creative potential" with the definition of its internal architecture has recently been developed in domestic and foreign science (Mamurakhon, 2020; Karataeva, Khan, 2022). In turn, the intellectual and creative potential of the younger student includes the following components:

–motivational;

–metacognitive;

–intellectual-reflexive;

–intellectual and communication;

–self-regulating (Karataeva et al., 2022).

The very system of public knowledge and scientific cognition today has an intersectoral character, highlighting metacognition as a leading component of intellectual and creative potential. No scientific achievement, no achievement of a person as a professional in modern society can be based on knowledge isolated from other fields, focusing on the cooperation of joint meta-knowledge, which is constructed with the help of a teaching presence combined with a cognitive presence in the course of practical research (Garrison, 2022).

In addition, the vector of development of modern education and science, the vector of development of the epistemological aspect of social interaction and social adaptation, determines the important role of a foreign language in the system of meta-knowledge. In this regard, there is a need to clarify the concept of "meta-knowledge".

Meta—knowledge is a concept that characterizes the structure of the knowledge system, which is a complex of knowledge in its intersectoral and applied meaning. We believe that meta-knowledge is not just knowledge about one's system of knowledge, but also represents a self-developing system in which new knowledge and understanding of the possibilities of its expansion are based on previously acquired and integrated interdisciplinary and intersectoral knowledge.

The concept of metacognition as a mental activity characterized by the recognition of one's cognitive processes and their results is closely related to this concept (Flavell, 1976; Veenman, van Cleef, 2019; Boronenko et al., 2019).

In turn, metacognition includes both metacognitive knowledge (or ignorance) and metacognitive control, which makes it possible to put into practice the existing body of knowledge. Intersubject, the universality of metacognition creates the basis for universal on the one hand, and individual, conditioned by personal characteristics on the other, the process of intellectual and creative potential development. The foundation for the development of intellectual and creative potential, which determines the degree of comprehensive personality development and its successful social adaptation, is the period of junior school (Ackerman, & Goldsmith, 2011; Balcikanli, 2011; Buratti, Allwood, 2012; Cer, 2019).

The intellectual and creative potential of a junior schoolboy is a fairly new and extremely important concept for the modern educational paradigm, around which the concept of modern Kazakh education is built (Bondareva et al., 2016).

The metacognitive component is the central link in the development of intellectual and creative potential in the process of mastering subject programs for primary classes and includes the following elements:

-metacognitive (awareness cognitive process);

–logical-analytical (the ability to analyze and logically deduce solution algorithms through existing knowledge);

–general and interdisciplinary (functional literacy: memorization, planning, self-assessment, reading, writing, digital literacy) (Anderson, Krathwohl, 2001; Teng, 2021).

In this regard, each of the subject areas acquires more and more features of meta-knowledge, requiring appropriate tools for its development (Volkova et al., 2022).

Numerous studies prove that multilingual education contributes to the intensification of mental development, especially when solving tasks that require originality of thinking and intellectual flexibility, based on interdisciplinary knowledge (Nijiati et al., 2020; Zhang and Zhang 2019; Lin et al., 2021; Sengul et al., 2022; Yamada 2018). Psychological, neurophysiological, and social characteristics of younger schoolchildren provide significant advantages for starting to learn a foreign language, since at this age children absorb linguistic features indirectly, through the development of a system of thinking skills (Karabulatova et al., 2013).

The influence of teaching a foreign language on the development of intellectual and creative potential on a scientific and applied basis is investigated, starting with the mid-XX century, updated in the XXI century (Nijiati, et al., 2020; Sun, Zhang 2022).

However, L.S. Vygotsky also put forward the thesis about the positive influence of multilingualism on the development of thinking at the primary school age, relying on the more intensive development of the knowledge system in conditions of the need for conscious control of linguistic operations (Vygotsky 1978). Since the 60s to the present, the world of pedagogical evidence-based science has reliable empirical data, relying on the law of repetition and reproduction of previously performed thought processes, putting forward the thesis of learning a foreign language as an intensifier of complex knowledge development by expanding their structure (Sato, Lam, 2021).

At the same time, the complexity of the knowledge structure in the continuous improvement of development is defined as meta-knowledge, which has come to be understood in modern pedagogical science and which is given increased attention (Zhang et al., 2023). Along with this, the development of new knowledge and mastering the skills of their application, their expansion and acquisition of universality and interdisciplinary characteristics, determine the adaptability of the intellectual and creative potential of the child (Boronenko et al., 2019; Teng, 2021).

The intellectual and creative potential of a junior schoolboy is a complex meta-cognitive ability to creatively solve educational tasks based on acquired knowledge and individual thinking characteristics (Karataeva, Khan, 2022; Yamada, 2018), which acquires new colors in the conditions of using digital literacy.

The realities of the modern multilingual information and communication space determine the long-term trend for such an extra-subject and universal system of knowledge and skills as digital literacy. At the same time, digital literacy creates an urgent need to learn English as a programming language and international scientific communication, acting as an implicit mechanism of influence of the "soft power" of Western civilization, forming a global identity dominated by the values of foreign culture.

**Conclusion**

Teaching younger schoolchildren, a foreign language is one of the main, socially significant, and at the same time difficult pedagogical tasks. Knowledge of a foreign language, in particular English, is today a prerequisite for successful and comprehensive personal development, expanding knowledge and using the opportunities provided by the open global information space. In addition, it has been scientifically proven that the process of learning a foreign language has a positive effect on the overall intellectual and creative development of a child, providing creativity and flexibility in thinking. Accordingly, the very teaching of a foreign language within the framework of a standard educational program carries a metacognitive effect.

However, despite the fact that the period of 8-10 years is optimal for starting to learn a foreign language, the effectiveness of this training and the positive effect of it depends entirely on how interesting and exciting the lesson is.

In primary school, when teaching a foreign language, it is extremely important to focus students' attention on the linguistic units being studied, the features of sentence construction, as well as to form basic speech-thinking skills. In this respect, teaching a foreign language differs significantly from teaching other subject areas.

The development of speech–thinking processes (listening, speaking, reading) is the basic task of teaching a foreign language in primary school. The intensity and effectiveness of this pedagogical process can be increased by integrating the basics of teaching digital literacy into the content of a foreign language lesson. Since children aged 8-9 already have some basics of digital literacy in their native language, as a rule, learning (especially cross-cutting topics) with intensive use of digital three-legs is not only easier but also more interesting, which is important for increasing motivation and attention. In addition, immersion in a foreign language environment through the use of digital literacy skills allows you to give a practice-oriented nature of learning, which significantly increases the memorability of the material.

During the research, for 6 months we have implemented a system for integrating digital literacy into foreign language teaching. As a result of the assessment of the dynamics of speech-thinking processes, it was revealed that the use and development of metacognitive skills of digital literacy is an effective and efficient way of teaching younger schoolchildren foreign language lessons.

A new time has come, which is characterized by the technological formalization of humanitarian knowledge with the subsequent transformation of the value code of the entire human civilization. There are different ways to treat the departure from traditional values that set the vector of development of the human individual. However, the rejection of the advantages of a technological breakthrough will not be able to slow down the evolution of the human community.

Digital literacy is therefore important because it allows you to be thoughtful about cultural meanings and values. A careless attitude to digital tools determined by the market economy can lead to uncontrollable consequences when the desire for more and more possession of material values leads humanity to a dead end. The "soft power" of digital literacy sets the vector of social engineering for future generations.

## Declaration of Conflicts of Interests

## Funding Disclosure/Acknowledgement

## References

Resolution of the Government of the Republic of Kazakhstan. On approval of the Concept of Science Development in the Republic of Kazakhstan for 2023-2029: approved on March 28, 2023, No. 248, https://adilet.zan.kz/rus/docs/P2300000248. 28.09.2023.

Resolution of the Government of the Republic of Kazakhstan. On the approval of the National Plan "Quality Education – an educated nation: approved on October 12, 2021, No. 726, https://adilet.zan.kz/rus/docs/P2100000726. 28.09.2023.

Aipova A., Apaeva A., Temirgalinova A., Shabambaeva A., Karabulatova I. (2021). The features of the formation of ethno-value consciousness in the modern Kazakh Pedagogical University. EduWEB. *Revista de Tecnología de Información y Comunicación en Educación,* 2021 Volumen 15, 2. Mayo-agosto 2021, 229-244, DOI: https://doi.org/10.46502/issn.1856-7576/2021.15.02.18

Ackerman, R., & Goldsmith, M. (2011). Metacognitive regulation of text learning: On screen versus paper. *Journal of Experimental Psychology: Applied, 17*(1), 18–32. https://doi.org/10.1037/a0022086

Alaimo, C., & Kallinikos, J. (2017). Computing the everyday: social media as data platforms. *The Information Society, 33*, 175 - 191.

Anderson L., Krathwohl D. (2001). A taxonomy for learning, teaching and assessing: a revision of Bloom's taxonomy of educational objectives. Addison Wesley Longman, Inc. New York, NY. 2001. 49 p.

Andrushchenko, V., Yershova-Babenko, I., Kozobrodova, D., Seliverstova, A., & Lysakova, I. (2022). Digitalization of society: implications and perspectives in the context of the psycho-dimensionality of social reality / psychosynertics. *Amazonia Investiga*, 11, 56: 183-195. https://doi.org/10.34069/AI/2022.56.08.19

Balcikanli, C. (2011). Metacognitive awareness inventory for teachers (MAIT). *Electronic Journal of Research in Educational Psychology, 9*(3), 1309–1332, http://repositorio.ual.es/bitstream/handle/10835/733/Art_25_563.pdf?sequence=1.

Bérešová, J. (2022). Benefits of exploiting authentic materials for developing sociolinguistic competence. *International Journal of New Trends in Social Sciences*. DOI:10.18844/ijss.v6i2.6652

Bondareva, T.O., Lyubashits, V.Y., Shirshov, A.A., Lopukhinskiy, L.M., Khizbullin, F.F., Stratonova, L.M. (2016). Psychological Bases of formation of Key economical information technology specialist competencies of higher education. *International Review of Management and Marketing*, 6(S3): 114-118.

Bondareva, T.O., Khan, N.N., Pristupa, E.N., Moldazhanova, A.A. (2016a). A Model of Readiness of the Future Teacher to Developing the Intellectual-creative Potential of Junior Schoolchildren. International Review of Management and Marketing, 2016, 6(S3): 39-46.

*Bondareva, T.O., Khan, N.N., Pristupa, E.N., Dossanova, A.Zh., Kremneva, T.L. and Turysbek, R.* (2017). The Social and Pedagogical Characteristics of a Future Teacher's Readiness for Developing the Intellectual and Creative Potential of a Junior Schoolchild in the Heterogeneous Ethnic Environment. *PertanikaJ. Soc. Sci. &Hum.* 25 (S): 195 – 210.

*Boronenko, T. A., Kaysina, A. V., & Fedotova, V. S.* (2019). The development of digital literacy of schoolchildren in conditions of creating a digital educational environment. *Perspectives of Science and Education*, 38 (2): 167-193. doi: 10.32744/pse.2019.2.14

*Buratti, S., & Allwood, C.* (2012). The accuracy of meta-metacognitive judgments: Regulating the realism of confidence. *Cognitive Processing, 13*(3): 243–253. https://doi.org/10.1007/s10339-012-0440-5

*Cer, E.* (2019). The instruction of writing strategies: The effect of the metacognitive strategy on the writing skills of pupils in secondary education. *SAGE Open, 9*(2): 1–17. https://doi.org/10.1177/2158244019842681

*Dzhumanova L. S., Tugambekova M.A.* (2017). Problems of implementation of multilingual education in the Republic of Kazakhstan. *Issues of science and education*, 1, 4: 208-217. https://cyberleninka.ru/article/n/problemy-realizatsii-poliyazychnogo-obrazovaniya-v-respublike-kazahstan?ysclid=lnxbp1tzxq2649073

*Emelin V. A. (2016*). Simulacra and virtualization technologies in the information society. *National Psychological Journal*. 2016. No.3 (23). URL: *https://cyberleninka.ru/article/n/simulyakry-i-tehnologii-virtualizatsii-v-informatsionnom-obschestve* (accessed: 19.10.2023).

*Garrison, R.* (2022). Shared Metacognition in a Community of Inquiry. *Online Learning*. https://doi.org/10.24059/olj.v26i1.3023

*Grekova A. A.* (2019). Peculiarities of thinking of representatives of the "digital generation". *Psychology. Psychophysiology.* 2019, 1: 28-38. DOI: 10.14529/psy190103

*Grishina, A.V., Abakumova, I. V.* (2020). Informational behavior in the COVID-19 pandemic: psychological predictors, *International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE)*, Special issue of Current Research and Trends in Cognitive Sciences 8: 59-67. https://doi.org/10.23947/2334-8496-2020-8-SI-59-67

*Gutierrez de Blume, A.P., Montoya Londoño, D.M., Daset, L. et al.* (2023). Normative data and standardization of an international protocol for the evaluation of metacognition in Spanish-speaking university students: A cross-cultural analysis. *Metacognition Learning* **18**, 495–526 (2023). https://doi.org/10.1007/s11409-023-09338-x

*Harracá, M., Castelló, I., & Gawer, A.* (2023). How Digital Platforms Organize Immaturity: A Sociosymbolic Framework of Platform Power. *Business Ethics Quarterly, 33*, 440 - 472.

*Karabulatova I.S, Polivara Z.V., Zamaletdinov R.R.* (2013). Ethno-Linguistic Peculiarities of Semantic Perception of Language Competence of Tatar Bilingual Children. *World Applied Sciences Journal Education, law, economics, language and communication)*, 27: 141-145, DOI: 10.5829/idosi.mejsr.2013.27.elelc29 http://www.idosi.org/wasj/wasj27(elelc)13/29.pdf

*Karabulatova, I.S., Aipova, A.K., Butt, S.M., Amiridou, S.* (2021). Linguocognitive conflict of digital and pre-digital thinking in online educational discourse during the pandemic: social danger or a new challenge? *J. Sib. Fed. Univ. Humanit. soc. sci.,* 14, 10: 1517–1537. DOI: 10.17516/1997-1370-0836

*Karabulatova, I.S., Lagutkina, M.D., Borodina, N.V., Streltsova, M.A., & Bakhus, A.O.* (2021a). Formation of ethnosocial identity in the matrix of media discourse. *Amazonia Investiga*, 10, 43: 234-247. https://doi.org/10.34069/AI/2021.43.07.23

*Karabulatova, I. S., Kopnina G. A.* (2023). The specifics of parameterization of destructive mass media text with the devaluation of historical memory. *Medialinguistics*, 10, 3:319-335, https://doi.org/10.21638/spbu22.2023.303

*Karasheva, Z.T., Amirova, A., Ageyeva, L., Jazdykbayeva, M., & Uaidullakyzy, E.* (2021). Preparation of future specialists for the formation of educational communication skills for elementary school children. *World Journal on Educational Technology: Current Issues*. DOI:10.18844/wjet.v13i3.5954

*Karataeva T.O., Khan N.N.* (2022). Pedagogical conditions for the development of intellectual and creative potential of a younger student. *Collection of materials of the International Scientific and Practical Conference III "Kalyuzhnov readings: consolidation of pedagogical science and practice as a basis for training specialists of a new generation", 10 – 15. Aktobe,* Aktobe Regional University named after K.Zhubanov https://www.kaznpu.kz/docs/docs/30.5.2023_ann_rus.pdf

*Karataeva, T.O., Khan N.N., Pristupa E.N.* (2022). The problem of developing the intellectual and creative potential of a younger student in a holistic pedagogical process. *The world of university science: culture, Education, 9: 29-34.*https://elibrary.ru/vujxsk?ysclid=lnwujyxxuc480829296

*Kurebayeva, G., Mussatayeva, I., Kenesbayeva, S., Kurebayeva, G., & Karabulatova, I. S.* (2023). Effects of SARS-CoV-2 Pandemic on computer communication: delayed consequences and new behavioral standards. *Amazonia Investiga*, *12,* 66: 175-187. https://doi.org/10.34069/AI/2023.66.06.17

*Lagutkina, M. D.* (2022). *Linguistic ways of representing Russia and China in the Russian and Chinese media discourse in the context of "soft power"*: abstract of the dissertation of the Candidate of Philological Sciences: 10.02.19 / Lagutkina Margarita Dmitrievna; [Place of defense: The Peoples' Friendship University of Russia]. - Moscow, 2022. - 23 p.

*Lin, Y., Karabulatova, I.S., Shirobokov, A.N., Bakhus, A.O., & Lobanova, E.N.* (2021). Cognitive distortions in the reflection of civic identity in China: on the material of Russian-language media of East and Western. *Amazonia Investiga,* 10, 44: 115-125. https://doi.org/10.34069/AI/2021.44.08.11

*Mamurakhon, T.* (2020). The Use of Information and Communication Technologies in Mathematics Lessons. *The American Journal of Social Science and Education Innovations*. https://theamericanjournals.com/index.php/tajiir/article/view/1379/1295

*Nijiati, A., Karabulatova, I., Lin Yuan, Sautieva F.* (2020). Problems of cognitive distortions in cross-cultural communication when using automatic translation in the Russian Chinese dialogue. *Published online: 24 December 2020. International Scientific Forum "Issues of Modern Linguistics and the Study of Foreign Languages in the Era of Artificial Intelligence (dedicated to World Science Day for Peace and Development)" (LLT Forum 2020) Volume 88, 2020.* Problems of cognitive distortions in cross-cultural communication when using automatic translation in the Russian Chinese dialogue | SHS Web of Conferences (shs-conferences.org) DOI https://doi.org/10.1051/shsconf/20208803004

*Flavell J. H.* (1976). Metacognitive aspects of problem-solving. *The Nature of Intelligence.*Ch. 12, New Jersey: 231–235

*Fleur, D.S., Bredeweg, B. & van den Bos, W.* (2021). Metacognition: ideas and insights from neuro- and educational sciences. *npj Sci. Learn.* **6**, 13 (2021). https://doi.org/10.1038/s41539-021-00089-5

*Fu Y, Wang M, Min S, Zhou S, Pan X.* (2023). Exploring the relationship between metacognitive awareness and Chinese EFL learners' listening skills. Front Psychol. 2023 May 2; 14:1148610. doi: 10.3389/fpsyg.2023.1148610. PMID: 37205072; PMCID: PMC10185783.

*Sato, M., & Dussuel Lam*, C. (2021). Metacognitive instruction with young learners: A case of willingness to communicate, L2 use, and metacognition of oral communication. *Language Teaching Research, 25*, 899 - 921.

*Sengul F, Bostanci HB, Kurt M.* (2022). Online in-class vs. out-of-class flipped learning models in English as foreign language writing classes. *Front Psychol.* 2022 Nov 14; 13:1009800. doi: 10.3389/fpsyg.2022.1009800. PMID: 36452372; PMCID: PMC9703047.

*Sun, J. C. Y., Chang, K. Y.* (2016). Design and development of a location-based mobile learning system to facilitate English learning. *Universal Access in the Information Society*, 15, 3: 345–357.

*Sun Q, Zhang LJ.* (2022). Understanding learners' metacognitive experiences in learning to write in English as a foreign language: A structural equation modeling approach. Front Psychol. 2022 Sep 2; 13:986301. doi: 10.3389/fpsyg.2022.986301. PMID: 36118451; PMCID: PMC9478617.

*Temirgalinova, Assel, Karabulatova, Irina S. Amiridou, Stefania, Erina, Inobat A.* (2021). Case-Method in the Formation of Communicative Ethnopedagogical Competence of a Foreign Language Teacher: based on the Material of Russia, Greece, and Kazakhstan. *European Journal of Contemporary Education* E-ISSN 2305-6746 2021. 10(4): 1013-1026 DOI: 10.13187/ejced.2021.4.1013 https://ejce.cherkasgu.press

*Teng, M.F.* (2021). Exploring awareness of metacognitive knowledge and acquisition of vocabulary knowledge in primary grades: a latent growth curve modelling approach. *Language Awareness, 31*, 470 - 494.

*Veenman, M. V. J., Prins, F. J., & Verheij, J.* (2003). Learning styles: Self-reports versus thinking-aloud measures. *British Journal of Educational Psychology, 73*(3), 357–372. https://doi.org/10.1348/000709903322275885

*Veenman, M. V. J., & van Cleef, D.* (2019). Measuring metacognitive skills for mathematics: Students' self-reports versus online assessment methods. *ZDM, 51*, 691–701. https://doi.org/10.1007/s11858-018-1006-5

*Volkova L.V., Lizunova L. R., Volkova Y. S. (2022).* Digital literacy of a junior schoolboy: diagnostic results. *Humanities and education,*3, 51: 39 – 50. https://elibrary.ru/item.asp?ysclid=lnwthdrrgp78023648&id=49714887

*Vygotsky, L. S.* (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press. https://www.hup.harvard.edu/catalog.php?isbn=9780674576292.

*Winkler, J.R., & Nye, J.S.* (2004). Soft Power: The Means to Success in World Politics. *International Journal, 61*, 268.

*Zhang, D., & Zhang, L.J.* (2019). Metacognition and Self-Regulated Learning (SRL) in Second/Foreign Language Teaching. *Second Handbook of English Language Teaching*.

*Zhang, L., Karabulatova, I.S., Nurmukhametov, A., & Lagutkina, M.D.* (2023). Association Strategies of Speech Behavior of Communicators in Coding Discourse: An Interdisciplinary Approach Towards Understanding the Role of Cognitive and Linguistic Processes in Communication. *Journal of Psycholinguistic Research*, 1 - 17. https://doi.org/10.1007/s10936-023-09966-z

*Zubanova, S., Didenko, E., Karabulatova I.* (2021). Location-based mobile learning system facilitating English learning. Interactive learning environments: 1-17 https://doi.org/10.1080/10494820.2021.198360

*Yao, L., & Qin, Q.* (2022). Evaluation of the Students' Learning Status in the Foreign Language Classroom Based on Machine Vision. *J. Robotics, 2022*, 6432133:1-6432133:12.

*Yamada, H.* (2018). Exploring the Effects of Metacognitive Strategies on Vocabulary Learning of Japanese Junior High School Students. *The Journal of Asia TEFL*. 8, 4: 900-1238. http://dx.doi.org/10.18823/asiatefl.2018.15.4.3.931