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THE USE OF INNOVATIVE TECHNOLOGIES FOR THE FORMATION OF ECONOMIC COMPETENCE OF PRIMARY SCHOOL STUDENTS

ABSTRACT

The article analyzes the use of innovative, primarily, information and communication technologies to increase the efficiency of students' acquisition of competencies defined by the concept of the New Ukrainian School (NUS), native and foreign language, and economic competencies, in particular. The growing need to use the latest technologies to properly respond to the challenges and threats faced by the society, economy and educational process of Ukraine is pointed out. The prospects of using a hybrid model of the educational process, game technologies, and methods of "immersion" in the subject, first of all for learning languages, using the latest technologies, have been determined. It is indicated that proper provision of the primary school with modern equipment is the condition for the use of advanced technologies. This also forms a strategic task in the training of future teachers, first of all, primary school teachers, which consists in the need to ensure the training of teachers at the level of international standards, their natural orientation in the application of innovative technologies, the effective use of digital infrastructure, digital skills, smart education, robotics in the educational process. Prospective directions of innovative technologies, which provide a synergistic effect of pedagogical and technological innovations, have been identified. It is indicated that the effectiveness of the methods of "immersion" in the subject increases with the introduction of complex immersive technology. The use of immersive technologies in the educational process was stratified. It is indicated that the latest information technologies open the possibility of analyzing the data about students and their educational activities available in the network. This makes it possible to form an individual portrait of the student and to implement a strategy and teaching tactics that are aimed at ensuring the success of this particular student, to offer such an interaction between the student and educational materials that would ensure the best result, to reveal the connection between the individual characteristics of the student's educational behavior and effectiveness of his education, to prepare informational and pedagogical tools individually developed for and aimed at a specific student. It has been proven that such provision of the educational process with the necessary equipment requires significant resources. The conducted analysis proved that the average expenses per class for the implementation of modern information technologies in the educational process should increase more than twice, which is an unaffordable task for the country's budget. This requires the mobilization of all resources - both budgetary and extra-budgetary funds - in order to solve the problem of providing the educational process with the necessary equipment. The direction of transformation of education financing, which is based on a project approach, is proposed with the implementation of systematic coordination of projects and task fragmentation. The mathematical formalization of financial coordination of educational projects and optimization of costs by sources of financing and optimization of the efficiency of the financing process for achieving a new quality of education and strategic goals defined in the concept of NUS is also proposed.

Keywords: language competence, native language competence, foreign language competence, economic competence, innovative technologies, project, future primary school teachers

JEL Classification: A29, C51, I21, I22

INTRODUCTION

According to the Law of Ukraine "On Education" and, accordingly, the Concept of the "New Ukrainian School" (NUS), a significant part of the competencies that students must acquire are directly related to innovative technologies in the educational process. These are: "competence in the field of natural sciences, engineering and technology; innovativeness; information and communication competence; mathematical competence" [1]. But also other competencies, in particular, in accordance with the NUS Concept, "fluency in the state language; the ability to communicate in native (if different from the state) and foreign languages" [1], economic competencies, and so on, and other ones also, should use innovative technologies in order to acquire the appropriate level of efficiency of the educational process. These technologies, in a broad sense, rely on different tools, and different methodologies, which are related to different areas of the educational process. But, in our opinion, information and communication technologies (ICT) have a more significant impact on the level of students' competencies.

The specified competencies form the basis of the appropriate level of expertise in the formation of personnel reserves for the country's economy and form the prerequisites for Economy 5.0. The MES introduced a number of innovations and projects for the introduction of ICT into the educational process: the automated Educational Management Information Complex SELFIE; the national electronic scientific information system URIS; the international innovative program "Transformation of digital pedagogy", etc. Many of these innovative technologies are the answer to the significant challenges of the time. For example, the recently introduced mobile application "I'm studying - not waiting" will contribute to the education of elementary school students according to the Ukrainian curriculum in any geographical location. This application provides an accessible, successful, technological solution to both the problem of distance learning and the deep social problem of mass displacement of people associated with hostilities, that is, it is an example of a comprehensive solution to educational, economic and social problems which is relevant to ICT implementation. It is precisely in this that the relevance of the implementation of innovative technologies (IT) and ICT in the educational process lies. At the same time, this implementation requires significant additional funding, which creates problems in ensuring the appropriate pace of innovation implementation in primary schools.

LITERATURE REVIEW

A significant contribution to the research and substantiation of the implementation of innovative technologies was made by domestic and foreign scientists. Thus, Bibik [1] highlighted the task of training and retraining teachers to use IT and ICT when implementing the concept of NUSH, which made it possible to analyze the time and ways of training and retraining teachers in the presented work. Screpanti [2] points out that even for developed countries "there is still a certain degree of uncertainty about how to deal with technologies in education and how to evaluate the results of such activities", which enabled the authors of this article to apply the concept of "project effectiveness" in a mathematical formalization. Todino [3] stated that the implementation of uniform recommendations, even of the European Parliament, regarding IT and ICT in education should be implemented differently in different countries. This was used in the presented study to determine the features of financial support for the implementation of innovations in Ukraine. Rüdolf [4] indicates the need to implement a single strategy for IT in education, which would be differentiated into different projects, which was used in the presented work and extended to the field of education budgeting. Yang [5], using the example of web technology, indicates that such new tools of the educational process as remote assistance systems are emerging, which require significant financial resources for development and implementation. Rukayah's article [6] indicated the need for additional financial resources for the urgent application of "interactive multimedia based on hybrid learning for the TISOL program", which allowed the authors to point out the need for new approaches to financing innovative learning in Ukraine as well. Tutova [7] recommends introducing a criteria approach to check the readiness of future primary school teachers to use the latest methods in heterogeneous groups of students, which confirms the need for regular retraining of teachers. Scaradozzi [8] presented a methodology for retraining teachers for the need to use information technologies in the educational process, their study of the basics of programming, and technologies for automatic evaluation of results. Analyzing the scientific works of Āriņš [9] on Blockchain architecture in Smart Pedagogy, augmented reality Soroko [10], distance education systems Faisal [11], Yi [12] research on distance education resources based on the multiple constraints model, it can be indicated that all of them are effective from an educational point of view, but costly from the point of view of spending on hardware and software necessary for their implementation. Even for the implementation of the urgent tasks of effective acquisition of native and foreign language competence by students, which are set forth in the scientific articles of Bražienė [13], Blyth [14], Geng [15], Terletska [16], Ostanina-Olszewsk [17]; introduction of competence recognition based on virtual reality - Kauppinen [18]; acquiring the appropriate level of competences in the economy: Bradley [19], Amri [20], Vik [21], which require, first of all, hardware, a significant additional financial resource is needed.

Having analyzed the mentioned works, it should be recognized that the peculiarities of the training of primary school students and professional training of teachers in the context of the ideas of the New Ukrainian School, with the need to introduce the latest information technologies into primary school teaching, have not been sufficiently studied, which requires further research into this issue, in particular, regarding additional funding, which requires the introduction of IT, ICT and methodical tools based on them into the educational process.

This determined the choice of the goal, tasks, and direction of the research, the results of which are presented in the presented article.

The unsolved aspect of the problem. The tasks set by the Law of Ukraine "On Education" and the Concept of the New Ukrainian School require the introduction of the latest information technologies into the educational process, but there are no estimates of the funds necessary for this in the existing body of scientific research, analysis of the forms of their receipt. Trends in the use of innovative technologies, and prospects for the introduction of IT and ICT in the educational process, in particular for the acquisition of language and economic competencies, also require more detailed research. There is also a need to define a strategic task in the training of future teachers in view of society's acquisition of signs of a technologically enriched environment, existing challenges, and threats to identify new directions of education financing transformation.

AIMS AND OBJECTIVES

The purpose of the study is to determine the role of innovative technologies in the educational process of primary school in the context of the NUS, to identify the importance of innovative technologies for the effective acquisition of native language, foreign language, and economic competencies by students, to analyze the possibilities of using information and communication technologies in the educational process, to stratify promising information and educational technologies, identification of new directions of education financing transformation and development of mathematical formalization of their financial support.

RESULTS

The research was conducted in two directions: regarding the acquisition of language, primarily foreign language competencies, and ensuring the appropriate level of economic education in primary school. The choice of these directions made it possible to investigate the costs of using IT and ICT in the educational process and the mutual influence of the development of technologies and innovative methods in the teaching of academic disciplines. The first direction - the acquisition of language, in particular, foreign language competencies requires the use of a wider range of tools for information support of the educational process, primarily due to the fact that in order to increase the efficiency in the acquisition of competencies by students, the impact on all the student's senses must be implemented, which is confirmed in a detailed study of the problem [10, 16, 19]. The second direction is the teaching of economics in primary grades using IT and ICT. The proposed research approach of these directions indicated a certain difference in the hardware and software of the educational process, due to the need to use different methodological approaches for the effective acquisition by students of the competencies of various disciplines. This made it possible to further use the project approach to the formation of budgets for various educational projects in various educational disciplines. On the other hand, it made it possible to indicate the relationship between IT and ICT, the development of which offers new opportunities for the educational process, and the effective acquisition of competencies of various educational disciplines, the specifics of which may determine the choice of an individual set of hardware and software tools or the possibility of their joint use. which, in turn, leads to peculiarities in the scope of their needs for additional financing related to the use of the latest technologies. As research shows, the difference between different disciplines can even be conceptual for building teachers' confidence as curriculum developers. Thus, Brant [22] points out that economics teachers must take responsibility for the epistemic quality of the curriculum that their students need. At the same time, according to Modig [23], the question of which aspects of economic knowledge should be the subject of study in primary school is still relevant, considering their further usefulness in people's lives. From this point of view, Western researchers point to the primary need to study in elementary school of household economics, as evidenced, in particular, by Erjavšek's study [24]. At the same time, as stated in the scientific works of Bradley [19], Amri [20], Vik [21], and other scientists, the introduction of methodological innovations into the educational process should be based on technological innovations. This requires the implementation of additional methods of ensuring the educational process of various disciplines, including language and economic subjects. Namely: retraining of teachers; radical changes in educational programs in higher educational institutions, where future teachers are trained, primarily primary school teachers; the latest financial instruments for the implementation of innovations in education, etc.

Innovative learning, the implementation of which is required by the Concept of the New Ukrainian School, is an educational process aimed not only at the acquisition of certain competencies by students but also at the comprehensive solution of social and economic problems, the formation of a response to dynamic changes and new challenges to society and the economy. Innovative teaching should combine structural and logical, game, training, and dialogue technologies, promoting the development of communication skills and joint work of students. Such a combination is impossible without the use of the latest technologies in didactic systems, which indicates the existence of their relationship. The latest studies also confirm a significant increase in the effectiveness of learning using methods of "immersion" in the subject area using information technologies. In particular, the study of native and, especially, foreign languages in primary school is better when game technologies are introduced, first of all, game technologies in which children have already acquired certain skills. Virtual and augmented reality technologies have also proved to be effective for students in language learning. Nowadays these technologies are becoming components of complex immersive technology, i.e. technology of full or partial immersion in the virtual world when elements of simulated reality - virtual reality (VR) are added to real reality (RR). VR is not only about using a 3D or 360° simulated world. This is an effect on all the student's senses - sound, tactile effects, and even smell.

Immersive technology can be stratified (Figure 1) as follows. The first is the variety of VR use (by the depth of immersion of the student, and the combination with group learning technologies). The second is the varieties of use of augmented reality (Augmented Reality, AR). The use of a marker is understood, for example, as the use of a QR code, that is, access to technology is provided only in the amount intended for a specific student. Project-oriented AR allows the use of spatial augmented reality. AR using visual inertial odometry allows the creation of a 3D model of the space around the student or teacher and updates it when the position of the student or teacher changes. Mixed reality MR is a combination of VR and AR, which is, in our opinion, the most adaptable to pedagogical tools and methods, but, of course, the choice of immersive learning technologies belongs to the teacher.

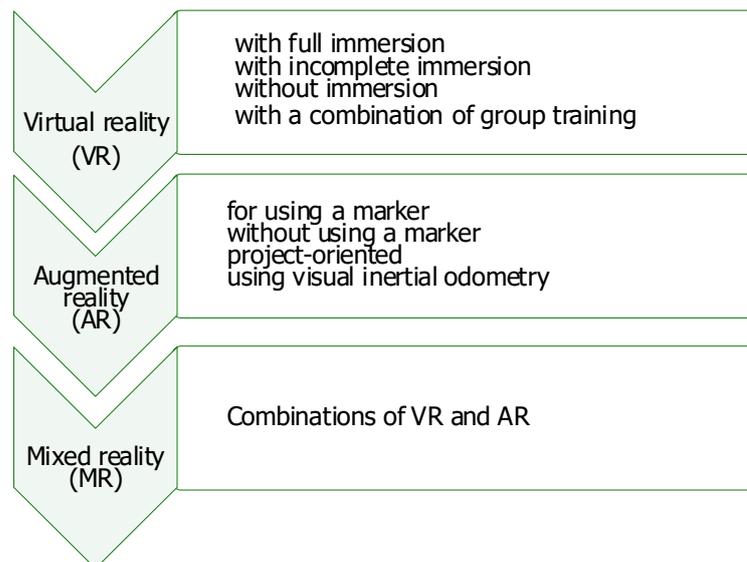


Figure 1. Stratification of immersive technologies when learning foreign languages.

In modern conditions, when some students may be out of the classroom for long periods of time, from a methodological point of view it is especially important to ensure the continuity of the educational process, because, as it is known, interruptions in the acquisition of educational, in particular, language and economic skills, have a negative impact on the learning of subjects, especially by primary school students. This learning model is called a hybrid model. The combination of a hybrid model with the use of interactive multimedia [14] and, especially, immersive technology provides many opportunities, in particular, it increases the effectiveness of independent learning without limitations in time and place, facilitates student-to-teacher and student-to-student feedback, and increases interest and motivation of students. The application of a hybrid model of learning and complex immersive technology requires new skills and abilities of the teacher.

To do this, it is necessary not only to teach future primary school teachers to use IT and ICT but also to reconfigure the thinking of teachers, regarding their understanding of what immersion is and how it is experienced by primary school students. The thinking of future teachers is still shaped by teachers of the old school. And today, the proper level of pedagogy is ensured by relying on the training of teachers during the implementation of the pedagogical process on the

formation of attitudes to teaching, motivation, knowledge, the diversity of the use of pedagogical methods, and relevant evaluation of the achievements and failures of the future teacher.

This forms a strategic task in the training of future teachers, first of all, primary school teachers (because it is a primary school that shapes the student's attitude to learning), which consists in the need to ensure the training of teachers at the level of international standards, their natural orientation in the use of innovative technologies, the effective use of digital infrastructure, digital skills, smart education, robotics in the educational process [2, 3, 9].

The rapid acquisition of the signs of a technologically enriched environment by society provides new opportunities for teachers, but also requires constant updating of basic knowledge in information technologies and a high level of readiness to implement these technologies in practice. This requires a certain transformation of the approach to IT and ICT education, which consists in ensuring that the future teacher masters the mentioned technologies fully, not just uses them.

Today, primary school education in mathematics, computer science, economics, and, due to the peculiarities of teaching the subject, mostly foreign languages, requires a transition to pedagogy, which has received the name Smart Pedagogy. This is due to the fact that Smart Pedagogy forms a synergistic effect of pedagogical and technological innovations. Smart Pedagogy uses the blockchain architecture [9], which, in our opinion, allows the effectively promoting of such social values as trust, social and individual identity, and the importance of transparency of actions for society and the individual. The introduction of modern ICT - intelligent educational systems into the educational process is a concrete example of Smart Pedagogy. The effectiveness of these systems lies not only in expanding access to educational resources but also in the formation of individually prepared informational and pedagogical tools aimed at a specific student. In particular, when teaching native and foreign languages, it helps to solve the problem of the formation of students' text creation, which is the basis for learning languages, and for which elementary school teachers of Ukrainian schools always lack time in today's realities. Teaching economics, will make it possible to gain wide access to information sources on economics and their analysis, master the basics of economics on practical examples, and the development of systemic thinking, which will form the basis for the formation of students' understanding of the importance of acquiring economic knowledge for further life in society. According to the concept of NUS, the technology of integrated learning [1] is the basic innovation in primary school. The technology of integrated learning is based on the formation of students' general picture, not a fragmented one, with a division into separate disciplines, which corresponds to the opinion of Brant [22] regarding the role of teaching economics as a fundamental discipline. In the absence of such an approach, it will require the primary school teacher not only the need to rely on several subject areas in teaching at once but also the need to ensure consensus in the educational process with other teachers in their disciplines. This indicates new possibilities in ensuring the coherence of subjects - i.e. normalization of not only the strategy but also the tactics of teaching subjects, coordination of programs and teaching schedules. At present this problem can be solved only by using the latest software complexes and IT and ICT capabilities. This makes it possible to effectively contribute to the introduction into the educational process of the strategy of strengthening factors that affect student satisfaction with learning (SEM) [26]. Increasing the effectiveness of achieving the effect of learning satisfaction is the main task of introducing innovative methods, IT, and ICT into the educational process and is a prerequisite for the effective acquisition of relevant competencies by primary school students.

The latest information technologies open up previously unseen opportunities for the teacher. The analysis of online data about students and their educational activities makes it possible to form in detail the so-called "individual portrait of the student" and to form a strategy and teaching tactics aimed at ensuring the success of this particular student, and to offer such interaction between the student and the learning materials, which would ensure the best result, that is, to establish the connection between the individual characteristics of the student's learning behavior and the effectiveness of his learning.

All this determines the need to solve the problem of providing both teachers and students with modern means of information and communication technologies: computers, 3D projectors, gadgets, etc.

Nowadays, the state and local budgets are the main sources of funding for education. The implementation of the latest information technologies in the educational process requires significant funds. And the limited budgetary resources of the state lead to restraining the introduction of innovations and, thereby, maintaining Ukraine's accelerated lag behind the leading countries in the training of personnel for all spheres of the national economy. Support from sponsors only partially solves this problem.

Our analysis confirmed this, in particular, using the example of providing Ukrainian teachers with laptops. Thus, the company "Google" organized the delivery of specialized equipment and software to Ukraine to help organize the educational process for distance learning which is especially important during the war. The project envisages the delivery of 43,000 Chromebook laptops for 50,000 devices. To date, 10,000 devices have been delivered.

But even this aid is insufficient, due to the big number of classes and teachers in Ukraine (Table 1).

Table 1. Comparison of 2020 expenditures on the educational process and forecasting of IT expenditures. (Source: own calculations using [27])

Parameter	In 2020	Forecast	Forecast data in relation to 2020, %
Number of schools	13458	-	-
Number of students	3980638	-	-
Number of teachers	346824	-	-
Number of classes	197709	-	-
Average expenses per student, hryvnia	24715	2759.08	11.16
Average expenses per teacher, hryvnia	283664	31667.1	11.16
Av expenses for one class, hryvnia	497601	55550.59	224.7

The authors calculated the provision of the necessary equipment for the needs of the Ukrainian school. In order to calculate the minimum need for the Ukrainian school with the necessary equipment, the need to provide all teachers with laptops and each class with a server and a 3D projector was taken into account. Budget options were selected: ARTLINE Business T13 v12 server (UAH 17.7 thousand); projector Blitzwolf BW-VP15 (UAH 7000 thousand) Wi-fi 1080 Full HD CastScreen (UAH 14 thousand); Lenovo laptop (UAH 14 thousand). Although it was more expedient to provide each student with a laptop, this is still an unattainable goal. Software (software) costs were not included as some educational software is affordable, for example, Timetables for teaching economics are only EUR 99 for a primary school, and some software may be provided free of charge. An example of a free Web service is BrainPOP Jr, where students can learn topics through writing, drawing, speaking, or reading in the game process. The teacher reads the instructions aloud as the students scroll through them on the screen and answer questions the students have. This service can be used for learning languages, but it is designed for studying economics. Also free is the EconEdLink Web service, which presents the necessary methodological and reference support for the study of economics, including links to the necessary resources, and the combination of how the tasks are presented can be useful for children with different learning needs.

To specify the number of necessary costs, we will consider the implementation in the initial process of the two above-mentioned directions - language and economic education. We will assume that the amount of hardware for native language education will be a component of the amount of hardware for foreign language education in primary school. To analyze the scope of economic education hardware, we take into account the teaching of economics in the 3rd - 5th grades of primary school. According to the data of the State Statistics Service [28], fluctuations in the number of primary school students in the period 2019-2021 were insignificant (2018/2019 - 1,724,664 students; 2019/2020 - 1,724,705 students; 2020/2021 - 1,722,098 students [28]), therefore, in the calculations, we will use the average indicator - 1,723,800 students. That is, for each year of study - 344,760 students. With an average class size of 20.1 students [27], the number of primary school classes for each year of study is 17,153. This allows for an assessment of the need for additional training and retraining of specialists, which may amount to ~ 40,000 foreign language teachers and ~20,000 economics teachers. Given the need to make adjustments to the educational process of the higher school, which prepares future primary school teachers, and specialists for teaching in advanced training courses, this may take from 2 to 5 years, subject to agreement by the relevant institutional structures. Since both higher education institutions and advanced training courses are financed from the state budget and, given the tasks set, will not require significant additional costs, the main share of additional costs will be hardware and software for innovative training and additional budgeting for the remuneration of non-teaching staff. Today, the number of full-time secondary school teaching staff is 346,824, and non-pedagogical secondary school staff is 228,204, i.e. the share of non-pedagogical staff in the total number of personnel is 39.7%. The introduction of one non-pedagogical employee into the staff of each school to ensure the use of innovative learning hardware and software will amount to 13,458 people, which will lead to an increase in the number of non-pedagogical employees by 5.9% and, accordingly, a necessary increase in the total salary fund of pedagogical and non-pedagogical employees by 2.3%. In our view is not exorbitant for the school education budget. As the analysis showed (see Table 1), the implementation of the specified hardware for innovative teaching only for the implementation of language education in primary school will require 238,206.6 thousand UAH for servers for 134,528 schools, 1,200,710 thousand UAH for Blitzwolf projectors for each class, for a teacher's laptop ~ UAH 560,000, Total ~ UAH 1,999,916.6 thousand To implement economic education in primary school, you will also need 238,206.6 thousand UAH for servers, for Blitzwolf projectors for each class - 720,420 thousand UAH, for a laptop for the teacher ~ 280,000 thousand UAH. Obviously, the combination of two directions - language and

economic innovation education will allow the use of the same servers and the same projectors. Laptops will require additional hardware costs, given that language and economics teachers can be different people. That is, with a comprehensive solution to the problem, the specific costs for each of the disciplines can be reduced. Despite this (see Table 1), with a relatively small increase in the average specific indicators - for one teacher and one student, the average expenses for one class for the introduction of modern information technologies in the educational process should grow more than twice, which is an unaffordable task for the country's budget. It should be added that all the mentioned hardware will need to be replaced after a relatively short period of time due to physical wear and tear and moral aging. But given the limited financial capabilities of the budgets, this requires, firstly, the transformation of education funding, in particular in the field of implementing innovative technologies, and secondly, the diversification of funding sources. Diversification of funding sources consists in expanding financial assistance to the educational process of wealthy parents of students; involvement of external and internal investors; receiving grants and financial assistance from international charitable foundations.

As a basis, we propose to use a project approach with the introduction of systematic coordination of projects and task fragmentation. Fragmentation of the task should consist, in particular, in the financing, at the first stage, only the re-equipment of several specialized classes in each school and the gradual expansion of their number. Project-based implementation should be realized according to the principle of financing a pilot sample of the project in each school, followed by a phased expansion of project implementation. This will help to identify problematic points in the transformational process of financing innovations, and training personnel, that is, it will allow the spending of financial resources economically.

Since all projects must be implemented to achieve a single goal, we offer a mathematical formalization of the financial coordination of projects:

$$\frac{\text{strategic goal}}{\text{opt } \sum_1^m \sum_1^n D_i} \rightarrow \text{opt} \quad (1)$$

where η_i is the efficiency of the project; $i = 1, 2, \dots, n$ is the project index; m is the number of funding sources; B_{1z}, B_{2z} are the level of the results of the external examination before the beginning and after the end of the project; D_i is the cost for each of the projects.

By using such a mathematical approach, it becomes possible to optimize costs by sources of funding and through coordination of project implementation and optimization of the effectiveness of the financing process for achieving a new quality of education and strategic goals defined in the concept of the NUS.

DISCUSSION

The rapid development of information and information and communication technologies opens up new opportunities in the introduction of innovative teaching methods. The application of these methods in elementary school cannot be careless and requires detailed scientific analysis and broad discussion. For the success of the implementation of innovations, measures to provide them with trained personnel, finances, and methodical development require special attention. In view of the above, the proposed project approach to providing innovative education in primary school, in particular project-based implementation of innovative methods by disciplines and regions, in our opinion, requires a wide discussion with the participation of scientists, practitioners, and representatives of institutional structures. The use of "immersion" methods in elementary school will require discussion with specialists in the field of child psychology, which may lead to the need to take into account the specifics of the health status of each individual child when implementing these methods.

The methodical detailing of directions and scope of teaching economics in primary school needs urgent clarification. For this, it is extremely important to develop a common point of view of scientists and practitioners regarding the concept of teaching economics as a fundamental subject for studying other disciplines. accordingly, methodical coordination with curricula of other disciplines. The problem of reconfiguring the thinking of teachers, regarding their understanding of the possibilities opened up by innovative technologies and the readiness for their implementation requires considerable attention and additional discussion. A certain problem is also the significant share of teachers of pre-retirement age, which, according to the Ministry of Finance of Ukraine, is 17.2%, therefore, it is necessary to study and discuss the formation of their motivation for retraining.

CONCLUSIONS

The conducted research established that in order to increase the effectiveness of education and in response to existing challenges and threats, there is a need to use a hybrid model of the educational process, game technologies, and methods of "immersion" in the subject field, first of all for learning languages, using the latest technologies. It was also established that in order to ensure the tasks set by the Law of Ukraine "On Education" and the Concept of the New Ukrainian School there is a need to introduce the latest information technologies into the educational process for the formation of the appropriate competencies of students. It is indicated that this requires significant funds, which are beyond the budget of Ukraine, and therefore require the transformation of education financing. This determines, on the one hand, other requirements for educators, in particular regarding the strategic task in the training of future teachers, which consists of the need to ensure the training of teachers at the level of international standards, their natural orientation to the use of innovative technologies in the educational process, on the other hand, it allows to formulate the need for a project approach in financing education and to propose a mathematical formalization of the financial coordination of educational projects.

The implementation of the project approach will improve the situation with the introduction of innovative technologies, in particular, due to greater efficiency in the use of funds. To implement the project approach in financial support of the educational process, a mathematical formalization of the financial coordination of educational projects is proposed.

It is indicated that the effectiveness of innovations in the educational process of primary school through the use of the latest information and information and communication technologies consists not only in expanding access to educational resources but also in the formation of individually prepared and targeted information and pedagogical tools for a specific student. This helps the primary school teacher to identify the connection between the individual characteristics of the student's learning behavior and the effectiveness of his learning, which allows him to effectively contribute to the implementation of the strategy of strengthening factors that affect the satisfaction of students with learning in the educational process. Increasing the effectiveness of achieving the effect of learning satisfaction is one of the main tasks of introducing innovative methods into the educational process and a prerequisite for the effective acquisition of relevant competencies by primary school students. In particular, when teaching native and foreign languages, it helps to acquire skills in their practical use in a more effective way and to solve the problem of forming students' text creation, which primary school teachers in today's realities of Ukrainian schools always lack study time. When studying economics, will allow for wide access to economic information sources and their analysis, and assimilation of the basics of economics through practical examples, which will form the basis for forming students' understanding of the importance of acquiring economic knowledge for their further life in society. All of the above confirms the thesis that innovative technologies in education become a guarantee for students to acquire the appropriate level of competence in various educational disciplines, in particular when learning languages and the basics of economics, making the initial process more effective, and mastering subjects - more qualitative.

The subject of further research should be an assessment of the phasing of the implementation of specialized classes, maximally equipped with the necessary hardware, software, and support staff, the calculation of pilot projects in each area, and the assessment of the necessary pace of training for future primary school teachers prepared to use innovative methods using IT and ICT. For this, it is necessary to detail the necessary level of use of the hybrid model of the educational process, game technologies, and methods of "immersion" in the subject area for each discipline taught in primary school.

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ВИКОРИСТАННЯ ІННОВАЦІЙНИХ ТЕХНОЛОГІЙ ДЛЯ ФОРМУВАННЯ ЕКОНОМІЧНОЇ КОМПЕТЕНТНОСТІ УЧНІВ ПОЧАТКОВИХ КЛАСІВ

У статті проаналізовано застосування інноваційних, насамперед інформаційно-комунікаційних технологій для підвищення ефективності засвоєння учнями компетентностей, визначених концепцією Нової української школи (НУШ). Зокрема рідномовної, іншомовних та економічної компетентностей. Указано на зростання потреби у використанні новітніх технологій для належної відповіді на виклики й загрози, перед якими постало суспільство, економіка й навчальний процес України. Визначена перспективність застосування гібридної моделі навчального процесу, ігрових технологій та методів «занурення» в предметну галузь, найперше для вивчення мов, за використання новітніх технологій. Указано, що умовою застосування перспективних технологій є належне забезпечення початкової школи сучасним обладнанням. Це також формує стратегічне завдання в підготовці майбутніх учителів, найперше вчителів початкової школи, яке полягає в необхідності забезпечення підготовки викладачів на рівні міжнародних стандартів, органічної орієнтації їх на застосування інноваційних технологій, ефективного використання цифрової інфраструктури, цифрових навичок, smart-освіти, робототехніки в навчальному процесі. Визначені перспективні напрями інноваційних технологій, які забезпечують синергетичний ефект впливу педагогічних та технологічних інновацій. Указано, що ефективність методів «занурення» в предметну галузь збільшується за впровадження комплексної імерсивної технології. Проведено стратифікацію використання імерсивних технологій у навчальному процесі. Указано, що новітні інформаційні технології відкривають можливості аналізу наявних у мережі даних про учнів та їхню навчальну діяльність. Це дозволяє сформувати індивідуальний портрет учня та реалізувати такі стратегію й тактику навчання, які спрямовані на забезпечення успішності саме цього учня, запропонувати таку взаємодію між учнем і навчальними матеріалами, яка б забезпечила найліпший результат, виявити зв'язок між індивідуальними особливостями навчальної поведінки учня та ефективністю його навчання, підготувати індивідуально розроблені й спрямовані на конкретного учня інформаційні та педагогічні інструменти. Доведено, що таке забезпечення навчального процесу необхідним обладнанням потребує значних ресурсів. Проведеним аналізом доведено, що середні видатки на один клас за впровадження сучасних інформаційних технологій у навчальний процес мають вирости більше ніж удвічі, що є непосильним завданням для бюджету країни. Це вимагає для вирішення завдання забезпечення навчального процесу необхідним обладнанням мобілізації всіх ресурсів – і бюджетних, і позабюджетних коштів. Запропоновано напрям трансформації фінансування освіти, в основу якого покладено проектний підхід за впровадження системного узгодження проектів та фрагментації завдання. Запропонована математична формалізація фінансового узгодження освітніх проектів та оптимізації витрат за джерелами фінансування й оптимізація ефективності процесу фінансування за досягнення нової якості освіти й стратегічних цілей, визначених у Концепції НУШ.

Ключові слова: мовна компетентність, економічна компетентність, інноваційні технології, трансформація фінансування, проект, НУШ, майбутні вчителі початкових класів

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