Praktické predpoklady pre tvorbu a implementáciu platforiem dištančného vzdelávania

Practical Prerequisites for the Creation and Implementation of Distance Learning Platforms

Maxot E. Rakhmetov[1], Aigul K. Sadvakassova[1], Peter Schmidt[2]

Abstrakt
Rýchly vývoj informačných a komunikačných technológií si vyžaduje začlenenie flexibilných, webových vzdelávacích prostredí, ktoré sú dostupné bez geografických obmedzení. Táto štúdia skúma efektivitu LMS pri poskytovaní komplexných, adaptabilných a interaktívnych vzdelávacích skúseností vhodných pre inštruktorov aj študentov. Zdôrazňuje použitie štandardných a inovatívnych nástrojov v rámci LMS na zvýšenie produktivity výučby, splnenie vzdelávacích cieľov a podporu pútavého vzdelávacieho prostredia. Ďalej článok pojednáva o vývoji a implementácii prototypu systému riadenia vzdelávania založeného na štandardoch SCORM (Sharable Content Object Reference Model) na ilustráciu praktických aplikácií v dištančnom vzdelávaní. Empirické dôkazy z prieskumov uskutočnených v L.N. Eurázijská národná univerzita Gumilyov a univerzita Atyrau vykazujú významný trend smerom k prijatiu týchto platforiem, čo podčiarkuje ich rastúci význam pri plnení súčasných vzdelávacích požiadaviek a príprave študentov na profesionálnu konkurencieschopnosť v globálnom prostredí. Zistenia obhajujú neustále zlepšovanie online vzdelávacích platforiem, aby sa zabezpečilo, že budú spĺňať dynamické potreby študentov aj pedagógov v digitálnom veku.

Kľúčové slová
LMS, synchrónne učenie, asynchrónne učenie, vzdelávacie online platformy, technológie dištančného vzdelávania, virtuálne platformy

Abstract
The rapid evolution of information and communication technologies necessitates the incorporation of flexible, web-based educational environments that are accessible without geographical constraints. This study explores the effectiveness of LMS in providing comprehensive, adaptable, and interactive educational experiences, suitable for both instructors and students. It highlights the use of standard and innovative tools within LMS to enhance teaching productivity, meet educational objectives, and foster an engaging learning environment. Furthermore, the article discusses the development and implementation of a prototype learning management system based on the SCORM (Sharable Content Object Reference Model) standards to illustrate practical applications in distance education. Empirical evidence from surveys conducted at L.N. Gumilyov Eurasian National University and Atyrau University shows a significant trend towards the adoption of these platforms, underscoring their growing importance in meeting contemporary educational demands and preparing students for professional competitiveness in a global landscape. The findings advocate for continuous

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improvement of online educational platforms to ensure they meet the dynamic needs of both learners and educators in the digital age.

Keywords
LMS, synchronous learning, Asynchronous Learning, Education-online platforms, distance learning technologies, virtual platforms

JEL classification
I21, I23

1 Introduction

Currently, one of the pressing issues in the training of future computer science teachers at universities is the necessity to integrate online educational platforms for distance learning. This requirement arises from the need to apply and implement modern technologies in the development of information and communication technologies, which is one of the primary tasks for computer science teachers. Learning Management Systems (LMS) enable students to transmit information both within and outside the classroom, allowing teachers and students to provide tailored instructions that are accessible anytime and anywhere without geographical constraints. Thanks to unique learning and design capabilities, LMS can be implemented for students at each educational level. Most LMS platforms come equipped with a standard set of tools designed to facilitate learning and discussion in an online environment. Some tools, such as discussion forums, are used for relationship-building and collaborative learning. Other tools, such as assessment devices and online evaluations, enhance teacher productivity and ensure that the courses meet educational objectives while also tracking student progress. Additionally, the optimal curriculum offers comprehensive solutions that address all aspects of online learning without the need for supplementary tools.

The Learning Management System (LMS) provides a platform for a web-based learning environment, enabling the management, provision, and monitoring of learning. LMS is often regarded as the foundation for any web-based learning program. An effective LMS should be fully suitable for web deployment without the need for additional client applications. It is also crucial that the LMS supports various sources from different manufacturers and is based on open industry standards for web deployment (Andyusev, 2020), (Tariq & Said, 2023).

We will then explore some effective methods of feedback with resources when creating a learning management system.

2 Methodology

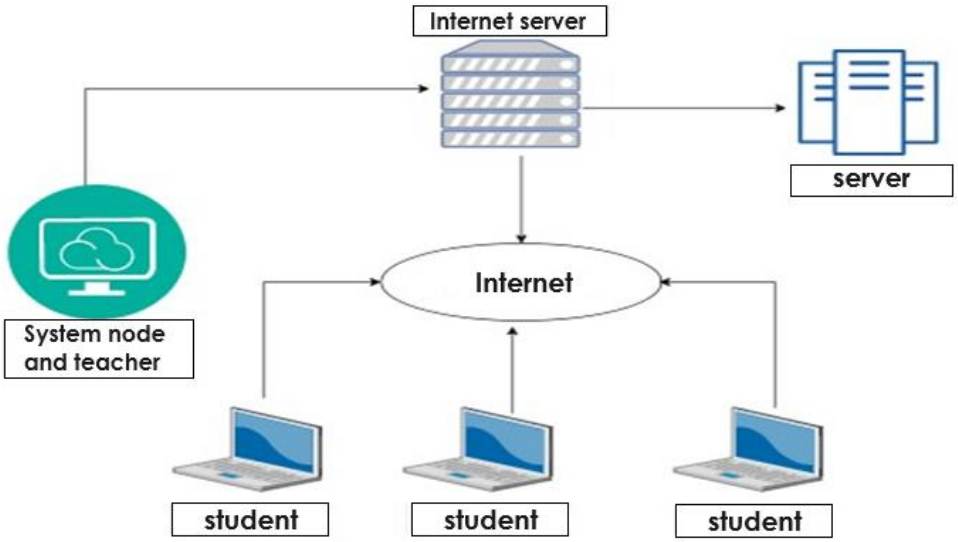
The most effective approach to organizing educational processes through a Learning Management System (LMS) is the use of distance learning platforms. The organizational structure of distance learning is illustrated in Figure 1.

Advantages of Using a Learning Management System for Education:

- Individual Training: Students can set the pace of learning according to their personal preferences and circumstances, allowing for a personalized learning experience.
- Freedom and Flexibility: Learners have the liberty to select from a variety of courses and can independently schedule the timing and duration of their lessons.
- Accessibility: Distance learning platforms enable educational access to any student at any university that supports these technologies, irrespective of geographical constraints. This universality helps to meet diverse educational needs effectively.

- Speed of Interaction: Rapid interaction between students and teachers is crucial and is seamlessly facilitated by LMS, enhancing the educational process.
- Productive Capacity: The use of cutting-edge information and telecommunication technologies in education maximizes the effectiveness of learning outcomes.
- Creativity: LMS provides a conducive environment for students to express themselves creatively within the learning process (Assaf Alfadly, 2013).

Fig. 1: Distance learning process



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Traditional methods of developing online learning platforms are generally costly, time-consuming, and require specific technical skills. For comprehensive online learning implementation, organizations employ Learning Content Management Systems (LCMS) to swiftly arrange, launch, and manage online course content.

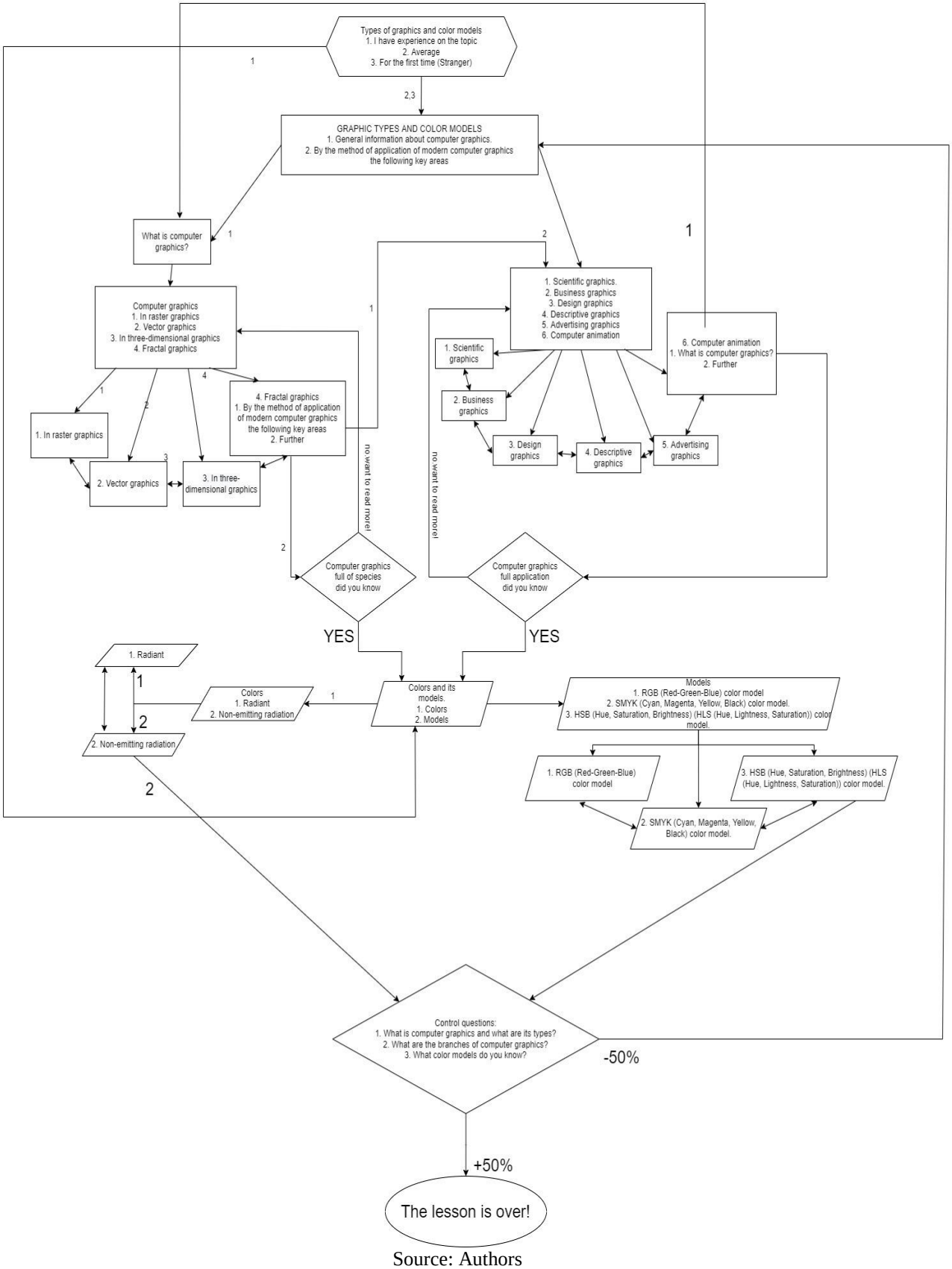
In 2000, the Advanced Distributed Learning (ADL) Initiative Group introduced the SCORM (Sharable Content Object Reference Model) standard for distance learning systems, which outlines requirements for organizing educational content and the entire educational platform system. SCORM, which is XML-based, includes specifications for content storage, execution environments, and search and navigation functionalities (Ruano et al., 2016).

SCORM is a set of recommended specifications and standards it consists of several sections:

- content storage model;
- current execution environment;
- search and navigation.

Consequently, a blueprint for an autonomous interactive learning management system based on SCORM standards was developed for distance learning applications. The schematic of this system is depicted in Figure 2.

Fig. 2: Autonomous interactive learning management system



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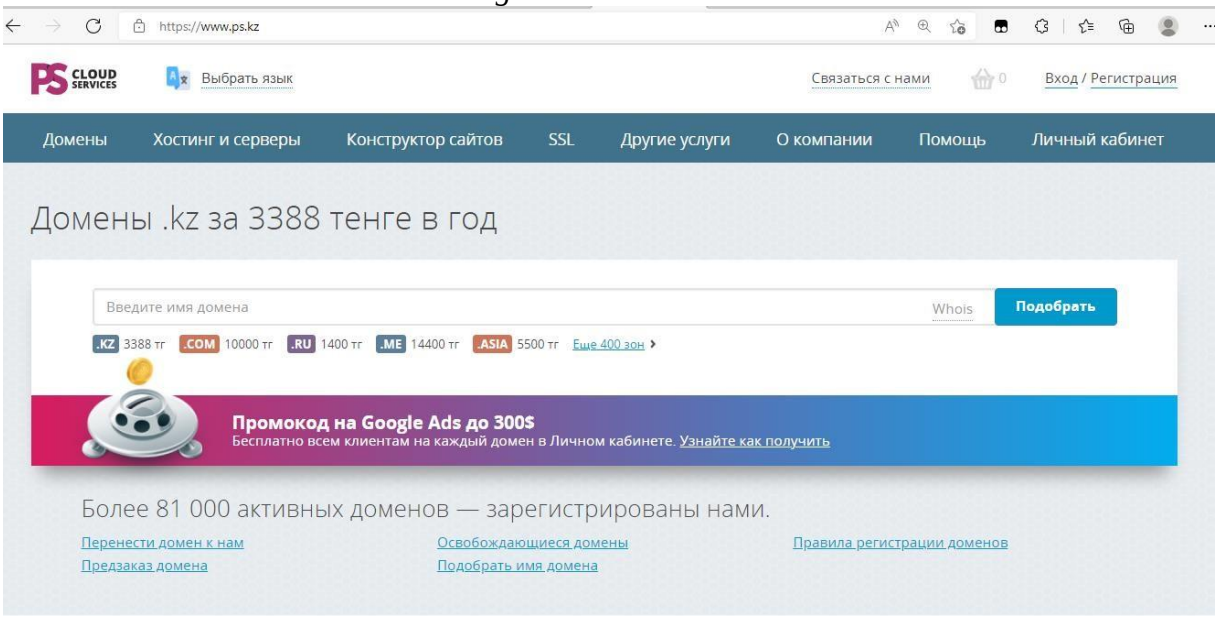
Additionally, to facilitate the creation of a distance learning platform, hosting was secured from a cloud server at www.ps.kz.

Fig. 3 Cloud server PS



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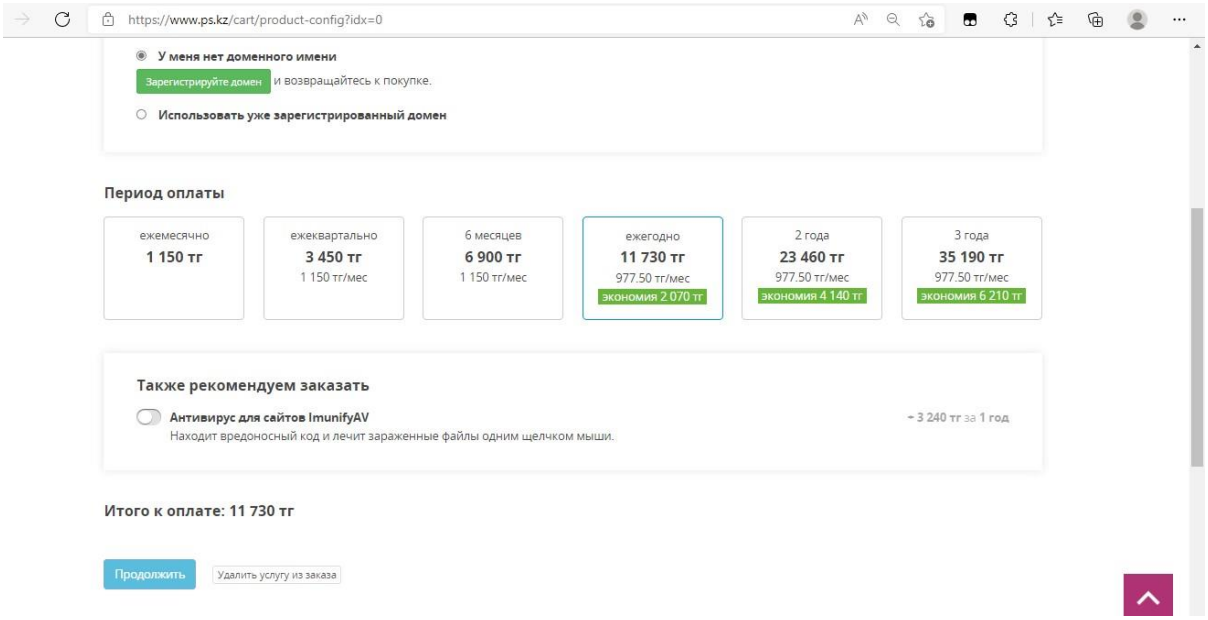
Registration on the cloud server can be accomplished by clicking the "support" button and entering the required data or using a Gmail account. Selections can also be made based on timing considerations since hosting incurs costs. The capabilities and pricing of the hosting are detailed in Figure 4.

Fig. 4: Hosting capabilities



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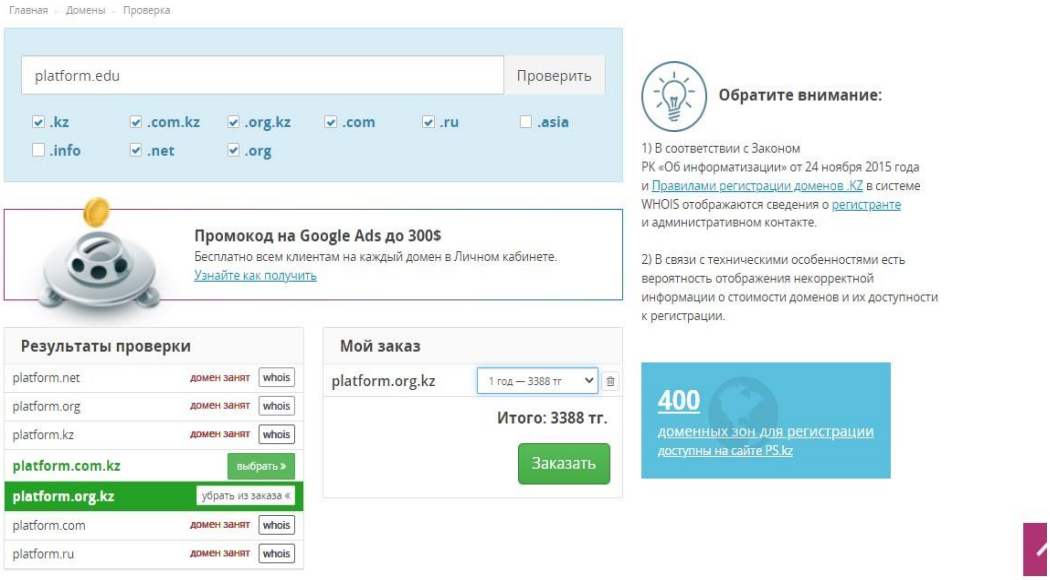
For those without an existing domain, requests can be made by specifying the desired domain name. In this instance, the domain platform.org.kz was secured as shown in Figure 5.

Fig. 5: Getting a domain



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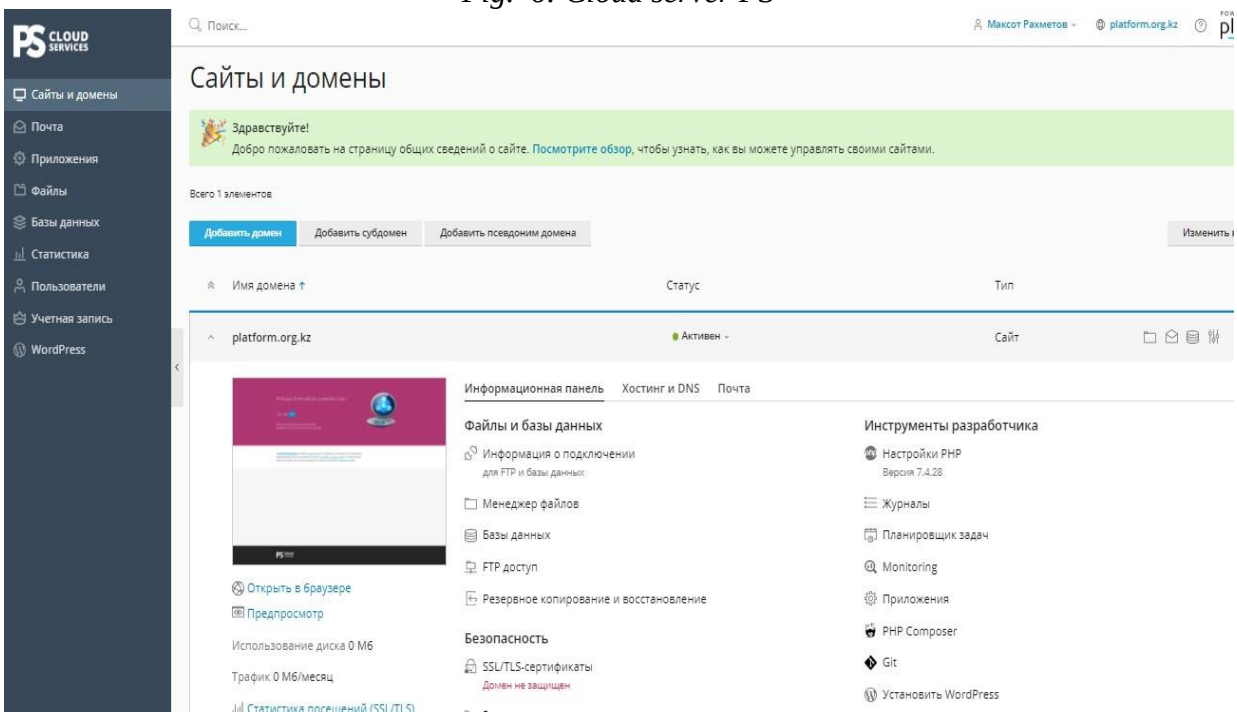
The cloud server offers multiple functionalities for creating platforms and websites, including database creation, email setup, statistics management, user list customization, and WordPress plugin configurations. The operational interface of the PS cloud server is illustrated in Figure 6.

Fig. 6: Cloud server PS



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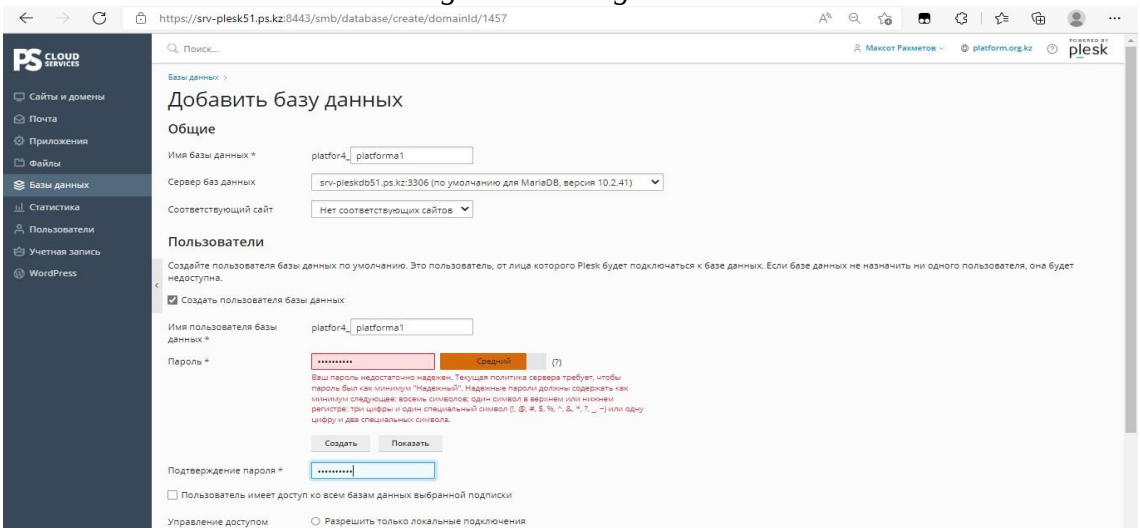
A database named 'platforma1' was established on the server, secured with a password, as depicted in Figure 7.

Fig. 7: Creating a database



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Following database setup, the latest WordPress 5.9 application model was installed on the cloud server to support the development of learning management system platforms. After logging into WordPress, the wp-admin page associated with our domain is accessible, allowing for future development of the learning management system using specific templates and programming languages tailored to meet technical specifications and diverse educational needs.

3 Distance Learning Platforms: The Effectiveness of Education

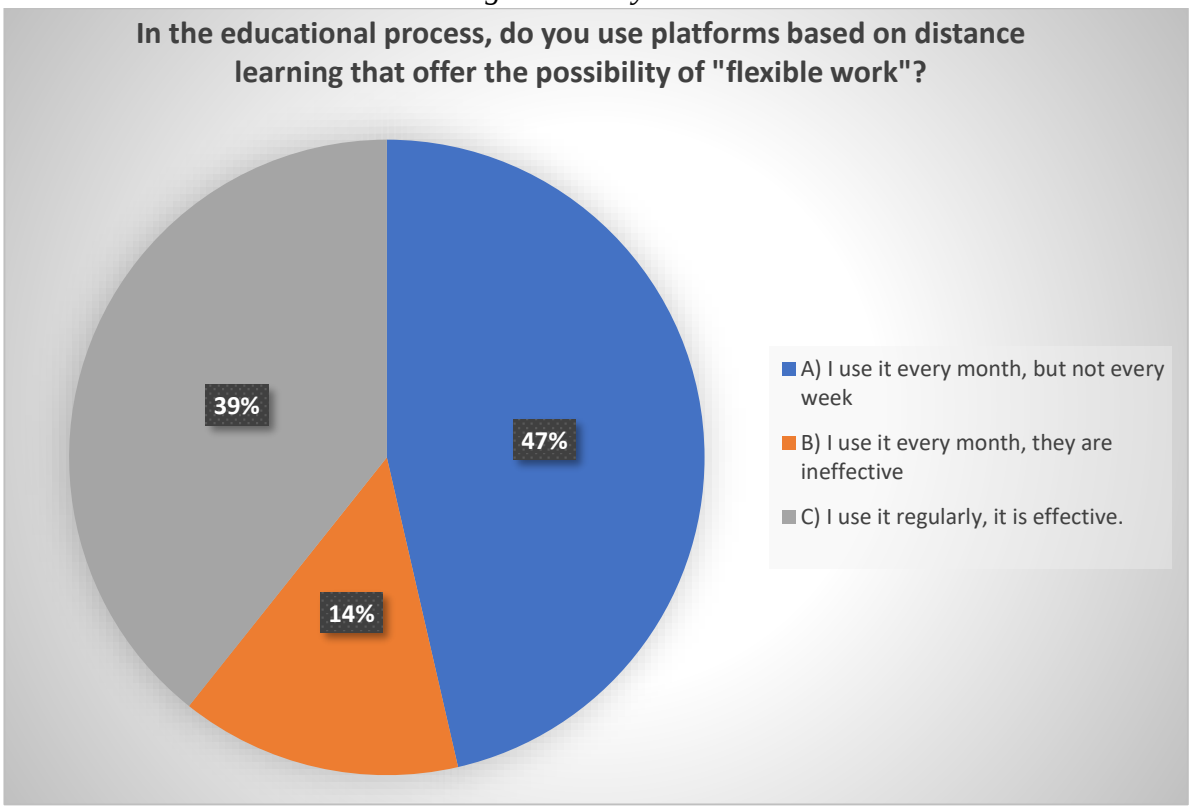
The Learning Management System (LMS) facilitates the provision of online classes for both educators and students within the training process. Engaging in education through online classes enhances the educational experience for instructors. The application of LMS supports the notion that online learning can operate on a non-profit basis (Najm et al., 2018). Internet user engagement increases as the LMS focuses on their achievements, providing flexibility in learning locations to accommodate other commitments such as employment or family. The online learning system allows instructors to independently manage the pace and scheduling of their educational activities (Holmes et al., 2018). Al-Fraihat (Al-Fraihat et al., 2019) pointed out that during the development of central and Constructivist online courses, the emphasis was on directing students selflessly toward their academic pursuits. Bradley emphasized the necessity of enhancing student autonomy and active participation in remote learning. Furthermore, Murcia and Vanga explored the potential of online education through discussion, modeling, and planning (Wu et al., 2010). Collectively, scholars concur that the advancement of the Internet and its tools such as email, chat, forums, and other technologies have enriched the interaction opportunities available to educators and students (Stenetorp et al., 2012).

4 Results and analysis

Educational content for training future computer science teachers has been developed on the newly created platform, alongside organized practical work. This initiative was executed during the educational processes at L.N. Gumilyov Eurasian National University. The utility and effectiveness of the educational platforms were assessed through experimental stages involving students from the departments of "Informatics" at both Gumilyov Eurasian National University and Atyrau University, under the educational programs "Informatics and Information and Communication Technologies in the Education System 6b01511" and "Informatics 7M01511". Based on the data gathered in 2018, it was predicted that the user base for distance education

platforms would expand rapidly. By the end of 2020, 41% of educational institutions globally were utilizing these platforms, as evidenced by survey outcomes. These findings are presented in Figures 8 and 9, which depict the strong inclination among students towards using distance learning platforms and indicate a growing interest in the development of autonomous platforms.

Fig. 8: Survey result



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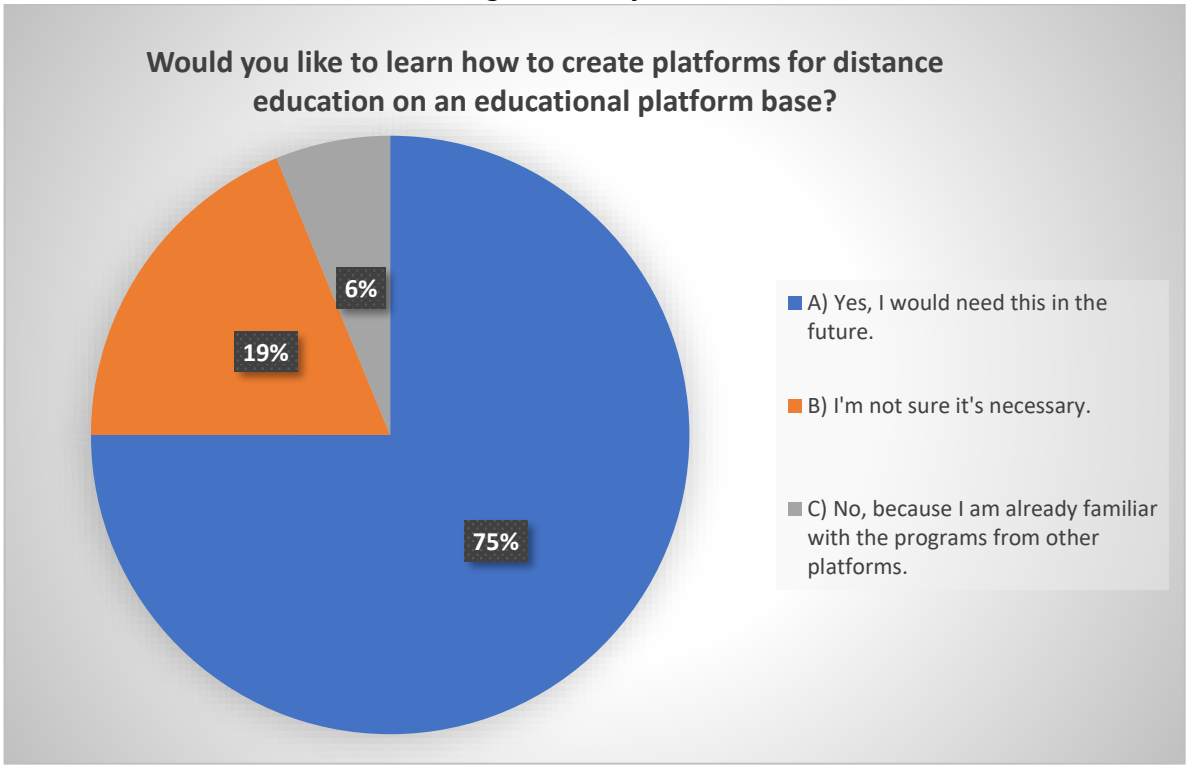
From Figure 8, it is evident that 47% of respondents regularly use platforms based on distance learning that offer the possibility of "flexible work," demonstrating a high level of effectiveness and regular usage of these tools. An additional 39% indicate that they use such platforms monthly, though not weekly, suggesting less frequent but still consistent engagement. Only 14% of respondents find these platforms ineffective, even though they use them every month.

In Figure 9, a substantial 75% of respondents expressed interest in learning how to create platforms for distance education based on educational platforms, indicating a strong demand for developing these skills for future applications. Only 19% are unsure of the necessity, and 6% already have experience with similar programs from other platforms, they do not see a need for further education in this area.

Integrating these insights into the existing discussion, it becomes clear that distance learning platforms are not only widely used but are also seen as effective and beneficial for a significant portion of the educational community. This underscores the importance of further enhancing these platforms to meet the growing educational needs and preferences for flexible, accessible learning environments. Such data supports the ongoing development and refinement of educational technologies, aligning with the broader goals of increasing accessibility and personalizing the learning experience.

Fig. 9: Survey result



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5 Conclusion

In summation, the development of innovative Learning Management Systems and the integration of information technologies into distance learning processes are poised to significantly bolster student interest in academic disciplines, cultivate a scientific and creative outlook, enhance professional attributes, and produce market-competitive specialists. Consequently, the adoption of distance learning platforms within educational frameworks signifies a shift towards a new educational paradigm that leverages highly efficient technologies for societal advancement, integrates fully into the global educational landscape, and achieves international standards. Our ongoing research into distance education will continue to evaluate the efficacy of distance learning platforms and develop methodological guides that leverage these technologies in the training of future computer science teachers.

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