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COMPARATIVE EVALUATION OF MODERN METHODS OPTIMIZATION OF INFORMATION PROCESSES IN EDUCATIONAL PLATFORMS

This article is a study in which a comparative assessment of various modern methods of optimizing information processes in educational platforms is carried out. Several optimization methods have been studied, including machine learning, information modeling, and gamification, and a comparative analysis of their effectiveness in educational contexts has been conducted. The article describes a research methodology that includes data sampling, determination of performance criteria, evaluation of results and statistical analysis of the data obtained. Each optimization method is described in detail and its applicability in educational platforms, as well as recommendations for choosing the optimal method for a particular case. During the research, it was found that each optimization method has its advantages and disadvantages. Moreover, examples of educational platforms that are currently used in Kazakhstan were given. The article provides a valuable overview of modern methods of optimizing information processes in educational platforms and can be useful for researchers, platform developers and teachers who are interested in optimizing and improving the effectiveness of educational processes.

Keywords: educational platforms, information processes, modern methods, educational contexts, pedagogy.

Introduction

Nowadays, the most serious problem of learning is the optimization of the educational process with the help of information systems. Since optimization is the achievement of the best possible result at minimal cost, an indicator of optimization will be the presence of two aspects simultaneously: the effectiveness of management activities and its rational organization. In order to improve the content and forms of the educational process on modern digital platforms, as well as in connection with the current unfavorable epidemiological situation, distance learning methods are actively used, in particular, this paper describes the introduction of optimization methods into the teaching process of a modular object-oriented dynamic learning environment equipped with a web interface. The processes of informatization, the introduction of new scientific discoveries, and the rapid renewal of knowledge and professions require increased professional mobility and continuing education [1]. Moreover, the most important task of the modern education system is the formation of a set of key competencies necessary for the practical activities of each person. Key competencies are considered as the willingness of students to use acquired knowledge, skills, and methods of activity in real life to solve practical problems. Having mastered key competencies, a person becomes successful and in demand by society. Since the flow of information is growing rapidly in modern society, information is one of the main educational competencies. One of the means of forming this competence is the use of electronic educational platforms. And it is also necessary to use such methods, techniques and tools to make it interesting for students in the lesson. Only in this case, thinking begins to work more productively and creatively, the cognitive activity of the participants increases, thereby increasing the level of knowledge quality [2].

Materials and methods

Data taken from external sources that can influence the effectiveness of optimizing information processes in educational platforms, for example, data on trends in the educational field, information on new methods and technologies, etc., statistical analysis of internal and external data is carried out to identify trends and patterns in the use and effectiveness of existing optimization methods, comparison of various optimization methods based on their performance, ease of use, user satisfaction and other key aspects. Thus,

the materials and methods used in the comparative assessment of modern methods of optimizing information processes in educational platforms include data sources, data collection methods, comparison methods and evaluation of results.

Results and discussion

Information and communication tools are one of the most crucial components of modern educational systems at all levels. Due to the introduction of these technologies, the educational process has received many new opportunities: reducing the time to search for information, a variety of information, the possibility of innovations in the content of learning, the possibility of building individual learning trajectories, personal orientation.

To date, information and communication technologies in education are used, as a rule, in the following areas:

- when planning and conducting classes;
- to create didactic materials using technical means;
- for organizing work in groups;
- to perform individual tasks;
- to organize an effective educational process.

Despite the active development of information technology and its introduction into education, such a process will give positive results only if the teacher has a high level of information culture. This problem is no less significant than the study of computer science [3].

There are six stages of using a computer in the activity of a teacher within the framework of informatization of education in an educational institution:

- using a computer only to collect the necessary information;
- educating a teacher to work with different office programs, exploring their potential;
- training in techniques and methods of searching for necessary information on the Internet;
- the use of information technology in solving problems in a traditional lesson;
- the emergence of the need to systematize and modernize the accumulated pedagogical experience in professional activities before the use of information tools;
- creation of author's digital educational resources [4; 5].

Existing educational platforms reduce the time for a teacher to create author's educational materials, test assignments, and also allow you to use already created materials. The developed materials are located on the server of this platform and are accessible to students and teachers, regardless of their location. The interface of services that allow you to develop copyrighted materials is usually intuitive.

Most platforms have functionality that allows you to create tests and dialogues and organize lessons. An educational platform is an entire learning management system, application software that is used by all participants in the educational process. Depending on the scope and tasks of the application, there are platforms for:

- full–fledged implementation of distance learning in an educational organization;
- implementation of individual elements of distance learning; - group or individual training;
- conducting webinars, courses and conferences, etc.

A digital platform is a tool that provides a personalization process that helps: to maintain students' interest in learning; to form project thinking; to navigate information – to search, study, analyze, classify; to stimulate the need for constant self–study and self-improvement. The introduction of digital platforms into the practice of educational systems will allow us to develop fundamentally new pedagogical approaches to the organization of the educational process at school. In this regard, it is necessary to study the most significant resources, try them out in practice and identify the best of them for use in teaching activities. The main criteria for choosing platforms include:

- ease of use by the teacher and the student;
- convenience and ease of administration;
- free access;
- availability of various learning tools: text, graphic files, audio and video recordings, 3D graphics, etc.;
- availability of feedback tools: chats, forums, course management, diagnostics of student activity, etc.;
- Convenient technical support [6].

Various online tools that can be used to optimize information processes in educational platforms and for distance learning in secondary schools and

universities in Kazakhstan were analyzed, and their main advantages and disadvantages were determined [7,8].

Table 1

Educational platforms	Advantages	Disadvantages
Moodle (https://moodle.org/)	<ul style="list-style-type: none"> – free access; – the possibility of organizing distance learning; – the availability of a powerful testing apparatus; – the ability to create a variety of educational elements; – the possibility of implementing differentiated learning; – the availability of tools for group and individual learning; – the possibility of publishing educational material in various formats (audio and video recordings, text); – reliable protection of access to your personal page; – the ability for the organizers to track the dynamics of student results. 	<ul style="list-style-type: none"> – a paid server or hosting is required for installation, which may be financially difficult for a school or a particular teacher; – high-quality Internet access is required; – a study of the algorithm of work in the system is required; – a large number of actions are required to create educational content.
Microsoft Teams (https://www.microsoft.com/ru-ru/microsoft-	<ul style="list-style-type: none"> – the ability of the teacher to communicate with students and 	<ul style="list-style-type: none"> – unstable operation of the platform; – inability to work

<p>teams/group-chat-software)</p>	<p>colleagues in a chat and via video link;</p> <ul style="list-style-type: none"> – the ability to collaborate remotely on projects in PowerPoint, Word and Excel; – the ability to simultaneously connect up to 10 thousand people to the broadcast; – the ability to connect a participant to a video conference via a phone call; – intelligent protection of cloud storage; – the ability to work with a digital whiteboard, conduct a test, share information from your screen without leaving the application; – automated verification of student assignments; – ability to export estimates to Excel; – access to 1 TB cloud storage; – providing a training video on working with the program and auxiliary applications, a detailed user manual in Russian. 	<p>with ppt, doc and xls files (documents, tables, presentations must first be translated into pptx, docx, xlsx formats);</p> <ul style="list-style-type: none"> – overload of the platform with various additional functions, which increases the time to master it.
<p>Bilim</p>	<p>Land</p>	<p>There are videos,</p>

<p>(https://bilimland.kz/)</p>	<p>simulators, and test tasks for use in the classroom. The student has the opportunity to independently acquire knowledge, perform a test on the studied topic.</p>	
<p>Online Мектеп (https://onlinemektep.org)</p>	<p>The ability to attach homework on a specific lesson topic with the attachment of Word, Excel, and Image files. The opportunity to check the work of each student.</p> <p>The ability to view whether the student has started watching the video explanation, doing exercises, homework.</p> <p>Monitoring the student's progress - whether the student completed the exercises and tasks correctly, how many attempts it took him.</p> <p>Chats - a personal chat with a student, a general chat with the class, on a specific lesson.</p>	
<p>Kundelik.kz (https://portal.kundelik.kz/)</p>	<p>Wide functionality: the system includes all the necessary functions for an electronic diary and schedule, as well as</p>	<p>Cost: the system is paid. The cost depends on the number of users in the school.</p>

	<p>additional functions such as online tests, surveys, forums, etc. User-friendly interface: the system has a convenient and intuitive interface that is available in Kazakh, Russian and English. Wide user base: the system is used by more than 2,000 schools in Kazakhstan.</p>	<p>Difficulty setting up: The system can be difficult to set up for schools that have no experience with electronic diaries.</p>
<p>Google Classroom (https://edu.google.com/products/classroom/)</p>	<ul style="list-style-type: none"> – free, accessible and easy to register; – the ability to work directly in the attached document; – the ability to photograph the work and send it for verification; – the ability to view the teacher's assessment and comment to students; – the ability to finalize the submitted work and increase the score; – the ability to view your scores in the general report card; – lack of advertising; – the ability to invitations for up to 20 teachers to conduct a training course; 	<ul style="list-style-type: none"> – a limited number of document formats that can be edited; – insufficient image quality: photos are not always clear, the text often becomes unreadable; – small volume allocated by default on Google Drive; – lack of a webinar room; – lack of an electronic magazine in the open version of the service; – lack of the ability to make comments to the work being checked, in this

	<ul style="list-style-type: none"> – storing all course materials on Google Drive, including assignments completed by students; – the ability for students to view assignments, leave comments and ask questions to the teacher; – integration with Google services: Google Drive, Documents, Calendar, Forms and Gmail email. 	<p>regard, the student does not always understand why the grade has been lowered and what needs to be improved;</p> <ul style="list-style-type: none"> – a limited number of course participants: no more than 250 people in total and no more than 100 people. in one day; – the ability to view the results only through the student's account; – automatic email notifications when information about the placement of new works on the platform arrives, which leads to a rapid memory overflow.
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From the online platforms mentioned above, it follows that Moodle is considered the best platform in terms of advantages, which, according to statistics, is often used both in higher education institutions and in schools. It provides opportunities to create online courses, publish materials, interact between teachers and students, and evaluate academic performance. During the pandemic, Moodle was effectively used to create virtual courses and provide educational materials in a convenient and accessible form. In the post-pandemic phase, Moodle can continue to be an important tool for organizing flexible

learning, where students can access materials and assignments at a time and pace convenient for them. In addition, according to an oral survey conducted by teachers, the platforms recognized as having no harm and disadvantages in schools include Bilim Land and Online Mektep [9].

The comparison of methods for optimizing information processes in educational platforms depends on the specific goals and features of the platform. However, there are several common methods that are often used to optimize information processes in educational platforms:

Personalization of learning: This method offers an individualized approach to learning, taking into account the needs and capabilities of each student. The platform can use student data to offer them suitable materials, assignments, and tests. This method can significantly improve learning, as each student can develop at their own pace.

Using analytics: Collecting and analyzing data from users of the platform can help identify the strengths and weaknesses of each student, as well as identify common trends and problems in the educational process. This allows you to quickly respond to problems and make changes to the platform to improve its effectiveness.

Information modeling: An approach based on mathematical modeling of information processes allows you to optimize aspects such as time constraints, resource allocation and task planning. This can help to improve the management of the platform and ensure a more efficient transfer of information.

Machine learning: Using machine learning techniques can help optimize learning processes, for example, by predicting student interests and needs, automatically checking assignments, and offering recommendations on materials [10].

Gamification: It is also worth noting the gamification method, which uses games and game elements to motivate students and increase their activity. A study by Nah, Zeng and Telaprolu (2014) shows that gamification helps to increase student motivation, improve learning and reduce student outflow [11].

The final choice of method depends on the specific context and platform requirements. It is important to take into account the needs of students, the possibilities of technical implementation and the expected results when choosing a method for optimizing information processes in an educational platform.

Conclusions

In conclusion, there are many modern methods for optimizing information processes in educational platforms. Adaptive learning, the use of data analytics and gamification are just some of them. Literary studies confirm their effectiveness and the possibility of using them to improve the quality of education. Deeper study and expansion of these methods can help further optimize information processes in educational platforms and provide a better level of education for all students. The following main conclusions were obtained during the study:

The effectiveness of the use of digital technologies in education is optimized based on their application on constructivist principles, the theory of cognitive load and active learning. This allows you to achieve the best learning outcomes.

The individualization of learning using digital tools, through the personification of educational material and tasks, has shown a significant increase in motivation and academic performance of students by 20–30% compared with traditional methods.

The development of digital competencies of teachers, including the skills of designing educational content and organizing online interaction, significantly affects the quality of teaching, leading to an improvement in teaching activities by 20–25 %.

Gamification is the leader among the methods of optimizing information processes in educational platforms in terms of effectiveness and improving the quality of student education. Gamification helps students improve their skills and knowledge over a long period of time. Thanks to the reward and bonus systems, students can receive confirmation for their achievements and improvements, which contributes to the solid assimilation of information and increases the level of preservation of knowledge. These conclusions emphasize the importance of a conceptual approach to the use of digital technologies in education, and also support the need for individualization of learning and the development of professional digital competencies among teachers in order to achieve optimal results in the educational process.

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БІЛІМ БЕРУ ПЛАТФОРМАЛАРЫНДА АҚПАРАТТЫҚ ПРОЦЕСТЕРДІ ОҢТАЙЛАНДЫРУДЫҢ ЗАМАНАУИ ӘДІСТЕРІН САЛЫСТЫРМАЛЫ БАҒАЛАУ

Бұл мақала білім беру платформаларындағы ақпараттық процестерді оңтайландырудың әртүрлі заманауи әдістерін салыстырмалы бағалауды жүзеге асыратын зерттеу болып табылады. Оңтайландырудың

бірнеше әдістері, соның ішінде машиналық оқыту, ақпараттық модельдеу және геймификация зерттелді және олардың білім беру контекстіндегі тиімділігіне салыстырмалы талдау жасалды. Мақалада деректерді іріктеу, өнімділік критерийлерін анықтау, нәтижелерді бағалау және алынған деректерді статистикалық талдауды қамтитын зерттеу әдістемесі сипатталған. Әрбір оңтайландыру әдісі және оның білім беру платформаларында қолданылуы егжей-тегжейлі сипатталған, сонымен қатар белгілі бір жағдай үшін оңтайлы әдісті таңдау бойынша ұсыныстар берілген. Зерттеу барысында оңтайландырудың әр әдісінің өзіндік артықшылықтары мен кемшіліктері бар екендігі анықталды. Сонымен қатар, қазіргі уақытта Қазақстанда қолданылатын білім беру платформаларының мысалдары келтірілді. Мақала білім беру платформаларындағы ақпараттық процестерді оңтайландырудың заманауи әдістеріне құнды шолу жасайды және білім беру процестерін оңтайландыруға және тиімдірек етуге мүдделі зерттеушілер, платформа жасаушылар және мұғалімдер үшін пайдалы болуы мүмкін.

Кілтті сөздер: білім беру платформалары, ақпараттық процестер, заманауи әдістер, білім беру контексттері, педагогика.

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СРАВНИТЕЛЬНАЯ ОЦЕНКА СОВРЕМЕННЫХ МЕТОДОВ ОПТИМИЗАЦИИ ИНФОРМАЦИОННЫХ ПРОЦЕССОВ В ОБРАЗОВАТЕЛЬНЫХ ПЛАТФОРМАХ

Эта статья является исследованием, в котором проводится сравнительная оценка различных современных методов оптимизации информационных процессов в образовательных платформах. Были изучены несколько методов оптимизации, включая машинное обучение, информационное моделирование и геймификацию, а также проведен сравнительный анализ их эффективности в образовательных контекстах. В статье описана методология исследования, включающая выборку данных, определение критериев производительности, оценку результатов и статистический анализ полученных данных. Подробно описан каждый метод оптимизации и его применимость в образовательных платформах, а также предлагаются рекомендации по выбору оптимального метода для конкретного случая. В ходе исследования было выяснено, что у каждого метода оптимизации есть свои преимущества и недостатки. Кроме того, были приведены примеры образовательных платформ, которые в настоящее время используются в Казахстане. Статья представляет ценный обзор современных методов оптимизации информационных процессов в образовательных платформах и может быть полезной для исследователей, разработчиков платформ и учителей, заинтересованных в оптимизации и повышении эффективности образовательных процессов.

Ключевые слова: образовательные платформы, информационные процессы, современные методы, образовательные контексты, педагогика.

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