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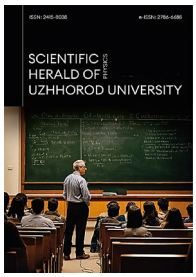

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Preparation of university students for independent work using benchmarking technology

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Abstract

Relevance. The study's relevance arises from the increasing adoption of new teaching methods in the education system, particularly influenced by the COVID-19 pandemic, which necessitates rethinking the learning process. Benchmarking technologies aim to enhance these processes by leveraging best practices from leading universities globally.

Purpose. The study aims to assess university students' readiness for independent work and evaluate the outcomes of preparing students for independent work using benchmarking technology.

Methodology. An experiment was conducted in three stages: collecting information, developing and testing the methodology, and integrating the methodology into the educational process. The study was carried out at Sh. Ualikhanov Kokshetau University.

Results. The study revealed the degree of readiness of university students for independent work using benchmarking technology. The focus was on how benchmarking technology improves the educational process and the development of self-educational components. Systematic diagnostics and constant adjustments helped achieve planned results in organizing independent work.

Conclusions. The proposed methodology for organizing students' independent work enhances future graduates' competitiveness, creativity, stress resistance, communication skills, and professional development capabilities.

Keywords: modern teaching methods; future specialist; self-organisation; learning process.

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Introduction

The education system of the 21st century requires profound changes to meet the needs of society, especially those related to social and economic changes. Therefore, it is necessary to develop new skills and competencies required by educational standards, which each student must master by the end of compulsory education. Teachers' perception of the integration of technologies, the competencies they possess, and their relationships are public policy, which is also the subject of research. Of particular relevance today is the issue of adaptation and implementation of scientific research in the field of development of students' readiness to organise independent work using benchmarking technology [1; 2]. The modern system of higher education in combination with the prevailing conditions requires structural renewal, as it does not meet the requirements of employers [3]. This is reflected in the acute shortage of qualified specialists who meet the requirements of the modern labour market. In order for a future specialist to be in demand among employers, it is necessary to regularly improve their qualifications, strive for creative growth, self-education, and learn new and useful information through self-education.

Many Kazakh and international researchers have been studying benchmarking and issues of independent work of students. M. Sankey and F.F. Padró [4], considered the features of benchmarking in the educational process of higher educational institutions. M. Tsvetkova et al. [5] attempted to identify the peculiarities of the organisation of students' independent work (SIW), and to investigate the psychological component of this process. O. Osadcha [6] considered the development of a model of independent work of students in the conditions of distance learning and investigated the role of independent work in the development of professional competencies of students. The study by K.M. Khamidullayevich [7] was devoted to the problematic aspects of the use of information and communication technologies in the learning process. But at this stage, the topic of preparing students for independent work using benchmarking technologies has been rather neglected in the scientific literature, so it was considered in this paper.

The process of development of students' readiness for self-organisation in the process of independent university work is one of the complex pedagogical phenomena in which the human factor is involved. The introduction of innovations is aimed at the successful development of students' ability to independent work [8-10]. Coordinated learning with innovative elements can also help achieve self-learning goals and increase the likelihood that students will master basic skills. To create a positive impulse, teachers need to use the experience of the best specialists in this field. This is conditioned by the pedagogical basis identified in the study, reflecting the effectiveness of the modern content of education in the process of self-organisation using benchmarking technology. This approach requires a more adaptive learning style in which educators can adapt the best educational strategies to improve self-learning [11-13].

The purpose of the study is to create such a pedagogical model for the development of students' self-learning using benchmarking technology, which can be adapted in the proposed university; to evaluate the effectiveness of internal and external pedagogical frameworks for the development of this type of predisposition. The purpose of the experimental work is to develop a high level of readiness for independent work among students, to train competitive specialists in demand in the labour market, with such qualities as a creative approach to achieving goals, stress tolerance, the ability to make decisions and avoid conflict situations, etc. The ultimate goal of the study was to convincingly prove that the model can be adapted using best practices and implemented in the educational process.

Materials and Methods

This study is based on benchmarking technology, based on which a methodology for preparing students for self-education was developed. Benchmarking is the art of working with information, and not just with regular information, but with its best samples. When preparing a benchmarking project, it is important to choose the right research object for detailed work. To do this, it is necessary to correctly assess the current state of the system under consideration (university, department, educational processes), i.e., to conduct a self-assessment. Benchmarking identifies, studies, and adapts the best practices and experience of other organisations to improve the efficiency of their organisation (organisations with similar processes in their industry, regardless of the industry, within the country or abroad).

This technology is based on the concept of continuous improvement of production processes, which provides for a continuous cycle of planning, coordination, motivation, and evaluation of actions for sustainable improvement of the organisation's activities. Benchmarking is aimed at improving any given (in this case pedagogical) process by investigating the best approaches and not only measuring the best performance, but also searching, researching, and achieving the best pedagogical results. The authors of this study, using benchmarking technology as an assessment of ways to solve problems and transfer effective experience, the process of identifying, understanding and adapting existing examples of effective functioning of organisations to their improvement work or as monitoring, do not indicate fundamental differences in the nature and content of benchmarking [14].

In this study, benchmarking implies the search and transfer of effective experience in the process of organising the independent work of students, and benchmarking technology imply control, improvement of the process of organising independent work of students, continuous planning, coordination of motivation and results to sustainably improve the results of the organisation of the educational process. The study was conducted on the premises of Sh. Ualikhanov Kokshetau University. A total of 129 students and 3 teachers from the Faculty of Natural Sciences of the aforementioned university participated in the experiment. Additionally, 25 students and 1 teacher from Gorno-Altaisk State University, 20 students from Turan University in Astana, and 3 employers from the restaurant and hotel complexes “GREEN Which Hotel”, Plaza Hotel, and Rixos Borovoe were involved. The experiment was conducted in three stages from 2015 to 2021. At the first stage of the pedagogical experiment

(2015-2016), indicators were determined that characterise the level of education and readiness for students' independent work (SIW); methods for diagnosing readiness for students' independent work (questionnaires, interviews, observation) were identified. The following methods were used at this stage: analysis of theoretical aspects of literature and normative documentation; questionnaire survey; conversations; educational monitoring; testing, and ranking.

At the second stage (2017-2019), a special course was developed and tested in the Google class interface, which included special tasks for SIW of different levels of complexity, and the dynamics of the development of the level of education of students in readiness for independent work using benchmarking technology was revealed. Primary methods of statistical processing of the results were used; verbal methods of explanation, methods of cognition of the surrounding reality, project method, methods of diagnostics of the level of development of readiness of students of the SIW using benchmarking technology: questionnaires, testing. In the third stage (2020-2021), methodological recommendations were developed, conclusions were drawn and benchmarking technology was introduced into the educational process using methods of analysis, synthesis, comparison, and ranking of material; methods of presenting the results of processing statistical research data; statistical methods of processing the experiment results.

Results

The effectiveness of the process of developing students' readiness for independent work using benchmarking technology is determined using the following indicators:

- the criterion of the approximate motivational component (understanding the importance of students understanding the purpose of a certain type of activity and its connection with the achievement of independent work; the need for independent work to achieve the expected results in the future of achieving professional activity);
- the criterion of the educational component (the ability to navigate modern educational programs taking into account the needs of the educational environment; willingness to use benchmarking technologies to prepare for independent work);
- the criterion of the procedural component (readiness to use benchmarking technologies adapted to a specific university (faculty) in the process of organising independent work; analysing the results of scientific research directly at the stage of preparation for independent work, conducting independent work on modern educational programmes;
- the criterion of the correctional component (teaching students to work with pedagogical literature, joint analysis of mistakes in the independent work of students; with this type of support, the actions of the teacher should be tactful, professional and not devoid of the ability to see their actions and the actions of others from the moral side);
- the criterion of the control and evaluation component (consists of monitoring the process of self-organisation of students: the teacher evaluates the adequacy of the selected methods of independent activity of students) [15; 16].

The development of students' readiness for independent work using benchmarking technology is ensured by the introduction of complication of pedagogical conditions:

- revision of approaches to teaching university teachers, including the development of readiness for independent work of future specialists: moving away from the conventional "knowledge" approach to modern educational technologies, while applying an individual approach to each student. The high degree of orientation of the educational process allows the teacher to make the right choice when determining their educational trajectory, using the best practices of colleagues in organising independent work with their adaptation to the educational process;
- introduction of computer educational platforms aimed at developing students' readiness for independent work using benchmarking technology;
- participation of employers in monitoring the level and effectiveness of self-education in subsequent professional activities.

Modern educational technologies create a new learning environment that is effective for both teachers and students. Benchmarking is a systematic activity aimed at the search, evaluation, and perspective of learning in order to show the effectiveness and efficiency of the learning process. Considering the issue of organising independent work of a student at a university, it should be noted that it has significant advantages over the conventional teaching methods familiar to everyone. First, it is a creative approach and thinking that allows choosing new ways and means of learning, using the best experience in the field of pedagogical practice [17]. The problem was solved now when, in the conditions of the pandemic, all educational institutions of the world switched to distance learning. Educational platforms were introduced into the educational process and studied and tested by teachers, departments, faculties, and universities. In addition, each teacher independently had the opportunity to bring the best experience into practice using benchmarking technology and adapt it to the educational process, including forming readiness for the process of self-education using benchmarking technology, consistently according to the ranking principle [18]. Since the most important period of adaptation is during the initial courses at the university, the survey "What is self-education in your understanding?" was conducted among them, in which 40 students took part. The survey results are shown in Figure 1. The next question the students answered is, "How often do you engage in self-education using benchmarking technology?", the results are shown in Figure 2.

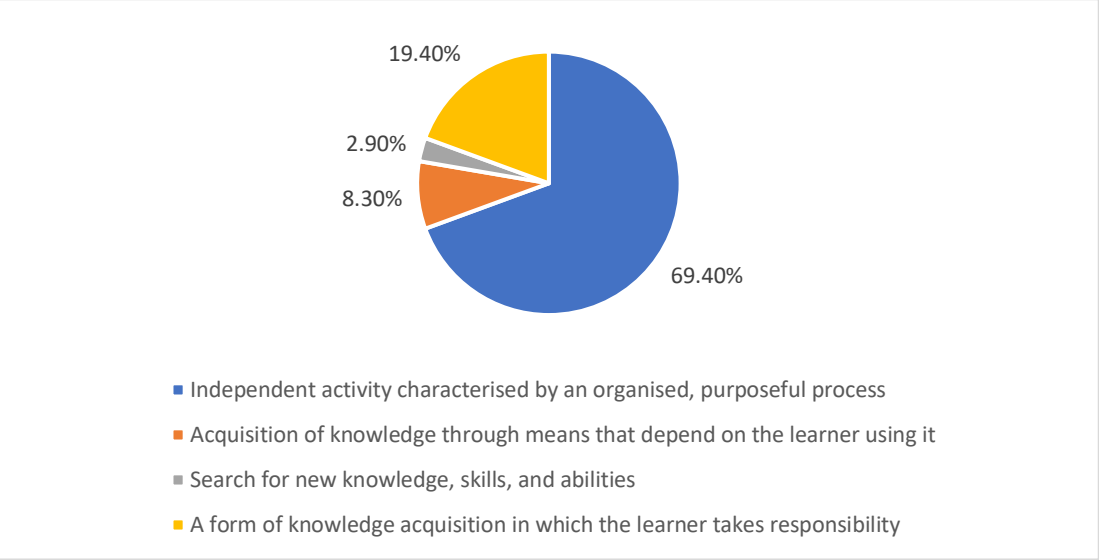
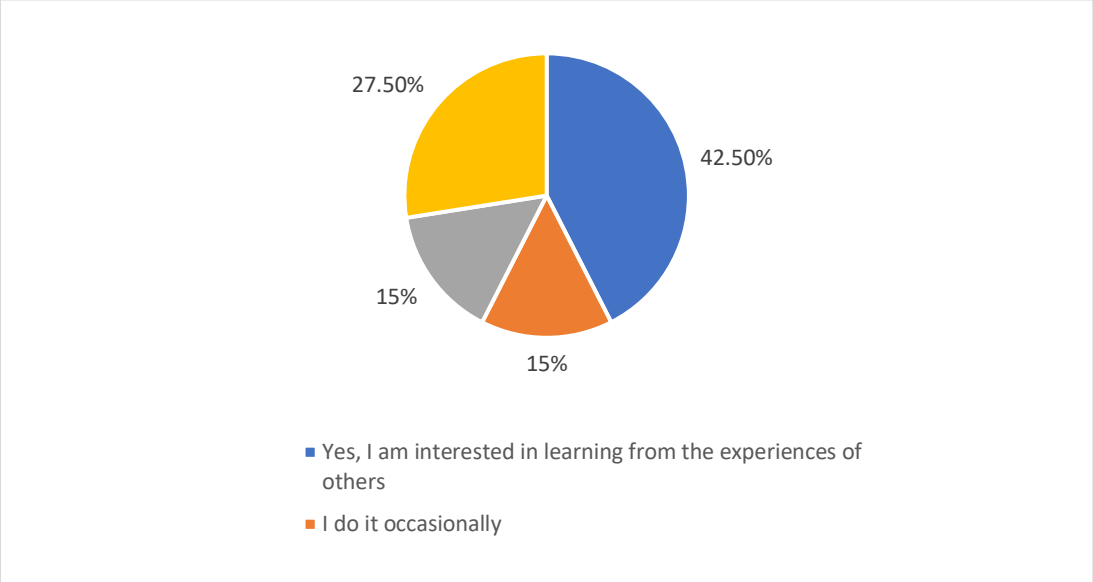


Figure 1. Students' answers to the question: "What is self-education in your understanding?"



The third question is, "What ways are you most interested in preparing for independent work using benchmarking technology?" the results are shown in Figure 3. Students use benchmarking technologies to prepare independent work with different goals, and the answers to the question about motivation are as follows (Figure 4).

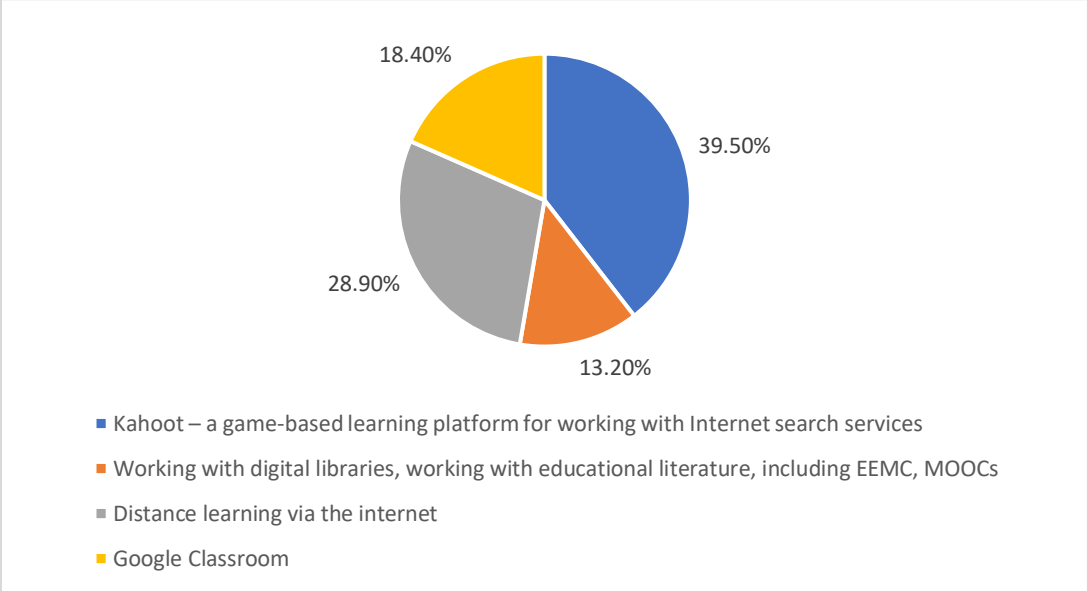


Figure 3. Students' answers to the question: "What ways are you most interested in preparing for independent work using benchmarking technology?"

Note: EEMC – electronic educational and methodical complex; MOOK – massive open online course.

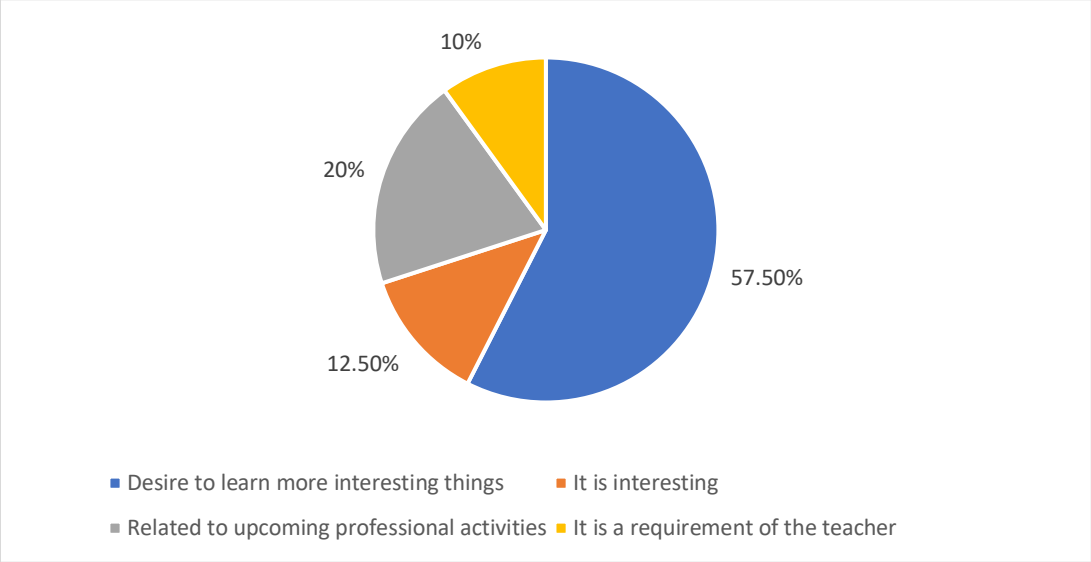


Figure 4. Students' answers to the question: "Why do you use benchmarking technologies?"

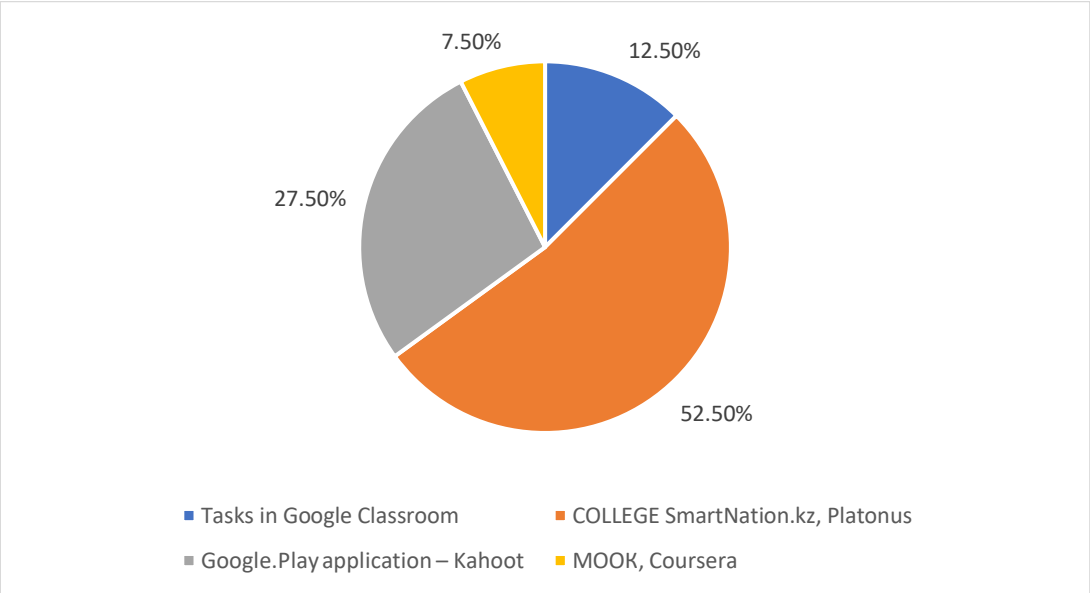


Figure 5. Students' answers to the question: "What platform do you use for this?"

Students were also asked whether benchmarking technologies could influence motivation to study, where most of the answers were negative, which can be seen in Figure 6.

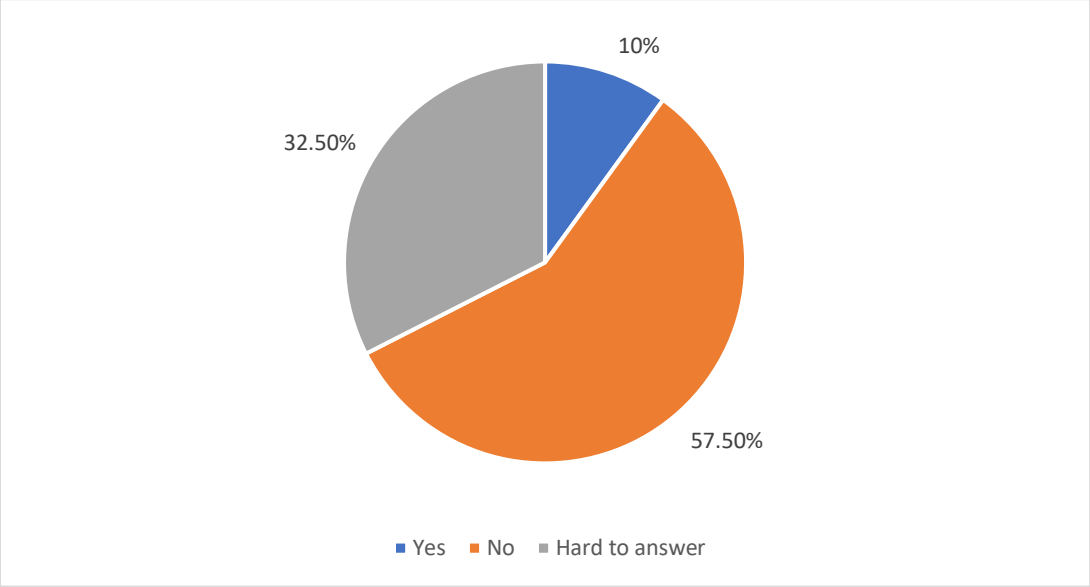


Figure 6. Students' answers to the question: "Do benchmarking technologies affect your motivation to self-study?"

The desire of students to use benchmarking technologies in preparation for independent work is negatively affected by such factors as a lack of work skills on modern educational platforms and a lack of knowledge of English, in which most applications are presented. At the second stage of the study, a specially designed course with SIW tasks was experimentally tested on the Google Classroom platform. According to the questionnaire conducted at the first stage of the study, only 12.5% of the students surveyed used this platform. Additionally, the dynamics of the level of students' preparation for independent work using benchmarking technology were demonstrated. In addition, the third stage of the study allowed the creation of a methodological guide for the development of students' readiness for independent work using benchmarking technologies, and to introduce of the above-mentioned SIW special course in Google Classroom. The average value of the results of the primary diagnosis of the condition of these components becomes the quantitative basis for subsequent study, since it, the positive or negative dynamics of the development of the readiness to independent work at the university, applied using benchmarking technology, will be monitored in the future. The results obtained at the initial stage of the experiment do not provide reliable information about the development of components, since they are scattered and require statistical analysis for reasonable conclusions.

With the right pedagogical approach and competent organisation, independent work on benchmarking technology develops the ability to search for information on the Internet and forms the ability to plan and allocate personal time for self-preparation. Students show the ability to develop the best personal qualities, learn to plan their time correctly and choose suitable methods of individual work. Growing competition, accountability requirements, and an abundance of available information are changing the usual system of universities. For higher education to lead to significant and sustainable changes in efficiency and productivity, new thinking or paradigms must be introduced into institutional structures that promote efficiency and the desire for lifelong learning. Tools are also being developed to measure or evaluate the progress and success of these efforts. Among the strategies and methods of improvement, benchmarking has become a useful, understandable and effective tool for maintaining competitiveness.

Discussion

Benchmarking refers to the mechanism of learning from personal experience and the experience of others; learning is carried out with a specific purpose; it is organisational learning, which is a continuous process of systematic, constant improvement, including a cycle of research, action, feedback, and organisational memory. Since benchmarking relies on reliable data and research methodologies, it is especially useful in higher education institutions where teachers and administration are familiar with this kind of research. University practitioners have found that benchmarking helps overcome resistance to change, provides a framework for external evaluation, and creates new communication networks between educational institutions where valuable information and experience can be exchanged. Benchmarking is a positive process that provides objective measurements to determine baseline indicators, set goals, and track improvements that can lead to significant innovation. In addition, both quality strategies and reengineering efforts are enhanced using benchmarking, as it can identify areas that can benefit the most and allow operations to be improved through often radical innovations.

S. Cordes [19] also studied the issue of using online tools to perform project work for students. The research was aimed at understanding the problems that students face when working with computer information on the Internet. The technique of critical incidents was used to describe and classify problems that arise when using technologies, searching and collecting information by established standards of information literacy and technological competence. The study results confirmed that the students of the network generation have different levels of skills in using technology to search and display information and that all students need training in the use of technological applications and search strategies for effective information work based on the course. The study of students' independent work was conducted by A. Gerashchenko et al. [20], who presented mathematical models of students' independent work, which is the dominant component of the educational process, both in terms of volume and didactic significance. These models are based on probability theory and set theory. Because of the analysis of empirical data, a matrix was obtained reflecting the relationship between the success of students' classroom work and independent work. The authors have developed information-probabilistic models reflecting the relationship between learning and the independent work of students.

The rapid development of technology and the Internet has facilitated the use of e-learning methods for training specialists in higher education in many countries. E-learning systems link learning content to other educational activities and provide digital tools and better services to facilitate learning. In this context, ensuring the quality of e-learning for higher education institutions has become of great importance in terms of retention and student satisfaction [21-23]. Based on 22 recent studies, T. Huynh-Cam et al. [24] conducted a review, analysis, and synthesis of existing literature to improve the quality of e-learning and define standards, criteria, and benchmarks for e-learning systems and their evaluation. The results showed that the studies differed mainly in terms of research methods used for comparative analysis and evaluation of e-learning. Eight of the 22 studies focused on comprehensive fundamentals and benchmarks, and four studies provided theoretical and conceptual analysis. It was also noted that three studies presented a comparative analysis of e-learning case studies and considered conceptual models for evaluating e-learning, and two studies presented criteria and factors for evaluating e-learning. The authors presented a comparison of the methodological approaches of these studies and also considered how e-learning benchmarking can be used to ensure quality in theory and in practice.

L.R. Ríos-Rodríguez et al. [25] studied the independent work of students using the APA-Prolog environment and concluded that students manage knowledge through free or auxiliary viewing by their choice and the type of activity to be solved and that an adaptive teaching and learning environment contributes to a dynamic educational process addressed to students. O.I. Vaganova et al. [26] considered the problem of the introduction of modern educational technologies for the organisation of independent work of students at the university. The authors defined the concepts of “independent work” and “management of independent work of students”. They also described the advantages of the Moodle electronic platform, which is already used in many universities. After an experiment proving the effectiveness of electronic, project-based, problem-based learning technologies in organising students' independent work, the authors concluded that the use of the discussed technologies gives positive results. In addition, a survey was conducted among students focused on motivation for independent work, which showed a high level of motivation using electronic, project-based and problem-based learning technologies.

The study by C.L. Yeung, L. Zhou and C. Armatas [27] provides a comprehensive overview of benchmarks available worldwide to support institutions in continuous quality control or improvement of e-learning. The purpose of the review was to identify the main categories of e-learning, and which benchmarks are suitable for each category. The use of technology in conventional teaching or e-learning has become the future trend of higher education worldwide. Although it has evolved from

conventional teaching and learning, it has distinctive features, which is why researchers classify e-learning as a separate form of education. In the last decade, significant efforts have been made to research applications or develop models or e-learning environments. Since e-learning is now widespread in higher education, universities are responsible for its quality. Quality assurance can be carried out through comparative analysis or assessments by the specification of standards [28-30]. Many national authorities and organisations have established various criteria, standards and headings to describe or evaluate the quality of e-learning. However, the researchers noted that benchmarking at universities still causes difficulties. This is mainly conditioned by the fact that there is a wide variety of courses and approaches to learning, especially in an electronic environment.

Thus, it should be concluded that higher education solves the important task of preparing the younger generation for labour and social activities in the key links of the modern production system. At the same time, the conventional system of higher education, which emerged more than a century ago and has practically not changed, is now being justly criticised. The following aspects condition this. Until recently, student education was mainly aimed at the transfer of knowledge, and the development of skills and abilities, and did not always contribute to the development of intellectual, professional, and creative capabilities of students, their ability to self-education, the development of which ensures the competitiveness of a qualified employee in the labour market. The reproductive method of teaching provides for the organisation of the educational process, in which the student acts as a passive listener who has practically no time for self-preparation. The applied technologies and teaching methods aimed at increasing the level of learning do not provide adequate active cognitive activity for students, the development of their intellectual abilities and overall personality. At the same time, the improvement of the quality of training of specialists is provided, first, by pedagogical influence and psychological factors, which have a significant impact on the development of educational skills, self-development of the student, the quality of their education at the university, will almost not be considered.

The main task of higher education is not only to transfer passive knowledge to future specialists but also to develop a creative personality, a competitive, mobile graduate who can move quickly in rapidly changing professional fields and be ready for self-organisation. All of the above is of particular relevance, including the model of development of students' readiness for independent work using benchmarking technology. The pedagogical model allows for characterising the objects of research, conveying the information received about them, and exploring connections and phenomena that cannot be considered by other methods. In accordance with the benchmarking technology used in the study, it is necessary to adapt the proposed pedagogical conditions identified during the analysis of advanced pedagogical experience to a specific pedagogical environment.

Conclusions

The results of the study confirmed the opinion regarding the expediency of using benchmarking technologies in the process of preparing for independent work using the Google Classroom educational platform. This indicates that the educational results of the tentatively motivating, instructional, procedural, correctional, and control-evaluation components indicate that less than 50% of students showed a transformative level of self-educational competence, i.e., a pronounced desire for self-improvement and active creative activity. The diagnostic study took into account the multi-component nature of the structure of students' self-learning organisation in the aggregated orienting-motivating, instructional-regulatory, procedural and corrective, control and evaluation components. The control and evaluation component is based on independent control of the process of students' work using benchmarking technology: the teacher analyses and evaluates the methods of students' work, creativity, character, completeness, content, and usability of modern educational platforms. The assessment is accompanied by the task of ensuring the transition of students to a higher level of self-learning using benchmarking technologies.

It is worth noting that the conducted experiment revealed the pros and cons of the conventional training format. The complete transition of teachers and students to distance learning has revealed several problems, one of which is the lack of motivation to develop students' readiness for independent work. The proposed pedagogical model and diagnostics significantly changed the approach to the process of self-education and allowed students to increase their readiness for independent work. Therefore, identifying the specific features of the process of developing students' readiness for independent work with the help of benchmarking technology is an urgent scientific problem at the present stage. However, considering educational and industrial benchmarking as technologies for developing students' readiness for independent work at a university, then obvious differences become apparent: not all training organisations have been able to adapt to conditions requiring continuous learning and have developed the ability to learn at the required level. In this regard, it is advisable to rely on the use of new teaching methods that develop the ability for independent activity and creative cognitive activity, both in curricula and in training, retraining, and advanced training courses.

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None.

Conflict of Interest

None.

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Підготовка студентів університету до самостійної роботи з використанням технології бенчмаркінгу

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Анотація

Актуальність. Актуальність дослідження зумовлена все більшим впровадженням нових методів навчання в системі освіти, особливо під впливом пандемії COVID-19, що вимагає переосмислення процесу навчання. Технології бенчмаркінгу мають на меті покращити ці процеси, використовуючи найкращі практики провідних університетів світу.

Мета. Метою дослідження є оцінка готовності студентів університету до самостійної роботи та оцінка результатів підготовки студентів до самостійної роботи з використанням технології бенчмаркінгу.

Методологія. Експеримент проводився у три етапи: збір інформації, розробка та апробація методики, впровадження методики в навчальний процес. Дослідження проводилося на базі Кокшетауського університету ім. Ш. Уаліханова.

Результати. Дослідження виявило ступінь готовності студентів університету до самостійної роботи з використанням технології бенчмаркінгу. Основна увага була зосереджена на тому, як технологія бенчмаркінгу сприяє вдосконаленню навчального процесу та розвитку самоосвітніх компонентів. Систематична діагностика та постійне коригування допомогли досягти запланованих результатів в організації самостійної роботи.

Висновки. Запропонована методика організації самостійної роботи студентів сприяє підвищенню конкурентоспроможності, креативності, стресостійкості, комунікативних навичок та здатності до професійного розвитку майбутніх випускників.

Ключові слова: сучасні методи навчання; майбутній фахівець; самоорганізація; навчальний процес.