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Methodology of teaching future computer science teachers to create and use open educational resources

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Abstract

Relevance. At the moment, getting an education is not limited to attending higher educational institutions, the development of the Internet and the emergence of an increasing number of open and accessible online educational courses opens up new learning opportunities.

Purpose. The purpose of this paper is to substantiate the need to format the education system of future computer science teachers based on the creation and use of open educational resources in their learning process.

Methodology. The methodological basis of the study is based on the use of such research methods as analysis, synthesis, and actualisation applied in the framework of a pedagogical experiment.

Results. The result of the study is the assessment of the degree of development of Internet technologies and educational resources aimed at ensuring the accessibility of education. The world experience of forming an optimal model of education, which is aimed at training future computer science teachers to create and use OER, has been considered. The results demonstrate that for the effective use of open educational resources, it is necessary to ensure their safety. It is also determined that not all open educational resources meet the required level of quality of the information and educational materials provided by them. It is indicated that modern society is at the stage that demonstrates a high level of trust and loyalty to various educational Internet materials and resources, which necessitates their comprehensive study.

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Conclusions. A clear understanding of the requirements of modern society for the process of obtaining education indicates the ways to adapt the educational environment. The significance of the results is expressed in the development of the methodology of the teaching process of modern computer science teachers based on the creation, implementation, and use of open educational resources.

Keywords: information technologies; training of specialists; learning opportunities; informatisation; pedagogical activity.

Introduction

Studying the issue of creating and using open educational resources (OER), it is necessary to clearly understand the significance of this phenomenon. For the first time, the concept of OER was presented at the Forum of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in 2002 [1]. Since 2019, according to the UNESCO recommendation, OER refers to digital educational resources that are created for teaching and used for educational purposes, including all educational and research materials that are freely available on the Internet, have an open license for their use and are elements of the information environment. The use of open educational resources became most relevant during the global lockdown caused by the COVID-19 coronavirus infection [2]. In the modern world, teaching future computer science teachers to use and create open educational resources has several main reasons and goals.

Firstly, open educational resources are becoming increasingly popular in the educational environment. They enable teachers to get access to high-quality and diverse materials for the preparation and conduct of their lessons, which can affect the improvement of the quality of education. Training in the creation and use of open educational resources will help future computer science teachers to use these tools in their practice [3]. However, according to S.P. Karunanayaka and S. Naidu, despite the spread and recognition of open educational resources, their integration into the process of educating future teachers is still a difficult process [1]. Even if an appropriate level of professional development, a change in pedagogical thinking and a huge amount of practice are required from existing teachers, training future teachers is not an easy task.

In turn, the creation of their own open educational resources can be quite useful for teachers in the process of solving the issue of simplifying the learning process. The second reason and goal is an opportunity open to teachers to share their knowledge and experience with other teachers and students, as well as to contribute to the general community of open education. This theory is also adhered to by G.K. Baymakhanova et al. [4]. The researchers note that the use of OER allows developing a culture of information exchange, positively influencing the global educational environment. A similar opinion is shared by A.D. Ongarbaeva [5]. Thirdly, the use of open educational resources can help computer science teachers reduce the time spent on developing teaching materials and lessons, and focus on developing other important skills, such as communicating with students, preparing assignments, and evaluating academic achievements. This issue was described by B. Tillinghast [6].

Moreover, training in the creation and use of open educational resources can help future computer science teachers develop their skills in working with modern technologies, which can improve the quality of their

learning activities and increase students' interest in learning computer science. In addition, F. De Langen notes that the use of the Internet provides teachers and students with constant access to educational resources and information, having a positive impact on the effectiveness of learning [7]. However, it is almost impossible to develop a universal technology for creating electronic educational resources. Each developer of such a method offers their own individual approach, considering all the most significant, in their opinion, factors. Although, the standardisation of the process of creating OER and the implementation of training based on them can significantly reduce the cost of education and increase its availability [2]. An additional difficulty in developing an optimal methodology for teaching future computer science teachers to create and use OER is the insufficient technical equipment of educational institutions in Kazakhstan.

Considering all of the above, the main goal of the current study is the development of an optimal methodology for training future computer science teachers to create and use OER.

Materials and Methods

The theoretical basis of the current study was the research by both Kazakh and world (Chinese, Ukrainian, Dutch, American) scientists who investigated the use of open educational resources in the process of training future teachers and studies aimed at identifying the needs of modern society, within the framework of determining preferred methods of teaching. This included papers that examined possible models for teaching future teachers to create and use open educational resources. The theoretical basis was the basis for determining the most effective methods and approaches used in world practice, proposed by other researchers. The analysis of the research base was aimed at identifying the main advantages and disadvantages in the process of training future computer science teachers to create and use open educational resources, for the clearest understanding of the issue and the creation of the most effective methodology.

As an additional methodological basis for this study, normative documents, official statistical data and information that are freely available and presented on the Internet were taken. Statistical data on the development and use of open educational resources in world practice were investigated. To achieve this goal, various research methods were used, which were applied at each stage of the development of the teaching methodology. The study was carried out using the method of actualisation, analysis, and synthesis. The current study considered the results of analytical work, which analysed existing training programmes for future computer science teachers in various countries and educational institutions. The methods used as the main research methods were applied as part of a pedagogical experiment. Basic data of the pedagogical experiment:

Scope of activity and venue: based on the course “Fundamentals of teaching the creation and use of open educational resources” in the speciality “6B01506-Computer Science” at Kazakh National Women’s Teacher Training University, located in Almaty, Republic of Kazakhstan.

Hypothesis and the problems lie in the need to improve the educational model through the widespread use and introduction of open educational resources.

Boundaries of research: creation, implementation, and use of open educational resources in the learning process. The study was conducted from 2022 to 2023, among the 3rd-4th year students.

Action plan consisted of familiarisation with the world history of the use of open educational resources, analysis of the current situation in the field of training organisation, development of an optimal model, and its implementation developed in the practical plane.

Task: to determine the main elements of the teaching methodology, considering the positive and negative aspects of the use of open educational resources in the process of educational activity, and to formulate the methodology of training future computer science teachers considering these factors.

Provision and evaluation of the results obtained.

The chosen methodology and theoretical base fully corresponds to the goals and objectives of the current study. And it is aimed at developing the most optimal training programme that allows future computer science teachers to effectively use open educational resources in their work and in teaching students. The higher educational institution – Kazakh National Women’s Teacher Training University, which served as the basis of the current study, has sufficient technical and pedagogical equipment to develop this training programme.

Results

The 21st century is the age of digital technologies. Modern society is improving, and technological progress does not stand still. Within the framework of the rather rapid development of society, new requirements are emerging for the field of education. Nowadays, there is increased pressure on education. The sphere of education and teachers should respond to changes in the technical development of society and consider the trends of widespread use of technological means, mobile and multimedia technologies [8-10]. The role of technology in education is significant, as the use of technological tools increases the quality and accessibility of education. The newest tools for the implementation of the educational process can be considered open educational resources. In a general sense, open educational resources are various educational materials, statistical and scientific data, educational courses, video and audio lessons, research information, and other data available on the Internet, with the possibility of their free use, modification, and dissemination without copyright restrictions [11; 12].

It is important to understand that educational resources that are part of the OER must have an open license that allows distributing, copying, storing, and using all these materials [13]. The use of such materials can be considered legal only if these materials have an open license. The main goal of OER is to expand access to education and promote

a culture of knowledge sharing. Open educational resources provide teachers and students with extensive free content with an open license that can be used to improve the quality of teaching and learning. This can be especially useful in areas where resources are limited or conventional textbooks are too expensive [14; 15]. Previously, open educational resources were not used as an independent learning tool. Open educational resources were used only as an additional tool used in situations where the application of the conventional teaching method is complicated, uncomfortable, limited, or ineffective. For example, open educational resources were used as part of the training of people with disabilities, or for teaching people who are unable to attend conventional offline lessons due to high employment at work. With the onset of the COVID-19 pandemic, open educational resources have become established as an independent learning tool. In 2020, most educational institutions were forced to close, switching to the online learning format [16; 17].

The creation and use of open educational resources has its own characteristics for different categories of consumers. For example, for students, open educational resources serve as a source of additional information in the learning process. Moreover, students have the opportunity to discuss the information received with other students in an asynchronous or synchronously-oriented mode, which allows them to make a more balanced decision about admission to various educational institutions or choosing an educational institution for additional education [18; 19]. For teachers, OER act as an additional tool to improve the effectiveness of their professional activities, providing ease of building the educational process, based on gaining access to more information [8]. It is worth listing some of the main advantages of open educational resources. Thus, the advantages of using OER include the following [20]:

1. High economic efficiency. Since open educational resources are freely available, they can help reduce the cost of the educational process. There is no need for students to purchase expensive textbooks and other educational materials, which makes education much more accessible.

2. High level of adaptation. OER can be customised and adapted according to the needs of different students and the educational context.

3. Cooperation and knowledge sharing. OER promotes cooperation between teachers and institutions from different countries, as they can share and contribute to a common pool of resources. Moreover, open educational resources allow building cooperation within the framework of new projects based on open data. This helps create materials of the highest quality.

4. Continuous improvement. OER have the possibility of constant updating and improvement. Open educational resources are able to promptly reflect the latest research and best practices of teaching and learning.

5. Global access. Access to OER can be obtained all over the world, overcoming geographical and cultural barriers to education.

6. Variety. OER offers a variety of formats, from video tutorials to interactive games and tests, which helps students develop their skills and gain knowledge more effectively.

7. Open educational resources can contribute to ensuring equality and accessibility of education by providing equal opportunities to all students and teachers, regardless of their socio-economic status or geographical location.

However, in addition to a fairly large number of advantages, open educational resources also have disadvantages, among which the following can be attributed [21]:

1. Insufficient quality control: due to open access to the creation and use of OER, low-quality materials may be created.

2. Limited topics and subjects. Unfortunately, not all topics and subjects can be covered by open educational resources.

3. Limited availability. Not all students have access to the Internet and gadgets, which may limit their ability to use OER.

4. Copyright infringement. OER may contain copyright-infringing materials if they have not been properly checked and prepared.

Based on this, it is worth concluding that, despite the presence of certain disadvantages, open educational resources can be extremely useful. Thus, the question arises not only of the use, but also of the creation of OER. The development of an optimal model should include measures to train future computer science teachers not only in the correct and effective use of OER, but also to teach their creation. In general, when developing a model for teaching future computer science teachers to create and use open educational resources, it is necessary to clearly understand the current level of use of OER by computer science teachers. And, based on this, to determine the readiness of future teachers to create and use open educational resources. 6 main steps of creating such a model can be distinguished (Figure 1).

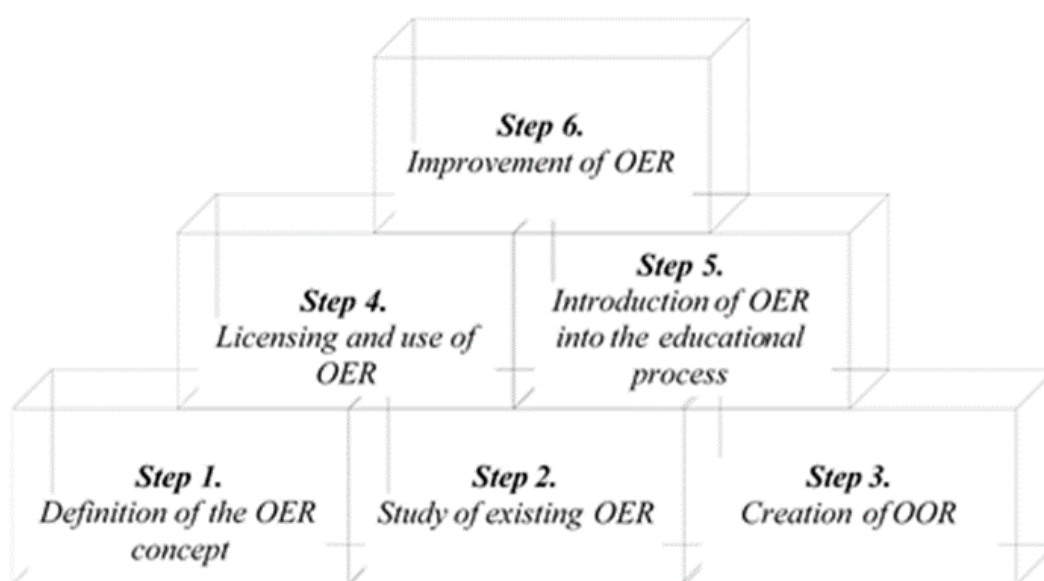


Figure 1. Step-by-step model of training future computer science teachers to create and use OER

1. Defining the concept of open educational resources. Familiarisation with the concept of OER and its significance in education. Identification of areas of use of OER that can help reduce student costs, improve access to educational materials, and facilitate the process of collaboration between teachers.

2. Analysis of existing OER. The study of existing OER by future computer science teachers in their field of study.

3. Creation of OER. Providing training and support for future computer science teachers in creating their own OER. Conducting seminars on the creation and publication of OER, providing feedback on the quality of created resources.

4. Licensing and sharing of OER. Teaching future computer science teachers how to license and share their OER. This step includes a discussion of different types of licenses, with further assistance in choosing the appropriate license for the created resources. Teaching future teachers how to share their resources in OER repositories and on websites.

5. Implementation of OER in the educational process. Providing recommendations and support to future computer science teachers on how to implement open educational resources in their work. It includes a discussion on how to integrate open educational resources into an existing curriculum, create new lessons and tasks using OER, and evaluate their effectiveness.

6. Optimisation and improvement. It includes the evaluation of the effectiveness of created and implemented open educational resources, and identification of areas for improvement, including the exchange of experience.

The definition of the methodology for teaching future computer science teachers to create and use open educational resources should lead to the widespread development and implementation of OER in the educational system of the Republic of Kazakhstan. However, in the modern system of training computer science teachers in pedagogical universities, unfortunately, not enough attention is paid to the issue of systematisation of training [2]. This indicates the need to train computer science teachers to create and use OER. Thus, starting the development of a model of the pedagogical process of teaching future computer science teachers to create and use

open educational resources, it is necessary to have a sufficient technological and educational base. Consideration of the readiness of students in pedagogical educational institutions in the specialities “Computer Science”, “Computer Engineering” to perceive and understand the material using OER. It is important to take into account the material base of a higher educational institution implementing such a model. The material base of the university should provide free access to a variety of sources of information that may be necessary for the creation and further use of OER, and, if possible, provide the latest information and communication technologies.

That is, when creating the highest quality methodology, it is important to rely not only on the development of an effective training process for future computer science teachers to create and use open educational resources, but

also on the material base that contributes to the creation of this model. Thus, one of the main tasks is to create a methodological system for training future computer science teachers, considering all possible introductory and influencing factors. As already mentioned earlier, at the initial stages, it should be clearly defined who this model is aimed at, and what goals are being pursued. It is also important for students and teachers to understand the concept of OER. Moreover, determining the basis for training future teachers to create and use OER and, directly, the learning process itself, is not the end point of the process. Quality control and the development of a process system is the final stage in the learning model. The development of a learning model for the creation and use of OER by students is shown in Figure 2.

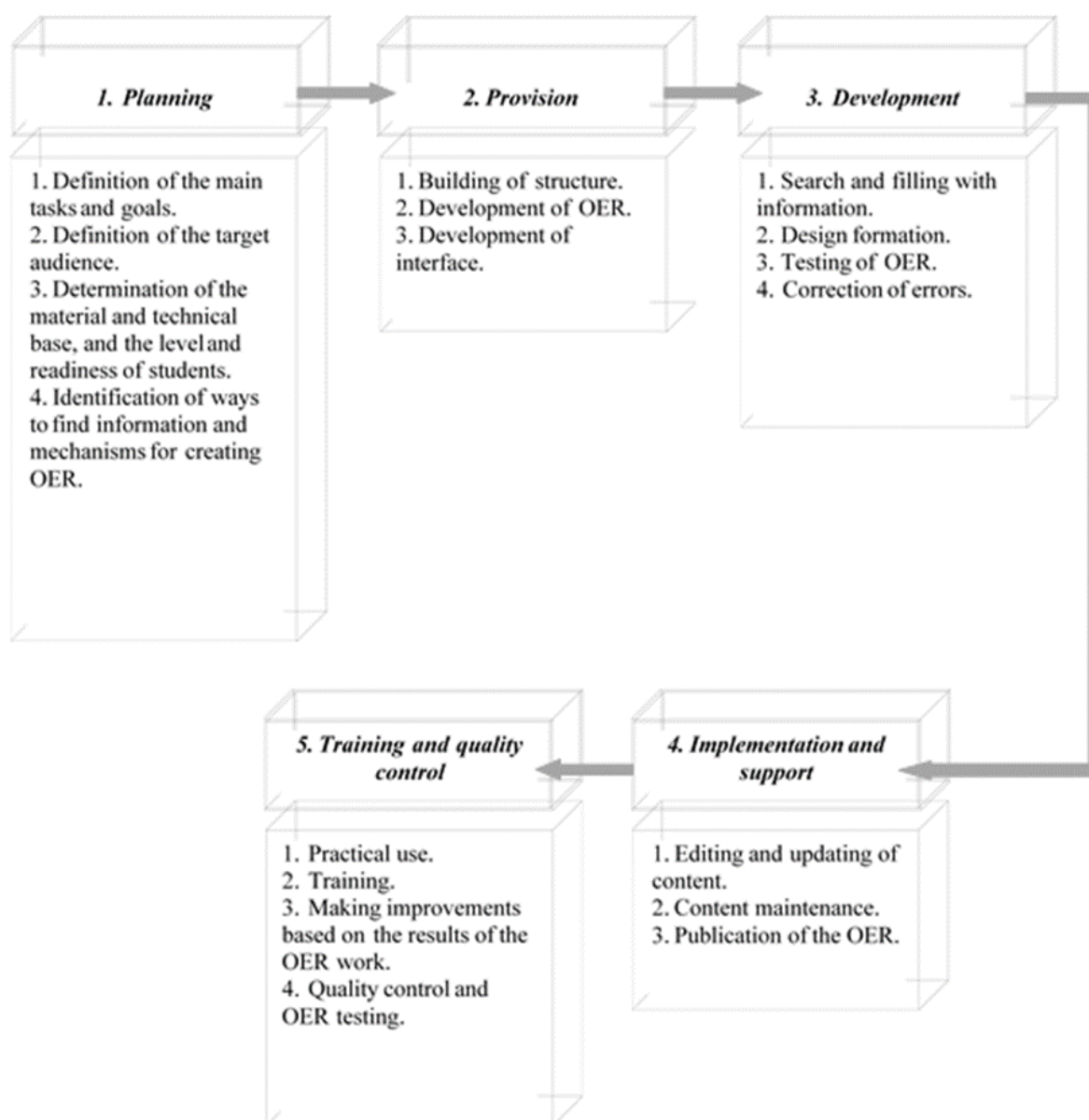


Figure 2. OER creation model

Based on the proposed model, it can be seen that the learning process covers all stages of OER creation, including the definition of the material and technical base, ending with the definition of quality control mechanisms for the created product. It is worth noting that such a tool

as OER is quite affordable and flexible. A teacher can use both graphic educational materials and text. Among the materials related to open educational resources, one can even include mass open online courses (MOOCs), the creation of which requires a completely different approach

[22]. Ultimately, the methodology of teaching future computer science teachers to create and use OER requires an assessment that determines its optimality and effectiveness. Any developed learning model can be evaluated only after its direct implementation in the educational process. To determine the effectiveness of the model, it would be appropriate to use several areas of assessment and analysis. Some of them include:

1. Determining the level of student satisfaction. It is measured by conducting surveys or focus groups.

2. Conducting a preliminary and post-test study. Such an assessment tool includes conducting a test for computer science teachers before the training programme and after they complete the programme. The test can assess their knowledge of open educational resources and their ability to create and use them. The results will show whether the developed model was effective.

3. Analysing learning outcomes. This criterion evaluates the level of knowledge associated with the creation and use of open educational resources. It can be measured with the help of final assessments and tests.

4. Using the control group method. Within the framework of this method, a sample of students of a higher educational institution is randomly selected, both from those students who studied within the framework of the proposed methodology, and from those who did not study within this methodology. After that, the knowledge and skills of these two groups are compared before and after the programme to see whether the proposed teaching methodology has had a significant impact on the students.

5. Teacher productivity level. This criterion evaluates the effectiveness of the methodology for preparing future computer science teachers to create and use open educational resources. It can be measured in the process of observing the teacher’s work.

6. Intensity of the use of open educational resources. Within the framework of this criterion, the degree of use of open educational resources by students and teachers in the

course of their teaching and learning activities is assessed. It can be measured by conducting surveys, or, for example, getting acquainted with the analytics of websites containing OER.

7. Quality of open educational resources. This criterion evaluates the quality of open educational resources created by students and teachers. It is measured using expert assessments or other quality determination mechanisms (for example, conducting a pedagogical experiment).

8. Level of impact on education. It is evaluated by determining the impact of the implemented methodology on changes in the education system as a whole. It is measured by tracking policy changes, increasing trends in the wider use of OER, evaluating statistics or other indicators of systemic changes.

As part of the current study, a pedagogical experiment was conducted (from 2022 to 2023) among students of the 3rd-4th years of the speciality “6B01506-Computer Science” at the Department of “Informatics” of the Institute of Physics, Mathematics and Digital Technologies of Kazakh National Women’s Teacher Training University. It is determined that, at the moment, the vast majority of respondents are not ready to develop and use OER in their activities (90% of respondents). As the main reasons for the reluctance to use OER in their professional activities, students note three main aspects: insufficient level of university training in this area; lack of methodological training in this area; low level of computer equipment of educational institutions. Only 10% of students are ready to create and use OER in their professional activities. In addition, the pedagogical experiment included testing, after studying the course “Fundamentals of teaching the creation and use of open educational resources”. The test was conducted among the 4th year students of the speciality “Computer Science” of Kazakh National Women’s Teacher Training University (in February 2023). The results of the test are shown in Figure 3 and Table 1.

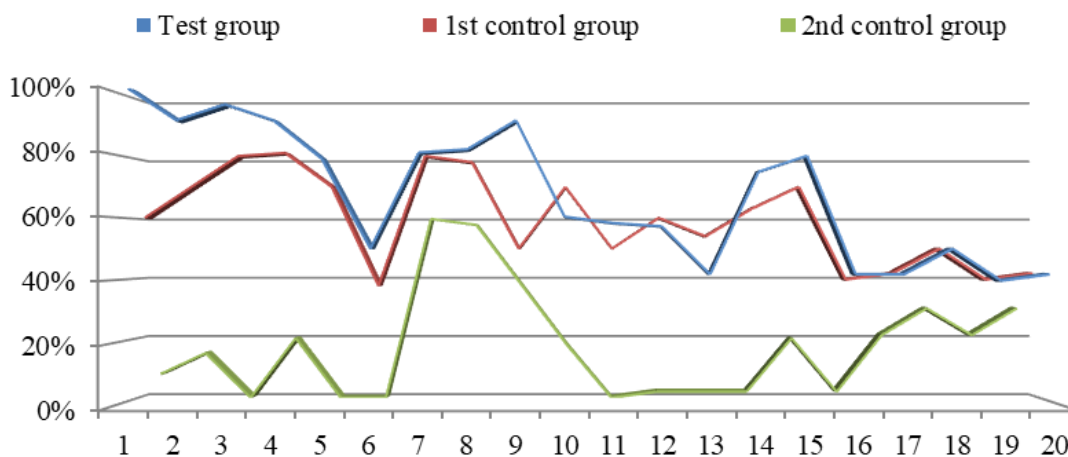


Figure 3. Results of correct answers to test tasks

Table 1. Results of students’ testing on the creation and use of OER

Control groups	Assessment of passing the test			
	Excellent	Good	Satisfactory	Unsatisfactory
Test group	30%	40%	20%	10%
Control group 1	8.3%	25%	50%	16.7%
Control group 2	0%	12%	28%	60%

Source: compiled by the authors.

The test results demonstrate that the control group, after passing the special course, demonstrated significantly higher results than the 2 control groups. This leads to the conclusion that along with conventional methods of transmitting educational information, the use of OER gives positive results. Thus, the results of the conducted testing demonstrate that after students have completed a special course, the results are significantly higher than the results of groups who did not take the course “Fundamentals of teaching the creation and use of open educational resources”. Therefore, to achieve even better results, it is necessary to continue training future computer science teachers using the chosen methodology. Thus, if a higher pedagogical educational institution has sufficient resources and facilities for the development and implementation of teaching methodology, future computer science teachers to create and use open educational resources, it is possible to develop a sufficiently effective mechanism that significantly improves the quality and increases the accessibility of education.

Discussion

The creation and use of open educational resources has become increasingly popular in recent years, especially after the COVID-19 pandemic [23]. Considering the fact that open educational resources are directly related to technological progress and the development of the Internet, they are a particularly interesting and relevant tool in the training of future teachers of computer science and computer technology. As a result of the rapid development of Internet technologies, there is also a growing need to create new and improve existing teacher training programmes and methods to train future computer science teachers to effectively create and use open educational resources [24-26]. Many researchers, including both Kazakh and from countries such as China, the United States of America (USA), Japan, the Netherlands, Finland, have been studying the development and improvement of the methodology for training future computer science teachers to create and use OER.

One of the studies on this topic is the paper by M. Virnes and T. Leinonen [22]. The researchers describe a professional development programme designed to improve the competence of Finnish computer science teachers in the field of OER. The programme included online modules, face-to-face seminars and peer support, and was recognised as effective in improving teachers’ skills with open educational resources. The programme was aimed at expanding the knowledge and skills of teachers related to the use of open educational resources, facilitating the exchange of experience and cooperation between teachers in the creation and use of OER. The paper considered the results of the evaluation of the programme, which included surveys and interviews with participating teachers. The

data obtained indicated that this professional development programme proved to be effective enough to increase the competence of teachers in the use of OER and had a positive impact on their teaching practice. Moreover, the paper gives an idea of the development and implementation of a successful professional development programme for teachers on open educational resources and highlights the potential benefits of using OER in education.

It is worth noting that this programme can be implemented only if there is a developed methodology for training teachers to create and use OER, which means that it cannot be implemented in educational institutions where the use of open educational resources is not practiced, and there is not enough information and technical base. Thus, in order to carry out activities to improve the competence of teachers, it is necessary to have a clearly structured methodology for teaching them how to create and use OER. This also indicates that in the presence of an effective learning mechanism, future computer science teachers, starting their professional activities, will be able to demonstrate greater efficiency, since they will have the necessary knowledge. C.M. Stracke et al., in turn, argue that the use of MOOCs can be an independent educational tool, and although mass online educational courses are part of OER, they are more complicated and have their own specifics, which contributes to their isolation [27]. The authors agree that they can be effective in the framework of professional development, and also represent an innovative educational tool aimed at the exchange of experience. Speaking about OER, researchers suggest that they are an effective tool for ensuring inclusive and high-quality education for all groups of the population and promoting lifelong learning opportunities without relying on age qualification.

Thus, the use of open educational resources is indeed a rather promising area in the modern conditions of the development of world educational practice and the field of education, directly in the Republic of Kazakhstan [2; 28]. At the moment, the boundaries of the requirements for education recipients are being erased more and more, education is becoming more accessible and multifaceted. Moreover, the researchers proved that the use of OER in the learning process demonstrates positive results. S.P. Karunanayaka and S. Naidu report that the use of OER in the modern education system significantly increases the level of motivation of students, and is also a tool for improving the educational process [1]. Researchers C. Avila et al. in their paper talk about the widespread use of Internet technologies in the educational process (including the effectiveness of using the Google search engine and YouTube video hosting) [29]. The researchers note that the importance of such educational practices lies in the fact that they give students the opportunity to develop their skills and transform them by creating a new educational

product. Such a learning format requires the involvement of all parties, both students and teachers, and also needs support from an educational institution.

With this in mind, it is necessary to understand how best to build the process of teaching future teachers to create and use open educational resources. L.A. Hamora et al. consider the importance of developing a methodology for creating open educational resources, based not only on their information content, but also the need to ensure ease of use and aesthetic design [30]. As part of their research, they came to the conclusion that the creation of an OER based solely on the information component does not bring the desired result. Students are more likely to prefer OER with a pleasant interface. Thus, it highlights the need for the development of a teaching methodology, with an emphasis not only on the content of OER, but also on their aesthetic appearance. In the process of creating open educational resources, it is not enough to fill the resource with the necessary educational information, it is important to ensure the convenience of using and perception of this information. Ultimately, the methodology of training future computer science teachers to create and use OER should consist of several stages. Before the start of training, it is necessary to clearly understand the level of development of the technical, material, and educational base of the university, within which this training will be conducted [31-33]. At the initial stages, information about the subject of study and the basic concept of OER should be provided, measures have been developed and implemented to teach students to use existing educational materials that are publicly available [34; 35].

Further, it is necessary to implement a number of measures to train future computer science teachers to adapt available educational resources to their needs and goals. The next step should be to train future teachers to directly create OER. This stage includes teaching them how to choose the right software and tools for creating OER, how to structure open educational resources to meet the needs of different students, and how to ensure proper licensing of OER. Within this stage, it is also important to pay attention not only to the content, but also to the design of the created OER, in order to achieve its maximum possible effectiveness. The next stage is the publication of materials and their sharing, collection of feedback. This stage is aimed at teaching future computer science teachers how to publish the OER created by them in online libraries and on various educational platforms, and how to promote and support the created open educational resources in the future.

Conclusions

Summing up the results of the current study, the use of open educational resources in the field of education of the Republic of Kazakhstan is quite a promising area. The active use of OER in the learning process in higher educational institutions determines the need to develop a methodology for teaching future teachers to use and create this tool. In general, open educational resources cover almost all areas, including computer science, which indicates a high potential for training future computer science teachers to work with OER. Thus, the methodology of teaching future computer science teachers to create and use open educational resources is crucial in the process of improving the quality of education. Moreover, open educational resources contribute to reducing the requirements for education recipients, making it available by providing free access to knowledge. The methodology developed in this paper covers all stages of the educational process, starting from determining the sufficiency of resources of a higher educational institution for this kind of training, ending with measures to control the quality of open educational resources created by students. Such a wide range of consideration of all possible introductory and efficiency factors makes the developed model optimal.

With the help of this methodology, future teachers can learn how to effectively create and use OER, which contributes to improving their professional qualities necessary for further work. In addition, it is determined that the use of open educational resources can also reduce the cost of education and provide equal opportunities for all students (due to the high level of inclusiveness). Thus, the integration of this methodology into the Kazakh National Women's Teacher Training University curriculum in the speciality "6B01506-Computer Science" for future teachers can be of great importance for promoting open education and ensuring students' access to high-quality, affordable and relevant educational resources, and providing them with additional opportunities to gain practical work experience. However, in the future, additional research is needed to investigate the effectiveness of this methodology in various contexts and find ways to improve it, if necessary.

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Conflict of Interest

None.

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Методика навчання майбутніх учителів інформатики створення та використання відкритих освітніх ресурсів

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Анотація

Актуальність. На даний момент отримання освіти не обмежується відвідуванням вищих навчальних закладів, розвиток мережі Інтернет та поява все більшої кількості відкритих і доступних освітніх онлайн-курсів відкриває нові можливості для навчання.

Мета. Метою даної статті є обґрунтування необхідності форматування системи освіти майбутніх учителів інформатики на основі створення та використання відкритих освітніх ресурсів у навчальному процесі.

Методологія. Методологічна основа дослідження ґрунтується на використанні таких методів дослідження, як аналіз, синтез та актуалізація, застосованих у рамках педагогічного експерименту.

Результати. Результатом дослідження є оцінка ступеня розвитку інтернет-технологій та освітніх ресурсів, спрямованих на забезпечення доступності освіти. Розглянуто світовий досвід формування оптимальної моделі освіти, яка спрямована на підготовку майбутніх учителів інформатики до створення та використання ООР. Результати демонструють, що для ефективного використання відкритих освітніх ресурсів необхідно забезпечити їх безпеку. Також визначено, що не всі відкриті освітні ресурси відповідають необхідному рівню якості наданих ними інформаційно-освітніх матеріалів. Зазначено, що сучасне суспільство перебуває на етапі, який демонструє високий рівень довіри та лояльності до різноманітних освітніх Інтернет-матеріалів та ресурсів, що зумовлює необхідність їх всебічного вивчення.

Висновки. Чітке розуміння вимог сучасного суспільства до процесу отримання освіти вказує на шляхи адаптації освітнього середовища. Значущість отриманих результатів виражається в розробці методики процесу навчання сучасних вчителів інформатики на основі створення, впровадження та використання відкритих освітніх ресурсів.

Ключові слова: інформаційні технології; підготовка фахівців; можливості навчання; інформатизація; педагогічна діяльність.