FUTURITY EDUCATION

VOLUME 2
NUMBER 3

2022

E-ISSN: 2956-3402

Futurity Education

ISSN 2956-3402

Futurity Education

Volume 2 Number 3

2022

Futurity Education is an international peer-reviewed scientific journal with open access. The journal publishes 4 issues per year (March, June, September, and December). The journal publishes original and review articles in the field of education. We publish articles that are thorough research aimed at offering new innovative solutions and approaches to solve the problems of education of the future

https://futurity- education.com/index

Publisher:
Futurity Research Publishing, Poland,Lodz, STEFANA ŻEROMSKIEGO street53, 90-625.
info@futurity-publishing.com;
https://futurity-publishing.com/

Publication schedule

Futurity Education is published four times a year, on March 25, June 25, September 25 and December 25.

Type of publication: electronic

Country of publication: Poland

Number: 2022 September, 25

CONTENT

FUTURITY
Education

DOI: https://doi.org/10.57125/FED/2022.10.11.29

How to cite: Rakhimov, T., & Mukhamediev, M. (2022). Peculiarities of the implementation of the principles of the education of the future analysis of the main dilemmas. *Futurity Education, 2*(3), 4–13. https://doi.org/10.57125/FED/2022.10.11.29

Peculiarities of the Implementation of the Principles of the Education of the Future Analysis of the Main Dilemmas

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Received: May 11, 2022 | **Accepted:** June 28, 2022 | **Published:** September 25, 2022

Abstract: Recent trends in the development of education demonstrate the need for gradual changes in this area in Uzbekistan. The direction of transformation, which is needed in the sphere of educational organization, determines the need to borrow foreign, especially European experience. The established problems have been on the margins of attention of researchers, which further emphasizes the relevance for further interpretations and discussion. The article aims to analyze the main dilemmas (in the example of Uzbekistan) related to the chosen path and the peculiarities of implementing the principles of education of the future. It should be noted that consideration of the main objectives also implies addressing the issues of important practices of the educational process organization, in

particular in the sphere of school and university education and education for sustainable development. The main methods used in the work were: comparativistic, method of abstraction, deductive-axiomatic method, concretization. The results state that today for Uzbekistan the convergence of the national education system with the European models is relevant. Important elements are the introduction of a credit-module system of training, and the beginning of the application of continuous education for sustainable development with new paradigms aimed not only at memorizing the material but also - on the development of critical thinking. New benchmarks for the educational system should become STEM, a change of curricula, and training systems for pedagogical professionals. In conclusion, it is noted that the key principle for the development of future Uzbek education is Eurocentricity. The latter is aimed at the formation of a modern specialist with creative, leadership skills and developed critical thinking.

Keywords: education of the future, Uzbekistan, Eurocentricity, development paradigms.

Introduction

Reforming the educational sphere in the Republic of Uzbekistan and bringing it in line with the best European analogues are important tasks of today. Outdated development paradigms associated with the legacy of the Soviet system of educational training are losing their effectiveness in an active digitalization of society, globalization, and related structural changes. Therefore, the change in the guidelines of the field of education in secondary and higher educational institutions in Uzbekistan is an urgent problem for the study, because the government of the country has only relatively recently embarked on the path of reform, so the use of foreign experience is a little studied episode from the point of view of professional researchers. We believe that the obtained arguments and vectors of the direction of reform efforts can have a practical, recommendatory direction and be used in practice in direct decision-making. At the same time, the points of contention and difficulties of the transformation process also need to be voiced, because the conditions under which education has developed in Uzbekistan may be different from those prevailing in European countries. Such a difference has not yet been argued in research. The literary basis for this study consists of the works of contemporary educators. In particular, Siddikov (2021) characterized the main paradigms of the development of modern education in Uzbekistan. Ehlers (2019) devoted his work to the analysis of the formation of the basic principles of education of the future. Abdullakhanova and Alimatova (2020) investigated the development of modern digitalization in educational processes and the prospect of using modern technologies and trends in education.

Research Problem

The study of benchmarks for the transformation of the educational sphere is an important problem to comprehend because different ways of solving one case (improvement of the state of education) have their own specifics in the implementation in practice. Separate markers and features of the implementation are quite unevenly investigated in the scientific literature so that the possibility of their use on the example of Uzbekistan is an understudied phenomenon.

Research Focus

The study aims to identify modern paradigms of educational sector development. It is important to review the Uzbek experience of development and development of this sphere, and how it coincides

or differs from similar principles of European countries. A review of peculiar landmarks, which the Uzbek environment would be worthwhile to look up to - to demonstrate the main current trends of education of the future, the likely paths for transformation in other countries (primarily post-Soviet).

Research Aim and Research Questions

The main purpose of the study is to analyze the main dilemmas (using the example of Uzbekistan) related to the chosen path and the peculiarities of the implementation of the principles of education of the future. The study of this main issue is also related to the solution of other problems. In particular, in order to highlight the global transformations recommended to the Uzbek authorities, several separate aspects are analyzed: the current European practice of organizing the educational process in the field of school and university education. This will make it possible to identify possible directions for reform, crystallization of the main methods and features of this process.

Research Methodology

This study is built on the application of pedagogical theoretical research methods. In particular, based on the comparativistic method comparative features of functioning of modern European and Uzbek model of education. Based on abstraction it was possible to move from generally accepted concepts to own judgments and conclusions. The work also used the deductive-axiomatic method, which divided the main subject of research into smaller parts (the problem of the functioning of modern education in Uzbekistan, Europeanization of education in Uzbekistan, analysis of modern trends, methods, forms in the educational sector, etc.). Based on the method of concretization, it was possible to study features of the introduction of the European model of credit-modular training in Uzbekistan, the problem of the functioning of STEM-education. Also in this work, empirical methods of research are used: observation, monitoring, and comparison.

The main sources of this research are the official documents of the European Union, and the charters of the Council of Europe, which are of applied importance for the reform of the educational sector. Besides, other empirical materials are the decrees of the President of the Republic of Uzbekistan and resolutions of the Government of Uzbekistan.

Research Results

The Europeanization of Higher Education of the Future in the Republic of Uzbekistan

In the Decree of the President of the Republic of Uzbekistan “On the state program for the implementation of the strategy of action in the five priority areas of the Republic of Uzbekistan in 2017-2021” a special role is assigned to the organization of measures to improve and enhance the quality of education, the effectiveness of educational institutions through the introduction of international standards of learning and assessment of the quality of teaching (Karabaevna et al., 2019). Nevertheless, we believe that the modernization of the education system of Uzbekistan can be as successful as possible only when all educational settings of the state try to attract the European experience in the field of education.

Note that at present in Uzbekistan there is a systematic effort to bring the national education system closer to European models. In particular, this is evidenced by the Resolution of the Government “On Measures for Fundamental Reforming and Improving the Efficiency of the Personnel Training

System at the Tashkent University of Information Technologies". Taking into account this decree in the mentioned higher education institution and its branches during 2019 the credit system of education is introduced (Ismoilovna & Oripovna, 2020). In addition, at the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers in the 2018–2019 academic year, the principles of the credit system of education were also introduced in the master's specialties. Note that in European universities the credit-module system of education helps to ensure the integration of the study of both theoretical and practical material based on the personal and professional development of students (Karabaevna et al., 2019). At the same time, the professional development of students is a systemic phenomenon, which corresponds to the personal characteristics of an individual and is provided by educational modules that streamline the content of educational programs.

In general, according to the researchers, the modular organization of education is a content base of credit-accumulative order, which solves the problem of combining the personal needs of students and obtaining a professional education according to international (European) standards (Ismoilovna & Oripovna, 2020).

However, some European methods are still used and actively implemented in the educational system of Uzbekistan. In particular, the innovative approaches used in the education system of Uzbekistan have manifested in the variability of content and teaching methods. They are implemented based on the analysis of individual abilities and skills of students, their personal capabilities, etc.

The principles of public policy in the field of European education are defined as humanization, democratization, fundamentalization, training and education, continuity and succession of education, identification of talented young people, the use of the latest educational technologies and principles of self-education, mobility of the educational program, academic mobility of pupils and students, multilevel quality control, etc. (Karabaevna et al., 2019). These principles should be used extensively in the education system of Uzbekistan. Separate attention in the European education system is paid to innovative technologies, which are a system psychological and pedagogical complex. Note that this complex includes a special selection and combination of didactic methods, forms, ways, and conditions necessary for learning. As a result of the use of this complex, urgent transformations in the educational system are carried out, improving the mental skills of students (Ehlers, 2019). In general, innovative technology is a dense didactic system, the implementation of which affects the achievement of certain learning objectives. We believe that the main function of innovative technology is to fulfill the basic learning objectives and the comprehensive development of the individual. At the same time, the widespread and systematic implementation of innovative teaching methods contributes to the transformation of the basic paradigms of education.

In the practice of European higher education has long been used various directions of innovative technologies. We are talking about methods and technologies built on the principles of humanization, and democratization of pedagogical relations, they are aimed at the formation of an individual educational trajectory, which allows applicants for education to focus their attention on the really necessary disciplines (Herţanu, 2020). Another aspect of the modern development of educational technologies is the orientation of the acquired skills towards practical use, so the mastery of theoretical knowledge is accompanied by a mandatory practical component (Ismoilovna & Oripovna, 2020). This element should also be borrowed for the development of the educational sector in Uzbekistan.

An important part of the modern Eurocentric Uzbek education should be the introduction and implementation of STEM-education ideas. The concept of STEM is used to define the actual pedagogical direction, which combines several key aspects: natural sciences, technological education, technical creativity, and mathematics (Herţanu, 2020).

Table 1

Fundamental Aspects of STEM Education

Integral fundamental aspects of STEM education
Science (natural sciences)
Technology (technological education)
Engineering (technical creativity)
Mathematics (mathematics)

A key aspect of the application of this direction in the pedagogical process is the integration of the natural history component and comprehension of innovative technologies. We believe that innovative methods of STEM education should be disseminated in Uzbekistan. The practice of implementation of the educational system in Ukraine serves as a valuable experience. In particular, for the first time employers have become important initiators of the transformation. Back in September 2015, a Memorandum on the establishment of the Coalition of STEM-education was signed. It is known that powerful giants, including Ukrainian companies and global brands (Kyivstar, United Minerals Group, SE NAEK Energoatom, Samsung, Microsoft Ukraine, etc.) joined the reform of education as partners. Separately, it should be noted that the leading Ukrainian universities, in particular in the field of polytechnics, have also come up with similar initiatives. Thus, the innovative potential of STEM is developing in Ukrainian education, given the level of interest in its implementation. However, we note that the financial difficulties associated with military destruction and Russian aggression may become an obstacle to such optimistic plans. We are talking about considerable material losses, for example, in Kharkiv, one of the most powerful scientific and production centers in Ukraine. The continuation of military operations may lead to a brain drain, a withdrawal of investments in technological production, etc. However, the desire to invest in and support education in Ukraine testifies to the optimism present in society. Consequently, we believe that STEM-education technology should be widely implemented in higher education in Uzbekistan.

Principles of Future Schooling: A Generalized Description

The current world is characterized by a gradual change in the paradigms of schooling. The actual tasks at this stage of training are not only to acquire and assimilate a certain amount of knowledge in a well-regulated list of disciplines. We are talking about the possibility of laying the foundation for a future successful career, for which it is necessary from a young age to master the solution of complex problems, to be able to manage their emotional background, resolve conflicts, cope with stressful situations, etc. (Protsyk, 2020). Accordingly, one of the main directions of this sector's reform is considered to be the problem of updating the content of education, focusing on the development of necessary and useful

competencies and “soft skills” (it is said not only about the paramount importance of knowledge acquisition, but also the formation of skills for their application) (Herţanu, 2020).

In today's world, digital technology has become extremely important. Accordingly, almost any information can be retrieved from the Internet, for which the student does not even need to leave his own home. At the same time, the use of unverified information is harmful, because it can lead to the formation of misconceptions about certain objects (Ehlers, 2019). In such circumstances become critical thinking skills, are the ability to quickly and qualitatively look for and find cause and effect relationships between phenomena, events, and people's reactions. We can add to this list the importance for students to be able to propose their own hypotheses, defend them against criticism, prove their own rightness, work on possible alternatives, and generally think independently, relying on evidence rather than emotion.

At the same time, the ability to use one's knowledge in practice also requires mastery of certain social-emotional skills:

- empathy or the ability to empathize cognitively;
- teamwork with clearly defined roles;
- planning, development of discipline;
- communication;
- emotional resilience; is the ability to clearly understand one's state of mind.

The decentralization of the market for educational resources will also help in the implementation of changes in teaching strategies. It is proposed to create conditions for teachers in which they are given much more freedom in the choice of textbooks, manuals, and other didactic materials. The usual diktat of the relevant ministries should become a historical phenomenon, which will affect reality. Government agencies must provide financial support for the formation of full-fledged educational and methodical sets, the content of which should include not only textbooks but also teaching materials for teachers, and a set of digital resources. The latter requirement is dictated by the realities of the time - and not only the development of technology but also possible quarantine measures associated with the COVID-19 pandemic.

One of the important points being emphasized in European countries and the United States is the qualification of school teachers. One possible way for teachers to adapt to the new conditions is to develop updated training standards for the profession. The implementation of this point implies a radical renewal of the training programs for educators. in particular, taking into account the competencies necessary for the current state of the profession (Ehlers, 2019). These measures, however, must be combined with the introduction of incentives. For example, in Ukraine, as a post-Soviet country, it has been proposed to increase the pay of school teachers. The ultimate goal of such a step is to be able to attract the best young professionals to work in the industry. Regular professional development is also needed to improve the situation. At the same time, such a decision provokes a problem - will professional development take place at the expense of educators, or will it be financed by educational institutions (ultimately, the national budget)? The mechanism used is not clearly defined. In France, for example, the costs are covered by the state budget, in Germany, the main burden is borne

by the individual states, while in the United States teachers improve their qualifications often at their own expense - with the possibility of later reimbursement. In formulating recommendations, the specifics of the local educational environment must certainly be taken into account.

Education for Sustainable Development - the latest learning concept

For some time, education for sustainable development has had the character of a separate strand of learning that was a property of education itself, defining its objectives and the means of realizing inclusive, equitable, and high-quality access to learning opportunities. Education for sustainable development was becoming a powerful transformational force because it needed a new focus for the development of the whole keystone (Laufer et al., 2021). This required a new framework for teaching and learning, a process that could not be considered a mere addition to an already functioning system of educational organization. In this way, education for sustainable development became a new educational idea that looked to the future.

Probably, its main feature was an anticipatory character, focusing on the formation of critical and systemic thinking of higher education applicants, as well as the analysis of local features of society development (Herţanu, 2020). Researchers believe that, as of today, there is no single universal global model of learning in the framework of sustainable development. At the same time, even given clear and defined goals, each country and each region has its educational approaches, taking into account economic, religious, and cultural specificities.

The most integrated education for sustainable development in the learning systems and pedagogical practices of a small number of countries in Northern and Western Europe and North America. For example, a short list can be summarized as follows: Finland, Canada, Netherlands, Sweden, Norway, etc. Overall, only one in three EU member states can boast of such an achievement. Educational activities here are characterized by the availability of national strategies, plans for education for sustainable development, a fairly extensive network of educational institutions, etc. Thanks to this direction, young people receive the formation of systemic values and the necessary transversal skills - the identification of their sustainable development and behavior in society is performed by applicants for higher education without the imposition of certain systematic knowledge and norms of behavior by teachers. In addition, educational and methodological support, which is carried out in the national language at all levels of education in a comprehensive and subject-oriented manner, is generally available.

In most post-Soviet countries, in particular, Uzbekistan, education on sustainable development is recognized at the state level, but the financing of its development is rather insignificant. First of all, the sources of funding are international organizations, non-profit charitable institutions, etc. The countries of the post-Soviet camp do not use common institutional and interdisciplinary approaches to the implementation of this sphere in educational institutions, often resorting to manipulation. In addition, the norms of this progressive methodology of organizing an entire educational sector are not supported by special training of teachers, heads of educational institutions. A low number of educational and methodological materials, there is too little research related to the implementation of progressive technologies at the state level.

Distance Learning – a Key Element of the Education of the Future in Uzbekistan?

This is the question the authors of this article ask themselves when exploring the phenomenon of future educational development. The Covid-19 pandemic has shown that digitalization of the educational process will be an indispensable companion to the transformation of the educational field. The experience of introducing distance learning during the Covid-19 pandemic is valuable, given the possibilities of improving the future of online education in Uzbekistan. Note that televised classes were conducted for schoolchildren throughout the republic (Abdullakhanova & Alimatova, 2020). Such lessons were conducted in Uzbek, Russian, in Karakalpakstan, also in Karakalpak languages. They were broadcast on state channels, particularly Nat Geo Wild and Eurosport. To reach as many students as possible, Uztelecom provided access to educational channels for all students. At the same time, video lessons also became available on other platforms, in a particular mover.uz, youtube.com, Uzedu online maktab.

Universities during the Covid-19 pandemic have completely switched to distance education. In particular, the dist.edu.uz portal was specially developed to bring together all useful resources. On the other hand, higher education institutions also worked on their own online education platforms. At present, online lectures, seminars, and practical classes were actively conducted through video conferencing in such resources as Big BlueButton or Zoom (Siddikov, 2021).

However, distance education in Uzbekistan has demonstrated certain shortcomings. In particular, the key disadvantage of distance learning is unequal access to modern technology among students. First of all, we are talking about those who live in remote areas of the republic. For this reason, such students will lag behind their peers (Abdullakhanova & Alimatova, 2020). Another characteristic disadvantage of this educational system is its social isolation. Educational institutions have always been a place of social interaction, and distance learning makes them very closed, which in the end can have a bad effect on the mental health of students.

Consequently, we believe that the concept of distance as a key element of the education of the future requires a weighty improvement, based primarily on the formation of special conditions for its development (Laufer et al., 2021). competence of teachers, improving their skills.

Discussion

As we have been able to establish, the development of modern educational technologies and methods in Uzbekistan is proceeding at a rapid pace. At the same time, “catching up” modernization leaves many problematic issues open since not all aspects of such a movement forward can be calculated at once. We are talking about individual legislative initiatives, reactions to their implementation, and the traditional conservatism of the teaching community. Therefore, the problems on the way to qualitative changes can be the fact that in today's world the rate of transformation of public life (including education) is extremely high. The COVID-19 pandemic has demonstrated the latest direction of its shifts: the dominance of distance education, the digitalization of the learning process, the demands of new teaching work criteria. Not all of these problems can be solved by the Uzbek experience - for example, providing educational institutions with all the necessary means of technical communication is a problem that is difficult to solve in general.

At the same time, we believe that the concept of distance learning as a key element of the education of the future requires significant improvement, based primarily on the formation of special conditions for its development. First of all, we are talking about the formation of pedagogical conditions, improvement of methodological principles of digitalization of education, development of information and technological competencies of teachers, and improvement of their qualifications.

However, distance education has its own advantages. It equalizes the opportunities of applicants for education from different parts of the country in access to sources of information - lectures and practical classes. At the same time, it provides the formation of independent work skills, which are extremely valued today not only by teachers but also by potential employers. Formation of individual educational trajectories, the introduction of education for sustainable development, emphasis on creativity and the ability to dispose of knowledge, not just to have it - all this creates the preconditions for the following transformations.

We believe that in the future it is necessary to develop the concept of Europeanization of Uzbek education, to introduce modern methods, forms, and techniques that are used in European educational institutions. It is especially important to further develop methods that are based on the principles of humanization, the democratization of the educational process, and the formation of an individual educational trajectory. Another aspect of the modern development of educational technology should be the orientation of the acquired skills for practical use. For this reason, STEM education, the principles, and methods of which are actively used in Europe, seems relevant. In Uzbekistan, we propose to spread innovative methods of STEM-education in a comprehensive way, to combine the capabilities of all participants of the educational process (including employers) to form the necessary modern, relevant competencies in students, which may be useful to them in the future.

Conclusions and Implications

So, the main New Year principle of the development of Uzbek education is the Eurocentric branch of education and science. Of particular importance in the practice of European education is the use of innovative technologies. They are formed based on personality-centered learning, humanization, democratization of pedagogical relations. In addition, some methods are aimed at the formation of an individual educational trajectory, which in turn allows students to focus on practical work. Of particular importance in the European system of education are self-education, mobility of educational programs, academic mobility of students. We believe that the above principles should be widely applied in the education of Uzbekistan. To this end, noticeable attention should be paid to updating the content of education, focusing on the development of necessary and relevant competencies and the so-called “soft skills”.

A new aspect of education development is the leading principle, as well as the emphasis on the formation of critical and systemic thinking. We believe that this can be realized through education for sustainable development. As we have found out, the digitalization of education is another principle for the development of education of the future. At the same time, distance education in Uzbekistan requires significant improvement based on the formation of special conditions for its development. The key recommendations for the implementation of digitalization of education in Uzbekistan are the formation of a system of relevant pedagogical conditions, improvement of methodological foundations, the introduction of modern technological solutions, continuous professional development of teachers, and improvement of the system of lifelong learning.

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FUTURITY
Education

DOI: https://doi.org/10.57125/FED/2022.10.11.30

How to cite: Sherman, M., Puhovskiy, E., Kambalova, Y., & Kdyrova, I. (2022). The future of distance education in war or the education of the future (the Ukrainian case study). *Futurity Education, 2*(3), 14-23. https://doi.org/10.57125/FED/2022.10.11.30

The Future of Distance Education in War or the Education of the Future (The Ukrainian Case Study)

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Received: June 4, 2022 | **Accepted:** July 15, 2022 | **Published:** September 25, 2022.

Abstract: The purpose of the publication is to analyze the future of distance education and determine whether the appeal to it is temporary, or whether it is mandatory and motivated. The following methods were used for writing: analysis, synthesis, induction, and deduction. Based on the comparative method, the principles of using digital platforms in Ukraine and the USA, Ukraine and France, etc. are compared, since the experience of using such a system in these countries confirms the effectiveness of modern distance education. In the results, a number of problems were analyzed, in particular, the general importance of distance education for the educational process was highlighted, the importance of asynchronous learning was demonstrated, the experience of using online platforms was analyzed, and certain recommendations were formed for the development of distance education against the background of military aggression. The conclusions summarize that distance education in Ukraine under the conditions of a full-scale Russian invasion is aimed at the following categories of students: persons who are forced to temporarily live in other regions of Ukraine, persons living in the occupied territories, or outside the borders of Ukraine.

Keywords: distance education, future, Russian-Ukrainian war, prospects.

Introduction

The widespread introduction of distance education has been the subject of much discussion since the beginning of the COVID-19 pandemic when educational institutions in many countries began to operate via the Web. The progressiveness of this way of conducting classes has not yet been determined, which makes this issue very relevant for research. It is especially important for the Ukrainian educational context, where the spread of the global disease was combined with the beginning of a large-scale Russian invasion in 2022. The consequences of active military actions for the development of educational technology is not fully clarified, if only because the European countries in the XXI century did not face such threatening challenges.

Since at present distance learning based on information and communication technologies is used at all levels of the educational process, it affects the emergence of a variety of pedagogical research on the conditions for the use of distance education. For example, Demiray (2017) analyzed the specifics of the use of online distance platforms in modern education. He believes that the circulation of other digital technologies in the modern day is a noticeable “tsunami” that has transformed industry of education. Kem (2022) described the main popular personal and adaptive digital platforms used in international distance education systems. At the same time, Ungerer (2019) described the role of e-learning for today's youth and the key advantages and disadvantages of using distance learning in universities. The author characterized the significance of the COVID-19 pandemic for higher education. He focused especially on the analysis of new information and communication technologies. At the same time, the author investigated the problem of the effectiveness of distance learning in the context of the pandemic. At the same time, Ayoub et al. (2020) investigated the key advantages and capabilities of Coursera, a global platform for distance learning. On the other hand, Lopes & Soares (2022), through the prism of multimedia, characterized the features of online learning applications, characterized the main information mechanisms used in E- learning. Despite this, they note that distance education contributes to the emergence of a variety of educational innovations. Valuable to this study is the work of authors who have characterized the problem of using distance learning in war. In particular, Rajab (2018) explored the characteristics and conditions of online learning use in the Saudi Arabian military realities.

At the same time, Kretzmer and Ronen (2021) investigated the state of education in the occupation territories through legal aspects. Gordon (2022) characterized the problems of university education in the context of the war in Israel.

Research Problem

The study of distance education based on the experience of a country in a state of open war has not been explored in contemporary European and American pedagogical opinion. Since there were no such precedents in the XXI century. For this reason, the search for answers to the challenges of distance learning in Ukrainian reality may become a certain matrix for solving similar situations in other states. Thus, such an analysis is an important research problem, which so far has not had synthetic solutions.

Research Focus

The main attention of the authors of the article is turned to the complex problem of distance education functioning in Ukraine from 2019 (the beginning of the Covid-19 pandemic) to the decisions made already during the Russian-Ukrainian war in 2022. This work will be useful to theorists and practitioners of pedagogical science, who, based on the results of this study, will be able to obtain material for the discussion about the future of distance education in general.

Research Aim and Research Questions

Professional literature offers an overview of several aspects of the broad problem, but there are no synthetic studies summarizing the projected effects of the war on the development of educational processes. Therefore, the purpose of the article is to analyze the productivity of distance education under conditions of war based on the Ukrainian experience. The paper investigates the following issues: the importance of distance education for the educational process, the importance of asynchronous learning, the analysis of educational platforms in online education under conditions of war, the specifics of the use of distance education in Ukraine, the formation of recommendations for further development of distance education based on the study of the situation in Ukraine.

Research Methodology

The work is built on the use of general scientific logical research methods. Among them, we will distinguish analysis, synthesis, induction, and deduction. Based on the analysis managed to divide the main subjects of research (the future of distance education) into smaller parts (characterization of the phenomenon of distance education, research advantages and disadvantages of this type of learning, predicting the future position of online education in Ukraine). By means of synthesis, it was possible to combine the previously highlighted parts and form their own judgments and conclusions. Based on the application of a systematic method of research, the phenomenon of distance education is considered as a complex system consisting of many elements. Special pedagogical methods were also used in the present study. From theoretical pedagogical methods, abstraction and concretization were used. Based on the comparative method the principles of application of digital platforms in Ukraine and the United States were compared, as the authorities of these states provided official empirical materials confirming the effectiveness of modern distance education. Based on the comparative method the problem of the use of online education in Ukraine, the USA, and France is compared. In addition, the article applies the axiomatic method of research. It implies a transition from general theoretical considerations (general characteristics of the distance education phenomenon) to the formation of specific recommendations

and conclusions. Based on the prognostic method further, probable use of distance education in Ukraine is reflected. Also, the article is formed on the application of the statistical method, which consisted in a thorough analysis of data (official documents of the U.S. Department of Education, Ministry of Education and Science of Ukraine). Consequently, the conclusions in the work are based on reliable empirical materials of official nature. Note that the article is built on the use of methodological principles of consistency, scientificity, and objectivity.

Separately, we should mention the method of SWOT-analysis, which has been used since the 1970s for a multifaceted analysis of entrepreneurial activity and the formation of estimates of the state of the enterprise and future threats. This method has not lost its relevance to this day. Its essence - identifying the strengths and weaknesses of projects, the calculation of risks, and future development based on the use of comprehensive analysis. The versatility of this method does not require complex calculations - you only need to adequately and clearly assess the external and internal impact factors.

Research Results

Distance learning is an educational process that provides the possibility of educational interaction between a teacher and a student at a distance. At the same time, there is an application of modern information and communication technologies and opportunities. Distance education includes three main aspects: 1) the possibility of learning regardless of geographic location; 2) determining the pace of learning; 3) the ability to set your own curriculum. At the same time, the need to analyze the possible advantages and disadvantages of distance education became urgent in the era of the COVID-19 pandemic (Lopes & Soares, 2022). This process manifested itself in a continuous transition to synchronous (in particular, Zoom, Skype, Microsoft Teams, Google Meet) or asynchronous platforms (LMS).

At the same time the introduction of online technologies in the educational process promotes the use of such activities in the educational process as the organization of various video conferencing, viewing lectures or practical classes both live and in recordings, working on discussions in forums, activities with shared documents (talking about Google Docs, Google Slides), organization and conducting various online queries and voting (based on Google Forms platforms), the ability to conduct autonomous testing, viewing various training videos Note that modern information and communication technologies facilitate the use of various private activities in the online form, in particular, to organize collaborative activities, as well as to use project approaches. Not all teachers and professors are ready to transform into work on themselves and their programs, but this way looks very promising. For example, in order to divide students into mini-groups, it is convenient to use the session room function in the Zoom app (Pinheiro & Santos, 2022). To organize online learning, it is necessary to use an appropriate learning management system (Lopes & Soares, 2022). For example, the Lviv National University has implemented this on the Moodle platform. In comparison, the University of Pennsylvania uses the Canvas platform. Another popular space in the U.S. is Blackboard. These platforms are convenient and functional. Here you can conduct a variety of controls for students in the form of tests, descriptive questions, or interviews. On the Moodle platform, teachers can also display their lecture or seminar materials for all students. Note that the Moodle platform used at Lviv National University is personality-oriented, where each student can review his or her own score and use individually the materials provided by the instructor. At the same time on the Canvas platform teachers can also publish materials, update them systematically, organize quizzes, hold discussion forums, etc. (Pinheiro & Santos,

2022). The distance learning process is built on the use of various information and communication technologies. Upon completion of such training, students and pupils receive appropriate certificates. Despite this, there are different models of distance learning in Ukraine (presented in Table 1.)

Table 1

The Main Models of Distance Learning in Ukraine

Distance learning models in Ukraine
1. Training with the use of multimedia programs
2. Based on autonomous learning systems
3. Cooperation of different educational institutions
4. Distance learning in the university
5. Distance learning in autonomous educational institutions
6. Based on of independent learning of the studied material

Source: Adopted from Ministry of Education and Science of Ukraine (n.d.).

Distance education in Ukraine is focused on several categories of students. First of all, we are talking about children affected by war and forced to temporarily reside in other regions of Ukraine or outside the state. Also, distance education may also be oriented toward students who live in hard-to-reach or geographically distant places from educational institutions (Kuzio, 2021). Children living in the occupied territories (in particular, in Crimea or some territories of the Donetsk and Luhansk regions) can also study in distance education institutions (Ministry of Education and Science of Ukraine, n.d.).

It should be noted that in the development of Ukrainian distance education an important place was given to asynchronous learning. This type of educational activity is implemented through the use of online channels (e-mail correspondence, classes on television, special educational platforms using web-technologies), but without direct contact at the teacher-student level. Asynchronous learning does not involve real-time communication but is based on the individual pace of processing learning materials (Ayoub et al., 2020). The experience of France has become important for European countries. In this country, there is a special National Center for Distance Education (abbreviated – CNED), whose specialists organized the work of a special learning platform "My Class at Home" (Ma Classe à la Maison), the basis of which consists of several components. First, students are invited to receive assignments in a learning module called "Terminal". It contains all the curriculums on which the educational process takes place, and students can visit it several times a day, individually checking in on a special questionnaire every day. The next part of "My Home Classroom" is represented by a synchronous "virtual classroom" in which the teacher conducts classes for students via videoconference. Each day, students are offered a class of 3-4 hours in various subjects that can be attended. Undoubtedly, the practices of synchronous and asynchronous studios are different, but these forms of learning depend on each other and contribute to the diversity of the distance learning process (Cherng et al., 2019). It is about information and communication technologies that allow students and teachers to communicate, work on problem-solving, monitor attendance, and conduct assessments.

The Ukrainian experience of asynchronous distance education is more modest, at least it does not have a long tradition of use. The COVID-19 pandemic entailed a transition to partial homeschooling, where asynchronous education methods were needed. Several trends have been negatively impacted: lack of digitalization of high schools, lack of internet access in remote locations (Rajab, 2018). The lack of experience with asynchronous learning has led to some chaos for learning organizations. Due to the poor quality of the Network in some areas of Ukraine, it was decided to conduct classes on television. This pioneering decision for Ukraine was faced with inconsistency in the work of TV channels - almost every Ukrainian TV channel wanted to join the initiative, and different lessons were broadcast in parallel, making it impossible to study all subjects. Later, a certain order was established, and each TV channel broadcasted lessons for a certain age group of students. To popularize the project, celebrities, and capable teachers were invited. True, it did not do without criticism.

Based on the processing of proposals, the Ministry of Education and Science of Ukraine created a separate platform, the Ukrainian School Online. Its functionality is similar to the French samples. Students are offered a choice of video lectures by leading teachers of Ukraine. The lesson materials correspond to the curriculum, and registration opens up the possibility of processing tasks based on the information contained in the textbooks and short video lectures. This significantly increases the coverage of students, because the lessons and assignments can take place at any time. An important aspect, however, remains parental control, because, in the context of distance education in the Ukrainian realities, it is them who have the additional responsibility to control the educational process (Lash et al., 2022).

Applicants for higher education under martial law have also switched to distance learning. Even since COVID-19, classes at Ukrainian universities have taken place predominantly through distance learning. In particular, to control knowledge, as already noted, the platform Moodle was used, which also developed e-learning courses, which, combined with a video lectern, created a favorable atmosphere for learning. A wide range of Ukrainian educational portals and platforms offering additional courses that would be useful for self-development and development of one's professional skills were also available for future specialists. For example, Prometeus offers a considerable set of online courses, partial access to which is free. Thanks to the active use of this platform, personal development and learning on an individual trajectory is possible, which is valued by modern stakeholders (Kem, 2022). Undoubtedly, the basic functionality of this site is not free, but in today's environment, it offers truly relevant courses of one's own choosing. If necessary, you can use materials from other platforms (Pinheiro & Santos, 2022). This, by the way, significantly distinguishes distance education opportunities for adults from distance education for school-aged children: the choice of educational material for student use is much wider than for school-aged children. This trend is expressive today and will require some resolution in the future.

The development of distance learning also contributed to the use of the project method. This method of teaching appeared in the U.S. in the twentieth century, but in Ukraine began to be used actually only after the collapse of the USSR. Free elaboration of the chosen subjects, fulfillment of the corresponding tasks form the necessary skills and competencies which will be necessary for continuing work experience as well as for mastering another specialty. The effectiveness of this method has been proven by Ukrainian researchers at least since the quarantine and pandemic COVID-19. It was found, in particular, that its effectiveness remained at the same high level as in the conditions of traditional training (Ayoub et al., 2020). However, for its wide application, there is a need for self-discipline,

organization, and teacher control (Ungerer, 2019). Active application of the project method in Ukraine under wartime conditions looks like a promising way to teach higher education applicants in the near future (Pinheiro & Santos, 2022). Note that during the active phase of hostilities, under conditions of Russian aggression, the asynchronous form of training becomes an important element for conducting and organizing training activities. In the border regions of Ukraine adjacent to the theater of military operations, it is impossible to organize the usual learning process - the risk of artillery and rocket fire from the Russian army is too high. Therefore, distance learning methods are more reliable, which, in particular, will make it possible to "return" to education those children who, due to various circumstances, have become displaced persons and reside in other regions of Ukraine. Asynchronous learning will also be useful but will require improvement. The use of the All-Ukrainian online school, Prometeus system, etc. looks promising in the field of regulation of educational processes (Ministry of Education and Science of Ukraine, n.d.). Thanks to these and other platforms, pupils and students will have access to educational materials, which will not reduce the quality of education. In particular, based on the Arab experience it was found that the decline in the quality of education using the distance learning process is not recorded. Although there is not enough data to calculate the Ukrainian statistical indicators to date, a future study of the Ukrainian experience of use will demonstrate the effectiveness or vulnerability of this technique in conditions of not just a territorial conflict or insurgency, but when regular armies clash. The possibilities of distance education in the reality of Ukraine can also be summarized in the form of SWOT-analysis (presented in Table 2)

Table 2

Opportunities for Distance Education in Ukrainian Realities based on SWOT-Analysis

Demonstrated benefits of distance education in Ukraine	Problems of using distance education in Ukraine
1. The use in combat situations of the experience of distance learning acquired during the "domination" of the COVID-19 pandemic.	1. Difficulties with Internet access in some regions of the country, in particular in frontline and occupied territories.
2. A broad toolkit of training practices that is as good as traditional training methods.	2. Difficulties with control over the performance of tasks (despite all the possibilities of current control and parental control).
3. Availability of digital learning platforms with generated content	3. Unwillingness of some teachers to improve themselves and develop methods of work in the online environment.
4. Safe reasoning, avoiding the accumulation of large numbers of children in one place vulnerable to artillery or rocket fire by Russians.	

Source: Formed based on the author's analysis.

Consequently, distance education in Ukraine has its disadvantages and advantages, which are more indicative of its high potential and further development. We believe that as a result of reforming some aspects of the educational process, distance education will receive more attention in the future.

Discussion

The use of distance education in the face of unfolding military aggression by the Russian Federation seems to be the only correct solution. Russian strikes against civilian sites in eastern and southern Ukraine using tactical aircraft and missile systems make traditional education almost impossible (Aladekomo, 2022). The destruction and complete occupation of about 200 educational institutions (schools) and partial damage to about 2,000 more educational institutions have been confirmed (Ghilès, 2022). At the same time, at the official level, the Ukrainian government is discussing the possibility of conducting classes as usual. This step is justified by the importance and effectiveness of traditional education, as well as by the norms of the security situation - a school bomb shelter would be better for children who are in a dangerous city than sitting out shelling at home. At the same time, the final decisions on the possibility of restoring ordinaries will be made by local authorities and parents (it is said whether they will let children leave home). In practice, under the threat of shelling, the use of distance technology is much more effective.

Representatives of the Ukrainian authorities argue that the resumption of instruction is only possible if all safety rules are observed and if there is a system of bomb shelters at the educational institution that can accommodate and protect all who study in the institution. In addition, it is only envisioned that traditional education will take place once hostilities have been settled or ceased, so it is not yet known what kind of education will be offered in the new school year. All these precautions in their own way testify in favor of the fact that distance education in the future in Ukraine will occupy the main place among the methods of organizing the educational process. Obviously, under conditions of open military aggression and the continuation of military operations, it will be the only option for continuing education. The only exceptions are the rather “peaceful” regions of Ukraine. In particular, the western regions sustained incomparably less physical damage - only as a result of pinpoint rocket attacks. However, remembering the tragedy in Vinnytsia, when Russian missiles destroyed an office center with peaceful people, the risk factor should always be taken into account during the training

At the same time, thanks to its versatility and the possibilities developed as a result of the COVID-19 pandemic and the worldwide “quarantine”, distance education is not inferior to full-time education. Representatives of the Ukrainian public appreciated the advantages and disadvantages of the distance system, so its use in the future seems to be a progressive step.

Conclusions and Implications

So, the large-scale use of distance education technologies began with the spread of the Covid-19 pandemic. At the same time, after the full-scale Russian invasion in February 2022, there was an urgent problem of resuming online education in Ukraine. Distance education in Ukraine in the conditions of military operations is focused on several categories of students. First of all, we are talking about children forced to temporarily reside in other regions of Ukraine or outside the state. Children who live in the occupied territories can study in distance institutions. We believe that in the conditions of military action, distance education allows schoolchildren and students to study effectively. At the same time, at the initiative of the Ministry of Education of Ukraine, UNESCO, and other non-governmental

organizations there are many platforms for additional online learning for both students and schoolchildren. An important condition for the functioning of distance education in Ukraine is its adaptation for children of primary school age. Based on the analysis it was possible to establish that in the conditions of the continuing confrontation, Russian shelling of civilian objects with rocket and artillery weapons the use of distance education technologies is relevant. As the Ukrainian experience of using distance education in the conditions of war shows, this method of organizing the educational process is almost without alternative. The aggressive actions of the Russian army and the threat of shelling of educational facilities make the traditional work of educational institutions difficult. Consequently, for Ukraine in the near future, distance learning is an integral part of education of the future. We predict that in the future distance learning mechanisms will only improve, which will affect the spread and development of online education in general.

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FUTURITY
Education

DOI: https://doi.org/10.57125/FED/2022.10.11.31

How to cite: Almahameed, B., & Al-Saraireh, M. (2022). Preparation of future specialists in civil engineering: innovative standards for future education. *Futurity Education, 2*(3), 24-34. https://doi.org/10.57125/FED/2022.10.11.31

Preparation of Future Specialists in Civil Engineering: Innovative Standards for Future Education

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Received: Jury 22, 2022 | **Accepted:** August 1, 2022 | **Published:** September 25, 2022.

Abstract: The main vector of professional activity of specialists in the field of civil engineering is the improvement of living conditions in society. Realizing the importance of this sphere. To support the economy and competitive ability of the country, we seek to assess ways to improve the qualification capabilities of future specialists in this field. The actual modernization of the educational process and the use of innovative standards will contribute to the improvement of engineering education and, consequently, the professional activities of the latter. This article presents an analysis of the leading innovative standards in education and their specifics in the context of Jordanian higher education. The

deductive-axiomatic method was applied in processing this topic: a fragmentation of the subject under study (the problem of distance learning, analysis of the latest teaching methods, trends in Europeanization of academic education, the problem of educational institutions management and interdisciplinary training of future specialists) was carried out. Besides, using the methods of abstraction and concretization, it was possible to form a model for improving the efficiency of the educational process for future civil engineering specialists. The empirical component of the study consists of a closed questionnaire survey. The method of student learning assessment (SET) was used. According to the results of the conducted research work, it can be noted that an effective direction of development for engineering education in Jordan is the formation of a new methodological basis and mastering of digital technologies. The European system of academic interaction, according to which decentralization trends are necessary, should serve as a reference point for educators. Recommendations on how to integrate certain elements into the existing system of professional training of civil engineers are presented.

Keywords: civil engineering, educational innovation, learning process, innovation management, student evaluation of teaching (SET).

Introduction

The leading industry in the context of the processes of gradualist development of the state is civil engineering, which determines the possibility of the successful functioning of the overall economic system. It is noteworthy that this movement is significantly transformed in the context of globalization processes. In particular, taking into account the increasing competitiveness in the international market, the spread of modern methods of research and production activities, and the modernization of technical support of engineering as a sphere in general. These changes necessitate a prompt and expedient restructuring of the educational process. As the basic prerequisite for supporting the production process at a proper level, in qualitative and quantitative representation, is the provision of qualification training for professionals of a certain direction. The general paradigm of the education of the future, above all, refers to the necessity to train experts of the future, in particular, in the field of civil engineering. It is noteworthy that both the requirements for the teachers: in terms of acquired skills and knowledge, and for the teaching staff of the higher school are significantly changing. Civil engineering education now follows the general narrative of Jordan's educational system. The commitment of educators to adapt to the current context is quite formalized, but at the level of educational institutions, this need is difficult to realize (Hassan et al., 2021). In particular, this problem acquires clear features in the context of the COVID-19 pandemic, illuminating the failure to prospectively assess the learning process (Zabalawi et al., 2020).

Research Problem

Developing the potential to implement innovative education standards for Jordanian higher education is a field presented exclusively in the theoretical research dimension. Determining the most feasible innovations and methods of their implementation, as well as the likely effect on civil engineering educators serves as the basis for an overall reform of the higher education system in the state, which is actualized and necessary in the current context.

Research Focus

The study aims to highlight the most expedient ways to improve the quality of qualification training of civil engineers. It is noteworthy that during this study it is important to refer not only to theoretical sources but to take into account the evaluations of the participants in the educational process on this issue. In addition, this approach allows us to assess the likely results of implementing appropriate methods in Jordanian higher education.

Research Aim and Research Questions

The leading task of the work is to determine the field of further development for technical higher education, in particular, in the field of educational and professional support for future civil engineers. Accordingly, we aim to highlight the current needs of the student community, determine the attitude of the teaching staff towards innovative methods of work, and evaluate statistical data on the effectiveness of approaches in the context of the educational process. Thus, it will be possible not only to crystallize the way of gradual updating of education but also to take into account the psychological and pedagogical components of the transition to the educational paradigm of the future.

Research Methodology

General Background

The chosen subject of research requires fragmentation and concretization, given the sufficient breadth of the topic. Accordingly, we use general scientific methods, in particular, deductive-axiomatic, methods of abstraction and concretization. Accordingly, the highlighted components of the process of updating the educational model of Jordan need additional empirical refinement. Thus, such methods were chosen as a closed questionnaire survey according to the Students` evaluation of teaching (SET) methodology, to identify the leading shortcomings and areas of development from the position of higher education applicant (Young et al., 2019); focus group interview method, to establish leading obstacles and advantages considering the activities of teaching staff and method of theoretical processing of predecessor sources, in accordance with the methodological principles given above.

Sample / Participants / Group

The surveys and interviews underlying this work were conducted in the engineering departments of Amman and Irbid institutions of higher education. The respondent groups formed (faculty and students) numbered 93 and 1,012, respectively. The online survey was conducted voluntarily, students were guaranteed confidentiality and anonymity to increase the motivation of the latter. Information about the student body was collected between December 29 and July 23, 2022. The response rate for the survey is 44.2%. Faculty focus group interview sessions were conducted between December 10-14, 2022. All participants expressed an independent desire to join the research program.

Instrument and Procedures

The tools can be differentiated by the type of information obtained: for the qualitative component of the study the method of the focus group was used, and the quantitative representation of the data was formed using a closed questionnaire survey. Accordingly, for the focus group. an interview plan was developed, which included the identification by teachers of the leading criteria for the development of

the actual educational process. The second component was the SET questionnaire. A modified form was used, which included the main aspects of the relevant subscales: course evaluation and teaching effectiveness, as well as an assessment on a 6-point Likert scale of the main categories previously identified during the focus group with the teachers. Note that we used the 6-point Likert scale included in the SET form (Işik, 2022) to determine the degree of implementation of trends in educational institutions at the moment, as well as the significance of the latter for students. Accordingly, a percentage representation was formed based on the results obtained. Teachers were evaluated using a similar method. In addition, additional teachers' comments were taken into account when processing the data obtained. Given the length of the text, the questionnaire and plan for the focus group interview are not given but are available upon request. A quantitative representation of the results of the empirical phase of the work was worked out using descriptive statistics and single-factor analysis of variance (ANOVA).

Research Results

Based on the results of data analysis using the descriptive statistics method and taking into account qualitative data, we can provide certain generalizations regarding educational needs and trends in Jordanian civil engineering. Thus, six main vectors of a new educational tradition have been identified, which correspond to an innovative approach and are necessary for engineering education from the perspective of the teaching staff and students of this specialty (Table 1). The teaching staff notes the need to implement such standards as decentralization, recognition of the academic community, modernization of technical support, and dissemination of LMS-systems, as well as the need for interdisciplinary training. At the same time, students emphasize Eurocentrism (the need for international academic interaction), the transformation of educational strategies (the use of the serious game, smart classes), the modernization of LMS-systems. As we see the question of the use of distance learning systems is actualized by the situation of quarantine restrictions due to the COVID-19 pandemic. At the same time, other aspects relate to the procedural characteristics of the educational process and are essential in the context of the effectiveness of the formation of professional competence.

Table 1

Innovative Standards for Civil Engineering Education of the Future

Category	**The trend in teachers' evaluation**	***Indicator of importance for students***	***Implementation rate***
Using LMS-systems	0,51	0,73	0,43
Gamification	0,22	0,63	0,18
Eurocentrism	0,43	0,37	0,22
Interdisciplinarity	0,55	0,29	0,78
Decentralization of educational institutions	0,67	0,29	0,54

Transformation of academic community image	0,78	0,20	0,21

Source: author's development.

First of all, let us note that the obtained values reflect the ratio to the conditional unit. Accordingly, we can give prognostic conclusions regarding the pronounced desire of more than half of the students for gamification of the educational process, as well as the use of learning management systems. On the contrary, we can note that teachers tend to rate the use of serious game and digital tools as the least meaningful way to enhance learning. The assessments coincide with the use of LMS-systems as a promising direction in the current limitations, as well as a relatively moderate need to focus on Western educational traditions. Let us also note that the obtained empirical results correspond to the concepts presented in scientific publications of this problem field. A significant exception is the category "Transformation of Academic Community Image", which probably refers to the research aspect of higher education institutions. Therefore, excluding the latter, we will provide specific clarifications on each of the presented categories, taking into account the specifics of Jordanian higher education.

The use of LMS-developments contributes to the adaptation of HEIs to today's challenges, as it implements the principle of accessibility of educational services. At the same time, the use of modern LMS contributes to the formation of a unified "infrastructure" of higher education institutions, which is recognized as one of the significant obstacles at this stage of their development (Zabalawi et al., 2020). The creation of a common information platform for an educational institution will facilitate the organizational components of professional activities and the formation of an academic community, the image of which will have a certain design and commonality. In addition, these systems are informative in the direction of screening the success of students. A recent trend in the use of LMS is the prediction of the effectiveness of mastering the discipline at the initial stage of teaching, which makes it possible to make timely adjustments to curricula. A sustainable channel for student feedback is a promising plane for mastery. Note also that this method is now increasingly available, as access to the log files of most new LMSs is open. Actually, a number of predictive models are presented in research publications, which are actually logs of potential educator outcomes (Riestra-González et al., 2021).

On the contrary, the disadvantages of this innovative method are expressed, in particular, regarding the ability to develop and master the systems by specialists of higher education. Notably, the common system Moodle LMS, which, in particular, is used at the University of Zarqa, is currently evaluated by educators as insufficiently functional. According to predecessor studies, the desktop and mobile interfaces are used similarly: among the features offered, students refer to 2 resources and note the need to significantly expand the functionality and add fifteen other resources to the system (Hasan, 2019).

The constellation of a large number of factors influences the possibility of widespread use of LMS in the higher education sector in Jordan. To conceptualize this process, let us turn to the technology perception model. Implementing a sustainable LMS requires the creation of an accessible platform and at the same time the accessibility of the technology provision as a whole (Al Amoush&Sandhu, 2019). This requirement challenges higher education professionals to create a unified infrastructure that meets the needs of all participants in the learning process. Moreover, the proposed system needs significant attention to issues of inclusivity. The formation of such a network of provision can be implemented in accordance with the five-year plan for the formation of digital infrastructure for the segment of public education, presented by the Ministry of Education of Jordan. However, the issue of financing in the

context of centralized educational management is relevant. The factor of readiness to accept the digital infrastructure by the employees of the education system should also be taken into account. Since the most significant factor for the integration of LMS into the existing interaction paradigm is cultural specificity, a significant effort must also be made to educate on the usefulness of IT tools for the educational process. Thus, there is a significant distance between the necessary components for effective training of civil engineers and the broader field of conditions in which their professional training takes place, requiring a global change to put the highlighted aspiration into practice.

Gamification of the educational process is also an expressed need for civil engineering educators, according to the survey results. This aspiration of students corresponds to the research results of recent years concerning the feasibility of this method (Zainuddin et al., 2020). In particular, the implementation of the serious game approach in the digital space for educational purposes is one of the areas of development of innovative learning. Since it is the educators who play a key role in the gamification process, their evaluation of this category should be taken into account. Note that the results of the presented interview are qualitative and do not indicate statistical trends in the general population. There are findings from a mass survey that Jordanian educators are interested in the use of gaming systems (Assaf et al., 2019). According to the lion's share of respondents, serious games can serve as a tool to establish a finite relationship with students, promote motivation to learn, and act as an independent edutainment technique. Despite the lack of significant experience with this development, educators note that the benefits of game mechanics in the work are significant. On the contrary, the problems described above are actualized: the lack of a unified IT infrastructure, methodological recommendations, and funding limitations. Moreover, the difficulty of evaluating the use of such technology remains unresolved. A key disadvantage is a need to develop new or integrate existing models of serious games in accordance with the educational objectives of a particular curriculum. Note that the measure of the load on the teaching staff of the educational institution in decentralization and implementation of this strategy increases quite significantly. Accordingly, the main place in this initiative should be given to developers, because serious games should realize the possibility of making adjustments by teachers, integration on different devices, being sufficiently inclusive, etc. (Schöbel et al., 2021). Let us also note that the possibility of customizing the game material will contribute to greater adaptability and interdisciplinary application of the latter, which will facilitate the implementation of this product at all levels.

Interdisciplinarity is an important principle for higher education in general, but the specialty of civil engineering requires the ability to interact with the broad architectural and engineering information field (Park et al., 2022). Forming a holistic professional competency requires a future professional to have a sustained understanding of the tangential fields. Moreover, this specialization requires involvement in macrosocial processes: awareness of research achievements at the international level, application of technical innovations, understanding of socio-economic dynamics, etc. Students' satisfaction with the feasibility of the interdisciplinary approach to professional training is now quite high.

Eurocentrism is one of the principles concerning two important aspects of the educational process at the same time. First of all, it is the desire for international cooperation and mobility of the student community. This category is significant, given the socio-economic situation in Jordan: grant support and sponsorship programs will serve as a sustainable and important foundation for higher education to flourish. Also, support for international connections ensures that educators remain included in the

current field of information, which encourages Jordanian professionals to make use of current global technical and methodological developments. For Jordan's state economy and culture, heterogeneity and interpenetrating processes in cooperation with other states are an advantage (Hassan et al., 2021). The inclusion of members of other ethnocultural and national groups in the educational system will help to infuse higher education with new traditions and methods. Such divergent thinking among educators will encourage the development of new teaching philosophies and modify the existing standard.

The second aspect of Eurocentricity is the postulation of a humanistic approach to education. Here we address the space of personal growth of future civil engineers. Since higher education serves not only as a platform for professional training but also as a significant institution of socialization, this condition should be taken into account in the development of methodological developments and strategies. As an example, let us note the specificity of the architecture of Jordanian universities: the planning of campuses was intensified and without taking into account the principles of environmentalism, respectively a large part of the cells of civil engineers is an example of the archaic, which makes it impossible to postulate the principles of future education in such a context (Winks et al., 2020).

Summarizing the main categories, we can turn to the need for internal decentralization of educational institutions. First of all, it is an important stage in the realization of the academic autonomy of an institution. In fact, the centralized approach to the management of the educational process quite often makes it impossible to implement innovative developments and slows down the gradualist development of the community. The main difficulty for a fully functioning centralized university is the low expertise of its managers, given the presence of a significant number of fluent processes that cannot be guided by one person. Accordingly, it is much more effective to distribute functions between structural subdivisions and to form responsibility cells within each of the latter. Thus, the functioning of the individual unit of the educational institution will be relatively autonomous and self-sustaining, in the context of management (Elhaija et al., 2021). For the deployment of this scenario of higher school activity organization, we can talk about the possibility of the operational embodiment of student and faculty initiatives, academic community development, and discreteness of units, which will have a unique image reflection. The question of designing strategies for the development of an educational institution remains open. Actually, this direction can be the basis for the professional realization of management.

Based on the results of previous studies, we can assume that it is decentralization that serves as the main method of achieving innovative education. First of all, the formation of an autonomous system at the unit level gives the opportunity to create a common IT infrastructure, which will require much less time and resources, in turn, such a digital substrate opens access to the use of LMS and game technologies. A separate unit has greater opportunities to prepare grants and international endeavors, but also humanistic traditions are more pronounced in a community of a smaller order. Note that the main disadvantage of this strategy is the uneven development of various scientific organizations and institutions, but the competitiveness of educators is greatly enhanced. In addition, corrupt or unbalanced budget distribution between or within units is possible. Moreover, this approach does not solve but also complicates the problem of providing interdisciplinary training for future experts.

It is also important to note that there are significant differences in SET scores for engineering education, established based on a one-factor analysis of variance (ANOVE). In particular, there is a

statistical difference between institutions with different degrees of realization of the aspects under study, which provides an opportunity to expand the deductive-axiomatic representation of the problem (Table 2).

Table 2

Significant Differences in Grades for Civil Engineering Students

Grounds	**Indicator of significance**			***p***
Implementation rate	**<0,25**	***0,26-0,74***	***>0,75***	
Using LMS-systems	0,74	0,66	0,81	0,159
Gamification	0,76	0,55	0,58	0,088
Eurocentrism	**0,58**	**0,14**	**0,41**	**0,010**
Interdisciplinarity	**0,11**	**0,23**	**0,55**	**0,037**
Decentralization of educational institutions	0,12	0,64	0,11	0,241
Transformation of academic community image	0,28	0,11	0,23	0,102

Source: author's development.

According to the results, we can testify that students studying at educational institutions with a high or low level of Eurocentricity to a greater extent aspire to embody Western educational traditions in the learning process. Let us preliminarily note that this tendency is due to the desire to modernize and follow modern trends in professional training. At the same time, the level of interest in the European educational-scientific paradigm among other teachers is much lower. An important factor, in this case, is the cultural peculiarities dictated by the geography of the institution. In addition, among the students who are more appreciative of the interdisciplinarity of professional training, the desire to implement this standard of higher education is also higher. First of all, this is due to the difficulty of mastering the value of an interdisciplinary approach, given the specific methodological foundations of this area and the peculiarities of teaching this material. Let us note that the realization of the didactic value of this category is related to the measure of its realization.

Discussion

As can be seen from the results obtained, the general trend towards the digitalization of the educational process, which is becoming more pronounced due to quarantine restrictions, meets the current needs of the participants in the educational process. Moreover, a significant modernization of technical support is needed, as evidenced by the values of the implementation of relevant educational standards presented above and the results of the evaluation of the functionality of LMS support in Jordan (Al Amoush & Sandhu, 2019). The need to create a unified IT infrastructure in the state, the development of modern educational methods for all public institutions: serious games, LMS-systems, system (interdisciplinary) approach is expressed. It is worth paying attention to the heterogeneity of methodological support of higher education, which is due to the lack of centralized interventions.

Besides, it should be noted that the training of civil engineering specialists should take place in compliance with the modern pedagogical tendencies of the European space. At the same time, it is necessary to maintain the glocalization approach to solve national-level problems, respectively, it is necessary to take into account the specificity of professional training exactly in the Jordanian context presented. To integrate these postulates, it is necessary to follow the concept of gradualist development of higher education: to promote international relations and maintain a moderate Eurocentrism, not embodied in Europeanization. But it is also necessary to promote the development of the educational space and the Jordanian community.

The question of possible ways to integrate the presented model into the existing system of higher education, methods of reconciling the needs of educators and the resource of Jordanian higher education remains relevant. In particular, we have established a significant difference between a certain degree of realization of the main categories and desirability for students and teachers. Now this distance cannot be reduced in the short term, as the current educational reforms are taking place under severe constraints and obstacles (Zabalawi et al., 2020). Nevertheless, the chosen direction corresponds to certain aspirations among educators, indicating a student-centered approach in the transformation of Jordanian higher education.

The limited resources of the education system require considerable plasticity among professionals in this field if the latter are to shape the education of the future. In turn, this makes it impossible to rapidly develop the educational tradition and master innovative approaches. Consequently, the leading issue remains the search for ways to embody certain methods of enhancing the effectiveness of civil engineers' professional training in a situation of constraints. In addition, comparative research to fill existing gaps would be an important addition to this topic. We can emphasize the need to develop a predictive model to assess the prospects for the embodiment of the above principles of innovative education. - Finish the discussion section

The main vectors of the modernization of the educational process in civil engineering are quite significant. At the same time, the possibility of their implementation depends on a significant number of direct and concerning factors, in particular those with socio-economic basis. We were able to identify the main categories that the participants of the educational process consider significant in the context of innovative education. Moreover, we have identified what prospects and obstacles are associated with the latter. Significant potential for solving these problems has a decentralization strategy - the formation of holistic units that will be able to implement innovative standards of future professional education at the local level, obeying the general principles of the institute.

Conclusions and Implications

Thus, the main principles of future civil engineers' training based on higher education should be interdisciplinarity and Eurocentrism. At this stage, these educational standards are partly implemented and confirm the compliance of the educational paradigm with modern requirements. At the same time, the problem of technical support of educational institutions remains relevant, and at the same time, the need to use LMS-systems and the latest didactic techniques (in particular, gamification in the digital learning space) at the level of structural units is expressed. The issue of management of educational institutions requires reconsideration among specialists because the need for decentralization of institutions is essential, given the obstacles of the distribution of resources in accordance with the needs. All the aforementioned principles of educational process development will reduce the distance between

the professional training system for civil engineers and today's challenges. It is important to note that it is for future civil engineers that this problem seems to be significant since this specialty belongs to the category of those in constant transformation and is sensitive to technical and instrumental innovations in the world. Therefore, ensuring that Jordanian engineers are up-to-date with their expertise is the first priority of the educators of today.

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FUTURITY
Education

DOI: https://doi.org/10.57125/FED/2022.10.11.32

How to cite: Raza, A., & Hussain, N. (2022). Problems and challenges of future medical education: current state and development prospects. *Futurity Education, 2*(3), 35-47

. https://doi.org/10.57125/FED/2022.10.11.32

Problems and Challenges of Future Medical Education: Current State and Development Prospects

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Received: July 1, 2022 | **Accepted:** August 16, 2022 | **Published:** September 25, 2022

Abstract: The system of medical education has demonstrated varying degrees of effectiveness around the world. Two approaches are dominant - the traditional approach, which consists of students acquiring knowledge, and the innovative approach, which implies a greater role of practical training. The traditional approach dominates in Asian countries, Russia, and Ukraine. The innovative approach is actively implemented in Western countries (USA, European Union). The study aimed to analyze the level

of medical education among the most effective systems. For this purpose, 703 articles were analyzed, 41 of which formed the basis of this study. The most effective systems turned out to be French and Canadian. Within the education of these systems, the duration of education can be reduced to 3 years without losing the quality of education. The features of the innovative system of medical education are the selection of applicants, the duration and structure of the educational program, the methods of teaching medical disciplines. This result is possible due to the application of the small group effect with an emphasis on individual search, interpretation of information, and its application in practice. An important factor is that learning to practice begins in the first year. With the help of the test system, students' knowledge is regularly monitored and the opportunity to work in polyclinics as well as with real patients is provided. Based on the information analyzed, we recommend applying the basics of medical education in Canada to students in Pakistan. Certainly, it will help to achieve practical results in a short period of time.

Keywords: medical education, applicants, students, doctors, problems, innovations.

Introduction

The problems of modern medical education are inextricably linked to the demands of society. In post-Soviet countries, there are too many disciplines in the medical education system, which determines the need to reduce them. The presence of too many narrow specialists in the labor market is inexpedient. For example, according to the latest data, in Russia medical education includes no less than 110 disciplines, in the USA it is twice less (49), in Germany - four times less (24), and in Great Britain - eight (16 specialties). Given that the European and American systems of medical education are generally considered the best, Asian countries need to consider the experience of their peers (Ganotice et al., 2022). There are three main areas of training for medical professionals worldwide. These include dentists, pharmacists, and health care professionals. However, a rather dangerous trend in modern medical education is the increase in the number of subspecialists (Yao et al., 2022).

The history of medical education in Europe is mostly related to the universities in which future specialists were trained. Most medical universities in Europe appeared in the second half of the 19th century and each of them has its own specific traditions and management features. For example, most medical universities in France, the Netherlands, and Denmark are separate from the ministries of health. Moreover, these universities usually have their own hospitals or seek services from private clinics. Countries such as Italy and Belgium have no restrictions on the admission of students to medical schools. Students are admitted based on their educational background. In some cases, aptitude tests are administered by psychologists and interviewers (Cant et al., 2022).

In comparison, the U.S. educational system differs from the European medical education system. Prospective physicians first graduate from medical school, then they go on to specialty training in residency. After students receive a doctor's diploma, they are required to take examinations after the next 10 years to obtain an extension of their license to practice medicine. To do this, physicians take special courses to improve their knowledge of medicine. Examinations of future doctors after residency are written and oral, after which they can work in general or private practice with the possibility of further specialization (Chang et al., 2022).

Research Problem

Thus, the system of medical education is quite diverse, and it implies the graduation of specialists with different levels of preparedness. Naturally, specialists with a low level of training will not benefit society, so it is necessary to pay close attention to their level as future specialists (Lazcano et al., 2022). Therefore, the problems of medical education in developing countries are particularly urgent, and successful experiences need to be adopted to solve them.

Research Focus

One of the most successful medical education systems is the French. The quality of education is a point of pride for the nation, with 80 universities and about 300 high schools. However, medical education is not only tied to universities but can also be acquired through higher-ranking schools (Åkerfeldt & Åberg, 2021). The French type of medical education consists of three cycles. The first cycle has a duration of 2 years, during which the student receives a general university education (DEUG or Diplome Universitair Generales). The choice of the medical profession is made by the student at the end of the 1st year. To advance from 1st to 2nd year, you must pass a serious competitive examination. If the competition is not passed, there is only one time to retake it. Further retraining is not limited, but it becomes a fee. There are 2 to 3 years allocated to pass cycle 2 (Dibek, 2021). The 1st year is called licensure and corresponds to an incomplete medical degree. At the end of year 2, students receive a diploma corresponding to the master's level. This level corresponds to higher education. In the case of 3 years of study, students may qualify as an engineer. Those who continue their studies enter the 3rd cycle of education. It is in this cycle that students specialize and become future researchers (Oztabak, 2021). Eligible candidates are selected from an interview and a personal dossier. The student is given the opportunity to choose between a professional orientation and a theoretical research orientation. The latter is offered to students who are to enter a doctoral program (Anghel et al., 2021).

Admission to medical school is not based on an entrance exam, but on competition between high school diplomas. The only condition is that the school diploma qualifies for admission to the university (Ross et al., 2022).

In fact, students can also receive medical education as part of their studies at universities where medical departments are present (Dhakal et al., 2022). Transitions from institutions (3 years of education) to university are possible. A knowledge of chemistry, physics, and other subjects taught in school is sufficient to enter the 1st year (Koskenranta et al., 2022). University education is somewhat different in European practice. For example, medical education also includes three stages, with the first stage lasting 2 years. The first stage involves the study of basic disciplines like medicine. The second stage (DSEM) is twice as long, in which students are educated in clinical disciplines. Finally, Stage 3 involves two degrees, residency, and internship (Mawela & Mahlambi, 2021). Whereas the residency provides 2 years of training for generalists, the internship prepares narrowly focused specialists after 4-5 years (Mwelwa & Mawela, 2021). Enrollment in the 2nd year is based on the results of written examinations not only in medicine but also in general specialties, with different subjects having different rates of significance (Hill & Abhayasinghe, 2022). According to some reports, between 60% and 75% of students fail their second-year exams (Gokalp, 2021). If a student fails his or her second attempt at an exam as well, he or she cannot continue to higher education. At the end of Cycle 1, students also take practical classes such as inpatient patient care (Blumenthal & Blumenthal, 2021). During the 1st year of the 2nd cycle, students learn the basics of virology, parasitology, bacteriology, and other medical

disciplines such as oncology, hematology, genetics, and pharmacology. Attention is paid to methods of biological statistics, as well as methods of medical examinations. In addition, training in foreign languages, psychology, and basic medical ethics is provided (Karjalainen & Nissilä, 2022). Students in the 2nd cycle can practice as nursing assistant. During the SSEM training period, students complete up to 8 practical internships for a total of up to 4 months or 36 tours of duty. By choice students study 2 disciplines, the remaining 20 are compulsory. Students are supervised by faculty members during the practicum (Duc et al., 2022).

Each semester, students take examinations that include clinical case analysis, analysis of laboratory results, and prognosis from radiographs. Today, there has been a change in the European medical education system - computerized tests have taken a back seat to direct communication between student and instructor during examinations. Students use computer-based tests, but as a means of self-testing (Nilsson et al., 2022).

The residency education process is supervised by the medical faculty. Practical training takes place within medical institutions with which the university has contracts. In another option, the performance of duties by residents is carried out within the framework of medical institutions within the structure of the university. Internships are organized for general practitioners for 2-5 semesters, with the location of the internship open to the reviewer every six months. If the thesis is successfully defended, the resident receives a Doctor of Medicine diploma but must pass a theory exam. In addition, an additional document certifying the level of qualification in general medicine is issued after practical training (Alonso et al., 2022).

In order to enter the internship, it is necessary to pass the competition. Only double participation in the competition is allowed, that is, in addition to students who have graduated from the medical faculty of the university, it can also be passed by last year's students who did not pass the exam. The competition is a difficult test because in order to pass it you must answer a test on 200 questions of theory and 150 clinical situations in practice. In addition, they are asked to analyze a medical history, establish a diagnosis, and prescribe a course of therapy. The duties of the interns include patient rounds in the inpatient unit, outpatient clinic appointments, and emergency room duty. In addition, interns may assist during surgeries or perform surgeries themselves. Interns expand their knowledge by studying in programs designed for young physicians. Specialties include hygiene, pediatrics, learning about hospital infections and their prevention. Close attention is paid to the legal specifics of the medical profession, as well as the economics of clinic and hospital management. There is an opportunity for interns to study in foreign clinics for 1-1.5 years. After passing the examinations, the interns get a corresponding diploma and can continue training in narrower profiles for 2-4 years. The head of the department supervises. After graduation, an exam is taken, the result of which is a diploma of a specialist physician. This diploma entitles you to engage in private practice. Within the polyclinic, vacant positions can be filled based on examination results after a competition is announced. As protection against competition, access of doctors from other countries is restricted (Hariyani et al., 2022).

Research Aim and Research Questions

From the information analyzed, it follows that receiving a medical education according to the Western European model is a rather labor-intensive process that takes a long period of time. At the same time, education results in the graduation of wide-ranging specialists with knowledge not only in medicine but also in jurisprudence and economics. This can come in handy if they take on leadership

positions in administrations. Among the works devoted to medical education, the relevant direction is the identification of an appropriate system for modern requirements. This has determined the need for the work.

The purpose of the study is to analyze the most effective systems of medical education and based on the analysis, recommend their implementation in the Asian system of medicine. Pakistan is a country with a well-developed system of medical education, but to eliminate the shortcomings of this system, it is necessary to adopt the experience of developed countries. The objectives of the study included: a) a detailed analysis of the process of training students in medical education; b) an identification of shortcomings in the system of medical education in Pakistan, based on the analysis of literary sources.

Research Methodology

General Background

The study was conducted in 2022. To select literature sources on the topic of the study, we used the Google Scholar search engine, as well as the search engines PubMed, ResearchGate, Elsevier.

Sample / Participants / Group

As a result, 703 articles were found, of which 42 articles were selected for analysis. The selection criteria were: compliance of the article content with the given keywords; availability of specific data on the educational system, methods of teaching medical students.

Instrument and Procedures

Internet search was used as a tool. Key words were used as the algorithm. Publications that did not contain specific results, such as a lack of analysis of the structure of student learning, were screened out. Publications with no comparison of the effectiveness of the traditional educational system and innovative methods of teaching in medicine were screened out. Publications containing such information were taken into account. We settled on the European and North American models since the most successful medical universities and institutions are located in these regions.

Data Analysis

For the search, we used keywords: medical education, problems of medical education, foreign experience in medical education, medical education in the USA, medical education in the European Union, medical education in developing countries. We chose the system of medical education adopted in Canada as a model educational system that meets such modern requirements as the motivation of students, a large amount of obtained knowledge, and graduation of high-quality specialists. The results obtained are presented in the section “Results and Discussion”.

Research Results

Features of admission and selection of candidates for medical education

The Canadian medical education system is similar to the French system in many respects. First, applicants do not have to submit any documents at the time of admission; all they need is a basic level of higher education in a particular specialty (Tung & Chang, 2022). Of course, most applicants to medical

schools have a science degree, but there are also many applicants from the humanities. In some cases, applicants may have a Ph.D. or Ph.D. degree at the time of admission. D. degrees have reportedly helped these applicants gain admission despite very high competition (Majola & Mudau, 2022). Among the prerequisites for applicants is a high-grade point average, which is calculated based on grades on all exams. This score is not derived from high school graduation exams, but from examinations at the basic level of higher education. Applicants take a specialized Medical College Admission Test, which is constructed so that it is possible to assess not only the basic knowledge of medicine, biology, chemistry but also the level of analytical thinking of the applicant. Accordingly, the test results can be divided into 4 parts, which include biology and biochemistry; chemistry and physics; psychology and sociology; and the ability to solve analytical problems. The test results are valid for three years and was developed by the American Association of Medical Schools (Ongaga & Stallings, 2021). It is the latter section that is the focus of some universities. Later, after passing the test, applicants take another one, the Computer-based Assessment for Samrling Personal Characteristics, the essence of which is to identify interpersonal communication skills. The test includes 12 situations from life, 3 questions each, for the resolution of each situation is 5 minutes. On average, on the example of McMaster University (Canada), there are 5,000 applications for 600 seats. These 600 people are interviewed in a Multiple Mini-Interview, during which a final admission decision is made, based on their GPA and test scores. This mini-interview is an innovative technology in medical education, replacing the standard interview since 2002 (Yolcu & Akar-Vural, 2021). The essence of the mini-interview is as follows. To pass it, you have to go through 10 rooms, in each of which certain tasks are discussed with the examiner. Each discussion is given 8 minutes, the break between discussions is 2 minutes. At each of the 10 stages the personality, communicative abilities, and moral skills of the applicant are evaluated. The level of scientific knowledge is not assessed. Of the 600 people, only 200 qualify for admission to the 1st year, that is, even at this stage is quite a serious competition (Boz & Saylık, 2021).

The study period for medical schools in Canada and the United States is four years, which is two years shorter than in countries such as Russia. At McMaster University, which we reviewed above, the study period is even shorter, at three years. Such a period is achieved mainly not so much by shortening the program as by reducing the time of vacations. Thus, there is a very strict selection process for admission to universities, allowing for motivated and quality students as early as the first year (Shroff et al., 2021). This makes it possible to graduate physicians who are ready to work with patients from the first days of residency. Moreover, these physicians can diagnose, prescribe treatment, and they have experience interpreting scientific research.

A shortcoming of the previous (pre-60s) period of teaching was its traditional approach. The approach to the student was limited by memorizing as much knowledge as possible using didactic pedagogical methods (Nonthing & Supakicco, 2021). Since 1965, the Problem-Based Learning model began to be used, which was reduced to the active role of the student as a gatherer, analyst, and interpreter of information, including any clinical problem-solving (Islam, 2021). Students were taught to adequately assess their capabilities and to work in a small team setting. Thus, the central idea of the new method of medical education was to find, integrate information concerning clinical problems in a small group setting.

Discussion

Schedule of students in a medical education setting

When students take 3 years of education, the program is divided into 2 parts, which includes the study of medicine and biology disciplines and the study of clinical cycles. In most Asian countries, students learn the basics of anatomy, pathological anatomy, physiology, and related areas of medicine during these years of study (Ocal, 2021). Embryology and pharmacology are also given attention. These disciplines form the foundation where the following lectures are based in the senior years. The Canadian system, like the European one, is based on quite different principles. The first year and a half is spent studying the five basic blocks of medicine (Medical Foundation). You spend 9 to 13 weeks on each block. The structure of the blocks is similar, despite the different content. Students study in groups of six to eight and the classes are held in the form of seminars. The essence of the seminar comes down to the analysis of clinical cases with the study of anamnesis, as well as the results of laboratory tests. The task of the students is to make a diagnosis or outline a therapy plan (Ulukan & Ulukan, 2021). By studying these clinical cases in practice, students can more easily learn about the physiology and biochemistry of pathological processes. Each of the seminars is divided into two parts, the duration of the seminar is 3 hours. The last part is devoted to familiarization with the clinical case, students can study the terms new to them independently. Two to three days are devoted to the independent study of the literature. In the first half of the following seminar, information is exchanged between the students, and collectively it becomes easier for them to understand the pathological process that is occurring. The instructor does not lead the process but plays the role of facilitator (Ludwig, 2021). The workshop is led by experienced clinicians, and the clinician's specialty does not necessarily have to correspond to the theme of the workshop. Supervision of the seminar by the instructor is accomplished through techniques. Thus, the central idea of seminars is to make it easier for students to learn the material using case studies. This involves such qualities of students as independent search and analysis of information, ability to work collectively (Dincer, 2021).

Another format for working with students is lectures, which take place 2 times a week, the duration of the lectures is the same as a seminar. The lecture provides focused information on the topic of one of the blocks. Attendance is not required as students can listen to the lectures via video (Sarapoom & Phrakrudhammapissamai, 2021).

Students can also participate in clinical-pathology conferences. There, discussions of autopsy or histology findings related to the examination of tissue specimens take place. These sessions are held once every 1 month during the course of the study. Students can listen to a brief lecture before the conference, and during the conference, they can participate in discussions and debates (Kurnaz & Kurnaz, 2021).

Students' clinical skills are developed through their participation in seminars. Seminars are held every 7 days, three hours each, in the same small groups. The task of the seminars is to master the methods of studying the anamnesis, data collection, and methods of physical examination of the patient. In the early stages, actors may be involved; in later seminars, the patients are involved. In addition, students take part in anatomy classes, which are also held once a week and last 1.5 hours (Li & Li, 2021). All anatomy classes are tied to a specific block, with provisions for students to visit the anatomy labs at any time. Dissected and plastinated cadavers may be used as teaching material. In addition, the use of digital images and teaching modules is allowed. Like the lectures, it is also used in Asian universities,

but there is no requirement to take an anatomy class in Canada, though questions on anatomy are included in the exam. There was no statistically significant difference in the anatomy knowledge of undergraduates compared to undergraduates who did not attend anatomy classes (Sen & Karagul, 2021).

Another type of class is the Family Medicine Workshop. It is held weekly and lasts half a day. The practicum is limited to observing the work of the family physician without directly participating in it. A separate physician is assigned to each of the students (Braun, 2021).

An important element of working with students are professional competence seminars led by two instructors - a physician and a worker in a related field, social, psychologist, nurse. The essence of such seminars comes down to the creation of effective communication with patients, patients' families, and medical workers. A separate block deals with issues of ethics and morality, students learn how to make decisions. The important issue of the physician's role in society is also explored (Espinoza, 2021).

A separate block is devoted to developmental features, taking into account the norms of physical development, neuropsychological development. Such a factor as the influence of the environment is taken into account, as well as a violation of the child's development in connection with various factors. This also includes legal and ethical issues when working with adolescents as well as their families (Eser & Cobanoglu, 2021).

Students have an indirect influence on faculty, which is certainly also an innovation in medical education. Students have the opportunity to evaluate faculty members anonymously, after which the information received can be reviewed by the university administration. Based on the results, faculty contracts are renewed or terminated, and faculty members can use the comments to improve themselves. This evaluation applies to both the general and clinical phases of student teaching. The second half of the course (clinical phase or clerkship) is reserved for the last 1.5 years of study. This corresponds to the senior courses in Asian medical universities. In addition to the general courses, of which there are nine, which can be taken in any order, students have the option of taking additional courses related to subspecialties (Ludwig, 2021). A clinical practicum is different from a theoretical practicum in that students only study in groups of two to three. Usually, in a clinical setting, there is one faculty member per student; in an inpatient setting, there may be two such students as residents. By the time clinical courses begin, students already have the necessary theoretical background and practical experience. Students are already required to examine the patient, know how to make differential diagnoses, and can make a therapy plan and recommend methods of examination. During the first few days, students simply observe the doctor's work, but then, in the presence of the instructor, they perform the examination themselves and fill out the relevant medical documents. The doctor's signature certifies the accuracy of the paperwork. Students attend lectures and seminars every day except on weekends (Dincer, 2021). In addition, students complete 2 to 4 clinical duty assignments in the emergency rooms of polyclinics each cycle, during which they learn the necessary skills to handle emergencies. Students specializing in psychiatry undergo similar duties in the psychiatric clinic setting, examining patients with psychiatric pathologies under the supervision of the psychiatrist on duty (Nonthing & Supakicco, 2021).

At the end of each cycle, students take a three-hour test on an appropriate topic. Based on the results of the test, a conclusion is made about the student's success in completing the cycle. For the student to be able to account for his/her mistakes, his/her knowledge and skills are assessed twice per

cycle, in the middle and at the end. This is an obvious innovation that helps keep students engaged in the learning process and medical education. Students take the Personal Progress Inventory test 8 times at regular intervals throughout their training. The test includes 180 questions, and through the test, the student can judge his or her progress or regression. Finally, in the clinical training phase, the Objective Structured Clinical Examination is administered three times (at the beginning, middle, and end), which includes taking 10 chambers with 8 minutes to complete each task. In doing so, each examiner points out the student's correct and incorrect solutions to the proposed tasks and clinical situations. Another exam, the qualifying exam, consists of two parts, theoretical (at the end of the first, theoretical part of the training) and practical (at the end of the 1st year of residency). The duration of the exam is 2 days. Based on the results of the exam, future physicians receive a license to practice medicine, and the exam process is overseen by the Medical Council of Canada (Yolcu & Akar-Vural, 2021).

Peculiarities of Medical Education of Students in Asia, by the Example of Pakistan

Shah and Aly (2015) conducted a study to establish the humanities in medical education in Pakistan. According to the results of the study, it was possible to establish that the majority of students experienced disappointment in the medical profession. The characteristic mental states for these students were a concern, doubt about their future, and the necessity of the medical profession. This indicates a deep crisis in the medical education system not only in Pakistan but also in other Asian countries (Iran, India, Bangladesh, and Indonesia). Students do not receive such necessary communication skills with colleagues and patients in the course of their training, but only practical skills. As we have shown above, in the Western system of medical education, communication is given special attention and addressed with students not only by teachers or doctors but also by representatives of related professions. In this regard, Shah and Aly (2015) believe a radical reform of medical education in Pakistan is necessary. This will produce qualified doctors who can be humane, sensitive to, and understanding of patients, as well as possess all the necessary legal and ethical, and moral skills. The formation of such physicians in the future will help to improve the efficiency of medicine in general for the whole country, which will certainly be of definite benefit.

Conclusions and Implications

Peculiarities of medical education for students in Asia, using Pakistan as an example. Shah and Aly (2015) conducted a study to establish the humanities in the medical education system of Pakistan. According to the results of the study, it was possible to establish that the majority of students experience disappointment in the medical profession. For these students, the characteristic mental states were a concern, doubt about their future and the necessity of the medical profession. This indicates a deep crisis in the medical education system not only in Pakistan but also in other Asian countries (Iran, India, Bangladesh, Indonesia). Students do not receive such necessary communication skills with colleagues and patients in the course of their training, but only practical skills. As we have shown above, in the Western system of medical education, communication is given special attention and addressed with students not only by teachers or doctors but also by representatives of related professions. In this regard, Shah and Aly (2015) believe a radical reform of medical education in Pakistan is necessary. This will produce qualified doctors who can be humane, sensitive to, and understanding of patients, as well as possess all the necessary legal standards and skills in ethics and morality. The formation of such physicians in the future will help improve the efficiency of medicine for the whole country, which will certainly be a definite benefit.

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FUTURITY
Education

DOI: https://doi.org/10.57125/FED/2022.10.11.33

How to cite: Tytova, N., & Mereniuk, K. (2022). Digital literacy of future teachers in the realities of large-scale military aggression (Ukrainian experience). *Futurity Education, 2*(3). 48-59. https://doi.org/10.57125/FED/2022.10.11.33

Digital Literacy of Future Teachers in the Realities of Large-Scale Military Aggression (Ukrainian Experience)

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Received: July 3, 2022 | **Accepted:** August 23, 2022 | **Published**: September 25, 2022

Abstract: The Russian aggression in Ukraine, which has been gradually unfolding since 2014, has revealed the problem of digital literacy among the population. Addressing this issue in 2022 took new forms and relevance, as the Russian regime began a full-scale war, an element of which was the distribution of huge amounts of misinformation. The article aims to analyze the Ukrainian experience of teaching digital literacy to future teachers of higher education. Realization of the goal was ensured by

using methods of analysis and synthesis, abstraction, comparison, processing of syllabuses of academic disciplines, and other documentation and practices of educational activity. The results reflect the general state of digital literacy in Ukrainian society, it was determined that the most prepared in this regard are representatives of the age group of students. Based on the consideration of methodological materials, it was found that the university educational and educational-scientific programs (primarily pedagogical) form a sufficient level of media literacy. Additionally, these effects are enhanced by the motivation of the teacher education applicants themselves and by government support. In particular, the government has offered several platforms for students to improve their digital literacy on their own, which the latter have already taken advantage of. The conclusion notes that in the future the trend of growth of digital literacy of the population will be intensive, and especially - among representatives of applicants for higher education (including pedagogical direction). The practical significance of the work lies in proving the effectiveness of distance learning, online educational platforms, and their combination with university disciplines aimed at increasing the level of digital literacy mastery.

Keywords: digital literacy, distance education, syllabuses of academic disciplines, russian aggression.

Introduction

During the professional training of specialist-teachers in higher education institutions, it should be taken into account that information and professional work in the educational sector under the current conditions of digital technology development is based on information processing. This leads to the processing of various databases on a predetermined subject area, the study of formalized information, convenient for providing a brief, but the meaningful and rich summary for students in the teaching process. Future teachers in modern institutions of higher education should have a set of knowledge, skills, and abilities, a variety of ways of activity related to the use of information and communication technologies in education, necessary for the process of adequate entry into professional responsibilities. For this reason, addressing the digital literacy of future university teachers is an urgent issue of the theory and methodology of professional education. In addition, the information culture of young people, which constitutes the digital competence of the population, has become important in the conditions of Russian aggression. The experience of using manipulative technologies in information wars demonstrates that mastering digital literacy is extremely important.

Research Problem

In the conditions of modern Ukraine and large-scale Russian aggression, acquiring the basics of working with digital information is also important not only for pedagogical reasons. We are talking about systematic counteraction to specially created and replicated fakes, actively spread by Russian information channels. Future teachers need to be able to distinguish manipulation from the truth, know how to properly check sources, and make it impossible to spread disinformation. The hybrid threats posed by the Russian Federation require a common response and response at all levels, especially in the classroom. Part of this is addressed at the secondary education stage (Hrushko, 2022), but it is higher education that is the main stage of comprehending the correct way to work on the Internet. Rajab (2018) identified the effectiveness of using digital learning in military zones. AlDahdouh (2021) explored the importance of information technology in today's education system. Bouton et al. (2021) analyzed the

impact of social media on the formation of modern student. At the same time, Edmunds et al. (2020) identified the role and impact of online courses on the formation of academic virtue. The authors of the article believe that academic virtue and the knowledge of its formation are components of digital competence. However, Fromm et al. (2021) characterized the unique capabilities of virtual reality to provide an experiential learning cycle. Mishchenko (2019) investigated the meaning of communicative competence, the main conditions, and possibilities of its formation. McGrew (2021) explored the role and importance of digital learning during the Covid-19 pandemic. In addition, Duran (2021) also investigated the impact of e-learning during the coronavirus pandemic. Yoon et al. (2021) in their case study described the specifics of using a video-based education system. European and Asian practices have also demonstrated the importance of media literacy, but at the domestic level, levels of confrontation with scammers and their schemes (Ju & Kim, 2021). Research on this topic is necessary if only from the point of view that the Ukrainian experience may prove useful in addressing similar problems in other countries. Modern Europe and America have not faced crises similar to the Ukrainian one. Therefore, the solutions adopted in Ukraine and used during martial law are highly relevant for further scholarly consideration.

Research Focus

To determine the peculiarities of training specialist-teachers in modern Ukrainian conditions there is a need to analyze additional materials. First of all, we are talking about syllabuses of academic disciplines of leading Ukrainian universities, novelties of digital tools (Internet platforms) to familiarize with the rules of the Web, sociological studies, the results of which assessed the level of familiarity of Ukrainian society with digital literacy. These problems will be considered in accordance with the modern context of the deployment of Russian aggression in the system of response challenge.

Research Aim and Research Questions

Consequently, the purpose of this article is to analyze the digital literacy of future higher education teachers in the realities of large-scale military aggression, that is, with a focus on the Ukrainian experience. At the same time, the war continues, and the new challenges of preparing future teachers need to be responded to. Accordingly, the disclosure of the main goal will contribute to the solution of the main research questions: coverage of the development of digital literacy in Ukraine in recent times (since 2019), the current view on the formation of digital literacy in modern universities in the preparation of future teachers, identifying the prospects and features of further transformations of literacy and related competencies by future teachers in the training.

Research Methodology

Since the purpose of this study was to investigate the digital competence of higher education applicants in the realities of large-scale military aggression, it was also to find out the state of students' information-critical thinking and their views on the promotion of digital literacy in universities. For these reasons, a statistical analysis of the digital literacy of young people in Ukraine, conducted by the Ministry of Digital Transformation of Ukraine, was important. To investigate the state of digital literacy of students of Ukrainian universities, a theoretical study of curricula and strategies for the development of higher education in Ukraine was implemented.

Data sampling and collection

A key aspect of the development of digital literacy is the educational and professional (educational- scientific) programs in the field of "Pedagogy of Higher Education", which are taught at universities in Ukraine. Data collection was based on a detailed analysis of the content of syllabuses and work programs from the Ivan Franko National University of Lviv and the Grinchenko National Pedagogical University. The study was based on the analysis of such data:

1.Formation of general professional competencies.

2.Formation of competencies contributing to the emergence of skills of processing.

3.Appearance of skills in using information and communication technologies, formation of knowledge on work with computers, and information culture as a whole.

The latter category also includes knowledge of graphics programs, presentation creation and mastery of a variety of multimedia sources, and active use of information technology in education and science (See Table 1).

Table 1

Key Data from Curriculum and Syllabus Analysis

Basic data for analysis	Explanation
General professional competences	Skills, knowledge, competencies that contribute to pedagogical professionalism
Competencies that contribute to the emergence of skills in working with information	Knowledge, skills, communication, responsibility of students to search, analyze, interpret information processing.
Skills in using information and communication technologies	Formation of a high level of use of modern technologies, formation of knowledge of working with computers, mastering graphic programs, mastering various multimedia sources, application of information technologies in the system of education and science.

Source: created by the authors based on the analysis of syllabuses and curricula (Faculty of Pedagogical Education, 2022; Borys Grinchenko Kyiv University, 2020).

Data analysis

The research methods were qualitative, thematic cases, and detailed analysis in accordance with objective hermeneutics.

The results obtained were examined in terms of the goals and objectives of this study based on the principles of systematic consideration, comprehensive analysis of scholarly works of related thematic areas. The qualitative paradigm is traditionally applied in the process of thinking of participants in the

educational process. Consequently, in this case, the case study is specifically aimed at identifying the information foundations of teacher education and their advancement in the field of HE pedagogy. However, the principles of in-depth analysis adhere to the foundations of objective hermeneutics.

The methodology is aimed at developing clear answers to the formation of digital competence in the conditions of Russian armed aggression. The data obtained are theoretical in nature and may undergo changes due to objective circumstances that do not depend on the objects and subjects of training (we are talking primarily about the further deployment of the Russian offensive and the military destruction caused by it). However, the information formed still provides grounds for the formation of generalizations and forecasts of the subsequent development of educational paradigms related to digital literacy in the future.

Of particular importance is the use of general theoretical pedagogical methods of research, including analysis and synthesis. Based on abstraction it was possible to move from general concepts grounded in science to our own hypotheses and conclusions. The comparative analysis of the data obtained was important. In the work comparable sociological indicators obtained from official sources, also using this method investigated syllabuses and training programs in the direction of "Pedagogy of higher education", which are taught at universities in Ukraine. As a result of the use of axiomatic principles of the study were highlighted the value orientations of modern applicants for teacher education, further emphasizing the relevance of digital competence. Based on the predictive method, the likely future significance of digital competence for young people in Ukraine is reflected.

Research Results

The Level of Digital Literacy of Modern Ukrainians: Development Trends

The concept of "digital literacy" is a dynamic combination of skills, knowledge, and ways of thinking in the field of information, communication, and digital technologies. It influences the formation of a person's ability to successfully organize professional activities and socialize using the latest information and digital technologies. Note that this competence is also determined by the responsible application of the information in the real and digital dimensions of human activity.

Thus, digital literacy is a complex, complex phenomenon affecting human life activities in the information, globalized society. In general, digital competence consists of the following components: informational, communicative, technical, consumer (See Table 2).

Table 2

Main Components of Digital Literacy

Key components of digital literacy	
Information (media literacy)	It consists of knowledge, skills, abilities that involve search, interpretation, archiving of digital sources, comprehension, analysis of the information received, formation of information objects.

Communicative	It involves knowledge, skills, motivation, responsibility necessary for communication in different ways (chats, e-mail, social network forums, etc.).

Source: author's development.

Russian aggression in 2014 exposed the problem of Ukrainians' unpreparedness to face hybrid challenges and real information threats. Much of the disinformation was spread through the Internet and other digital channels. The government's response to the huge amount of pro-Kremlin content in 2015 was the disconnection of Russian channels from cable television packages, the removal of blatant anti-Ukrainian periodicals and books from the printed media market, which intensified propaganda, and the blocking of popular social networks VKontakte and Odnoklassniki. Some Ukrainians were skeptical of such radical steps, but time has demonstrated the correctness of the decisions made. Along with the ban on the dissemination of fake messages, the transformation of the information sphere in Ukraine was taking place, and the next step was a new rethinking of the work with digital sources of information.

In 2019, the Ministry of Digital Transformation of Ukraine released the results of a large-scale sociological study on the digital literacy of Ukrainians. It is difficult to consider the obtained figures consoling: 37.9% of the population (including interviewed residents of the already occupied territories of Donetsk and Luhansk regions, but not Crimea) aged 18-70 had digital skills at a level “below basic” (Ministry of Digital Transformation of Ukraine, 2019). Another 15.1% of respondents had no skills with modern technology at all. Already on this basis, the figure of 53% of Ukrainians who had digital skills below the basic level - in accordance with the methodology for assessing digital skills, which was used by the European Commission, became relevant. At the same time, 61.4% of young people aged 18-29 expressed a desire to learn digital literacy in the future, which was an extremely positive dynamic. Also, representatives of this age group predominantly belonged to 25.5% of people with above-average digital skills (Ministry of Digital Transformation of Ukraine, 2019). So, the global sociological study pointed to a fairly high digital literacy among students. The proposed picture can be modeled on all areas of training, in particular, future pedagogical workers (although the skills to work with modern technology in representatives of technical specialties may be higher).

Abstracting from the Russian aggression, it should be noted that digital literacy among modern Ukrainian students has also turned into the ability to perform individual or collective tasks, intensive use of resources and systems designed to evaluate data obtained from media resources, and further use them to solve. tasks and obtain new knowledge. It is used to access, manage, integrate, evaluate, and generate content for further dissemination. Understanding digital literacy as a tool, a set of skills and abilities that everyone should be able to use, is important for the omniscience and self-development of potential workers around the world (Almås et al., 2021). Changes in values are also related to the rapid development of digitization of the population and distance learning, which has stimulated the exploratory interests of future educators and independent work (Duran, 2021).

In 2021, the proportion of Ukrainians with digital skills below the basic level decreased by 5.2% to 47.8% (when compared to 2019 data). the trend demonstrates the success of educational policies aimed at improving media skills. The increase in the number of students with sufficient and high levels of digital literacy also indicates a further perspective, which has been stimulated for objective reasons:

Russian aggression has further strengthened the role of criticality, responsibility, and prevalence of digital resources.

Digital Literacy in Ukrainian Universities: A Modern View

Active military operations did not interrupt the educational process in Ukraine. Although the training was transferred to the remote mode, it continued to take place. Work with the use of online technologies is flexible, so students and teachers who could leave for different parts of Ukraine or the world, fleeing the war and the Russian offensive, conducted regular classes remotely from safe places (Rajab, 2018). Additional access to modern technologies has become a significant factor in increasing the level of work with the Internet and modern information resources (Lopes & Soares, 2022). The lack of personal contact between teachers and students, online communication, independent search for information, and completion of tasks (writing essays, preparing presentations, completing projects, etc.) automatically forced personal work on the Internet (Duran, 2021). Due to this, the practice of using the resources of the Network has increased significantly - in terms of numerical indicators, qualitative transformations have begun. Distance education has demonstrated to higher education students that working with the Internet contributes to self-development, creativity, media literacy, etc.

An important aspect of digital literacy development is educational and professional (also educational and scientific) programs in the field of "Pedagogy of Higher Education", which are taught in various higher education institutions in Ukraine. The study of the content of syllabi and work programs has demonstrated the presence of a wide range of competencies that are designed to improve digital literacy. First of all, we are talking about the formation of general competencies that create the ability to search, process, and analyze information from various sources, work with the active use of information and communication technologies, and be familiar with computers and information culture in general. Accordingly, the professional competencies include the following abilities: to work with graphic programs, create presentations and master other multimedia resources of technology, ensure the implementation of pedagogical tasks (in particular at the level of programming), actively use information technology for the educational process, have knowledge of modern scientific research in the field of education, which uses modern research methods, information and innovative technologies (See Table 3).

Table 3

The System of Forming the Digital Competence of Students

Structure of digital competence formation				
Transversal competencies			Subject competences	
Promoting digital competence				
Information literacy	Ability to work with information	Communication skills	Responsible use of informative sources	Solving various educational tasks with the help of information

Empowerment of students				
Differentiation	Personalization	Availability	Inclusion	Active involvement of students

Source: author's development.

The experience of the National Pedagogical University named after Boris Grinchenko is important. Among the educational programs of the institution, which thoroughly introduces not only general but also professional competencies that form digital literacy, we should highlight the specialization "E-Learning Management" (Borys Grinchenko Kyiv University, 2020). Applicants for higher education, who will work in universities in the future, are invited to acquire the ability to navigate information flows, shape IT infrastructure in universities, plan and implement the educational process, approaching the use of the achievements of the IT sphere (Ju & Kim, 2021). In addition, the possibilities of solving the problems of educational and professional direction with the involvement of information and communication technologies, the ability to organize and manage the processes of updating information resource systems, model information flows, and set up electronic document management were also discussed (Kelly, 2021).

At Ivan Franko National University in Lviv, at the Faculty of Pedagogical Education, the course "Fundamentals of Media Literacy" (Faculty of Pedagogical Education, 2022) attracts attention. Its goal is to explain the mechanisms of functioning of public opinion about the essence of phenomena, reality, concepts, and ideas. During the training, future teachers work through individual cases of fake news that are found on the pages of print media, audio and video stories, etc. A detailed theoretical part forms an effective mechanism for critical understanding and filtering of information messages coming from manipulators, work on personal information hygiene and creation of systems of value orientations, ability to interpret information, etc. Specialists from the Ivan Franko National University of Lviv also conduct additional classes for schoolchildren, organized not only by students of pedagogical direction. For example, the "Young Diplomat Summer School" takes place annually at the Faculty of International Relations. In addition to researching the history of Ukrainian diplomacy, all participants listen to lectures and attend practical lessons on digital literacy, in particular, a certain collection of rules of the careful use of social networks is prepared for students. Educational work aroused interest among the audience because the theoretical material was qualitatively supplemented by communication in foreign languages, work with Internet materials, in particular the practical basics of media literacy, and the formation of information hygiene. The use of such platforms is extremely useful, because students, future university teachers, had an additional opportunity to practice pedagogical work related to the use of digital technologies and to acquire the necessary skills in working with it (Kelly, 2021). Note that the special role of digital literacy was highlighted after 2014 when the Russian occupation of Crimea and aggression in Donbas demonstrated the vulnerability of Ukrainian society to information attacks (Hrushko, 2022). We believe that the digital literacy of higher education applicants is also shaped by online conferences, in which students from different universities participate. In particular, the experience of the international scientific and practical conference "The Phenomenon of Europe", which has been repeatedly organized at Lviv National University, is important; the remote holding of the conference demonstrated the success of using distance technologies and the impact on the formation of digital competence in the participants of such educational events.

The state policy aimed at overcoming cyber threats on the Internet is important. As noted, an unprecedented amount of false information, fake content, and manipulation has become a satellite of open Russian aggression. Streams of such messages were aimed at the mentality of Ukrainians to demoralize and psychologically break, discredit the army and power institutions. To counteract this influence, the Internet platform "Action. Digital Education", the goal was to form and improve the digital literacy of the population. Changes in the organizational structure of the site "Action", easy surfing, improved algorithms for finding the necessary information, and some other improvements were brought to the attention of users. The use of the platform is free, which makes it possible to reach the widest strata of the population (Ministry of Digital Transformation of Ukraine, 2019). Particular emphasis is placed on educational series - this format is better perceived by the audience. The portal presents educational series on digital literacy for various categories and professions: lawyers, teachers, medics, media workers, civil servants, students, etc. This system of learning allows for learning and development even amid warfare.

The system "Diia. Digital Education system" allows you to pass the final exam (in the form of testing) using the National Online Digital Literacy Platform. The exam is freely integrated with any other courses that are taught remotely (and not only remotely) at Ukrainian universities. For example, future teachers from the Poltava V.G. Korolenko National Pedagogical University had the opportunity to get acquainted with the discipline "Digitalization of the Educational Process", which aimed to develop their skills and abilities to work with digital technologies for the organization and administration of the educational process, ensuring the development of the basis of information culture and digital literacy. At the end of the training, an exam was held on the National Online Digital Literacy Platform. We believe that such integration of state platforms makes it possible to diversify training, develops a system of distance learning in the realities of large-scale military aggression.

Therefore, modern university education offers a set of disciplines that aim to form digital literacy and other competencies related to modern work on the Internet (Fromm et al., 2021). The introduction of so many materials into the educational process is related to the Russian aggression in Crimea and eastern Ukraine in 2014 when the Kremlin regime and its controlled information channels did not find a proper response. A novelty of the teacher training was the possibility of close integration of state educational platforms with university courses, as well as a special emphasis on theoretical and practical classes on information hygiene and countering disinformation.

Discussion

The importance of digital literacy of the population has been rightly emphasized in the studies of American and European scientists. At the same time, the Ukrainian experience allows us to look at this problem from a slightly different perspective. Researchers had not previously assumed the possibility of an open and prolonged war within Europe, where the last bloody conflict accompanied the fall of united Yugoslavia during the 1990s. For this reason, the events taking place on the territory of Ukraine are of great importance not only on the military side (drone warfare and other new military technologies) but also in the socio-humanitarian sphere. Countering hybrid challenges and information security of the state turned out to be as important an element of protection as, for example, the air defense system.

The possibilities of distance learning are well known. In particular, Conte et al. (2019) outlined the potential opportunities for using this form of educational work in the context of active use of digital

technologies. Similarly, Rajab (2018) noted the effectiveness of online learning in times of armed conflict, identifying among the advantages that modern means of communication allow for the successful delivery of classes to student and faculty communities dispersed as a result of armed conflict. Without denying the conclusions of our colleagues, we would like to add: distance learning is effective even in conditions of open hostilities. In addition, as it has been established, it has a certain psychological effect: the appeal to educational activities calms the audience, returning it to a more normal emotional state. At the same time, working with the Internet required additional digital literacy.

The processes of digitalization in Ukrainian society have made it possible to establish a generally permanent work of educational institutions. Integration of state support for digital literacy and courses taught in higher education institutions will improve the situation in this important area. The armed aggression of the Russian regime has acted as an additional motivation - many young people do not want to get "hooked" by Russian propaganda (this is evident from sociological surveys). Students of pedagogical specialties are among this category of citizens, and in the future, the trend of their interest in digital literacy will only grow. Therefore, the creation of new disciplines that aim to form digital literacy among future teachers is a relevant process - the growth of such educational (educational and scientific) programs has become a kind of response to the hybrid challenges posed by Russian propaganda. Media education is also a relevant area, which influences the formation of digital and media literacy.

Conclusions and Implications

Thus, increasing the level of digital literacy among the Ukrainian population has become a response to open military and hybrid threats from the Kremlin authoritarian regime. In practice, fakes and disinformation are best monitored by representatives of the student age group, including representatives of pedagogical specialties. Among the reasons for this situation is the focus of state policy aimed at increasing the methods of countering cyber-attacks. Additional courses and opportunities to identify and overcome hybrid threats, special trainings, etc. were offered. This system is well integrated with the work of universities, especially pedagogical departments that train future teachers of higher education institutions. Theoretical and practical study of media will allow students to understand the manipulative component of modern media. However, currently, there are few disciplines with a component of media education in Ukrainian universities. Therefore, it is important to introduce a wide range of media education disciplines for different specialties.

The analysis of curricula and syllabi from several Ukrainian universities made it possible to establish a high level of knowledge that will be required from applicants for higher education. For this reason, further training in digital literacy will ensure an adequate level of media competence to work not only in distance learning mode (caused by martial law) but also to counter and detect hybrid threats.

Further unification of state platforms for digital literacy training and university pedagogical courses looks like a reliable prospect for countering Russian media policy. At the same time, this issue will still require further research in view of the new methods of information warfare offered by the Kremlin regime.

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FUTURITY
Education

DOI: https://doi.org/10.57125/FED/2022.25.09.6

How to cite: Haliuk, K. (2022). Regarding the digitalization of the cognitive gaming space of educational institutions. *Futurity Education, 2*(3), 60-70. https://doi.org/10.57125/FED/2022.25.09.6

Regarding the Digitalization of the Cognitive Gaming Space of Educational Institutions

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Received: July 13, 2022 | **Accepted:** September 16, 2022 | **Published:** September 25, 2022

Abstract: The modern development of digital technologies also demonstrates the relevance of its use in the educational process of children. The purpose of the article is to analyze the digitalization of the cognitive and gaming space of educational institutions, the formation of a future perspective model of their development and use. The article uses pedagogical (theoretical) and general scientific research methods: analysis, synthesis, induction, deduction, concretization, abstraction, forecasting. In the results, it is proposed to form a certain conditional model of the cognitive-game space, which will include the establishment of the necessary prerequisites, a comprehensive analysis of the spatial environment, the development and implementation of the necessary material and technical conditions, the processing of results and the elimination of shortcomings. Also, the process of understanding will take place according to the model: observation of children, survey, and determination of educational level work with documents and materials to improve and optimize the educational process. The conclusions particularly emphasize the need to develop digital competencies among children, as working with modern digital technologies will require special skills, given the fact that digital technologies are constantly improving.

Keywords: digitization, spatial and game environment, education, raising children.

Introduction

Children's aspects of the activity in elementary school and preschool age are cognitive, visual (drawing, modeling, applique, constructing), musical, and play. In the conditions of digitalization, play activity acquires special importance in the development of children, which, due to its important contribution to the emotional, social, physical, intellectual, and volitional development of children, is considered leading, among others. At the same time, the development of modern technologies of information society dictates new requirements for the functioning of already established forms of learning and the creation of its new varieties. The COVID-19 pandemic and related quarantine restrictions have added extra impetus to the emergence and active use of digitalization in the learning process. This trend has become common in educational environments and has been particularly reinforced by decisions on the equality of traditional and distance forms of education. Also, this vector of development embraced preschool and school educational systems, as they experienced extreme influence and limitations on the pandemic. Institutions of higher education have reoriented their activities with an emphasis on the independent education of applicants (students), while schools and primary schools cannot focus solely on independent work and require other mechanisms of response.

One of the effective ways out was to turn not just to the distance form of education, but also to experiment with alternative methods of constructing the lesson. The form of using game environments is one of the important aspects of organizing the work of a modern educational institution. Their evolution is not complete, as the current state is influenced by the latest technologies and opportunities for their use. Accordingly, it makes education, in general, more digitalized, and the creation of cognitive-game space becomes more digitalized than before. These trends form the relevance of the element under study.

Researchers have partially explored the proposed issue. For example, Clark et al. (2020) actualized issues related to the future upbringing and learning of children, noting the digital segment. The virtual learning game environment was explored by Chukusol et al. (2022). Separate aspects of the effectiveness of conventional and digital games in the teaching and learning process were traced by Tatli (2018). Gashaj et al. (2021) highlighted potential vectors for the development of virtual games in kindergarten and other preschool environments. At the same time, such an important and relevant issue as an attempt to build a working model of cognitive-game space, which in connection with the latest systems of distance and blended learning passed the attention of researchers is an extremely important and catalyst.

Research Problem

Actual personal development of children occurs in accordance with the familiarity with play activities at different levels, which also involves the formation of play competencies among preschoolers and primary school-age children. Completion of play competencies is evidenced by children's ability to show activity freely, emotionally, and richly, spontaneously on their own initiative. Thanks to it, it is possible to realize and use new information available for assimilation and personal experience. Achievement of personal development is provided by children's aspiration to participate in adult life through the possibility of realization of interests in the course of play and role-playing activities in common forms. Realization of a difficult task requires sufficient knowledge of work methods and skills from teachers and caregivers, thanks to which the use of game technologies becomes effective in using.

Research Focus

The main attention in the study is paid to the possibility of forming a model of cognitive and playful space. In practice, this will allow to implement and realize certain measures to improve the quality of school and preschool education, which in general will help to meet the requirements of the modern information society. It should be noted that the study also considers possible problematic issues that are bound to appear in the application of best practices of game techniques. Such construction of the study will unambiguously contribute to the further practical implementation of the research results and its main conclusions.

Research Aim and Research Questions

The main purpose of the article is to analyze the digitalization of the cognitive-game space of educational institutions, the formation of a future promising model for their development and use. Particular attention will also be paid to the problems of introducing digitalization in the educational space. At the same time, the recommendations obtained will improve the organization of the educational process, taking into account the possible continued use of distance learning, which is associated with quarantine measures and the specific functioning of educational institutions during this period, to harmonize the implementation of game techniques with modern requirements of training and education.

Research Methodology

General Background

The methodology that was used in this article research comes from the practice of analytical searches and relevant review of the most appropriate results that have significant potential for the implementation of digital cognitive-game space.

Consequently, the work is formed based on pedagogical (theoretical) and general scientific methods of research. Among the general-scientific, notable importance was the use of analysis, synthesis, induction, deduction. Among the special methods of pedagogical knowledge - specification, abstraction, prediction, etc.

Instrument and Procedures

As a result of the use of analysis, the main subject of the study (the formation of cognitive and playful space) is divided into the following key issues: the characteristics of the creation of cognitive and playful space, analysis of the model of cognitive and playful space, highlighting the main problems and ways to overcome them in the digitalization of the environment. Through the lens of the use of synthesis, these elements are combined and formed their own conclusions about the future development of digital cognitive-gaming space. The work applies a systematic method based on which the cognitive and play space of children, is considered as a special system, which is transformed and develops in accordance with current trends and changes. Based on the predictive method formed methods of overcoming problems for the digitalization of the play space of the future.

The study was implemented in several stages. On the first - the relevance of the research was defined, the importance of the cognitive-game space in the system of child formation was characterized,

on the second – the key foundations of the analyzed environment were described, the models of cognitive space formation were described, on the third - the main aspects of digitalization of the cognitive-game environment of the child were defined, the main problems of its total implementation were outlined, on the last - the obtained results and formed judgments concerning the future development of the digital cognitive-game space were summarized.

Data Analysis

In the methodological principles of this study, the use of the collection of necessary information through the prism of the survey of the process under study based on conceptual observation was notable. Through the prism of content analysis, primary information about the main opportunities for the development of the digital gaming space is collected.

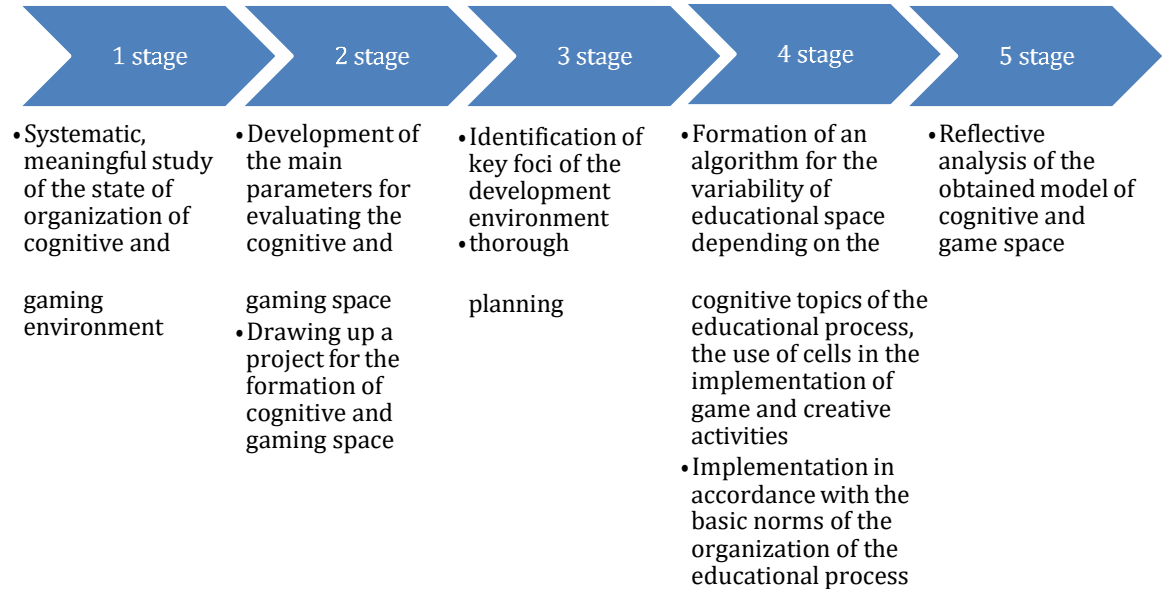
Research Results

Cognitive-game space in the educational institution should be formed in stages (Franco & DeLuca, 2019). In the first period, there is the formation and clarification of the main objectives and analysis of psychological and pedagogical, methodological, logistical tools to ensure the educational process. In the second (organizational) period it is necessary to make a project of the cognitive-playing space. Also at this stage, there is an analysis of the situation, the main problems associated with the goals of the educational institution, and participants in the educational process at the social and individual levels are identified. At the third stage, the formation of methods of organization of cognitive and playful space takes place and the concept of cognitive and playful space is developed, teachers form the main types of activities that will be applied in the process. The principle of programming is also implemented: the creation of basic programs of key activities and approaches focused on the development of cognitive and communicative abilities. At the same time, the planning stage requires thorough planning of the formation of cognitive-playing space (Kem, 2022). In addition, at this stage, there is a kind of transition from a monomodel to an integrated mixed model (Marathe, 2018). In the next period, there is the implementation of the plan in accordance with the norms of the learning process. The last plan refers to the reflective analysis and discussion of the established space.

The conditional model of the cognitive-play space as a means of influence on children is complex, consisting of several elements: prerequisites, comprehensive study of the state of the spatial environment, development of evaluation parameters, compliance with the material and technical conditions, implementation, reflection (See Figure 1).

Figure 1

Conditional Model of the Formation of Cognitive and Playful Space

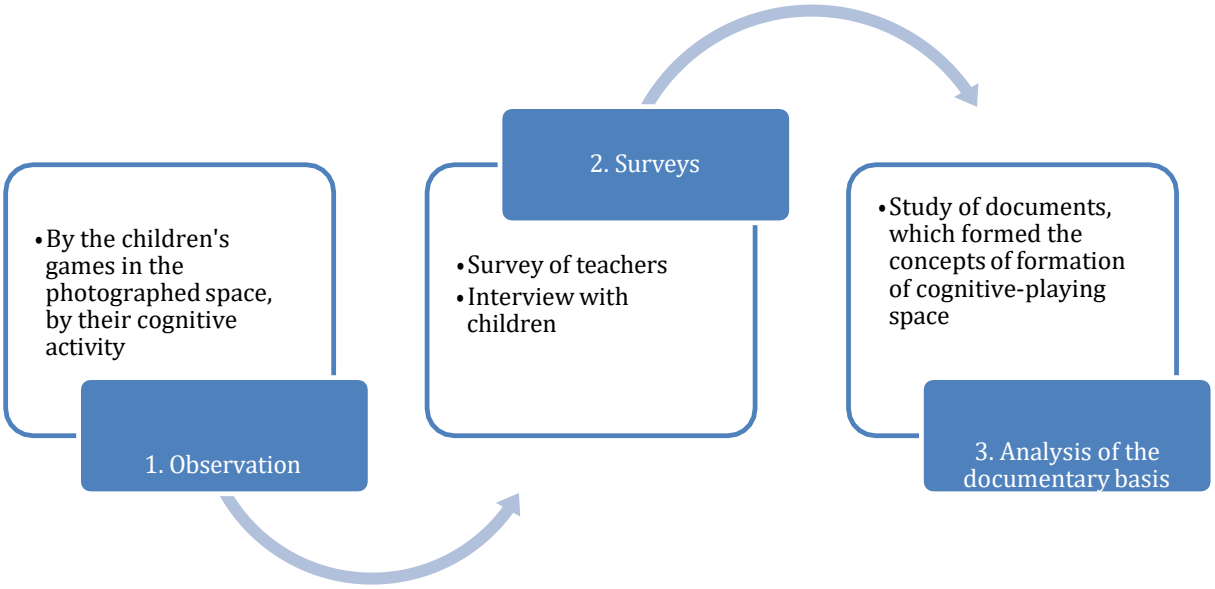


Source: authors' development.

At the same time, the process of a comprehensive study of the organization of educational and play space involves the implementation of several points (See Figure 2).

Figure 2

Model of a Comprehensive Study of the State of Organization of Cognitive and Game Space



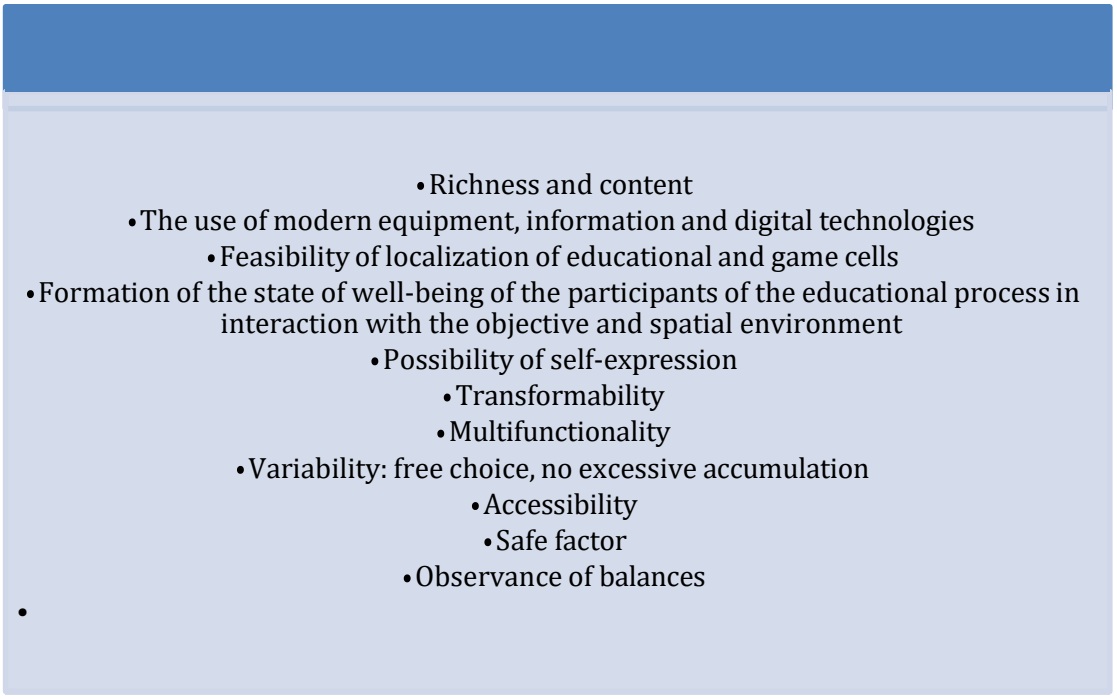
Source: authors' development.

Stage of the study of documents provides an analysis of the main legislative acts, which formulate the main aspects of the formation of educational and gaming space: programs, strategies for the development of educational institutions, plans for the year, thematic control materials, the main legislative acts on the digitalization of educational space.

However, cognitive and game space must meet the main relevant criteria, among which we highlight the content, variability, transformation, availability of modern interactive equipment, the use of digital communication technologies, emotional well-being of participants in the educational process, etc. (See Figure 3).

Figure 3

Criteria for Cognitive Play Space



Source: Authors' development.

All forms and means that contribute to the formation of children's play activity fall into several categories: material play techniques (playing fields, specially formed means to organize play, objects substitutes, etc.); information-game means (observation, literature, excursions); interactive means (speaking special computer technologies: interactive boards, interactive floors, game provocation, social design, quest games, flash-games, etc. (Lash et al., 2022).

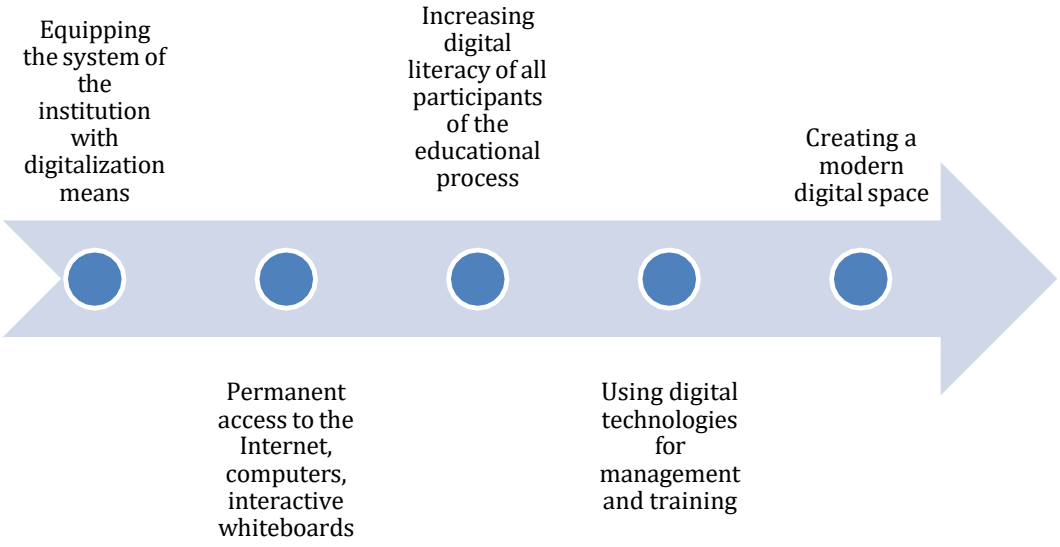
An important part of the cognitive play space is a specific set of diverse equipment (Healey et al., 2019), as well as modern devices, which are important for the formation of relevant competencies of children (in particular, digital, informational, cognitive, communicative, etc.) and contribute to their education (Tatli, 2018). Modern equipment should be placed in accordance with their functional characteristics, taking into account the type of play work. Most toys should have polyfunctionality, thus,

it will promote imagination, creativity, and creative thinking in children (Banting & Williams, 2020). At the same time, the cognitive play space should all accommodate new and novel equipment, which will promote children's critical and cognitive development. At the same time, the teacher should analyze the children's actions in detail and calculate the appropriate amount of equipment. For the space to be effective, all unnecessary things (not related to learning and cognitive work) should be removed (Anggraini & Handayani, 2022). Also, modern researchers note that the cognitive and play environment should be medium, because in a large space children get lost, lose interest in play. At the same time as a small space is not enough to realize free play (Ritter, 2022). Such factors in general will not contribute to the effective implementation of the cognitive activity of the child.

When forming a cognitive and play space using digital technology, a number of areas of implementation of digitalization in the educational process should be taken into account (See Figure 4).

Figure 4

Directions for Introducing Digitalization into the Learning and Playing Process



Source: authors' development.

Playful digital devices can be used as a weighty educational tool aimed at the formation of a critical and analytical type of thinking, socialization, and spatial imagination (Storli & Sandseter, 2019). The current educational institutions are actively introducing touchscreen interactive whiteboards, but Interwrite Dual Board in order to organize creative classes and circle interactive work with children. Installed Work Space for the use of various programs on the board is also fully supported by office relationships such as Word, Excel, and PowerPoint. This promotes children's interest in learning activities (Chukusol et al., 2022). Such relationships form different notes, promote editing of information and storage in the course of work. A characteristic feature of using Interwrite DualBoard is the formation of the organization of joint activity in the mode of two users. At the same time, touchscreen devices are interesting for children because they allow them to activate their cognitive work by touching the touch screen. Psychologists believe that working with touch screens gives such a feeling that the child gets

things done (Gashaj et al., 2021). This contributes to her development in many internal areas. In addition, a responsive touch device interests children and builds positive emotions, curiosity, etc.

However, the most common digital tool used by educators is a presentation formed in Microsoft PowerPoint (Sousa, 2021). In general, the multimedia-assisted lesson acts as a visual aid and demonstration material, which affects the emotional reinforcement of the lesson, mental development, supporting children's imagination and creativity in the educational environment. So, pre-established tasks with the use of digital technology require children to understand the content and essence of the task, the algorithm of its implementation. A characteristic feature of tasks for modern children is the formation of gradual complication of the task content through the prism of the game form (Wannapiroon et al., 2021). This is realized with the use of special drawings (symbols), while the learning program is “embedded” in the tasks (games) themselves. In addition, the mandatory components of a learning game task are the presence of challenges, actions, and reactions, creative and analytical approach. This will lead to specific relevant skills and achieve a greater level of assimilation of didactic material. Conditional game experiences can be used by children in order to implement different actions. A basic component for today's teaching programs that teachers use is the digital tool Google Drawing. To work in it, children should register through a Google account.

In order to form game and learning tasks, it is also important to use the service Jigsaw Planet, which affects the mastery of the necessary relevant skills. At the same time, creating personal authoring tasks requires registration. However, without registration actions, it is possible to apply game tasks formed by other users.

Discussion

That is why children's learning of different types of competencies takes place in accordance with their participation in certain types of activity. Play activity is the leading activity for children, but researchers also distinguish equally important motor, natural, object, pictorial, musical, theatrical, literary, sensory-cognitive, mathematical, speech, socio-cultural activities. Each of them needs children's practical understanding of the system of conventional and accessible knowledge about themselves and their environment, moral values, the ability to successfully and effectively use the information obtained during the training. Thanks to this, competent children act independently and constructively in different life and social circumstances.

An additional challenge for integrating cognitive play space into the learning process should be to teach children how to communicate competently with modern media, how to distinguish important and necessary information from a variety of messages, how to distinguish low-brow or fake content, and how to understand the use of media resources. In particular, the use of media becomes a comprehensive way of understanding the world around us, making digital tools tangible in children's educational, learning, and cultural development (Aghion et al., 2021).

Properly organized work with information sources allows to create an opportunity for children to perceive, analyze, evaluate, and create media texts. In fact, under these circumstances, working with information and media resources corresponds to the main content of educational work in children's learning. For example, as sociological surveys of parents of young children demonstrate, at least two to three out of five young children use a smartphone or tablet. Such children have abandoned the familiar and inherently childlike toy material, replaced by mobile computer entertainment (Van Vught & Glas,

2018). Therefore, one must agree with researchers who believe that such growth trends of young fans and users of mobile digital devices should be used wisely, as modern realities dictate just such ways of education and learning (Clark et al., 2020). Adequately applied digital technology, therefore, can be considered an integral element of the educational process.

At the same time, an additional important characteristic of the use of digital technology in the cognitive-game space of educational institutions is reproducibility, that is, the ability to use, repeat, reproduce, implement pedagogical technology during the educational process. Modern possibilities of digitalization can become extremely effective tools in pedagogical use, which does not depend on the age of the teacher, the characteristics of his experience, or personal characteristics.

However, we should also keep in mind the challenges posed by digitalization. Preschool and elementary school children in practice are confronted with a large number of messages coming from various sources over different intervals of time. The assimilation and reproduction of this array of information, analysis, and forming one's own opinion about a particular message is an important activity that children engage in. In particular, it is thanks to play, as a leading activity of children, that there is a rational and optimal organization of work with any informational messages.

In the formation of media literacy skills, the play takes on a special additional importance because it corresponds to the inner essence of young children. In particular, children are not able to perform the absolute majority of various actions in the same way as adults, if only because they lack certain elements of life experience. Without appropriate media literacy skills, children are capable of the deepest immersion into the game realities, which can cause the formation of some distorted picture of the world, further development of infantile behavior, inability to critically assess the situation, to think and operate with information.

Therefore, the need for proper media literacy (Zadeja & Bushati, 2022) should be taken into account when shaping the cognitive and playful space of educational institutions.

Introducing children to the world of media, learning about the histories of mass interaction and other forms of media, and teaching them how to use media are particularly important given the digitalization of education and upbringing in general.

Conclusions and Implications

Therefore, the digitalization of the cognitive-playing space of educational institutions is an urgent problem for research in terms of further prospects for its implementation. In particular, we propose a conditional model of cognitive-playing space, which will act as a comprehensive catalyst for the cognitive activity of children and will be formed of prerequisites, a comprehensive study of the state of the spatial environment, development and implementation of parameters to assess and endure the material and technical conditions and tools, direct implementation and critical reflection aimed at comprehension and overcoming potential obstacles.

At the same time, the use of modern digital technology is effective for creating a cognitive and playful space. In order to be as effective as possible, a number of areas of digitalization of learning activities should be taken into account. First of all, it is a question of purchasing digitalization tools and guaranteeing unproblematic access to the Internet, availability of other digital tools, etc. Work with

digital gadgets simultaneously requires appropriate skills and knowledge of pedagogical staff, able to unlock the potential of children, to teach them using modern technology.

It is also an important problem for children to master relevant skills and digital competence (at least its basics). Modern digital technologies contain many hidden dangers, and training to work with them is an important component of the modern educational process. We also believe that the necessary level of mastery of digital competencies is also important for parents because children are taught not only within the appropriate institutions but also at home.

Further research will also require the effectiveness of digital technologies because they are rapidly evolving, so, in all likelihood, will require further study.

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