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Integration of non-formal education through Moocs into the educational process of a higher education institution

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Abstract

The research paper considers the possibilities and prospects of integrating non-formal education through Massive Open Online Courses into the educational process of a higher education institution. As a result of the analysis of Massive Open Online Course platforms covering the Internet space, the best practices and teaching methods actively used in online learning are identified. An expert implementation of non-formal education through the mass open online course "Data Visualization in Excel" from the Coursera platform was conducted to obtain user skills in the field of spreadsheets for first-year bachelor's students of Toraighyrov University, taking into account their needs within the discipline "Information and Communication Technologies." The conducted experiment confirmed the effectiveness of introducing non-formal education into the educational process. The results of the study showed that the integration of non-formal education through MOOCs provides students with additional knowledge, closely related to previous ones, to systematize disparate knowledge. The study, for the first time, reveals specific factors affecting the effectiveness of integrating non-formal education into the educational process of higher education institutions, and also substantiates pedagogical and organizational conditions for successful integration. Based on the identified factors, methodological recommendations are proposed for teachers of educational institutions and course developers to effectively prepare them for formal and non-formal education. The assessment of the influence of non-formal education on the passage of training in higher education institutions has shown positive results.

Keywords: Efficiency, Information and communication technologies, Integration, Massive Open online courses (MOOCs), Non-formal education, Prospects.

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1. Introduction

Research on non-formal education in the global scientific community is a dynamic field, reflecting the growing recognition of its importance in modern society and in the context of lifelong learning. In today's world, young people are becoming increasingly busy and wish to acquire new professional skills not only from one source, higher education institutions, but also to expand their horizons through various educational resources, in particular MOOCs. This study highlights the need to identify barriers and opportunities for increased use of MOOCs to recognize and promote non-formal education.

A number of studies have been conducted on non-formal education problems in different countries. The challenges have a variety of forms and features depending on cultural traditions, educational systems, socio-economic conditions, and the availability of certain technologies. Approaches to non-formal learning vary in different regions of the world due to different educational needs and challenges [1].

All the well-known platforms offer a wide range of courses from leading universities and organizations around the world. In online learning, courses from various MOOC providers – such as Coursera, Udemy, and EdX – primarily utilize a hybrid recommendation system. These systems integrate web scraping of course data from different platforms and a deep learning-based chatbot to analyze the personalized requirements of learners. Recommendations are then provided, based on collaborative filtering with sentiment analysis [2].

In the analysis of existing MOOC platforms, successful practices and teaching methods that promote student engagement, increase learning, and improve course completion rates are identified. Online learning platforms (edX, Udemy, Udacity, etc.), learning management systems (Moodle, Blackboard, Classroom, etc.), and virtual learning environments (DEEDS, Coursera, etc.) are utilized. Learning analytics, including machine learning, educational data mining, statistics, social network analysis, and natural language processing, are applied to predict student performance [3].

The study includes understanding student satisfaction with MOOCs presented by various private platforms such as Coursera and Udemy. The study conducted revealed that using a proper proctoring mode grading system increases satisfaction [4]. It should be noted that the participation of a wide range of people in MOOCs promotes digital literacy for all segments of the population, which is becoming increasingly important in today's world [5].

Non-formal education is gaining relevance in Kazakhstan, which depends on some key factors such as the rapidly changing labor market and the need for new skills, as well as opportunities for continuous lifelong learning. In addition, non-formal professional development through massive open online courses has become a tool for expanding educational opportunities and integrating non-formal learning.

Improving the quality of non-formal education in Kazakhstan through Massive Open Online Courses (MOOCs) to international standards is a complex task that requires a systematic approach. In addition, empirical studies show that mass open online courses lead to improved quality of education, and the use of systemic activity and communicative approaches have opened new opportunities for students, such as improving English language proficiency, developing critical thinking and time management skills, deepening knowledge, and acquiring skills in the discipline [6]. Over the past ten years, in higher education in Kazakhstan, there has been an intensive introduction of non-formal education into the educational process to enable students to acquire additional skills in other specialties. The current trend indicates that it is necessary to increase the potential of MOOCs as a tool to expand educational opportunities and to integrate non-formal learning [7].

With the increasing integration of non-formal education into the educational process, Massive Open Online Courses (MOOCs) require further attention and study. Since not all MOOCs can represent a high-quality form of learning, the outcomes of learning are questionable. Therefore, it is necessary to investigate the possibilities and challenges of integrating MOOCs into the traditional educational process of universities in Kazakhstan. To gain a deeper understanding of this issue, an empirical analysis should be conducted, including the assessment of learning outcomes and key factors influencing successful course completion. This study aims to evaluate the impact of MOOCs on the quality of knowledge and student engagement. The findings will identify effective practices and teaching methods for MOOC implementation, as well as develop methodological recommendations for incorporating non-formal education into the educational process.

The aim of the study is to integrate non-formal education through MOOCs into the educational process of higher education institutions.

The main objectives of the study include:

- Analyze existing MOOC platforms to identify successful practices and teaching methods;
- Integration of non-formal education into the learning process through MOOCs and development of recommendations.

The results of the study will aim to improve the quality of education and develop innovative approaches to learning through online courses.

2. Literature Review

Non-formal education is the process of acquiring knowledge and skills outside the traditional education system. The difference between non-formal education and formal and informal education is that, while there are limited opportunities for social interaction, especially in terms of influencing short-term stays abroad [8].

Analysis of studies on non-formal education and its role in modern education has shown that in the U.S., online courses on platforms such as Coursera, edX, and Khan Academy are actively used. Students gain knowledge, and these courses play an important role in the development of skills, including soft skills for professionals throughout their careers [9].

The potential of Massive Open Online Courses (MOOCs) in non-formal education within the European Union, supported by Lifelong Learning programs, is widely recognized and includes a variety of courses and training. In contrast, in UK higher education, the focus is on company-wide learning management systems rather than active and collaborative learning tools [10].

In India, non-formal education, particularly through online courses and mobile applications, is being actively developed to meet the needs of a growing adult population, particularly in rural areas and among migrant workers, with a focus on skills in demand in the labor market. For example, the Anganwadi program is a paradigmatic hybrid system that combines attributes of formal and informal education [11]. Pakistan Medical and Dental Council has made continuing medical education mandatory for doctors, utilizing MOOCs that are easily accessible to all learners, regardless of geographical boundaries and resources [12].

The pedagogical models used in MOOCs are widely recognized. In Asian countries, non-formal education is being developed in a region-specific manner, with China actively adopting online platforms such as Mooc.cn, and Japan supplementing traditional employee training with professional development courses. In Vietnam, a study of student satisfaction with MOOCs' mixed-method instructional design found positive learning outcomes [13].

The analysis of successful cases of using MOOCs to complement higher education curricula has revealed a number of key aspects, which are geographical and time constraints [14, 15] updating knowledge and skills to meet changing professional requirements [16, 17] integrating academic disciplines into MOOCs before practical skills [18-20] integrating MOOCs into traditional teaching [21, 22] modern technologies, such as large language models (GPT-4), are used for automated and reliable assessment of student writing. [23] hybrid recommendation systems and chatbots based on deep learning [2] blended learning [24].

In the process of integrating non-formal education through MOOCs, attention should be paid to the international standards for the recognition of MOOC certificates from foreign universities [25] to the difficulties in understanding the material with excessive information due to lack of competence [26] to ensure the technical readiness of teachers to use online courses and to consider the possible difficulties of adaptation [27] to the role of the teacher and its displacement [28] on integrating online courses with curricula, aligning them with educational standards, and adapting them to the needs of specific courses [29] on student opinion and satisfaction as well as knowledge gains [30] on motivation in students, inequalities in access to online resources, and difficulties in monitoring academic integrity [31] on the ability to predict course performance on the MOOC platform [32] on additional support in organizing time and maintaining motivation [20]. Studies on the application of MOOCs have proposed methodologies such as analyzing the impact of pedagogical approaches on motivation and performance in ICT, including randomized evaluations of the impact of MOOCs on various indicators such as course completion and labor market outcomes [25].

In modern Kazakhstan, the application of MOOCs and the introduction of non-formal education occupy an important place in the development of the educational ecosystem. The current situation with the use of MOOCs in the higher education system of Kazakhstan shows that, on the initiative of the Ministry of Science and Higher Education of the Republic of Kazakhstan, more than 600 courses have been introduced into the educational programs of 25 universities in the country. This has contributed to the improvement of Kazakhstan's position in the global Coursera ranking. The Global Skills Report 2023 studied the demand for the posted courses and the success of their completion by the trainees. Kazakhstan, in the global ranking, took the 31st position. The Minister's report noted that trainees in Kazakhstan excel in technology skills (Technology score was 96%) [33].

There is a need to develop a model for integrating online courses into traditional educational programs. A review of monographs by Kazakhstani scientists on the benefits of MOOCs in the educational process showed that non-formal education, due to its flexibility and responsiveness, plays a key role in ensuring the adaptability and continuous professional development of teachers in a rapidly changing educational environment, especially in combination with formal education. In addition, a number of studies emphasize the need to develop and structure Kazakhstani MOOCs to improve the quality of education and the competencies of students [34]. At Karaganda Technical University, during the research, the method of mathematical statistics was used, followed by a quantitative analysis of the obtained data to conduct an experiment, where the comparison of the results of student learning in the course "English for Special Purposes" using traditional methods and blended learning with integrated MOOC technology was performed. At Kazakh National Women's Pedagogical University and International University "Astana," a pedagogical experiment was conducted using MOOCs,

which compared the results of learning the discipline "Basics of organizing and conducting tourism and local history activities" on the Eduardo platform. The results of the study showed the positive impact of blended learning on the educational process [35]. In other words, the main problem of the study is to identify the key contradictions between the need for flexible and accessible forms of learning and the traditional organization of the educational process in universities. In particular, there is insufficient development of mechanisms for integrating the results of non-formal learning obtained through MOOCs into formal educational programs.

Thus, the analysis of the literature has shown that the integration of non-formal education through MOOCs is understudied and requires additional research, in particular, recommendations for the development of MOOCs for the integration of non-formal education into the learning process. It also demonstrates the significant potential of MOOCs for enriching higher education, while emphasizing the need to address a number of organizational, pedagogical, and technical issues for their effective integration.

3. Methods and Methodology

3.1. Analyzing Existing MOOC Platforms to Identify Successful Practices and Teaching Methods

The study employed methods of theoretical analysis of MOOC platforms, comparative analysis of the experience of using modern online learning platforms, and innovative teaching methods, which contributed to the development of a structured approach to assessing the effectiveness of online education. In the conducted research on integrating non-formal education into the learning process, the primary objective was to identify successful practices and teaching methods for their further application in this integration. Currently, there are more than 600 learning technology platforms. To analyze existing platforms and identify effective teaching methods, platforms such as Coursera.org, edX.org, Udacity, and Enbek.kz were reviewed.

The Coursera platform actively applies methods and materials in combinations of lectures, interactive assignments, and group projects. Courses on the Coursera platform are developed by leading universities and companies. Specializations and degree programs are introduced. Professional certifications are available. A large number of courses are offered in different languages. The platform has an important impact on employment; Coursera certificates are valued by employers. Many courses focus on developing in-demand skills. Additionally, the platform offers career services.

A distinctive feature of the edX.org platform is its courses from the world's leading universities, such as MIT and Harvard. It also offers interactive exercises, tests, forums, MicroMasters programs, and professional certificates upon passing. There is a greater emphasis on technical and scientific streams. When edX certifications demonstrate a high level of knowledge, they have a significant impact on job placement. Additionally, partnerships with large companies facilitate employment opportunities. The platform provides courses in very narrowly focused specialties. Analysis of edX reveals that it offers academically rigorous courses. The platform is suitable for those eager to study a subject in depth and is ideal for individuals seeking an academic career.

Udacity is an online education platform that offers intensive Nanodegree programs developed in collaboration with leading technology companies. A key feature of the platform is its focus on practical skills, achieved through numerous projects completed by students during their studies. Students receive mentoring support and access to career services, which significantly enhances their employment prospects in the IT industry. Udacity's Nanodegree certificates are highly valued by employers, as they demonstrate that graduates possess relevant and in-demand knowledge and skills. Udacity's analysis indicates that the platform emphasizes rapid mastery of modern IT technologies and is ideal for individuals seeking to acquire practical skills quickly and build a career in the technology sector. Therefore, Udacity provides intensive and targeted training closely aligned with the current requirements of the IT market.

The methods and materials of Enbek.kz online platform is focused on the labor market of Kazakhstan, offering courses on in-demand professions and employment assistance, and cooperating with Kazakhstani enterprises. The Enbek.kz platform helps individuals find jobs in Kazakhstan. It also aims to bridge the gap between education and the labor market. Courses are adapted to the needs of the local market and are aimed at employment.

Based on the analysis, each of the reviewed platforms has its own unique structure and offers a different number of courses, with the languages of instruction being an important factor in accessibility. The accessibility and openness of the platforms play a key role in attracting users. Differences in the availability of accessible courses and programs, as well as prerequisite requirements, determine how widely the platforms can be used by different categories of learners.

3.2. Integrating Non-Formal Education into the Learning Process Through MOOCs and Developing Recommendations

Integration of non-formal education into the learning process of higher education institutions requires flexible skills and more independent work from students.

In Toraighyrov University in 2024, there was a pilot implementation of non-formal education through studying a Coursera course. This study involved 445 first-year students across two semesters from the faculties of Energy, Architecture and Construction, Natural Sciences, Engineering, Agricultural Sciences, Humanities and Social Sciences, Economics and Law, and Computer Science. This MOOC was integrated into the course "Information and Communication Technology," with the main objective of developing students' competence in spreadsheets.

Learners were given access to select and seamlessly complete the Data Visualization in Excel course from the Coursera platform. The learning outcomes of the online course were recognized in selected topics of the ICT discipline. The trainees obtained and systematized theoretical knowledge and practical skills on the topic "Excel Spreadsheet".

When introducing non-formal education at Toraighyrov University, methods such as analytical techniques, a thorough analysis of existing global practices, and the identification of key factors affecting performance were employed. The

analysis was followed by an experiment implementing Coursera MOOC courses into the educational process at Toraighyrov University, evaluating the course design and applying pedagogical methods such as adaptive learning, gamification, and blended learning. During the experiment, the observation method was utilized to study students' interactions with MOOC materials. As a result, recommendations for the seamless integration of non-formal education into the university's educational process were developed.

4. Results

4.1. Analyze Existing MOOC Platforms to Identify Successful Practices and Teaching Methods

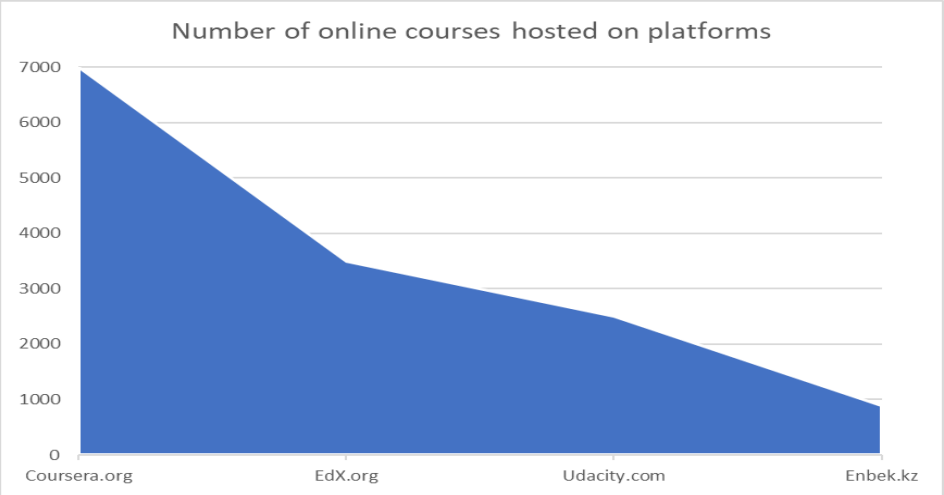

Figure 1.
Number of online courses hosted on platforms

The analysis of the platform indicated that Coursera offers high-quality education from renowned institutions. Its wide range of courses makes the platform accessible for various purposes. The platform is well established in the international market.

According to Figure 1, Coursera.com has over 7,000 courses, edX.org over 3,500, Udacity.com over 2,055, and Enbek.kz over 894. Udacity.com is focused on IT, although Coursera and edX generally offer more courses. Udacity stands out due to its intensive project work and mentoring support. Coursera and edX offer automated and peer review, and in this respect, Enbek.kz's platform is more limited.

The analysis of the platforms revealed that the main and important method of online learning is traditional lectures. In 100% of courses, traditional lectures are presented in the form of videos. In 80% of courses, video lectures include interactive elements (immediate consolidation of the topic during the lecture). Interactive assignments are a widespread method for consolidating and developing practical skills. Group projects foster teamwork and problem-solving skills.

An analysis of 27 courses from Coursera showed that 100% of courses include video lectures, confirming the dominance of video content as the primary medium of instruction. All courses include interactive video lectures accompanied by embedded questions, pauses for reflection, and other engaging elements. Most courses contain interactive assignments in 60% of cases, but their number is limited to 1-2 assignments, which is insufficient for confident consolidation of the material. Only 40% of courses include 3 or more assignments, providing a deeper practical study of the material. Courses provide for testing, usually automated quizzes at the end of sections or final tests to assess the level of learning.

Skills (skills.enbek.kz), an online professional training platform, is actively developing and providing a variety of courses for citizens of Kazakhstan. At the moment, the platform has more than 527 thousand registered users, of which 433.3 thousand have completed training, 83.5 thousand have registered, and 22.5 thousand have received certificates in 2025. More than 894 courses in various fields are available on the platform, of which 313 are free of charge. The duration of the courses varies from 6 to 72 hours. Courses on the platform cover a wide range of topics, including not only professional but also flexible skills, such as "Project Management on the principle of Agile," "Time Management and Prioritization," as well as courses from partners such as Yandex Kazakhstan, Courstore, Fluent Education, with the possibility of further training on the relevant platforms. The format of training courses on the platform includes video lectures, text materials, interactive tasks, and practical work. The platform actively maintains partnerships with various educational institutions, which helps to expand the focus of courses and improve the quality of training.

Table 1.
Teaching methods on educational platforms.

No.	Description of teaching methods	Coursera.com platform	Enbek.kz platform	Advantages of teaching methods
1	Verbal	Online courses from universities and companies.	Transfer of knowledge from the instructor to the trainees in the form of video.	Effective for covering a large amount of information quickly.
2	Visual	Interactive video lectures	Interactive videos	Effective for quick memorization of information
3	Practical	Completion of 4-5 assignments, test materials	Completion of 1-2 tasks	Develops skills, reinforces theory
4	Research	Scientific projects, preparation of reports	Students independently find and analyze information.	Develops learning and analytical thinking skills
5	Multimedia	Use of audio, video and interactive materials	Video lessons, simulations	Makes learning visual and varied
6	Individual	Adapted to the needs of the individual student.	adaptive online platforms	Takes into account the level, pace, and learning style of the trainee.

Hence, the analysis of existing platforms identified one of the successful practices - the Coursera platform, which provides basic engagement and validation of knowledge. Among the teaching methods, such as verbal, visual, practical, research, multimedia, and individual approaches, these methods promote effective mastery of the material and increase learner engagement in informal learning.

4.2. Integrating Non-Formal Education into the Learning Process through MOOCs and Developing Recommendations

The main part of the study involved surveying and analyzing students' perceptions of their experience in their personal accounts on the portal https://tou.edu.kz/student_cabinet/, as well as examining their attitudes towards MOOC integration. Students evaluated their informal education experience and expectations of the course, prior knowledge and connection to informal education, motivation and integration, the impact of prior informal education on taking the course, the impact of the course on further informal learning, and their overall assessment of integration on a 5-point Likert scale. For each of the assessed aspects (knowledge, skills, motivation, attitude), several statements can be formulated. Students are asked to rate their degree of agreement or disagreement with each statement on a Likert scale, with example questions using a 5-point scale: 1 - completely disagree; 2 - rather disagree; 3 - neutral; 4 - rather agree; 5 - completely agree. Statistical data were processed using the IBM SPSS Statistics 22 program.

The survey questionnaire is divided into two main parts:

Prior to taking the MOOC (Pre-Assessment), this part is completed by students before or at the very beginning of the relevant MOOC. The questions aim to assess their current level of knowledge, skills, motivation, and attitudes towards ICT learning prior to the informal learning experience. Questions about their expectations of the MOOC can also be included.

In Kazakhstan, non-formal education is currently not integrated into the curriculum of general secondary schools, which results in limited independent learning of additional knowledge through MOOC platforms among students.

Table 2.
Pre-MOOC Questionnaire (Preliminary Assessment).

Approval	Average value	Standard. Deviation.	Extreme value (answers)
Non-formal education experience and course expectations			
1. I have considerable experience in self-studying various topics through online courses, video tutorials, and other informal sources.	3.07	1.38	72 (2) 49 (5)
2. I believe that my previous informal education experience will help me learn the Data Visualization in Excel course faster and more efficiently.	2.96	1.54	48 (1) 73 (2)
3. I am confident in my ability to independently find and use additional resources to better understand the Data Visualization in Excel course material.	3.04	1.42	67 (4) 49 (5)
4. I expect that the self-organization skills I have developed through informal learning will be useful in completing this MOOC.	3.06	1.43	48 (3) 67 (5)
Prior knowledge and links to non-formal education			
5. Prior to starting this course, I had/have some experience with spreadsheets from informal learning experiences.	2.90	1.51	50 (1) 73 (3)
6. My knowledge from other MOOCs or online resources relates to topics that can be associated with spreadsheets (e.g., basic statistics, data analysis).	3.19	1.38	68 (2) 45 (3)
7. I plan to use the knowledge and learning approaches I have developed through my informal learning in the course Data Visualization in Excel.	2.87	1.43	57 (4) 68 (5)
Motivation and integration			
8. One of the reasons why I chose this MOOC is that I want to systematize and deepen the knowledge I have acquired informally in the field of spreadsheets.	3.04	1.40	46 (1) 69 (5)
9. I believe that taking the MOOC course will help me to better integrate my disparate spreadsheet knowledge from different informal sources.	3.06	1.36	43 (1) 66 (4)
10. I hope that this MOOC will provide me with a more structured approach to learning spreadsheets compared to my previous informal experiences.	2.93	1.43	55 (1) 62 (5)

The results of the survey on Table 2 showed that the respondents have experience in non-formal education and expect a lot of usefulness from the course, showed a mean of 3.03 (standard deviation 1.38). This is welcome when students come with some background and motivation. Also, students express expectations from prior knowledge and the relationship with informal learning, showing a mean of 2.98 (standard deviation 1.44). Importantly, most agree that the course will help systematize their disparate knowledge. This is one of the key values of informal learning. At the same time, statements on motivation and integration of MOOC courses, most respondents indicated rather strong agreement that taking MOOC courses will help to better systematize their disparate spreadsheet knowledge from different informal sources, mean of 3.01 (standard deviation 1.39).

Post-IOOC (Post-Assessment). This section was completed by students after finishing the MOOC. The questions are similar to those in the first part but are formulated to assess their self-perception after completing the MOOC.

Table 3.
A questionnaire after completing the MOOC.

Approval	Average significance	Standard. Rejected.	Extreme value (answers)
Impact of previous non-formal education on course completion			
1. My previous experience with informal education (online courses, self-study, etc.) has made it much easier for me to understand the "Data Visualization in Excel" course materials.	3.05	1.37	47 (4) 80 (5)
2. The self-organization skills that I developed through informal learning were very helpful in successfully completing this MOOC.	2.96	1.43	52 (1) 66 (3)
3. The knowledge I gained outside of formal education allowed me to grasp new concepts presented in the course more quickly.	2.96	1.38	65 (2) 48 (5)
4. My experience with other MOOCs has helped me become more familiar with the structure and functionality of this course, Data Visualization in Excel.	2.92	1.40	68 (3) 52 (4)
Impact of the course on further non-formal education			
5. After taking the Data Visualization in Excel course, I feel more confident exploring more complex spreadsheet topics on my own.	3.02	1.36	50 (1) 68 (2)
6. The spreadsheet skills learned in the course are actively being applied in my further informal education and self-development.	3.04	1.30	73 (2) 46 (3)
7. This MOOC taught me how to integrate knowledge from various online sources more effectively when learning new topics.	2.88	1.39	46 (3) 70 (4)
8. Taking the course "Data Visualization in Excel" has increased my motivation for further informal education in data analysis and related disciplines.	2.92	1.42	63 (4) 56 (5)
Overall assessment of integration			
9. This MOOC effectively utilized my previous informal education experience as a foundation for learning about spreadsheets.	2.92	1.42	56 (1) 65 (5)
10. Through this course, I have become more aware of how to structure my non-formal education to accomplish specific goals (e.g., learning spreadsheets).	3.06	1.38	53 (2) 69 (4)
11. The spreadsheet knowledge I gained in the course helped me to better understand information I had previously encountered in my informal education.	3.04	1.45	70 (3) 43 (5)
12. Overall, I believe that the experience of non-formal education and participating in this MOOC mutually enhanced the educational process.	2.98	1.34	45 (4) 69 (5)

As shown in Table 3, the results of the survey on the evaluation of the impact of previous non-formal education on course completion show a preponderance of positive evaluations, with a mean of 2.97 (standard deviation 1.39). this confirms that previous experience can be useful in learning MOOCs. the analysis of answers to the question about the influence of the course on further informal learning showed a mean value of 2.96 (standard deviation 1.36), which indicates the effectiveness of integrating MOOCs of the course into the educational process of the university. so, the course not only provides knowledge here and now, but also stimulates further development. the results of the respondents' survey showed an overall assessment of the integration of MOOCs into the educational process neutral, which showed a mean of 3.0 (standard deviation 1.39).

Analysis of the MOOC results showed that 67% of trainees successfully completed the course, while 33% remained non-completers. To improve the effectiveness of training and increase the share of successful course completions to 90-100%, new methodological recommendations are proposed.

Toraigyrov University offers students opportunities to acquire additional skills through platforms such as Coursera, Huawei, and Enbek.kz, supporting the intensive development and implementation of non-formal education at the university.

In the course of the study, a questionnaire survey was conducted among faculty members of higher education institutions in Kazakhstan. The results of the survey showed that 74.8% of respondents use MOOC platforms in the learning process, 78.5% of teachers have their own original courses on different platforms, 50.5% of respondents noted that they sometimes use MOOCs in the learning process, and most often 61% of them use the Coursera platform. They believe

that Coursera is more convenient to use among the known ones. Respondents mentioned the main characteristics of the platforms, such as interface, large selection of courses, easy navigation, cross-platform compatibility, and obtaining a certificate. 69.2% of teachers believe that it is necessary to integrate MOOCs into traditional education [7].

The results of the questionnaire were used in the development of methodological recommendations. These recommendations were proposed for inclusion in the university normative document "Methodological Recommendations for Teachers on the Development of MOOCs".

To successfully integrate non-formal education and learner engagement, it is necessary to choose the right target audience, improve the design of learning materials, apply the latest pedagogical methods, select a platform to make the course accessible, and optimize the evaluation and feedback system, as well as personalize learning.

1. Choice of target audience - to offer courses for learners who are interested in self-development and evaluation of their time, in acquiring new knowledge and mastering new technologies, and who are proficient in business tools and strategies.

2. Develop a flexible structure, modules, and interactive elements in course design. Flexibility in structure will allow for modifications and provide a logical and intuitive course structure with clearly defined modules, topics, and assignments. Interactive elements enable visualization and integration of video lectures (broken into short, focused segments) and interactive assignments.

3. Application of modern teaching methods - gamify assignments, include problem tasks and real-life situations, and assign tasks to develop critical thinking through evidence-based discussion.

4. Preparation of the platform for MOOCs. The platform should provide direct access to the selected course without technical errors, be user-friendly, have a simple design, and meet ergonomic requirements.

5. Each course should have feedback, and the data received should be automatically analyzed for quick responses to course corrections.

6. Use of the EdSmart Premium Multimedia Studio - a state-of-the-art space for creating high-quality educational content. The studio allows for the creation of visual and engaging course materials, high-resolution video footage, and high-quality sound recordings, which contribute to the development of a visually appealing course.

Table 4.
Main areas of use of EdSmart Premium.

Directions	Methodological recommendations
Recording of video lectures	- Using an LED board to visualize diagrams, formulas, graphs, etc. - Break lectures into short logical blocks (5-10 min) for better comprehension; - Use a teleprompter to confidently present material without the need for and memorization of text.
Creating interactive instructions	- Demonstrate step-by-step actions on the screen (e.g., algorithms, hands-on activities, program interfaces); - Use self-check questions or short assignments between steps.
Organization of online broadcasts, webinars, and conferences	- Use high-quality video and sound for a professional pitch; - Organize simultaneous output of presentations and the presenter (picture-in-picture mode); - Connect participants via Zoom, MS Teams platforms.
Creating podcasts	- Record audio in a special soundproofed area; - Prepare thematic series to reinforce material, interview experts, or discuss difficult topics.
Preparation of content for online platforms (Coursera, EdX, Enbek.kz, etc.).	- Follow the IOOC platforms' recommendations on the length of clips, structure of materials and format; - Record introductions, lectures, practice units, assignments and final videos

7. Pedagogical guidelines for the use of multimedia studios. Adapt content to a visual style, e.g., short wording, anchor charts, and interactive elements. Perceptual orientation, i.e., alternating between talking heads, infographics, and on-screen explanations. Stimulate engagement, e.g., interactive work with the audience (reflection questions, mini-tasks).

8. Organizational tips play an important role, such as preparing the script and timings, conducting rehearsals with equipment, involving a studio technician if necessary, and taking into account copyrights when using materials, images, music, etc.

Implementing the proposed recommendations will help create a more effective, engaging, and personalized learning environment in MOOCs, leading to increased student satisfaction, improved learning outcomes, and higher course completion rates.

5. Discussion

Analyzing existing MOOC platforms to identify successful practices and teaching methods revealed several positive aspects:

- Analysis enables the identification of the most effective pedagogical approaches, technological solutions, and organizational models already successfully implemented in various MOOC platforms. This can serve as a valuable source of knowledge and inspiration for developing new courses and enhancing existing ones.

- Studying already implemented solutions helps to avoid repeating mistakes and focus on implementing proven and effective practices.
- Comparing different platforms and their teaching methods can help identify best-in-class options and set benchmarks for the quality of online education.
- Analyzing successful MOOCs can reveal which content formats, types of assignments, and modes of interaction are most relevant and effective for different groups of learners.
- Exploring the diversity of approaches may prompt the search for new, even more effective solutions and combinations of existing methods.

In addition to the positive aspects, there are also negative aspects of using MOOC platforms:

- What works well on one platform and for one audience may be less successful in another context (e.g., due to the specifics of the subject area, target audience, or technology infrastructure).
- Evaluation of "success" can be multidimensional and dependent on different criteria (e.g., course completion rate, learner satisfaction, depth of learning). Collecting and comparing such data between different platforms can be challenging.
- Online education is a dynamic field, and successful practices can quickly become outdated or require adaptation to new technologies and trends.
- Some platforms may not provide sufficient information on the methods used and learning outcomes, making it difficult to conduct a comprehensive analysis.
- There is a risk of conducting a superficial analysis limited to the external characteristics of the platforms, without a deep understanding of the underlying pedagogical and technological solutions.

Integrating non-formal education into the learning process through MOOCs and developing recommendations has shown a number of benefits. MOOC integration can be a mechanism for recognizing knowledge and skills acquired outside formal education, which increases motivation to learn and opens up new educational trajectories. Taking non-formal experiences into account can make the educational process more relevant to the needs of learners and the labor market by linking theoretical knowledge with practical experience. MOOCs can provide opportunities to develop important meta competencies such as self-organization, responsibility, and critical thinking, which are often formed in the process of non-formal learning. Integrating MOOCs can provide access to unique educational resources and experts that may not be available through traditional formal education. Providing opportunities to integrate non-formal education can foster a culture of continuous learning and self-development.

The study of integration has revealed shortcomings such as the difficulty of assessing and validating informal learning, the risk of reducing academic rigor, and the need to develop new pedagogical approaches. Additionally, there are problems with motivation and self-discipline, as well as technological and organizational difficulties, and the heterogeneity of informal experiences.

Research on the integration of non-formal education through MOOCs into the educational process of higher education institutions holds significant promise for the transformation of higher education. Here are the key areas in which this research can yield valuable results, such as flexibility and personalization of learning, widening access and inclusion, development of lifelong learning, increasing practical orientation of education, innovations in pedagogical approaches, collaboration and networking: recognition and validation of non-formal learning, development of digital learning environment of HEI.

Thus, the study of integrating non-formal education through MOOCs into the educational process of higher education institutions has promising prospects for modernizing higher education, increasing its accessibility, flexibility, and practical relevance, as well as preparing graduates for the challenges of the modern world.

6. Conclusion

In the course of the conducted research, the set tasks were solved, which allowed for reasonable conclusions and recommendations on the integration of non-formal education into the educational process through MOOC platforms:

The analysis of existing MOOC platforms to identify successful practices and teaching methods is a *fundamental step* for further development of online education. Identification and systematization of effective approaches to course design, pedagogical strategies, technological solutions, and organization of interaction will *enrich the methodological arsenal of* MOOC developers and teachers. This, in turn, will contribute to *improving the quality and effectiveness of* learning on these platforms, as well as *increasing the involvement and satisfaction of* students.

In parallel, the challenge of integrating non-formal education into the learning process through MOOCs opens up *new perspectives for personalizing learning and recognizing prior knowledge and skills.* The development of specific recommendations on how to incorporate non-formal experiences into the structure and content of MOOCs, and how to establish mechanisms for recognizing the results of such learning, will contribute to the *democratization of education and enhance opportunities for lifelong* learning.

The realization of these objectives will not only *improve existing* MOOC *practices* but also *create prerequisites for the development of innovative approaches that* blur the boundaries between formal and non-formal education. The results of this research will have *practical significance* for educational institutions, MOOC platforms, teachers, and learners themselves, contributing to the creation of a more flexible, accessible, and effective educational environment.

Based on the analysis and identified practices, methodological recommendations for the implementation of MOOCs in the educational process of higher education institutions have been developed, which include the selection of courses in

accordance with educational objectives, adaptation of content to the specifics of the discipline, integration into the schedule and assessment system, and motivational support for students when taking online courses.

Thus, the conducted research confirmed the high significance of MOOCs as a tool to increase the accessibility and flexibility of education, and also outlined practical ways to integrate non-formal education into the formal educational environment of the university.

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