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Digital technologies in education

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Abstract

Relevance. In the modern world, the student is no longer attached to the teacher or to their environment. Digital communication technologies give the student an opportunity to choose where and what to learn, in what environment to develop, in what events to take part. The success of this new, increasingly digitalised education system will be determined not only by the extent the training adapts a person to the current socio-economic structure. Success increasingly depends on the ability to constantly adapt, change, rapidly master new activities and acquire new professional skills and abilities.

Purpose. The purpose of this study is to analyse the prospects for the introduction of digital technologies that allow improving education and planning concrete steps to transform the work of universities and improve education and professional training.

Methodology. The leading method of research was the method of analysis and synthesis, which allowed fully completing the tasks set and achieving the intended purposes.

Results. As a result of the study, digital trends in education were studied, which allowed identifying the advantages and disadvantages of digitalisation of education. The study described the most currently used modern technologies that have already been successfully implemented in the Kazakh education system, and considered the tools of the virtual space that need to be used in the future for the full implementation of the strategy of transition to digital education. The authors determined that at the moment the education system of Kazakhstan needs to develop a more effective and comprehensive programme for the introduction of modern technologies in the educational process.

Conclusions. The practical significance of the present paper is determined by the fact that the proposed tools of digitalisation of education can be used in pedagogical activity.

Keywords: gamification; digitalisation; modern trends; computer science; virtual space.

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Introduction

The introduction of information technologies in the learning process is one of the main trends in the development of the modern educational system. The use of digital technologies in the educational process is becoming a familiar real methodology for both students and teachers. Educational institutions are gradually being fitted with modern equipment, many schools already have high-quality computers, tablets, virtual reality glasses, and much more [1; 2]. At present, an educational environment has already been created wherein everyone has the opportunity to use digital technologies, with many teachers already using them competently. Previously, students from the regions sought to study in large cities, since the quality of education in small towns, villages and urban-type settlements was not at a high level. At present, a high-quality education does not depend on the location of a person – one can study with a teacher of any level, discipline and nationality, even if they live in a different time zone and speak a different language [3; 4].

Digitalisation is a challenge of modern times, but it is also a reality that one can not only witness, but also take a direct part in. Considering the issue of digital technologies in education, the movement in this area is, firstly, not an end in itself, it has a certain meaning and goals, and, secondly, it is not a national decision of Kazakhstan, but a practice applied globally [5; 6]. Over the past two decades, improving the quality and relevance of teaching and learning has been the main task of the Bologna process and the main task of structural reforms in the field of higher education. Lifelong learning is becoming increasingly important for society, the economy and the well-being of the country's citizens, as well as for all European countries [7-10].

At present, universities face the task of training students and supporting teachers in the development of creative abilities in an electronic environment. Kazakhstan should consistently adapt its education system to make greater use of high-quality e-learning and blended learning, ensure the diversity and flexibility of education throughout life, develop information literacy and skills, improve data processing, educational research and forecasting, improve regulatory barriers to creating open e-education systems [11; 12].

A digital transformation of educational institutions is taking place everywhere. It is important to understand that this refers not only to universities or schools – new technologies are already being introduced in preschool educational institutions, in institutions of secondary professional education, as well as in additional education. Digital transformation is a transition from an analogue to a digital environment, and it is necessary and inevitable. It is impossible to ignore this process in the modern world, even if it is not the purpose of individual educational institutions. It is not just about information technology or digitisation. It is necessary to review organisational structures, goals, processes, products, management systems, and expected results. And all this against the background of the relatively low readiness of most educational institutions for change. Developments already exist and are being used today, which allow all educational institutions to determine the so-called digital

transformation index, that is, to assess the current situation and set goals [13-15].

Digital technologies have ceased to be just a tool, they have become a new environment for human existence. The digitised educational environment provides fundamentally new opportunities: to move from learning in the classroom to learning anywhere and anytime; to design an individual learning trajectory that meets the educational needs of the student's personality; students act not only as active consumers of electronic resources, but also as creators of new resources, etc. Various seminars, webinars, and courses present to teachers new digital technologies that are already actively used in the education system. To stimulate the study of this subject, various competitions are held, where teachers exchange methods and techniques for using modern technologies. The more technologies a teacher has, the more interesting and diverse they can design lessons.

The purpose of this study is to analyse the prospects for the introduction of digital technologies that allow improving education and planning concrete steps to transform the work of universities and improve education and professional training.

Materials and Methods

Upon designing and developing their work, the researcher should deal with the tools necessary to achieve the proposed goals, so that the methodological framework and the foundation of the study should be clearly defined. In this sense, a well-structured study chooses a research methodology that better allows for a brief, coherent, and purposeful study of the subject matter. Furthermore, it takes a lot of effort and study to think about choosing a methodology for working in research, because the purpose of this process is to get a comprehensive knowledge of the possibilities and prospects of what one wants to know. Thus, the work plan and the reality of the phenomenon under study should be correspond in a safe way, ensuring the maximum possible accuracy. This study used such methods as the method of analysis and synthesis, as well as comparative analysis, which allowed identifying the advantages and disadvantages of digitalisation of education. Various methods of collecting information were also used.

The method of analysis and synthesis as the essence, as the content and form of human thinking, as techniques and methods of scientific thinking are widely studied in several dimensions and in many subjects. Analysis and synthesis (from Greek “ἀνάλυσις” – decomposition, dismemberment; and “σύνθεσις” – connection) are two universal and oppositely directed operations. The terms “analysis” and “synthesis” have several meanings: analysis and synthesis as properties of proofs in mathematics – in this sense they acquire the features of analytical and synthetic methods; analysis and synthesis in the sense of Kant's distribution of “analytical” and “synthetic” estimates, which actually means an outline of a method of obtaining knowledge by purely logical processing of this experience (“analytical”) from the method of obtaining knowledge by applying to the content, attracting other data of experiment (“synthetic”); the terms “analysis” and

“synthesis” are most often used in relation to all thinking in general, for the study as a whole.

Proceeding from this fact, the analysis is a procedure of mental (sometimes real) dismemberment of the studied object into components, consideration of all sides and ways of functioning in the properties and their study. Dismemberment is aimed at moving from the study of the whole to the study of its parts and is performed by abstracting from the connection of parts with each other. Synthesis is a procedure for connecting objects obtained as a result of analysing parts, features or properties of a single whole, considering the method of connections and relations of parts, without which it is impossible to gain true scientific knowledge on the given subject. Analysis and synthesis are used both in mental and practical activities, especially in experimental activities. Particular methods of analysis and synthesis are used in different disciplines, and each field has its unique methods.

Comparative analysis is associated with the correlation of one object of study with another, the objects of research are most often compared in time and/or space. The comparison method can be both qualitative and quantitative. It is often necessary to make a compromise: the more cases are compared, the fewer variables can be compared, and vice versa. Comparative analysis is often used when looking for models of similarities and differences that can explain continuity and change. The commonly used approaches in comparative methods are the most similar approaches to system design (which lies in comparing very similar cases that differ in a dependent variable, provided that this will simplify the search for independent variables that explain the presence/absence of a dependent variable) or the design of very different systems (compare very different cases that have the same general dependent variable, so that other conditions present can be considered as an independent variable).

Results and Discussion

At present, education must adapt to the younger generation, it is necessary to consider the specifics of modern children and introduce new technologies into a modern school. The Soviet principles of teaching are becoming obsolete – in 2021 it seems strange to manually rewrite a huge and difficult exercise or work with an inappropriate textbook of the last century. To better understand what digital technologies are, it is necessary to turn to the history of the development of numbers in the development of humankind. The history of numbers relates to the history in numbers, a section of history that is a statistical source. A more correct wording is “historical computer science”, which is used by most modern researchers. It is generally believed that humanity has passed through four information revolutions.

the first information revolution took place in 3500 BC and was associated with the emergence of writing;

the second information revolution was caused by the invention of the printing press in the 15th century, which substantially changed access to information;

the third revolution (telephony, radio) occurred in the first third of the 20th century, creating a technological basis for data transmission;

the fourth information revolution is usually considered as a lifestyle, a system of values [16; 17].

As for modern education, it is worth understanding that the rapidly changing world forces educational institutions to change just as swiftly. Nowadays, the world is experiencing a leap into the digital age. A new educational paradigm has matured: teaching students to independently acquire knowledge using Internet technologies. And the teacher acts as a mentor who directs and corrects the activities of students. Using the term “digitalisation of higher education”, one usually refers to three aspects of the use of digital technologies in a modern educational institution: the use of digital technologies in the management of both an individual and an educational institution during the educational process (including assessment of the level of assimilation of material, competencies, construction, and adaptation of educational trajectories); digital education; digital technology training for professional purposes.

The infrastructure of educational institutions is continuously updated, equipped with modern educational technologies. For example, until recently, students usually worked on a blackboard, and today many schools have interactive whiteboards which allow students not only write, but also create drawings, layouts, view videos, pictures, and much more. Most interactive whiteboards allow writing with a finger – this is convenient, since teachers no longer need to get dirty with chalk, and any child will enjoy such an experience regardless of their age, since children keep up with the times and literally absorb all innovations [10; 18].

Apart from interactive whiteboards, schools are equipped with digital access systems. They have also become available due to the use of modern technologies. Now parents or guardians have the opportunity to monitor when their child entered the educational institution and when it left. All a student needs to do is pass through the turnstile with a pass attached, and in ten years it can be biometrics – fingerprints, such as Touch ID on mobile phones and tablets, and retinal scanning. Paper diaries have practically disappeared – electronic diaries have become commonplace. In the future, 3D gadgets will replace conventional printers, and students will be able to print any 3D model that they need to solve various tasks. In Minneapolis, USA, one of the schools has already purchased a Dimension BST printer, which students use to create design prototypes. The use of modern technologies in schools is developing increasingly more actively from year to year. Plain paper will probably no longer be used – scientists are already developing OLED displays. These are flexible, light and thin “sheets” that can be rolled up like paper, or stored in a stack. This solution is more practical, more environmentally friendly and more durable than ordinary paper, such displays do not tear and are interactive.

Online education is developing at an incredible pace. Soon, not only distance learning with real people will be used, but also training under the control of artificial intelligence. For example, Microsoft has already released an educational application for learning Chinese, where a student responds to short printed and audio messages from a teacher bot in a chat. Artificial intelligence analyses the answers and selects the desired load. There are also many other applications and websites for learning foreign languages, where learning takes place without the

participation of teachers. Modern online learning technologies make education accessible to everyone who has access to the Internet, and perhaps conventional full-time education will become completely obsolete in the future.

Gamification is used to make learning livelier and more interactive: elements of games (including computer and video games) are introduced into the learning process. Gamification changes the attitude towards mistakes – children are no longer afraid of conditional “F”s. The ability to repeat the mission is an important principle in a computer game, one can search for a solution as much as they want, each time finding new opportunities. At the Foxford online home school, where children from all over the world are taught remotely, gamification is already being successfully applied in practice. For completing homework, children receive experience points – XP. Just like in their favourite computer games. Each task has a level of difficulty: from the initial to the Olympiad level. The more difficult and the fewer hints a student spent on the solution, the more experience they will get. Experience points accumulate and allow students to move from an easy level to a more complex and interesting one [19].

Visual aids and technologies are increasingly used in the educational process. The point is again in the features of the current generation. Modern children do everything with the help of YouTube – they make DIY creations, do makeup and hairstyles, unpack purchases, and learn languages. Statistics show that 85% of teenagers use YouTube regularly, and 80% of them claim that the video is a way to learn more about their hobbies. It is not surprising that teachers are increasingly using videos, films, and recorded lectures in their classrooms. With the expansion of the use of modern educational technologies, children can study school subjects using virtual and augmented reality technologies. For example, with the help of a VR headset, a child can observe and even take part in historical events. Such learning is called immersive, it creates a “participation effect” and allows getting an experience that is impossible in the real world. Such an exciting modern learning format allows one to better assimilate information, because visual material contributes to better memorisation of what one has learned.

The most important advantages of digital technologies are as follows:

Self-education. Since the future system involves independent work, the child realises that it itself should strive for knowledge from childhood. Such education will make the student independent in the future, without excessive care on the part of the teacher, the student will achieve better results.

No paperwork. Students need to carry several textbooks and notebooks at the same time, which take up a lot of space in the bag and weigh a lot. Weight can be so large that the child develops health issues. Digital education saves a person from a heavy load of papers and books, all textbooks and notebooks are placed in a computer, and a tablet replaces textbooks.

Economy. Since paper versions are no longer needed as a result of digitisation, parents do not need to spend money on notebooks, textbooks, pens, and other stationery, besides school supplies are quite expensive. Electronic

versions should be replaced with new ones only if the old devices fail.

Simplifying the work of teachers. The teaching profession is considered one of the most difficult, a lot of energy and nerves are spent on educating young minds. In a digital system, the task of the teacher is to help, the teacher sets the direction in which the students develop. Students turn to the teacher only in controversial situations, so the teacher partially acts as a consultant, the role of the teacher changes to the role of a manager and organiser of the learning process.

New professions related to teaching emerge, for example:

content curator (takes part in the selection of digital didactic materials); tutor (accompanies individual educational trajectories); pedagogical designer (develops online pedagogical courses and systems of individual educational tasks); expert in formative and criteria-based evaluation (provides a methodology for evaluating student learning outcomes); analyst (sets up a system for collecting data on how students interact with the curriculum).

A step into the future. The transition to digital education is an important step in the development of Internet technologies. Science is developing at a rapid pace, and new structures are appearing every day. Digitalisation of education will help schoolchildren to better navigate the world of information in the future. Digital technologies open up new opportunities for the teacher, which become limitless. Demonstrating the clarity that is possible when using these technologies is more successful.

The disadvantages of online education include the following:

The risk of a negative outcome. Since the changes in the education system will be drastic, it is impossible to say with certainty whether such an innovation will be positive. This system is used for the first time, so it will not be possible to compare it with something similar.

Lack of creative abilities. Scientists have proved that colour design helps a person to remember information better, adults are also recommended to make their notes with small changes. This also contributes to the development of creative thinking, but information technologies exclude the opportunity to express themselves. The child will quickly get used to a boring story, as a result of which children's creativity will noticeably suffer.

Reduced mental activity. A person does not need to think about anything, they have stopped receiving information unassisted. It is sufficient to have access to the Internet to find the necessary information, which leads to a reduction in mental activity.

Poor socialisation. When a student comes to school for the first time, they have little chance of meeting familiar people there. The child immediately finds itself in another society, where it knows nobody. In the institution, the child not only gets knowledge, but also makes friends and learns to communicate with society. The information system considerably reduces the degree of socialisation of a person, which affects the further development of the personality.

Problems of physical development. First of all, vision and fine motor skills will change, prolonged use of screens

causes eye fatigue. In the next few generations, it is unlikely that a person with good eyesight will appear, but in the future, technology may become safer for the development of children. Working with a keyboard and tablet changes the physiology of the fingers, the structure of bones, joints, and muscles can change.

Absolute control. This applies to students, teachers, and parents, a personal file is created for each person and detailed information about the family is gathered, which will lead to total control over society. At a lower level, a child cannot hide anything from adults, until now it was possible to hide the diary, adjust the rating and hide the comment. In the future, this will be impossible, which is bad for children, it will considerably affect independence. When a child has problems, they try to solve them unassisted, although not in the way that adults would like.

The role of the teacher. After digitalisation, the concept of the teacher will completely change. Professionals are being replaced by robots and virtual systems, which will lead to an increased level of unemployment among teachers.

At this stage of human development, there are many technologies. Modern digital technologies include the technology of joint research of a teacher and a student using an experiment, "Virtual reality", the technology of "Panoramic images", "3D modelling", "Educational robotics", the technology of using small information tools, multimedia educational content, interactive electronic content, etc. Multimedia technologies are introduced into the educational process harmoniously due to consistency and systematicity.

Developed in the first half of the 20th century based on John Dewey's pedagogy, the project method is becoming increasingly relevant in the modern information society. The project method is not new in the world of pedagogy, where it is defined as a "sincere idea". The computerisation of society and, as a private form, the computerisation of the education system leads to the emergence of new technologies for the organisation of the educational process. One of those technologies that reflect the influence of informatisation is open education, and one of the most effective methods of expanding and globalising the open educational space is the development of distance learning technologies as the main component of the open education system that are emerging in Kazakhstan.

The reality is that until recently the Kazakh society discussed information technologies, the trends of their development in Kazakhstan and in the world, and everyone made a decision themselves, evaluating their abilities, which of these technologies they can use based on their skills, as well as technical support. Today, there is not a single discipline where the use of technology would be inappropriate – either remotely or in the classroom. This even applies to physical education, since a teacher can, for example, monitor the progress of students in various activities – all one needs is a smartphone and a fitness bracelet. Furthermore, the teacher can make a frame-by-frame shooting of the exercise and demonstrate to children common mistakes during running, hitting the ball, etc. [5; 8]

A "digital" teacher does not necessarily use modern expensive equipment, such as virtual reality glasses, which, admittedly, not every school can afford. This refers

to the ability to work with available devices and services – the ability to show a creative approach and figure out the way to effectively integrate it into the educational process and use it as much as possible. Learning to use technology is a life skill and an important form of literacy. Currently, the process of introducing information technologies into education is underway, it requires a lot of time and effort, but in the end, technologies are the way to new knowledge and experience. Over time, the technology will become familiar and easy to use for teachers.

Interactive teaching methods come to the fore: lessons are conducted in an alternative form – visits to online exhibitions, museums, theatres, remote studies, game and pedagogical technologies, excursions are used. Interactive learning relates to creative learning methods. The creative method of teaching focuses on the opportunity to get a personal educational product. Interactive learning is interpreted as a technology, a method, and a form of organisation of cognitive activity where such interaction is implemented [20; 21].

The term "interactive learning" is most often used in the context of information technologies, distance learning, the use of Internet resources, electronic textbooks and working on the Internet. Modern computer telecommunications allow participants to enter into an interactive live dialogue with a real partner and actively exchange messages between the user and the information system in real time [22; 23]. Interactive teaching methods together with computer training software provide continuous dialogical communication between the user and the computer, allow students to control the learning process, adjust the speed of studying the material and return to earlier stages.

Distance learning involves searching for information on the Internet, which allows students to receive cyber information. Cybernetics (from the Greek "the art of management") has acquired the meaning of "information", "system". With the development of technologies, such terms as "virtual communication", "electronic communication", "cyber communication" began to be used. Communication virtualisation is one of the most defining features of modern society, "virtual communication" and "cybersecurity" are synonymous words. Limited sensory experience, means of communication, such as gestures, facial expressions, voice modulation, do not create an analogue to full-fledged human communication. In cyberspace, a person must "identify" oneself, they have the freedom of choice: they can publish reliable or fictitious information about themselves [24; 25].

Social networks offer many free options, for example, a teacher can go to the expanses of group chats with the ability to exchange files. They already have live broadcasts, video calls, surveys, educational game simulators and much more that a digital teacher can use to make their lessons interactive and diverse [26; 27]. There are also many tools on the Internet for creating quests, quizzes, and questionnaires that students will like. Another available tool is chatbots. Today, almost every more or less advanced Internet user can find a solution according to their needs – this does not even require knowledge of a programming language [28; 29]. But while this convenient tool is underestimated by teachers for some reason, using a

chatbot, for example, it is easy to conduct surveys among students. Interactive whiteboards are great for practicing team interaction skills: each student does their part of the work, and these elements form the overall picture.

The above options are generally available, but there are also more expensive methods of digitalisation of education, the possibilities of which are almost limitless. For example, if a teacher uses virtual reality technologies in a history lesson, then children will have the opportunity to be in the pyramid of Cheops, in astronomy – on a walk on another planet, in chemistry – to see what happens when scientists mix reagents that cannot be mixed, and in health and wellness – to demonstrate correct behaviour in case of fire or other emergencies.

To organise distance learning, the teacher needs the technical equipment of the teacher's place: a webcam; create an electronic platform on Google or Yahoo!, Gmail, Zoom or other websites; video communication; chat with the "raise your hand" function; broadcast of lessons; Internet whiteboard; video communication (for the whole class) and other functions; online tests (knowledge testing). Pieces of video and audio editing software are invaluable teaching assistants [30; 31]. The teacher can use this software to create training videos on various topics of the curriculum. Next, the software and technologies that the teacher can use to create multimedia content will be presented. To edit video clips, there is an available VideoPad Video Editor software. One can also use the oCam software, which allows the user to take a screenshot. Modern teachers need to master video editing, since video creation is a necessary skill that is widely used in education. The teacher often needs to create a video tutorial, cut a long video, create something of their own [9; 16].

One of the favourite technologies used by teachers is a screencast. A screencast is a digital video recording of information displayed on a computer screen, often accompanied by voice comments. With this technology, the teacher can record the work step by step and comment on what is happening on the screen simultaneously. There is plenty of software solutions available for creating screencasts, at the moment the most popular piece of software this purpose is the OBS Studio, which is free and can be used to record video tutorials for students of any age [32; 33]. Its principle of operation is that after turning on the recording, the teacher explains the material to students using prepared images, videos, presentations, can explain how to work with a particular educational platform, show where they can search for information, and much more. Screen video technology is a reasonable solution in the educational process: watching every movement and word, the students get acquainted with what is happening themselves; they are able to repeatedly scroll through the video and focus on the most difficult moments for them, study the material at an individual pace; they apply everything they see and hear in practice in the near future [34; 35].

Another very interesting technology is video scribing (it is a dynamic hand-drawn video comprising a combination of a drawing and a fascinating story, supplemented with animation and special effects). The popularity of this phenomenon is explained by several reasons. First of all, video scribes attract attention and can

retain it for a long time, they are very different in their style from videos. Another reason for its popularity is that scribing videos creates a participation effect and involves the viewer in the action. The action seems to unfold in reality right in front of students or pupils, so video scribes evoke emotions. Even the process of drawing pictures has a hypnotic effect: after seeing the creation of an animated picture, the viewer would like to know how the action of the video will develop and end. The originality of video recording, its unknown nature will make one stop their eyes on the videos made with this technology.

There is also a chromakey technology and a technology for creating video tutorials with video accompaniment from a teacher, which modern teachers are just beginning to familiarise themselves with. Chromakey technology is a technology for explicitly cutting out an undesirable part of the content from a series of frames by colouring it in a certain uniform key colour and then combining two or more images or frames into a composition [36; 37]. The principle of operation of chromakey is that when shooting, the object is placed on a solid background (the key screen). Combining an object with the background in the frame while recording a scene or when editing, one can place another image instead of the background.

Students can create videos themselves, there are children in each class who like to draw and edit videos. Admittedly, providing students with computers, tablets, and Internet access plays an important role. Cloud technologies offer the opportunity not only to combine information resources into packages, but also to simplify their use. Blockchain technology, which became known in connection with the spread of cryptocurrencies, is actively used in the preparation of dissertations at foreign universities [38; 39]. This allows teachers and employers to track students' progress in implementing the FQP in an open information environment and evaluate their promising employment opportunities in the company. Blockchain in education is an open self-developing system where a specific purpose (providing high-quality training of a specialist, project implementation, personal development, etc.) acts as a parameter of the procedure for which all participants in the educational process are involved in dialogical, active cooperation with the help of the cloud information space used to ensure the achievement of the purpose.

Digital technologies allow showing an important area in modern education – the possibilities of smart didactics, which allows "purposefully" training personnel. The development of higher and professional education based on the use of digital technology resources allows identifying this aspect of the interaction of social partners in the training of specialists. The chosen path of development of the Kazakh economy, based on the discovery of new talents and their orientation towards the development of innovative technologies, is the main guideline for the development of a strategy for the development of the modern economy of Kazakhstan, and consequently, modern educational institutions. That is, effective intellectual didactics should work for a person who is capable of realising their talent using blockchain technology in an innovative professional field.

The teacher simply needs to study digital technologies and develop their competencies in this area, this is a

requirement of the time. Nowadays, teachers can communicate with colleagues from all over the world, from other schools – they have long left the conference hall or the meeting room and take part in webinars, video conferences, distance learning. Achieving this purpose is especially important in connection with the spread of cloud computing, public high-speed Internet, the introduction of intelligent digital tools, the use of artificial intelligence methods and the widespread promotion of virtual reality technologies.

Conclusions

The study was conducted on the introduction of digital technologies that allow improving education and planning concrete steps to transform the work of universities and improve education and professional training. To cope with the upcoming challenges, the Kazakh education system needs to complete the digital transformation in the historically shortest possible time, switch to a new model of education organisation and use high-tech organisational, pedagogical, and methodological solutions. An important point: all these tools are just teachers' aids, 80% of the effectiveness of teaching is still determined by the teacher's personality. If we want students to feel the desire to do something themselves, immerse themselves in the topic, then the special knowledge and charisma of the teacher may not be enough. Modern children cannot concentrate on something for a long time, they practically do not use paper sources – they have the Internet since birth. Keeping this in mind, it is important that the teacher understands modern technologies, because a person who does not know what Wikipedia is, who sends children to the school library for information with an alphabetical index, is perceived by the representatives of Generations Alpha and Z as a person who is not adapted to modern trends, which is why the level of trust in them decreases.

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In accordance with modern realities, when a teacher is familiar with the Internet, it causes respect and trust in this teacher's students. And this is critical not only from the standpoint of the effectiveness of teaching, but also from the standpoint of the authority of the teacher, which will only grow with the wider use of useful technologies. Against this background, the introduction of digital technologies is crucial for the development of the system of higher education and professional training, but at the same time, a scientifically sound approach to their implementation is required. Improving education based on a cultural approach will allow forming digital intellectual didactics, introduce blockchain technology, which should become the basis of the development strategy of modern educational organisations. Kazakhstan needs highly qualified personnel, so the task of the state is not only to apply the best foreign practices in current conditions, but also to develop a scientifically sound strategy for continuing education based on the best Kazakh scientific schools and advanced digital technologies. But people should not forget that e-learning should not completely replace conventional learning, it should complement it, since nothing can replace live communication between a teacher and a student. Having received feedback from the student, the teacher can adjust the educational material during the lesson to make it more understandable and accessible. E-learning itself cannot adapt to the student, guided by the latter's living mind, which is precisely the case with the teacher.

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Conflict of Interest

None.

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Цифрові технології в освіті

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Анотація

Актуальність. У сучасному світі студент більше не прив'язаний до викладача або до свого оточення. Цифрові комунікаційні технології дають йому можливість обирати, де і чому вчитися, в якому середовищі розвиватися, в яких заходах брати участь. Успіх цієї нової, все більш цифрової системи освіти визначатиметься не лише тим, наскільки навчання адаптує людину до сучасної соціально-економічної структури. Успіх дедалі більше залежить від здатності постійно адаптуватися, змінюватися, швидко опанувати нові види діяльності та набувати нових професійних навичок і вмій.

Мета. Метою даного дослідження є аналіз перспектив впровадження цифрових технологій, які дозволяють удосконалити освіту та планування конкретних кроків для трансформації роботи університетів та покращення освіти і професійної підготовки.

Методологія. Провідним методом дослідження став метод аналізу та синтезу, що дозволило в повній мірі виконати поставлені завдання та досягти наміченої мети.

Результати. У результаті дослідження було вивчено цифрові тренди в освіті, що дозволило виявити переваги та недоліки діджиталізації освіти. У дослідженні були описані найбільш використовувані сучасні технології, які вже успішно впроваджені в казахстанській системі освіти, а також розглянуті інструменти віртуального простору, які необхідно використовувати в майбутньому для повноцінної реалізації стратегії переходу до цифрової освіти. Автори визначили, що на даний момент система освіти Казахстану потребує розробки більш ефективної та комплексної програми впровадження сучасних технологій в освітній процес.

Висновки. Практична значущість даної роботи визначається тим, що запропоновані інструменти діджиталізації освіти можуть бути використані в педагогічній діяльності.

Ключові слова: гейміфікація; діджиталізація; сучасні тенденції; інформатика; віртуальний простір.