Pedagogical Education in the New Kazakhstan: Technological and Methodological Aspects of Distance Learning for Future Teachers

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Abstract: The article defines the technological and methodological aspects of the formation of digital creative competencies of future teachers in the conditions of distance education in the Republic of Kazakhstan and reveals the essence of the concepts of competence, digital competence, digital-technological competence, digital-methodical competence, creativity, smart model and didactic characteristics of digital technologies. In the article, the essence of the components of competence is characterized in a new context: organizational ability; empathic ability; reflexive ability. An online questionnaire was compiled, and an online test was conducted. A mobile application for the online test was developed. Participants included future teachers of Kazakhstan, and also future teachers of the SHSPU of Russia. The digital competencies of future teachers of Kazakhstan are compared with the digital competencies of future teachers of Russia, and diagnostic monitoring is carried out. In the conditions of distance learning, the digital and technological competence of a future teacher is determined by the formation of his skills and abilities to work with internet resources, digital learning platforms, modern computer programs, and multimedia devices. The digital and methodological competence of a future teacher is characterized by his ability to create an electronic portfolio, an electronic media library, and the organization of pedagogical coaching and pedagogical training. A new model of the formation of digital-creative competencies of future teachers in the conditions of distance learning is proposed.

Keywords: competence, digital competence, digital content, pedagogy, smart-online.

1 Introduction

In the context of New Kazakhstan, improving the system of training teachers in pedagogical universities and the formation of digital competencies of future teachers is becoming an urgent problem. The process of informatization, which is taking place at a rapid pace in society in the XXI century, has expanded the scale of the information environment at a world level that has not existed for a long time. The informatization process also includes the education system and requires new content of professional training for future teachers.

Innovative pedagogical practices through the internet, internet resources, information media, and the digital environment, that is, information reaches every person, including every teacher, at the same time and in the same volume without visiting their place of work [1-3]. Training of future world competitive teachers in the conditions of Digital Kazakhstan Pedagogical University has its own innovative information pedagogical bank fund, innovative media library, knows new communication technologies, can conduct innovative research work for the development of creative, intellectual abilities of students, conduct a diagnostic examination of its results and conduct pedagogical monitoring, provides for the training of future teachers who can carry out innovative technological activities with high intellectual potential, which can form a technological map of an innovative lesson.

To make education the central link of a new model of economic growth in the XXI century, it is necessary to focus the training program on the development of critical thinking, independent search skills, and distance learning. In Kazakhstan in the new conditions, there is a need to modernize the system of pedagogical education, the formation of digital and creative competencies for future teachers. The purpose of the study is to identify technological and methodological aspects of the formation of digital–creative competencies of future teachers in the Republic of Kazakhstan in the context of distance education based on a partnership of cooperation between Kazakh universities and

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foreign universities within the framework of the integration of Kazakhstan and European education to improve the system of pedagogical education in Kazakhstan in the new conditions.

1.1 Objectives of the study

Objectives of the study include the following:

1.   Determination of technological and methodological directions for the formation of digital-creative competencies of future teachers in the context of distance education in Kazakhstan in the new conditions.

2.   Development of a model of cooperation partnership between Taraz regional universities named after M. Kh. Dulaty (Dulaty University) and Shadrinsk State Pedagogical University of Russia (SHSPU) in the formation of digital and creative competencies of future teachers in the context of distance education within the framework of educational integration of Kazakh universities and foreign universities.

3.   Identify effective ways to determine technological and methodological directions for the formation of digital-creative competencies of future teachers in the context of distance education in Kazakhstan in the new conditions.

1.2 Literature Review

Digital educational environment

The digital educational environment is an open complex of resources, conditions, and opportunities for human learning, development, and socialization [4]. How much the pedagogical potential of this environment is in demand and used depends on the subject activity and educational independence of the student himself. In vocational secondary education programs, students are characterized by a low level of motivational and instrumental activity in using the potential of the digital educational environment on the principle of learning [5].

Some elements can already be digitized due to the availability of appropriate digital tools, which makes it possible to significantly increase their pedagogical effectiveness, others can be digitized after the development of appropriate digital educational tools. Thirdly, it is necessary to carry out preliminary improvement (transformation), taking into account the capabilities of digital technologies, and only then their digitization. There are several elements of the educational principle that digitalization is not pedagogically possible; they must be preserved in a traditional (unsocialized) way [6].

Information and methodological support of students in distance learning are evident in the works of Malinina [7], pedagogical support of independent work of university students in the conditions of distance learning by Pochinalina [8], profile testing of educational results of students in distance learning by Malygin [9], development of subjects of students in the process of distance learning by Gorbunova [10] , implementation of independence in the context of distance learning by Fadeeva [11], features of stimulating the educational activities of students of universities of distance educational technologies by Sokolskaya [12], programmatic provision and improvement of the information educational environment for the organization of distance learning using the internet by Karasik [13], adaptation of students to the use of information technology in the conditions of distance education by Galchenkova [14] , formation of information competence of students in the conditions of distance learning by Gareeva [15], pedagogical conditions for the organization of distance learning in the preparation of future teachers by Bondareva [16], theoretical and methodological foundations for the formation of professional competence of teachers in distance learning by Nurbekov [17], the formation of the information culture of students in the context of distance learning was studied by Dzhusubalieva [18].

Digital education is proposed to independently organize and stimulate education with the active and effective use of the resources of the digital educational environment in conditions of low educational independence of students, it is necessary to create a digital education system of a medium-sized organization saturated with various opportunities, but a pedagogically effective digital educational process under the conditions of the organization is not enough. It is also necessary to create a system for organizing student activities in this environment. The presence of a digital educational environment and digital teaching tools is not a sufficient tool to support the educational motivation of students with a low level of educational independence [19,20].

The use of digital technologies creates new opportunities for creating the principle of education and solving a wide range of eternal and fundamentally new educational tasks that cannot be solved by traditional educational means [21,22]. It is necessary to use a complex of management tools provided by training motivation, including the means of digital technologies [23]: a state of success based on the full assimilation of the given learning outcomes, which makes it possible to significantly reduce the role of fear as the dominant factor in learning motivation in traditional pre-university education; instant feedback when completing training tasks; the use of a wide range of social and emotional methods for managing learning motivation, including the use of a game environment (gamification), interaction with

partners in the network, the formation of training groups, the formation of professional competencies of students.

Components of Competence

In the psychological and pedagogical literature, the word "competence" is revealed in a broad sense. In Pedagogical Sciences, the concept of professional competence is considered in the form of a set of knowledge and skills, the volume of skills in solving problems, the mutual understanding of individual qualities and abilities, a complex of professionally significant personal qualities and knowledge, a whole set of theoretical and practical preparation for work.

Competence is the ability of a teacher to independently raise knowledge, professional skills, and culture and adapt them to modern requirements as a specialist. In the short dictionary of foreign words, the definition of competence (from Latin Competent – proper, capable) is given as an expert in a particular field, competent, with his knowledge has the right to decide or do something" [24]. In the encyclopedic dictionary of the Russian Language, the concept of competence is revealed as follows: capable, competent, fluent in their business; knowledge, and experience in a particular area [25].

According to the research of scientists, the word competence includes the concept of complex, broad content characteristics, integrated into professional, socio-pedagogical, socio-psychological, legal, etc. In general terms, the competence of a specialist indicates the interconnectedness of his abilities, qualities, and personal qualities for the effectiveness of his professional activity in any field. It includes:

1)   organizational skills and ability of a specialist to create a rational connection between cooperation;

2)   ability to empathize – understanding others; empathizing; being able to put oneself in someone else's shoes;

3)   reflective ability – the ability to instantly regulate one's behavior and the behavior of a partner; make effective decisions in conflict situations; create a favorable psychological climate; and predict the development of intersubject relationships [26].

Creativity is the ability of a teacher to independently raise knowledge, professional skills, and culture and adapt them to modern requirements, competence is the path to creativity. In a short psychological dictionary, the concept of creativity (creation) is a direct translation from Latin and represents creation, hidden power, and the ability to create. Creativity is the personality quality of an individual who shows a willingness to act productively, and a willingness to make discoveries; the presence of a stable motivation of the individual to achieve high results [27].

Ospanova [28], revealing the scientific foundations of the formation of creativity of future specialists, offers the following definition of the concept of creativity. Creativity is the ability to be creative, thinking, the level of creative abilities that characterize a person, abnormal thinking of a person, the ability of an individual to discover new ideas, the level of creativity, talent, the ability to make quick ingenious decisions, a high level of intellectual activity, the ability to perceive and understand the new, and the ability to solve abnormal situations [28].

The role of digital technology in the formation of digital and creative competencies of future teachers is great [29]. In the context of distance education, the concept of technology is of particular importance in the formation of creative competencies of future teachers. This term is characterized by the arrival of computer technology into life and the introduction of new computer technology in the field of education. In science, a new direction of development has come to life, which is the technological one. The emergence of this technological direction in science and the beginning of its deeper study in pedagogy is no coincidence. Pedagogical science has long been striving to find the most effective method in the field of education, upbringing, and training, to use it in life, to obtain high results, and to find new forms and methods of teaching.

The word technology comes from the Greek language and is formed from two phrases: "techne" means art, skill, or business, and "logos" means science, doctrine, the doctrine of art, or doctrine of skill [30]. Initially, the concept of technology began to be used in the field of production, and the term technological process was introduced in science. A technological process is a simply controlled production process consisting of a system of operations performed in a certain sequence based on previously known scientific laws [31].

Our analysis of the scientific and pedagogical literature shows that in modern pedagogical theory, there is no identical approach to the concept of pedagogical technology, some researchers call it the technologization of educational organizations, others consider teaching as computerization, providing audiovisual means, and the next point of view is to raise didactic projects and the pedagogical system, the degree of its application in practice. All this characterizes this concept, the multifaceted nature of the phenomenon, that is, it requires justification of the methodological orientation of its study. Such orientation is characterized by consistency, action, and individual approach.

Likhachev [32] explains pedagogical technology as a pedagogical influence that affects the educational process as if it were pursuing a specific goal. Meanwhile, the technological process is represented as a certain system of units

(measures) that lead to a specific pedagogical result. According to Likhachev [32], "Pedagogical technology is not the ultimate unchanging mechanical structure, but the core of the constantly changing interaction between the child and the teacher, the content-organizing structure. The essence of pedagogical technology is to create the necessary conditions for the development of creative abilities and to reveal the essence of pedagogical technology [32].

According to Bespalko [33], "pedagogical technology is a content technique that implements the educational process". The well–known methodologist Monakhov [34] defines: "Pedagogical technology is a well-thought pedagogical " model of activity" that creates favorable conditions for the joint work of the student and teacher in the design and organization of the educational process. According to the definition of UNESCO, "pedagogical technology is a systematic method for the implementation of the entire process of learning and the assimilation of knowledge technical and human resources, taking into account their mutual influence on each other, the tasks of optimizing the form in Education" [35].

Choshanov [36] defines technology as a part of the didactic system. According to Selevko [37], pedagogical technology can manifest itself in three different fields: scientific, figurative, and real. In the first case, it is the part of, the area of pedagogical science that studies the purpose, content, and methods of teaching, and designing the pedagogical process. Technological skills of the future teacher include operational and methodological skills, psychological and pedagogical skills, assessment skills, diagnostic skills, expert skills, and research skills [38].

"SMART" model of digital technology

Using the "SMART" model, it is possible to describe how digital technology affects teaching and learning.

The model consists of four stages: replacement; assembly reconstruction; modification (Figure 1).
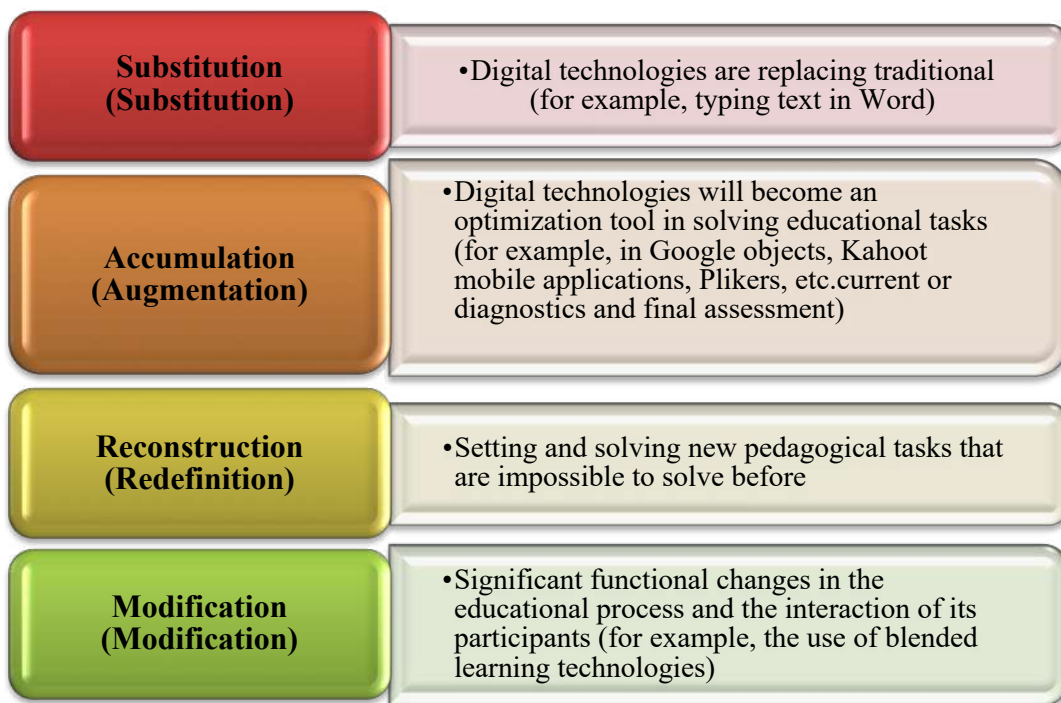

Fig. 1: SMART model of digital technology

In the context of digitalization of the principle of education, the role of active and interactive forms of learning will increase. The principle of digitalization creates new qualitative opportunities in the presentation of educational materials and the organization of the educational principle (the emergence and spread of new types of activity in the life of children and adolescents, which are real in the conditions of socialization in a digital society).

Factors causing the need to create the principle of digital education in training, three areas characterize the formation of a digital society:

1) the digital economy and the new requirements for personnel that shape it;

2) new digital technologies that create and develop a digital environment;

3) digital generation (a new generation of students with special socio-psychological characteristics)

In addition to "IT competencies", the new complex, which ensures the use of computer and digital technologies by a person and forms the core of modern functional literacy of any employee, includes the expected educational results from the content of a set of other competencies (professional, general professional, universal), which change under the influence of digitalization.

Many digital technologies have didactic (educational is important) potential, the characteristics of which are: freedom, autonomy, hypertext, subculture, multimedia (multimodal), and interactivity (Figure 2).
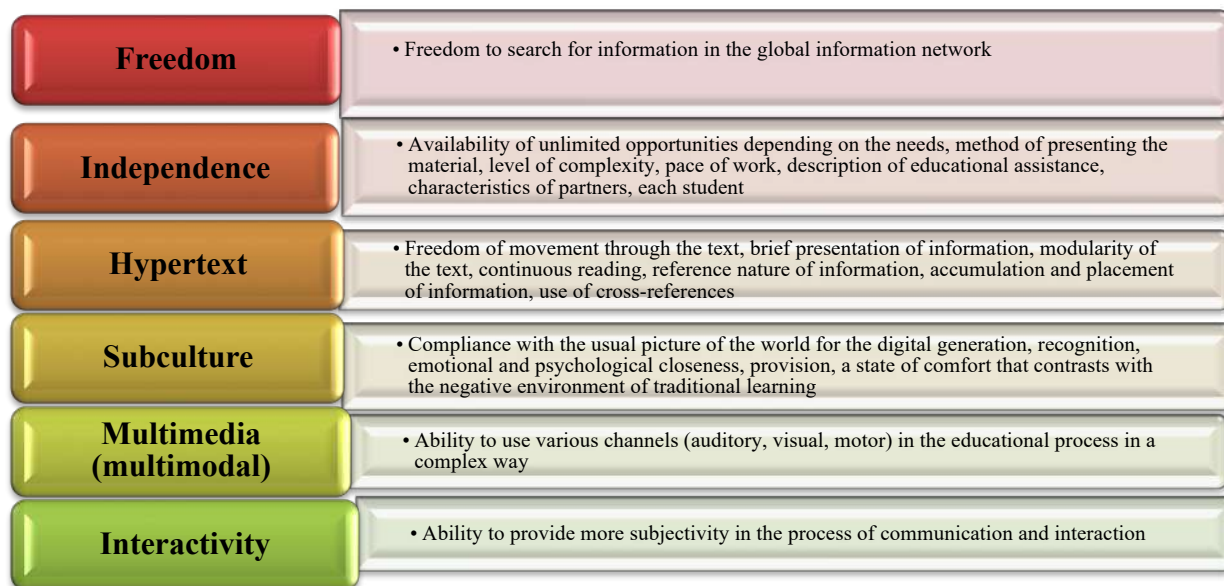
Freedom	• Freedom to search for information in the global information network
Independence	• Availability of unlimited opportunities depending on the needs, method of presenting the material, level of complexity, pace of work, description of educational assistance, characteristics of partners, each student
Hypertext	• Freedom of movement through the text, brief presentation of information, modularity of the text, continuous reading, reference nature of information, accumulation and placement of information, use of cross-references
Subculture	• Compliance with the usual picture of the world for the digital generation, recognition, emotional and psychological closeness, provision, a state of comfort that contrasts with the negative environment of traditional learning
Multimedia (multimodal)	• Ability to use various channels (auditory, visual, motor) in the educational process in a complex way
Interactivity	• Ability to provide more subjectivity in the process of communication and interaction

Fig. 2: Didactic characteristics of digital technologies

It is beneficial to use digital technologies in the context of distance education. In the context of distance education, it is important to develop the creative competencies of future teachers. Scientist Ospanova [39] revealed the components of the creativity of future specialists:

1) purposefulness: the ability to plan the pedagogical process, think and act abnormally, clarify goals and objectives, check assumptions, and constructive thinking.

2) technological: communicability, ability to apply theoretical knowledge in practice, search for new knowledge, activity, openness to change, adaptation to non-standard activities.

3) reflective: reflection on the situation, self-perception, self-assessment, self-development, self-assessment, the ability to put oneself in the shoes of others, etc. [39].

Turgunbaeva [40] offers the following definition of the concept of "creativity" from the point of view of pedagogical science: "Creativity is a personality trait that is observed in informational, current processes: the quality of personality that arises through its inclusion in information substructures; a trait that manifests itself when looking for a solution when proposing a hypothesis and proving its correctness. A recent study assessed the opinions of primary school teachers about distance education programs for gifted education. Since most instructors work with gifted students, they feel that a gifted education program is necessary, and that training should be provided using a hybrid model. The hybrid model is more effective than other models when it comes to providing gifted education for teachers [41].

Creativity is a single, stable built –quality of a person, which determines creativity, the ability to discover new, think abnormally, create ingenious solutions, and creativity is a set of certain processes, actions, processes: innovative action; a natural process arising from a person's need; discomfort (inconvenience), sensitivity caused by a feeling of lack of knowledge; identify a problem, search for a solution, offer assumptions; declare, formulate the result of a decision.

In the context of distance education, the creative competencies of future teachers are the ability of the future teacher to independently and efficiently work with digital educational content in the information environment. In the context of distance education, the digital-creative competencies of future teachers are a set of knowledge, skills, and abilities that allow students to freely use information and communication technologies at all stages of the organization of the educational process and, starting with lesson preparation, build individual educational trajectories that help create a digital environment, motivate them and predict educational achievements [42].

Information and communication technologies help to solve problems where knowledge and communication are needed: improving educational processes, improving the educational results of students and their learning motives, improving interaction, implementing communication and joint projects in the network of educational organizations, and improving the organization and management of digital educational programs. This is not surprising, because internet resources have become available for education, opportunities for the development of an innovative economy, and modern society [43].

In recent years, many countries, including the Republic of Kazakhstan, have made many efforts to study the conditions and consequences of the use of digital technologies in the educational process, described changes in the work of teachers, new requirements for the administration of education, as well as fully studied the pros and cons of this process. A detailed analysis of the experience of leading countries in the field of Education made it possible to abandon the simple list of requirements for the technical qualifications of teachers in pedagogical practice. On the contrary, the ICT competencies of a teacher are characterized as a system of Applied Knowledge, Skills, and skills that allow them to organize all stages of pedagogical work and improve the quality of Education based on the effective use of digital technologies (individualization of training, technical solutions for creative tasks, interactive project work, etc.) [44].

The competence of teachers in the use of digital technologies is manifested not only in their ability to use technology in the educational process but also in their approach to cooperation and communication with colleagues, students, teachers, the scientific community, and other stakeholders: the ability to integrate innovation into their practice, the ability to improve and develop themselves professionally [45].

2   Method

The format of distance learning for the epidemic situation Covid-2019 in the world and in our country has revealed some problems. General secondary schools, colleges, and even universities themselves were not 100% ready for this: insufficient digital educational resources; low digital competence of teachers, etc. World experience shows that even in the course of distance learning, there is a full opportunity to receive innovative knowledge and improve professional skills. Distance learning is training carried out using information and communication technologies, telecommunication means in the process of indirect (remote) or incomplete indirect mutual educational work activities of a student and a teacher.

At the stage of new development opportunities in the context of the Fourth Industrial Revolution, future teachers are faced with the following requirements: competitiveness; the high quality of education; professionalism; profitability; digital competence, and creativity necessary for distance learning and training.

To ensure the 5 results of the above training, it is important to form the following professional competencies in the future teacher:

1) creative skills: desire for innovation, mastery of innovative technologies;

2) search skills: skills of learning, research, accumulation of innovative experience;

2.1 Participant

To determine the level of digital competencies for the effective use of digital technologies by future teachers in Kazakhstan in the new conditions, students of the 1-4 courses were asked: "I will be a SMART-PEDAGOG!". A total of 2879 respondents took part in the online test. For this purpose, a mobile application for the online test has been developed. Not only future teachers of Kazakhstan, but also future teachers of the SHSPU of Russia take part in the experimental and practical work, and the digital competencies of future teachers of Kazakhstan are compared with the digital competencies of future teachers of Russia, and diagnostic monitoring is carried out.

2.2 Instrument

In the course of the study, indicators and criteria of the level of digital competencies of future teachers of Kazakhstan were identified, and the meaning was revealed. Among the future teachers at the Kazakh University – Taraz Regional University named after M. Kh. Dulaty and the Russian university – Shadrinsk State Pedagogical University "I will be a SMART-PEDAGOG!" online coaching for future teachers, a comparative analysis of the level of digital competencies of future teachers was carried out, methods of deduction and induction of research were used. An online questionnaire was compiled, and an online test was conducted. An online survey was conducted on the topics "What I know about distance learning technologies" and "What I learn about distance learning technologies", the results were processed by mathematical and statistical methods, sorted out, methodological recommendations were developed; and conclusions were drawn.

2.3 Data Collection

For the effective implementation of experimental work on the formation of digital competencies of future teachers of higher educational institutions, general theoretical, empirical, and statistical methods of scientific research were used. As part of the modernization of the pedagogical education system in the Republic of Kazakhstan, an online test was developed, and presented and the results were sorted, and a SWOT analysis was carried out to determine the level of formation of digital competencies of future teachers.

2.4 Analysis Technique

The essence and content of technological and methodological aspects of the formation of digital competencies of future teachers in the conditions of distance learning in the Republic of Kazakhstan were revealed and a SWOT-analysis matrix was developed:

1) the strengths and weaknesses of the formation of digital competencies of future teachers in the context of distance learning are identified, and the influencing pedagogical factors are differentiated;

2) the risks encountered in the formation of digital competencies of future teachers in the conditions of distance learning are identified, measures to prevent it are clarified, opportunities are studied; and pedagogical prerequisites are determined.

3   Result

The pedagogical conditions for the formation of digital competence of the future teacher in the conditions of distance learning are as follows:

1) volume of information: speed of information perception;

2) ability to process information in a meaningful way: to find and sort the searched, necessary information;

3) quality of information perception: assimilation of the necessary material;

4) the ability to make decisions based on information: to make pedagogical reflections and think constructively, etc.

In the conditions of distance learning, the digital and technological competence of the future teacher is determined by the formation of the skills of the future teacher to work with internet resources, pedagogical sites, portal and digital learning platforms, modern digital educational content, electronic and multimedia textbooks, computer programs, multimedia devices, and the digital and methodological competence of the future teacher is determined, it is characterized by the ability to create an information bank fund and an electronic media library; organize pedagogical coaching and pedagogical training; participate in a pedagogical forum, discussions, present their innovative project and defend their ideas freely (Figure 3).
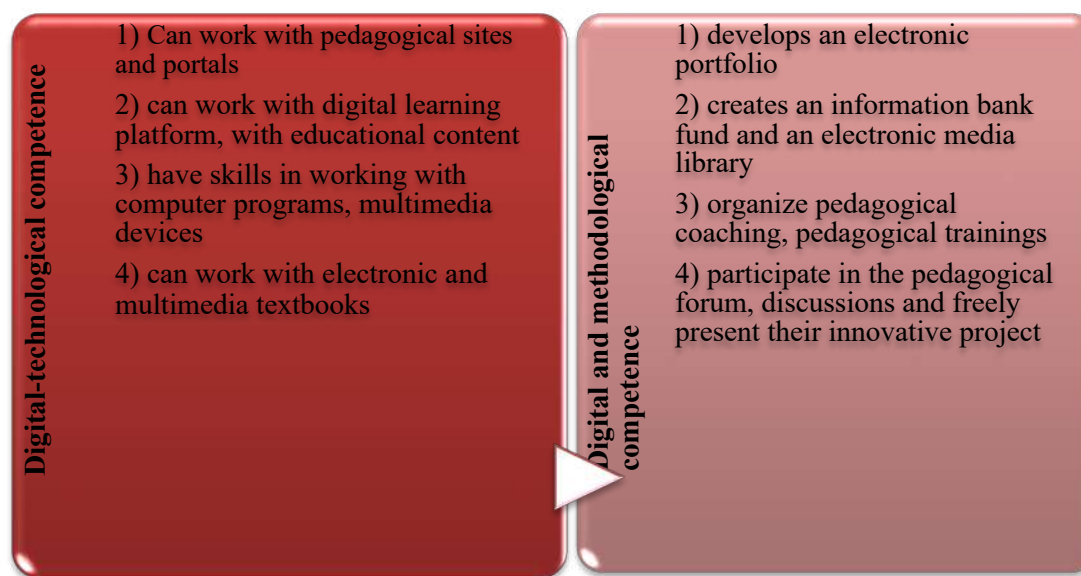

Digital-technological competence
1) Can work with pedagogical sites and portals
2) can work with digital learning platform, with educational content
3) have skills in working with computer programs, multimedia devices
4) can work with electronic and multimedia textbooks

Digital and methodological competence
1) develops an electronic portfolio
2) creates an information bank fund and an electronic media library
3) organize pedagogical coaching, pedagogical trainings
4) participate in the pedagogical forum, discussions and freely present their innovative project

Fig. 3: Digital-technological and digital-methodological competencies of the future teacher in the context of distance learning

Within the framework of the scientific project AP09259497 "Improving the system of pedagogical education in

Kazakhstan in new conditions: technological and methodological aspects of the formation of digital competencies of future teachers in distance learning in the Republic of Kazakhstan" of grant funding of research projects of the Ministry of Education and science of the Republic of Kazakhstan for 2020-2023 www.smart-pedagog.kz a pedagogical educational portal has been created.

The pedagogical educational portal www.smart-pedagog.kz provides the formation of digital-creative competencies of future teachers, which are reflected in the creative activities of the future teacher, such as creative thinking, methodological reflection, desire for novelty, creative use of innovative technologies, the constant search for improvement of the educational process, systematic use of pedagogical innovations in their practice, the ability to independently search and find information; process, accumulate, sort the received information, etc.

3.1 Active Aspect

For the formation of digital-creative competencies of future teachers in the context of distance education, it is necessary to update the content of higher education with special methodological disciplines. The future teacher can also acquire innovative knowledge through online courses and webinars, which are organized remotely. For the formation of digital and creative competencies of future teachers in Kazakhstan in the new conditions, a digital pedagogical hub (pedagogical campus) should be created as an innovative virtual educational platform that will provide access to all digital educational resources in pedagogical universities.

For the formation of digital and creative competencies of future teachers in Kazakhstan in the new conditions a pedagogical educational portal www.smart-pedagog.kz has been created. The pedagogical educational portal www.smart-pedagog.kz operates in 3 languages: Kazakh, Russian, and English (Figure 4).
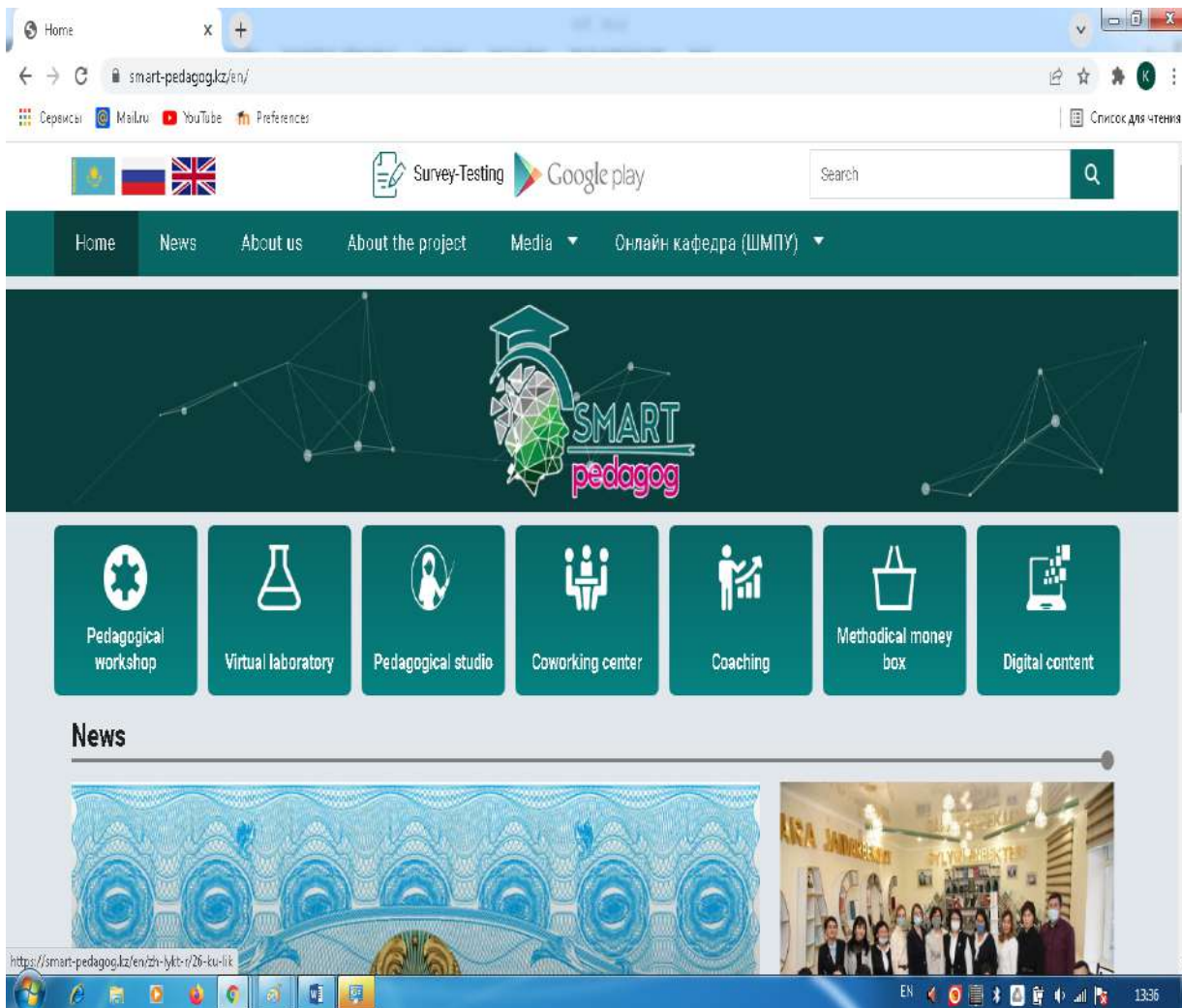

Fig. 4: The main page of the pedagogical educational portal

The flags of Kazakhstan, Russia, and England are placed in the upper left corner of the main page. One can select the

language in which language they need to get information by clicking on the flag of that country. In the upper middle part, there is a mobile application "Survey-Test" with the symbol "Google Play". At the top left is the "Search" grid. You can search and find the necessary information by writing down the keywords of the information you are looking for. In 2 bars of the Home Page, 6 blogs are grouped: home page; news; about us; about the project; media; and online department.

On the main page of the pedagogical educational portal www.smart-pedagog.kz there is a blog "About us". The "About Us" block of the pedagogical educational portal provides brief information on the project leader and project members. On the main page of the pedagogical educational portal www.smart - pedagog.kz there is a block "About the project". In the block "About the project" of the pedagogical educational portal, the topic of the project, the relevance of the project, the methodology of the study, the purpose of the project, the objectives of the project, and the expected results of the project are presented.

On the main page of the pedagogical educational portal www.smart-pedagog.kz there is a Blog "News". The "News" block is constantly updated with new information about the activities carried out on the project. For example, on February 5, 2022, 2 materials were posted in the "News" block on the main page of the pedagogical education portal:

1) Certificate No. 23213, received on February 1, 2022, on entering information into the State Register of rights to copyrighted objects, issued to the electronic textbook "Pedagogy" by the author of the project – Doctor of Pedagogical Sciences Buzaubakova;

2) Brief information on the conduct of collaborative research work by Kazakh and Russian scientists (figure 5).

On the main page of the pedagogical educational portal www.smart-pedagog.kz there is a block "Media". The "Media" block of the pedagogical educational portal consists of 2 parts: A video Gallery and a photo Gallery. In the "Video Gallery" part of the "Media" block of the pedagogical educational portal, 12 video lessons of the author of the project on the subject "Pedagogy" are presented. In the "Photo Gallery" part of the "Media" block of the pedagogical educational portal, photo images are grouped that reveal the content of the activities carried out within the framework of the project. In the "Online Department" block of the pedagogical educational portal, the special documents prepared by the project for the opening of the online department of the Department of Pedagogy of Taraz Regional University named after M. Kh. Dulaty opened at Shadrinsk State Pedagogical University and is presented.

3.2 Constructive Aspect

The advantage of the pedagogical educational portal is that in Kazakhstan in the new conditions, a digital pedagogical hub (pedagogical campus) DULATY will be created to train teachers and improve the digital literacy and competence of future teachers. The digital pedagogical campus is an intelligent innovative virtual educational platform that provides access to all educational resources in education, distance learning, and professional development. The digital pedagogical hub will be the digital and methodological Office of the Future smart teacher, where the digital and creative competencies of the future teacher are formed.

The pedagogical educational portal www.smart-pedagog.kz which was opened to train teachers and improve the digital creative competencies of future teachers in the Republic of Kazakhstan operates in the following areas and uses 7 online pedagogical resources:

1) smart-online pedagogical workshop (pedagogical center);

2) smart-online pedagogical studio;

3) smart-online methodological box;

4) smart-online coaching;

5) smart-online coworking center;

6) smart-online virtual laboratory;

7) smart-online digital content.

SMART-online pedagogical workshop (pedagogical center) - here future teachers get acquainted with the amazing secrets of the pedagogical profession as a result of watching, analyzing, and testing the stage of pedagogical practice video lessons of an innovative teacher from Kazakhstan, Russia, and other leading foreign countries; develops lessons on distance learning, etc. (Figure 9).

SMART-online pedagogical studio – here future teachers acquire the knowledge, skills, and abilities necessary to record their first innovative online lessons on video; and create and prepare their first video lessons.

SMART-online methodological basket-smart - the future teacher will master the necessary competencies to learn, apply, and disseminate the advanced innovative pedagogical experience of innovative teachers of Kazakhstan Russia, and other leading foreign countries.

SMART -online coaching – here future teachers will acquire the necessary competencies for pedagogical coaching, and training on current problems of pedagogy, cyber pedagogy, media pedagogy, and digital pedagogy.

SMART-online coworking center is an open platform for creative teachers and future teachers; a pedagogical hackathon that creates educational start-up projects, a simulation center for creative future teachers who share their experience and ideas; where smart-future teacher learns creative competencies related to innovative research and research projects on current problems of pedagogy, cyber pedagogy, media pedagogy, digital pedagogy.

SMART-online virtual laboratory - future teachers carry out some laboratory work in virtual laboratories.

SMART-online digital content - the future smart teacher develops electronic content in his discipline.

Also, at www.smart-pedagog.kz, you can access the web version and mobile application of the online test and online questionnaire "Smart-future teacher". On the pedagogical educational portal www.smart-pedagog.kz in the "Smart-future teacher online questionnaire" 10 questionnaires are offered, there is an opportunity to choose a language by clicking on the above buttons.

On the pedagogical educational portal www.smart-pedagog.kz, you can go to the web version of the online test "Smart - future teacher". By clicking on the online test button "Smart-future teacher", the future teacher will have the opportunity to test his knowledge by passing a test consisting of 15 test tasks (Figure 5). The portal of pedagogical education will make a significant contribution to the formation of digital and creative competencies of future teachers.

3.3 Authentic Material Aspect

To determine the level of digital and creative competence of future teachers, the online test "Smart-future teacher" was taken. The online test "Smart-future Teacher" consisted of 15 questions and presented 5 answers to each test (Figure 6).

Methods were selected to determine the level of digital and creative competence of future teachers. In the quantitative analysis of the results of the participants in the practical experiment, to assess the reliability of the change in the values of the arithmetic mean, the T-criterion of Student for dependent and independent samples was used. Quantitative analysis was carried out based on the Excell program.

For independent samples, the T-criterion of Students with a different number of test subjects in groups was calculated by the following formula:

$$t = \frac{M_1 - M_2}{\sigma_d}, \quad \sigma_d = \sqrt{\frac{\sigma_1^2 \cdot (N_1 - 1) + \sigma_2^2 \cdot (N_2 - 1)}{N_1 + N_2 - 2}} \cdot \sqrt{\frac{1}{N_1} \cdot \frac{1}{N_2}}$$

Here N1 and N2 are the total numbers of test subjects and the variances σ2.

The formula for the T-criterion of Student for dependent samples was used:

$$t_э = \frac{|M_d|}{\sigma_d / \sqrt{N}}, \quad df = N - 1$$

Here M_d is the average indicator of values; σd is the standard deviation of the difference.

3.4 Aspects of Intentional Activities

Figure 5 represents Page 1 of the online test block "Smart - future teacher" of the pedagogical educational portal www.smart-pedagog.kz
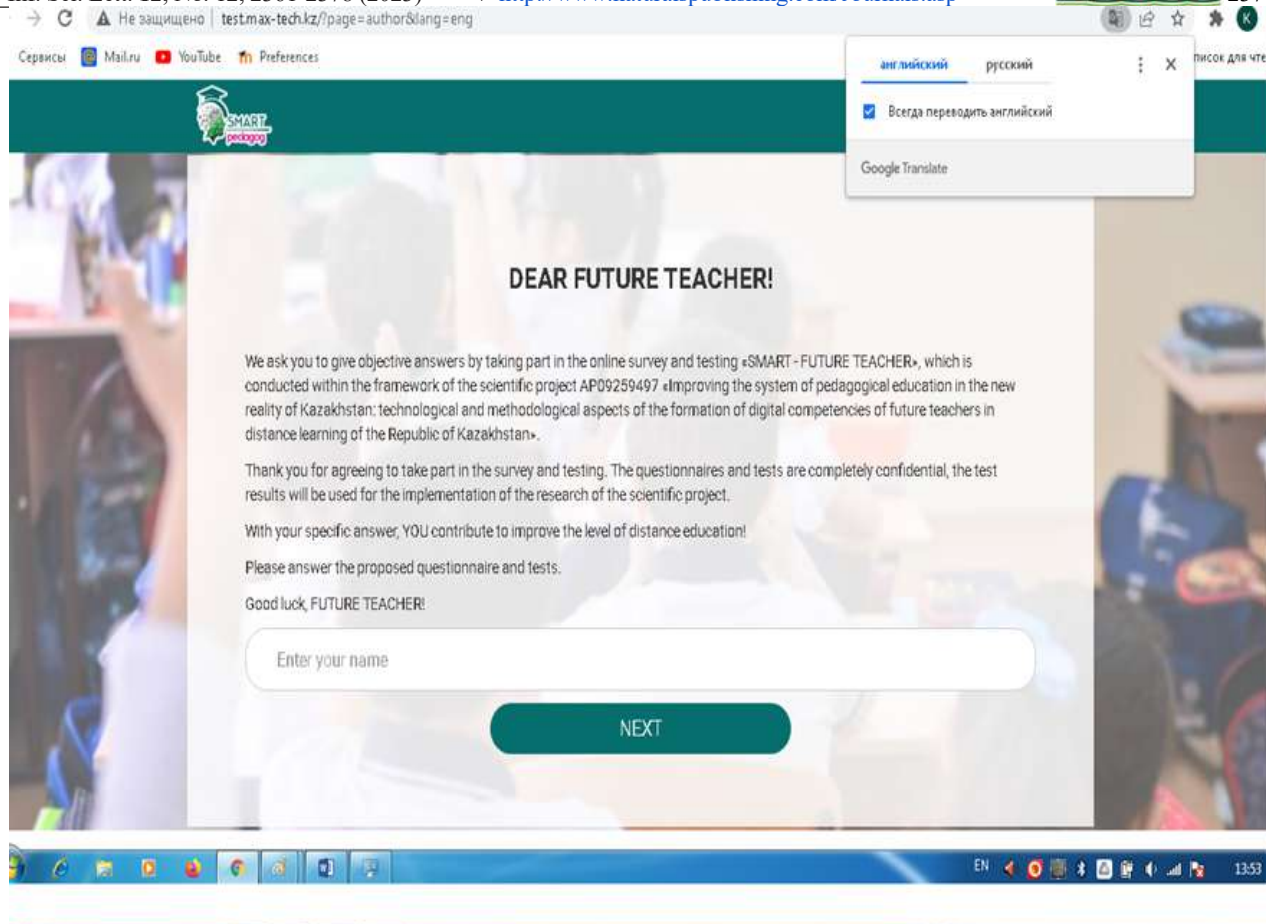
Fig. 5: Page 1 of the online test block

Figure 6 displays the online test on the blog "Smart - future teacher" of the pedagogical educational portal www.smart-pedagog.kz.
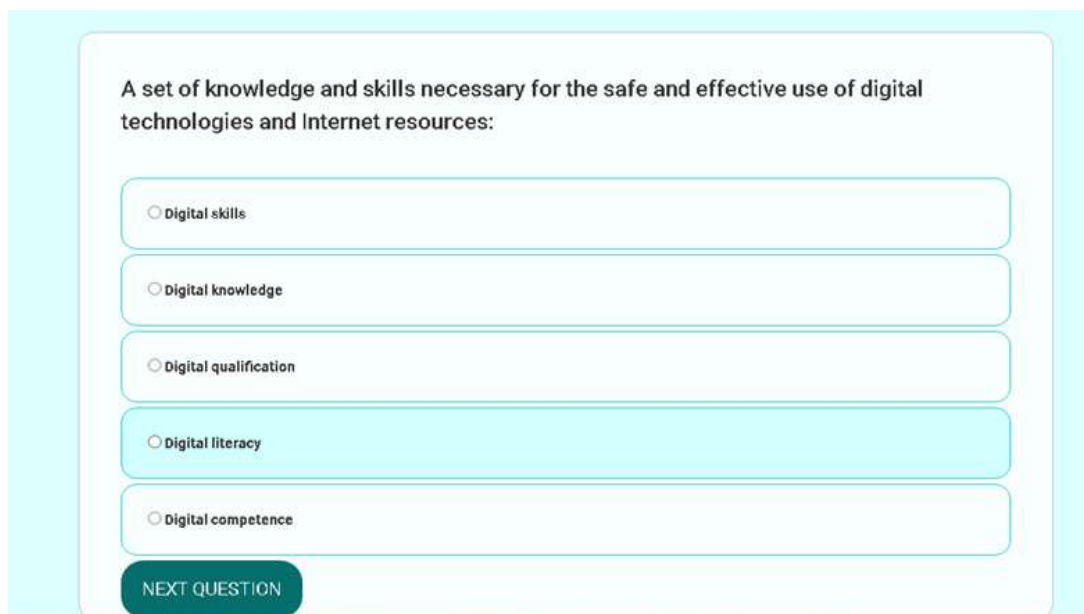

Fig. 6: Online test

Table 1 presents the results of the online test "Smart - future teacher".

Table 1: The results of the online test "Smart - future teacher"

№	Question	Correct answer	Wrong answer	Difference
1	A set of knowledge and skills necessary for the safe and effective use of digital technologies and internet resources	41%	59%	18%
2	Confident possession of all the constituent skills of information and communication technology for solving problems in the course of learning, training, and other activities	56 %	44%	12%
3	A set of knowledge and skills that determine the effectiveness of labor	49 %	51%	2%
4	Readiness and ability of a person to confidently, effectively, critically, and safely use information and communication technologies in various areas of life, based on the acquisition of knowledge and skills	14 %	86%	72%
5	What is an IP address?	67%	33%	34%
6	What is a browser?	67%	33%	34%
7	The following magnifications are suitable for text files	56 %	44%	46%
8	Program for preparing and viewing presentations	73%	27%	46%
9	In Microsoft PowerPoint, a presentation may include the following:	35%	65%	30%
10	A type of service for conducting online quizzes, online tests, and surveys that can be effectively used for didactic purposes	15%	85%	70%
11	Specify the distance learning platform that is often used in general secondary schools:	74%	26%	48%
12	A software complex consisting of educational materials and tests in a particular discipline	53%	47%	6%
13	Computer systems with integrated support for audio and video recording	44%	56%	12%
14	Training using textbooks, personal computers, and computer networks	45%	55%	10%
15	What service can be used to create a virtual class?	15%	85%	70%

A total of 2879 respondents took part in the online test "Smart - future teacher" (Table 1). Respondents who took part in the online test answered the question "The set of knowledge and skills necessary for the safe and effective use of digital technologies and internet resources is:" 41 (1180) respondents chose the answer "digital literacy", 24 (691) respondents chose the answer "digital knowledge", 3 (86) respondents answered "digital qualifications", 8 (231) respondents answered "digital skills", and the remaining 24 (691) respondents answered "digital competence" recognized. The specific weight of those who answered question 1 correctly is 41% (1180), and the specific weight of those who answered wrongly is 59% (1699).

Respondents who took part in the online test answered the question **"**Reliable mastery of all the constituent skills of information and communication technology to solve problems in training and learning and other activities", 56% (1612) chose the answer "information and communication competence", 19% (547) respondents "digital competence", 22% (634) respondents answered "technological competence", 3% (86) respondents answered "professional competence", and none of the respondents answered "creative competence". The specific weight of those who answered question 2 correctly is 56% (1612), and the specific weight of those who answered wrongly is 44% (1267).

Respondents who took part in the online test answered the question **"**The set of knowledge and skills that determine labor performance", 49% (1411) answered "professional competence", 17% (489) respondents chose the answer "digital competence", 17% (489) respondents answered, "technological competence", 6% (173) respondents answered "creative competence", and the remaining 11% (317) respondents recognized "information and communication competence. The specific weight of those who answered question 3% correctly is 49 (1411), and the specific weight of those who answered wrongly is 51% (1468).

Respondents who took part in the online test answered the question **"**The readiness and ability of a person to confidently, effectively, critically and safely use information and communication technologies based on the acquisition

of knowledge and skills", 14% (403) answered as "digital competence", 23% (662) respondents chose the answer "professional competence", 26% (749) respondents answered "technological competence", 17% (489) respondents answered "creative competence", the remaining 20% (576) respondents recognized "information and communication competence". The specific weight of those who answered question 4 correctly is 14% (403), and the specific weight of those who answered wrongly is 84% (2476).

Respondents in the online test answered the question "What is an IP address?" at 67% (1929) "a unique network address of a node in a computer network", 3% (86) respondents chose the answer "computer password", 6% (173) respondents answered "personal computer user ID" and 6% (173) respondents answered "a unique code of your personal computer", and the remaining 18 (518) respondents answered "supplier address" recognized. The specific weight of those who answered question 5 correctly is 67% (1929), and the specific weight of those who answered wrongly is 33% (950).

Respondents who took part in the online test were asked: "What is a browser? 67% 1929) answered "A program for searching and viewing information on a computer network on a computer screen", 18% (518) respondents chose the answer "Internet Explorer", 6% (173) respondents answered, "A program for reducing the amount of information (compression) of files", 9% (259) respondents answered, "A complex of interrelated programs for managing computer resources", and no respondent could recognize "antivirus program". The specific weight of those who answered question 6 correctly is 67% (1929), and the specific weight of those who answered wrongly is 33% (950).

Respondents who participated in the online test, when asked "The following increments correspond to text files", asked 56% (1612) "TXT, RTF, DOC, ODT ... 6% (173) respondents answered "AVI, MPG, MP4 ...", 15% (432) chose the answer "JPG, PNG, TIFF, BMP", 3% (86) respondents said, "XLS, ODS ..." the other 20% (576) respondents answered" Html, htm, dom... The specific weight of those who answered question 7 correctly is 73% (2102), and the specific weight of those who answered wrongly is 27% (777).

Respondents who took part in the online test answered, "Presentation preparation and viewing program" with 73% (2102) "Microsoft PowerPoint", 18% (518) respondents chose the answer "Prezi", 6% (173) respondents answered "Kahoot", 3% (86) respondents answered "Clogster", and none of the respondents could recognize "Adobe Captivate". The specific weight of those who answered question 8 correctly is 73% (2102), and the specific weight of those who answered wrongly is 27% (777).

Respondents who took part in the online test answered, "Presentation in Microsoft PowerPoint": 35% (1008) answered "All of the above", 29% (835) respondents chose the answer "Text, diagram, table", 30% (863) answered "Photo, Picture, pictures", 6% (173) answered "Hyperlink", and none of the respondents answered, "Audio and video materials". The specific weight of those who answered question 9 correctly is 35% (1008), and the specific weight of those who answered wrongly is 65% (1871).

Respondents who took part in the online test answered the question: "A type of service for conducting online quizzes, online tests and surveys that can be effectively used for didactic purposes" answered "Kahoot" in 15% (432), "Prezi" in 24% (691), "Microsoft PowerPoint Clogster" in 21% (604), «Microsoft PowerPoint» in 15% (432), and the remaining 25% (720) respondents answered "Adobe Captivate". The specific weight of those who answered question 10 correctly is 15% (432), and the specific weight of those who answered wrongly is 85% (2447).

Respondents in the online test answered the question "The distance learning platform most commonly used in secondary schools", 74% (2130) answered "ZOOM", 8% (230) respondents chose the answer "Adobe Captivate", 3% (86) respondents answered "Cisco Webex Meetinqz", 6% (173) respondents answered "Teams", and the remaining 9% (260) respondents recognized "Skype". The specific weight of those who answered question 11 correctly is 74% (2130), and the specific weight of those who answered wrongly is 26% (749).

Respondents who took part in the online test answered the question "Software complex consisting of educational materials and tests in a particular subject" in the following way: 53% (1526) answered "Electronic textbook", 12% (346) respondents chose the answer "Text textbook", 18% (518) respondents answered "Electronic dictionary", 9% (259) respondents answered "Simulator", and the remaining 8% (230) respondents recognized the answer "Handwritten book". The specific weight of those who answered question 12 correctly is 53% (1526), and the specific weight of those who answered wrongly is 47% (1353).

Respondents who took part in the online test answered, "Computer systems with integrated audio and video recording" at 44% (1267) "Multimedia", 18% (518) respondents chose the answer "Media Service" and 18% (518) respondents answered "Audiovisualization", 17% (490) respondents answered "Interactive", and the remaining 3% (86) respondents answered "Database" recognized. The specific weight of those who answered question 13 correctly is 44% (1267), and

the specific weight of those who answered wrongly is 56% (1612).

Respondents who took part in the online test answered, "Learning using textbooks, personal computers, and computer networks" with 45% (1296) "Distance learning", 6% (173) respondents chose the answer "Communication learning", 9% (259) respondents answered, "Navigation learning", 33% (950) respondents answered "Interactive learning", and the remaining 7% (201) respondents recognized "Traditional learning". The specific weight of those who answered question 14 correctly is 45% (1296), and the specific weight of those who answered wrongly is 55% (1583).

Respondents who took part in the online test were asked: "What service can be used to create a virtual class? 15% (432) answered "Google Classroom", 6% (173) answered "Quizizz", 3% (86) answered "Plickers", 39% (1123) answered "Whatsapp", and the remaining 37% (1065) answered "ZOOM". The specific weight of those who answered question 15 correctly is 15% (432), and the specific weight of those who answered wrongly is 85% (2447).

3.5 Aspects of Collaborative Activities

Future teachers will be able to form technological competencies by studying the experience of innovative scientists and innovative teachers:

1) goes to pedagogical sites and portals, and receives innovative knowledge from electronic textbooks;

2) creates an information bank fund and an electronic media library in their specialty and future subject;

3) conducts pedagogical diagnostics, monitoring, and SWOT analysis of the digital learning platform and educational content, computer programs, and multimedia devices used in distance learning.

4) participate in coaching, pedagogical training, forums, and discussions on topical problems of distance learning in pedagogical coworking, express their thoughts, and acquire the necessary digital and creative competencies.

5) the future teacher learns to control himself: he makes pedagogical reflections on each of his actions.

One of the key competencies necessary for the intellectual development of any future teacher is to evaluate educational resources and select, sort, modify, create a new version and share with others their project (version), be able to prove their idea, etc.

After analyzing the results of the online test, we were convinced that future teachers have low digital competencies:

1) "Readiness and ability of a person to reliably, effectively, critically and safely use information and communication technologies based on the acquisition of knowledge and skills in various areas of life" respondents gave 86% (2476) "wrong answer" and the difference between "correct answer" and "wrong answer" is 72%;

2) "Type of service for conducting online quizzes, online tests and surveys that can be effectively used for didactic purposes" 85% (2447) respondents gave "wrong answers" and the difference between "correct answer" and "wrong answer" is 70%;

3) "What service can be used to create a virtual class?" 85% (2447) respondents gave the "wrong answer" to question 15, and the difference between the "correct answer" and the "wrong answer" is 70%.

After studying the results of the online test, we concluded that future teachers are poorly versed in the didactic possibilities of distance education.

However, future teachers are well-versed in computer skills:

1) The vast majority of respondents to question 3 "The set of knowledge and skills that determine the effectiveness of labor" gave 49% (1411) "correct answer" and gave the "wrong answer", and the difference between the "correct answer" and the "wrong answer" is 2%;

2) "A software complex consisting of educational materials and tests in a particular subject", in question 12, respondents gave 53% (1526) "correct answer", and the difference between "correct answer" and "wrong answer" is 6%;

3) "Training using textbooks, personal computers, and computer networks", the respondents gave the "correct answer" 45% (1296), and the difference between the "correct answer" and the "wrong answer" is 10%.

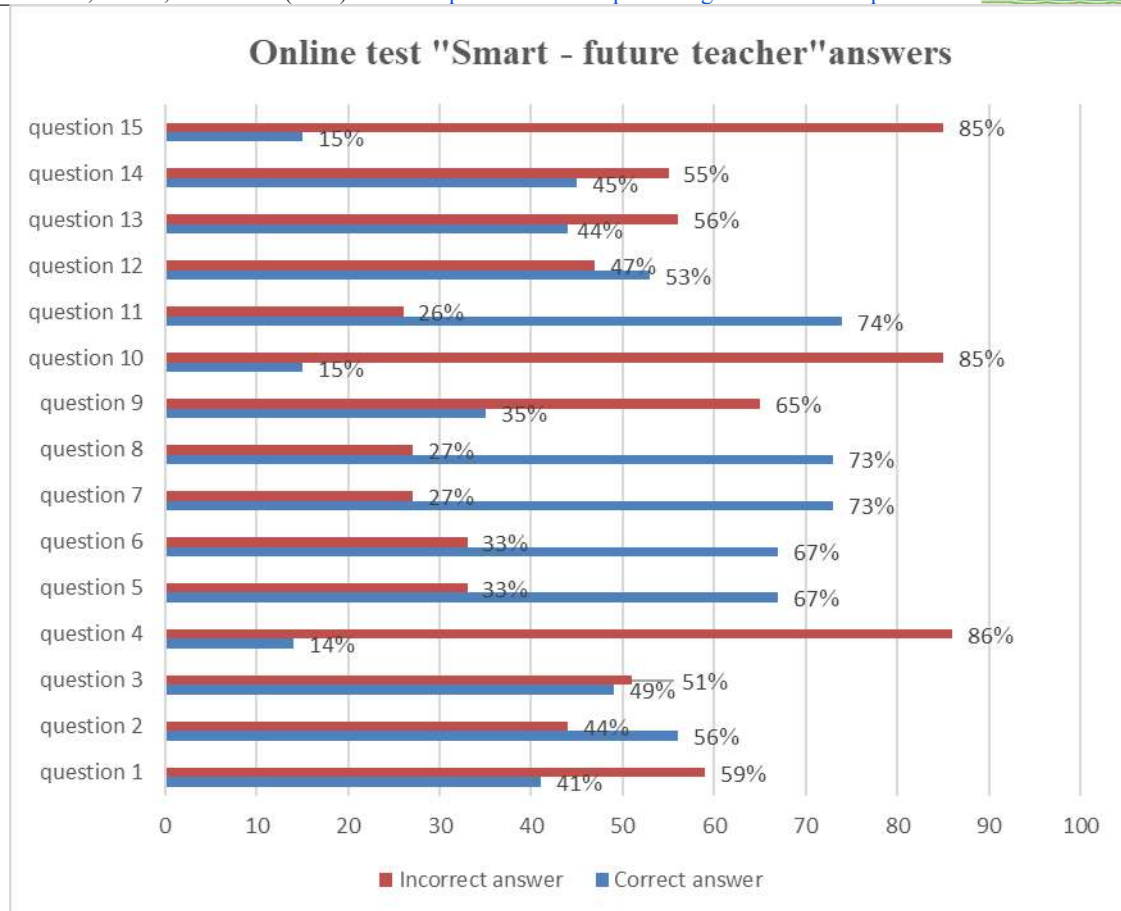Figure 7 shows the general results of the online test "Smart - future teacher".

Fig. 7: Correct" and "Wrong" answers to the online test "Smart - Future Teacher"

The importance of digital-creative competence of future teachers in the context of distance education is the ability of the future teacher to create, plan, and implement digital technologies at different stages of training. At the same time, it is necessary to strive for the fact that in the lesson (when working in pairs, or in a group) the main emphasis will not be on the teacher, but on the student himself. This can also be achieved through the use of digital technology.

4   Conclusion

Digital technologies make it possible to develop existing methods for monitoring and assessing the level of knowledge of future teachers and create new, more advanced modern methods. At the same time, by analyzing a lot of information about students and their activity in the digital environment, the university teacher can provide him with sufficient assistance, opening up opportunities for independent work of the future teacher in the digital environment.

In the context of distance learning, there is an opportunity to additionally develop and determine the digital competencies of future teachers, that is:

1)   training in digital communication opportunities with students and colleagues;

2)   development of skills in creating and exchanging materials with teachers in a digital environment;

3)   use of digital content to create educational material and adapt existing ones;

4)   deepening knowledge about ways to protect information;

5)   assessment of the reliability of information and identification of false or biased information;

6)   safe and responsible use of digital technologies; Digital technologies make it possible to develop existing methods of monitoring and evaluating the education levels of future teachers and to create new, more advanced modern methods.

7)   creative use of digital technologies to solve educational problems;

8) use of digital technologies in the educational process and monitoring of students' online activity;

9) to learn how to use digital tools to assess and monitor the level of academic performance and intellectual growth of students and apply them additionally.

For the effective implementation of distance education and training in pedagogical universities using Internet resources, a digital learning platform, it is advisable to be guided by the following pedagogical principles:

1) it is necessary to update the content of education of pedagogical universities: introduce mandatory special disciplines (for example: "Digital Pedagogy", "Cyberpedagogy", "Media pedagogy", etc.) to increase the digital competencies of the future teacher.

2) future teachers studying in higher educational institutions in the pedagogical specialty should be fluent in internet resources, and skills of working on a digital learning platform, which will allow them to fully improve their professional skills in the future, and not just in-depth knowledge of the subjects they teach in the future.

3) internet resources, extract new ideas, necessary information from materials, and information on a digital learning platform and guide them in future professional activities-opening pedagogical educational portals.

4) ability to sort Internet resources, and information received by modern pedagogical requirements.

5) ability to adapt materials obtained from Internet resources to their specialty and subject: take into account the personal characteristics of the specialty, discipline, and each student, etc.

6) effective use of materials on Internet resources in the learning process in such a way as to arouse the cognitive interest of students.

7) in the process of training, students are given tasks of various innovative content using internet resources: drawing up pedagogical cases; making presentations of small scientific projects; SWOT analysis; obtaining a video report; creating video situations, etc.

8) formation of digital-technological and digital-methodological competencies of the future teacher in the university: the future teacher should be able to develop his electronic portfolio independently.

One of the advantages of using digital technologies in training is the opportunity to actively involve all students in the educational process. Digital technologies can be used to adapt educational activities to the level of knowledge of each student, his interests, and his needs.

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