The experience of creating an open educational space and its usage in distance learning

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Abstract

The article addresses the issue of distance learning in universities. The purpose of the study was to examine distance learning platforms and to solve the challenges of designing and utilizing an open educational space. In the course of the study, methods such as analysis of scientific literature, modeling, experimentation, surveys, mathematical analysis of numerical data, graphical transformation, and generalization were employed. As a result, an open educational space was created, launched as a platform, and determined to be an effective environment for students. Thanks to the open educational space, students can improve their professional knowledge at any time, in a suitable place, full-time students can study some training courses remotely or additionally.

Keywords

open educational space, distance learning, learning platform, part-time learning, online course

1. Introduction

An integrated personnel training system in the global educational space requires innovative approaches that correspond to both the labor markets in Kazakhstan and the conditions of the global market. One of these approaches is the implementation of distance (part–time) training, taking into account personnel demand in various spheres of socio-economic life of the country. Part-time training involves students mastering the full scope of the full-time educational program based on an educational platform, depending on the conditions of social and labor employment. This defines the main idea of the study. The origin of such an idea appeared after the statement of Kassym-Jomart Tokayev in a Message to the people of Kazakhstan, 237 thousand young people of the NEET category are not registered either among students or among workers, and this stimulated the creation of conditions for part-time education of young people [1].

The development of an educational platform involves the implementation of the tasks of the National Development Plan of the Republic of Kazakhstan until 2025 [2] priority of quality education "creating favorable conditions and an environment for learning", "improving the quality of education". The organization of Part-time training based on the digitalization of vocational education includes such documents as the national project of quality education "Educated Nation" [3] and some legislative acts of the Republic of Kazakhstan on stimulating innovation, digitalization, information security and education issues [4]. The demand for distance learning leads to its development. This is evidenced by the analysis of statistical data. In fact, in the higher education system of developed

countries, distance learning is technologically accessible to many consumers. Thus, the contingent of students in the United States, according to the National Center for Education Statistics of the United States, in 2018-2021 in public universities - from 11.1% to 43.2%; in private universities - from 17% to 33.6%. Such data indicate the historical path of the development of distance education. In 2015, 61% of students enrolled in the accelerated program used the part-time form of education [5].

The history of distance learning began with the influence of relationships between people and countries in the field of education. In the 19th century, Isaac Pitman used postal correspondence with his students to test their knowledge and provide feedback. At the beginning of the 20th century, radio (University of Wisconsin, 1919) and television (University of Iowa, 1937) were improved [6, 7]. On the basis of this, a form of correspondence education was formed in the 20th century. Sophie-Karim M., Bali A.O. and Rashed K. considered the expansion of distance education in the 21st century due to the possibilities of online and offline learning through a large-scale network [8].

In our country, the part-time form of distance education was formed on the basis of the introduction of information and communication technologies. According to the concept of education development in the Republic of Kazakhstan for 2022-2026, during the COVID-19 pandemic, higher education turned out to be the most adapted to distance learning among all levels of education. It is confirmed by data that 41% of educational programs identified by the monitoring of the national Chamber of Entrepreneurs "Atameken" are fully ready, 43% are partially prepared for distance learning using online technologies [9]. This shows that the distance learning format is relevant and necessary. According to the e-government portal (05/16/2023), only about 50 higher educational institutions in Kazakhstan have a license to provide distance education [10].

Distance education can offer students flexibility and access to a wide range of educational resources. In particular, it opens the way to the presentation of educational resources in various formats, free use of feedback methods and personal online meetings. That is, distance learning must have a platform that meets the principles of flexibility, accessibility, feedback, learning environment, validity and reliability [11].

Models of distance learning platforms such as TRACK, SMR, LMS were analyzed in the works of Cacheiro-Gonzalez, Medina-Rivilla [12]. Distance learning platforms are learner-centric. They may consist of courses that are classified by reason and duration; Short-term courses, long-term educational programs with a diploma of vocational education, medium-term with the issuance of a certificate. In addition, according to the development technology, courses can be created by only one educational institution or in collaboration with other educational institutions [13].

The study examined several popular open education platforms. Countries that have widely implemented digital technologies in the educational process include Singapore, South Korea, China, Japan, Australia, New Zealand, Israel, the UK, Estonia, the US, and the UAE. These countries, which have focused on the development and widespread implementation of digital educational resources, generally show high learning outcomes in international comparative studies of education quality. According to the results of studies on the effectiveness of using various digital platforms in the educational process conducted in the Netherlands for several years, it was noted that the effectiveness of their use may depend on the subject areas, the age of students, the academic performance of students, the level of digital competence of tutors, facilitators and students, etc. [14].

Information about distance learning platforms is reflected in foreign and domestic publications. In recent years, digitalization has become an integral part of Education. In a digitized society, distance education opens up great opportunities. Distance education is considered as long-term distance learning on the basis of interconnection between subjects. Kentnor H. distance learning indicates that it is on-line education that has become "mainstream, not a trend" [15]. Because in recent times, on-line learning is widely used in the Western education system [16,17].

Models of distance learning system platforms and their perception by learners are considered in [12], and the structure in [17,18]. Sophie-Karim M., Bali A.O. & Rached K. The paper [8] reported on cases of expanding the use of online and offline learning opportunities in distance education.

The analysis of international digital education platforms showed that while there are various technological and organizational solutions in the world, most of them do not allow full access to the social and educational results provided by the university during full-time study.

Methods and materials of the research

The educational platform of the Kazakh open university Openu.kz (OpenUniversity) has been created in the Internet space of Kazakhstan. It includes 116 universities. Online courses of foreign and Kazakh scientists have been prepared and posted on the platform, and within the framework of the project "100 new textbooks in the Kazakh language" video lectures based on 47 textbooks. Its operator is the Public Foundation "National Translation Bureau". (https://openu.kz/kz)

28 online courses prepared by scientists of Kazakh National University named after Al-Farabi are posted on www.open.kaznu.kz in Kazakh, Russian and English languages.

The advantages of online courses are public orientation, openness (access to all courses), online training (availability of study regardless of geographical location), convenience (each student can choose a study pace that is convenient for him) [19].

By studying educational platforms in foreign and domestic distance learning practices, a comparative analysis of the software environment and provision of educational resources offered to students in part-time learning was carried out.

- Coursera: covers business, IT, data analysis, areas of self-development; consists of online courses, a media library, online schools, English language courses; there are tests that require creative thinking (competency-oriented), programming tasks, video tasks, tasks for peer assessment and self-assessment.
- Intuit: covers IT, business areas; designed for professional retraining, advanced training, courses, video courses, certification courses; there are tests and exam tasks.
- openU.kz: includes IT, business, humanities, natural sciences; contains courses, a library, an online webinar, TED, tests.

We conducted an experiment to create a distance learning platform as an open educational space. A survey and a conversation were conducted with the students. On the platform https://onlinetestpad.com/ part-time students of M. Utemisov West Kazakhstan University, H. Dosmukhamedov Atyrau University, Korkyt ata Kyzylorda University, West Kazakhstan University of Innovation and Technology, Zhangir Khan West Kazakhstan Agrarian and Technical University were interviewed (n=147). The survey involved respondents receiving their first professional education, including 6.8% (10 college students), 89.8% (132 undergraduate students), and 3.4% (5 master's degree students). In distance learning, respondents use the following educational services: 31.3% video platforms (Zoom, MS Teams, WebEx Meetings, Skype, etc.), 20.4% social networks (Telegram, Facebook, Instagram, etc.), 16.3% telelearning (YouTube), 11.6% file sharing services (DropBox, Bluetooth), 10.9% — chat (WhatsApp), 9.5% — email. To the question "Which of the educational platforms Moodle, Google Classroom and their additional services Platonus, Lektoruim, Stepik, openU is best to use?" - 15.7% answered that Moodle, 13.6% on the Stepik platform you can take an individual course, 27.9% Google Classroom and 63 students (42.9%) answered that they need another platform. Based on the answers received, general trends in the development of distance and online education were highlighted, and a conclusion was made about the need to develop an open educational space. The prospect of further research was the use of a combined form of distance and face-to-face learning, which can eliminate the disadvantages of distance learning, as well as introduce new concepts of distance learning. During the research, pedagogical models for distance learning through the open educational space (OES) were developed (Fig. 1).
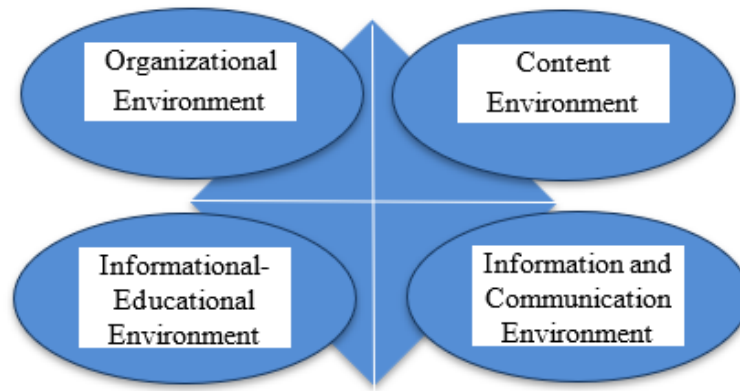
Figure 1: Model of information and educational infrastructure of OES.

This model is based on the integration of various educational environments such as informational-educational, content-related, organizational, and informational-communication. It aims to use digital technologies and tools to support the learning process in an online format, ensuring flexibility and accessibility for students. The goal of the model is to create a flexible and accessible educational environment that supports students' academic mobility and freedom.

As a result of the analysis of the educational platform model, a connection was created between the structural elements of the open educational space of distance learning. In our research, since OES is designed as an educational platform, its administrative section is comprised of an administrator, while the functional section includes the roles of users, specifically instructors and learners.

The administrative section of the educational platform serves as a content management system for user sections, as well as a tool for creating educational objects, organizing courses, and managing their registrations. Access to the system is provided through login credentials, including a username and password. This administrative section also includes a system for collecting and monitoring statistical data, which encompasses learners' digital footprints, responses to test questions, and other relevant information. The system administrator is responsible for overseeing the registration and authorization of both learners and instructors.

In this system, the instructor prepares educational materials and creates learning objects using a specialized tool. The instructor's responsibilities include developing educational content that encompasses video materials, tests, and supplementary resources.

On the main page of the open educational space, courses and access to the pages of the administrator, instructor-tutor (teacher), and student were considered (Fig. 2).
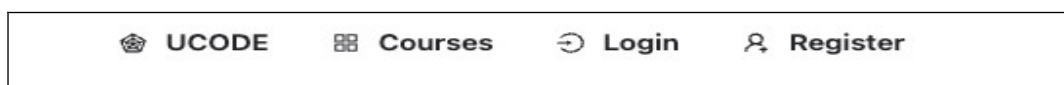

Figure 2: Education platform menu.

The main objects in the structure of open educational space: courses, news, staff departments. The administrator prepares and issues new information on the news page.

The course prepared by the instructor is automatically displayed on the courses page. The course includes videos and assignments, final tests, and resources. Feedback on the course takes the form of commenting, leaving a reaction. In addition, communication will be established by e-mail.

Employees are divided into instructors-teachers, students-learners, administrators. Each employee is registered by specifying their e-mail address.

Online communication is carried out according to the link provided by each instructor. And the time of online communication, which course and who will conduct it will be announced on the news page.

Each user has a personal account. For example, a teacher prepares a new course in their personal account according to the instructions. This ensures that the tutor does not depend on the administration, independently manages their course and monitors the student's activities.

The teacher can select information to enter into the platform through the teacher's course panel. The structure of the newly created course is created, and the list of modules and micromodules is visible in the work area of the teacher's account. The teacher can change the location and sequence of micromodules or video lectures to create content. It is also possible to add video lectures or assignments. After the editing process, the teacher can publish the course. In the personal account, you can see that the teacher has added assignments for each micromodule to the course. The options for viewing created courses and lessons as a list and a shortcut are enabled. Publications of prepared courses are located on the "Courses" page (Fig. 3).
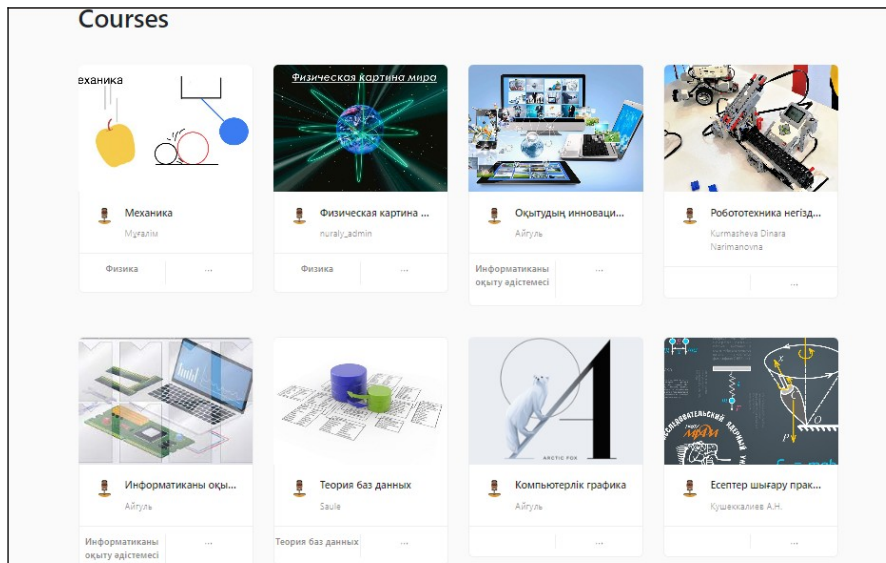

Figure 3: Menu "Courses".

In the open educational space, the teacher can see all subjects registered for the course, all students and the dynamics of their learning in the personal account.

The student can access the platform and take the course at any time convenient for him. After the student selects the course, the contents of the modules or micromodules will be displayed on the left side of the window. After completing any micromodule, the viewed video lectures and assignments are marked with a blue check mark. This means that this block of the micromodule has been completed (Figure 4).
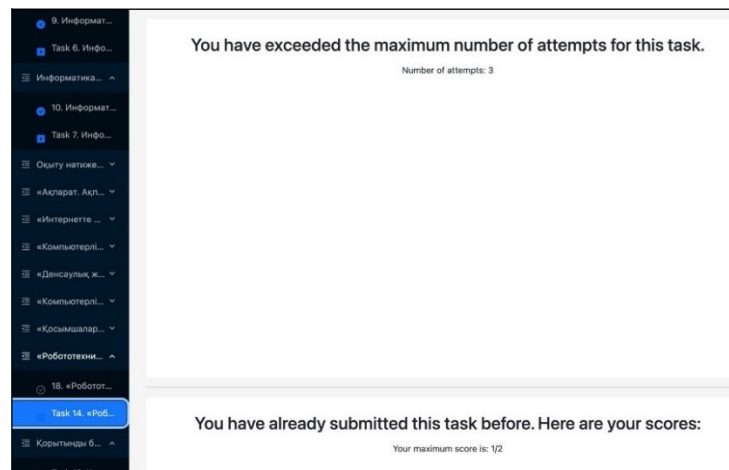

Figure 4: Completing the micromodule block.

After completing all the micromodules on the platform, the student completes the final test assignments.

The test assignments are completed only once per course. The practical assignments of the micromodule can be completed three times. The results of the assignments are immediately displayed on the screen and reflected in the teacher's office. After successfully completing the course, the student will receive a certificate.

The course is recorded in accordance with the rules for using the online course in the learning process. The design of the course creation is simple, the logical structure is thought out optimally, which reduces the time spent on studying the functionality of this page and creating a new object as a whole.

Table 1
List of online courses developed and offered for use

№	Course title	Creator	Educational Program
1	Methodology of teaching computer science	Medeshova A.B., Candidate of Pedagogical Sciences, associate professor	6B01506-Informatics, 6B01506-Informatics-Robotics
2	Innovative technologies of education	Medeshova A.B., Candidate of Pedagogical Sciences, associate professor	6B01506-Informatics, 6B01506-Informatics-Robotics
3	Computer graphics	Medeshova A.B., Candidate of Pedagogical Sciences, associate professor Eltaev A., 7M01535- Computer Science Master's student	6B01505-Physics-informatics,
4	Fundamentals of robotics	Kurmasheva D.N., Master of Pedagogical Sciences, teacher of computer science of the gymnasium	6B01503-Mathematics-informatics
5	Calculation practice	Kushekkaliev A.N., Candidate of Physical and Mathematical Sciences, associate professor	6B01506-Informatics, 6B01506-Informatics-Robotics
6	Theory of databases	Akimova S.M., master of technical science, senior teacher	6B01505-Physics-informatics,
7	Mechanics	Maksutov E., 7M01502- Physics Master's student, supervisor: Medeshova A.B.	6B01503-Mathematics-informatics
8	Physical pictures of the world	Ashikpaeva S., 7M01502- Physics Master's student, supervisor: Medeshova A.B.	6B01506-Informatics, 6B01506-Informatics-Robotics
9	Lego Spike Education	Kyrykbaev N.M., 7M01535- Computer Science Master's student, teacher of computer science and robotics at the Nazarbayev intellectual school, supervisor: Medeshova A.B.	6B01503-Physics and informatics
10	Informatics-UNT	Mergenbayeva A.H. 7M01535- Computer Science Master's student, supervisor Medeshova A.B.	6B01506-Informatics, 7M01535-Informatics
11	Issues of educational information and training	Eltaev A., 7M01535- Computer Science Master's student, supervisor Medeshova A.B.	7M01535- Informatics
12	Python programming language	Akimova S.M., master of technical science, senior teacher	6B01502 – Physics, 6B01505-Physics-informatics,6B01506-Informatics, 6B06102-Information systems
13	Object-oriented programming	Kurmasheva D.N., Master of Pedagogical Sciences, teacher of computer science of the gymnasium	6B01506-Informatics-Robotics 6B01505-Physics-informatics, 6B01503-Mathematics-informatics 6B06102-Information systems

In the designed open educational space (www.edtime.kz), several online courses have been created (Table 1) in accordance with the programs for training teachers of physics and computer science.

Practical knowledge of the course is obtained at the place of practical training, in particular, at school or college. Laboratory work is conducted at the university according to a certain schedule. It is possible that the practical part of some courses will be organized at the university. This is done by decision of the educational institution. In distance learning, students can sort and select online courses and educational materials offered in the learning environment based on their digital competence.

When learning remotely through an open educational space, it is important to be able to plan online course modules correctly. The continuity of modules should be scientifically substantiated, and the content should be understandable to the student. In addition, one of the types of feedback is the automatic marking method. This approach was used in the open educational space www.edtime.kz. It was convenient for both the student and the teacher. In particular, the student can find out which module he has completed, the task of which module has been completed by the active blue icon. And the teacher can see which student has completed which module, that is, his progress, in his personal account. When the student completes the online course, the teacher clicks the "Course Completed" button. In this case, the certificate will automatically appear in the student's personal account. The student can download it anywhere and anytime.

The student's performance indicator was determined based on the complete viewing of video lectures, completion of the approved assignments given in the lecture, and passing the course test. A student who has completed the online course materials by more than 70 percent and passed the final tests is awarded a certificate indicating the course volume and performance indicator.

2. Results and discussions

Students (students, masters) and teachers of M. Utemisov West Kazakhstan University, H. Dosmukhamedov Atyrau University, Korkyt ata Kyzylorda University, West Kazakhstan University of Innovation and Technology, Zhangirkhan West Kazakhstan Agrarian and Technical University, Astana International University registered and studied. This confirms the broad geographical scope of the study.

Let's compare the data of students who studied part-time in the experimental group in the open educational space www.edtime.kz. In the first half of 2024, 185 students were registered in the open educational space. 105 of them received certificates. Table 2 presents the learning outcomes.

Table 2
Average performance of learners in the edtime.kz open educational space

Online course name	Grade point average
Methodology of teaching computer science	85
Computer graphics	
	82
Mechanics	98
Innovative technologies of education	72,75
Physical pictures of the world	33,3
Fundamentals of robotics	96
Theory database	72
Python programming language	33,3

The average indicator was calculated based on the results of students who completed the online course and received a certificate. This shows that the success rate of teaching through open

educational space is high. According to them, learning is available anywhere, anytime; allows you to prepare for the exam; includes current courses.

This shows that there is a demand for an online course. In particular, it shows the priority of interest in online courses in the state language.

In a rapidly digitizing society, distance learning plays an active role in improving people's well-being, so the usability of the educational platform is important.

In a rapidly digitizing society, distance learning plays an active role in improving people's well-being, so the usability of the educational platform is important.

At the beginning of 2024, 185 students were registered on the distance learning platform, 128 of whom took part in the survey. The project passed the first test. Feedback was later provided to the students. The answers to the question "What benefit did the online course bring you?" were received:

- improved my knowledge on the course (58.8%),
- I received a lot of information on the course and deepened my knowledge (54.9%).
- video lessons of the course are informative (37.3%),
- I liked the presentation of the course (29.4%),
- shows my progress (21.6%).

The answers of the respondents to the questions "What would you recommend or add to a previous online course?" were as follows:

- a mobile application of the digital education platform is required;
- after completing the online course, the student should be given a certificate of graduation, etc. made suggestions.

92.1% of students said that it is better to have test tasks after the video lecture, and the remaining 7.9% of the respondents indicated that they had difficulty answering.

According to the data obtained through feedback, measures were taken to improve the online course and develop the digital educational platform. Accordingly, the digital platform has been transformed into an open educational space, not only for students of a specific higher education institution, but also for anyone interested in distance learning.

The student passes the test on each micromodule. Final testing is more complex than micromodule control, that is, it includes elements of functional literacy in the subject. After completing the course, the information will be available in the personal accounts of the teacher and student. The certificate with the index is stored in the student's account.

Digital educational platforms are used and are rapidly developing depending on the professional field; it will be easier to organize distance learning if the design of the digital educational platform is flexible and the function is systemic; The structure of the distance learning platform has been supplemented with tasks that form theoretical knowledge and practical skills and determine the level of education.

3. Conclusion

The features of the distance learning platform are determined by the convenience of design, ease of course preparation, availability of digital content to the student anywhere and at the desired time, inclusion of the possibility of harmonious continuation of online learning. and offline communication.

The structure and functional features of the platform developed for distance learning, implemented taking into account the requirements, were also presented. This platform is easy to use for a tutor or a student with an average level of digital literacy. The distance learning platform will be open, not only university students but also other individuals will be able to improve their education. There are no time or age restrictions. Also, tutors can publish an open online course.

An open educational space for distance learning opens up opportunities for improving people's well-being, reducing unemployment and on-the-job training with obtaining a certificate at a convenient time.

Acknowledgements

Declaration on Generative AI

The authors have not employed any Generative AI tools.

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