ISSN-p 2306-7365
ISSN-e 2664-0686

UDC 378.147; IRSTI 14.35.07
https://doi.org/10.47526/2024-4/2664-0686.124

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NON-FORMAL EDUCATION ON THE COURSERA PLATFORM: A REGIONAL UNIVERSITY EXPERIENCE

Abstract. This article provides a discussion of the usage of massive open online courses on the Coursera platform as a resource for non-formal education in Kazakhstan. The authors of this research define non-formal education as one of the strategies for students' personal and professional development. The article aims to evaluate the efficacy of massive open online courses in improving the language level of language majors studying. The usage of a variety of methods including theoretical and comparative analysis, pedagogical experiment, testing and content analysis are described to illustrate the findings collected during the study process. The methods of mathematical statistics, such as the non-parametric statistical criterion Mann-Whitney U-test and SPSS Statistics 27.0 program were utilized in this research. 68 3rd year students of the educational program "Foreign Language: Two Foreign Languages" of Pavlodar Pedagogical University named after Alkey Margulan took part in the pedagogical experiment. Data were collected from 4 massive open online courses on the Coursera platform: "Work Smarter, Not Harder: Time Management for Personal & Professional Productivity", "Programming for Everybody (Getting Started with Python)", "Project Management: The Basics for Success" and "Leading teams: Building Effective Team Cultures". The empirical study and the conclusions demonstrated that massive open online courses on the Coursera platform increase the level of language proficiency by 23.6%, allowing students to realize their goals outside the university, and also develop their metacognitive abilities.

Keywords: non-formal education, Coursera, personal development, professional development, language level, university students.

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Coursera платформасында бейресми оқыту: аймақтық университет тәжірибесі

**Бізге дұрыс сілтеме жасаңыз:*
Alimova Sh.Zh., Ospanova Zh.Z. Non-formal Education on the Coursera Platform: a Regional University Experience // *Ясауи университетінің хабаршысы*. – 2024. – №4 (134). – Б. 325–334. https://doi.org/10.47526/2024-4/2664-0686.124
Cite us correctly:
Alimova Sh.Zh., Ospanova Zh.Z. Non-formal Education on the Coursera Platform: a Regional University Experience // *Iasaui universitetinin habarshysy*. – 2024. – №4 (134). – B. 325–334. https://doi.org/10.47526/2024-4/2664-0686.124

Date of receipt of the article 02.04.2024 / Date of acceptance 30.12.2024

ISSN-p 2306-7365
ISSN-e 2664-0686

Аңдатпа. Бұл мақалада Coursera платформасындағы жаппай ашық онлайн курстарды Қазақстан Республикасында бейресми білім беру ресурсы ретінде пайдалану талқыланады. Авторлар бейресми білім беруді студенттердің тұлғалық және кәсіби дамуының стратегияларының бірі ретінде анықтайды. Зерттеудің мақсаты – оқитын тіл мамандықтарының тілдік деңгейін арттыруда жаппай ашық онлайн курстардың тиімділігін анықтау. Авторлар зерттеу процесінде жиналған нәтижелерді теориялық және салыстырмалы талдау, мазмұнды талдау, педагогикалық эксперимент және тестілеу әдістерінің кешенін пайдалана отырып ұсынды. Жұмыста параметрлік емес статистикалық критерий Mann-Whitney U-тесті және SPSS Statistics 27.0 бағдарламасы сияқты математикалық статистика әдістері қолданылды. Педагогикалық экспериментке Әлкей Марғұлан атындағы Павлодар педагогикалық университетінің «Шет тілі: екі шет тілі» білім беру бағдарламасының 3 курсының 68 студенті қатысты. Деректер Coursera платформасындағы 4 жаппай ашық онлайн курстарынан жиналды: “Work Smarter, Not Harder: Time Management for Personal & Professional Productivity”, “Programming for Everybody (Getting Started with Python)”, “Project Management: The Basics for Success”, “Leading teams: Building Effective Team Cultures”. Жүргізілген эмпирикалық зерттеулер мен жасалған қорытындылар Coursera платформасындағы жаппай ашық онлайн курстар тілді меңгеру деңгейін 23,6%-ға арттыратынын, студенттерге университеттен тыс уақытта өз мақсаттарын жүзеге асыруға мүмкіндік беретінін, сонымен қатар метатанымдық қабілеттерін дамытатынын көрсетті.

Кілт сөздер: бейресми білім, Coursera, жеке даму, кәсіби даму, тіл деңгейі, университет студенттері.

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Неформальное обучение на платформе Coursera: опыт регионального вуза

Аннотация. В данной статье рассматривается применение массовых открытых онлайн-курсов на платформе Coursera как ресурса для неформального образования в Республике Казахстан. Авторы определяют неформальное образование как одну из стратегий личностного и профессионального развития обучающихся. Цель исследования заключается в определении эффективности массовых открытых онлайн курсов для повышения языкового уровня обучающихся языковых специальностей. Авторами представлены результаты, полученные в процессе исследования с использованием комплекса методов: теоретического и сравнительно-сопоставительного анализа, контент-анализа, педагогического эксперимента и тестирования. В работе применялись методы математической статистики, такие как непараметрический статистический критерий U-критерий Манна-Уитни и программа SPSS Statistics 27.0. В педагогическом эксперименте приняли участие 68 студентов 3 курса обучения образовательной программы «Иностранный язык: два иностранных языка» Павлодарского педагогического университета имени Әлкей Марғұлана. Данные были собраны на 4 массовых открытых онлайн курсах на платформе Coursera: “Work Smarter, Not Harder: Time Management for Personal & Professional Productivity”, “ProgrammingforEverybody (GettingStartedwithPython)”, “ProjectManagement: TheBasicsforSuccess”, “Leading teams: Building Effective Team Cultures”. Предпринятое эмпирическое исследование и сделанные выводы продемонстрировали, что массовые открытые онлайн курсы на платформе Coursera

ISSN-p 2306-7365
ISSN-e 2664-0686

повышают уровень владения языка на 23,6% и позволяют студентам реализовать целевые установки вне университета, а также развивать метакогнитивные способности.

Ключевые слова: неформальное образование, Coursera, личностное развитие, профессиональное развитие, уровень языка, студенты вуза.

Introduction

Currently, the significance of non-formal education is expanding and entering the educational policy consideration in Kazakhstan. The demand for non-formal education as an integral component of Kazakhstani societal educational space is reflected in the numerous of statutory documents: the National Development Plan of the Republic of Kazakhstan until 2025 [1], the Concept for the Development of Higher Education and Science in the Republic of Kazakhstan for 2023-2029 [2] and the State Compulsory Standard of Higher and Postgraduate Education [3]. Non-formal education in higher education has quickly gained popularity, and ways to access educational content and track student progress have expanded and scaled.

Non-formal education is considered as a substitution to the formal one. It is conducted outside the official educational system and is unlimited by the location, duration, and type of instruction received. To a large extent, the basis of the space of non-formal education is the growth of personal individual potential, which is reproduced in the student's readiness to set goals, and find ways and means to achieve them through continuous self-education [4]. The purpose of non-formal education is not limited to gaining knowledge, but to providing students with practical strategies to ensure personal development. The organizing principle of the non-formal educational process is its individualization, aimed at the unique objectives of each student. According to Yakushina M.S. non-formal education should be based on the student's experience, systematicity, selectivity, individualization, and actualization of learning results [5].

Holland A.A. notes that non-formal education has a positive effect on the interaction of opportunities to gain knowledge in one field and the capabilities of students, in addition to the significance of an individual approach to learning [6]. Massive open online courses are growing in importance as a non-formal education resource. In massive open online courses learners are free to decide the place, pace, time, and location of learning, given autonomy helps students regulate their learning process [7]. A traditional online course and MOOC differ in that the second one is open to all applicants, includes publicly available materials, and does not always charge a registration fee outside of obtaining formal certification [8]. MOOCs are enabled to train a large group of students concurrently and open-source access software code for everyone to register. Learning occurs primarily through self-study; autonomy reinforces and requires a self-regulation strategy to succeed [9]. MOOCs support the growth and enhancement of professional skills in the educational field and assist to the language proficiency improvement of the participants of the courses. MOOCs are applied by learners as an extra resource for mastering the English language, professional development, and self-education [10].

The aim of the article is to evaluate the efficacy of massive open online courses in improving the language level of language majors studying.

Research methods and materials

During the research process, a complex of methods was utilized, including theoretical and comparative analysis, studying the practice of non-formal education, content analysis, methods of mathematical statistics: non-parametric statistical criterion Mann-Whitney U-test and the SPSS Statistics program 27.0. The empirical part of the study is based on learning results from massive open online courses on the Coursera platform and testing. The study involved 68 3rd year students – future teachers of English at Pavlodar Pedagogical University named after A. Margulan. Participants in the pedagogical experiment were divided into control and experimental groups, with

ISSN-p 2306-7365
ISSN-e 2664-0686

34 students in each group. This experiment was conducted during the 2022-2023 academic year, the second semester.

To justify the usage of the methods mentioned above the following research questions were formulated:

RQ1. What differences in language level can be observed between the experimental and control groups before the pedagogical experiment?

RQ2. What changes in language level are distinguished in the experimental and control groups after the pedagogical experiment?

RQ3. What impact did non-formal education courses have on students' language proficiency?

Results and discussion

Regarding the computerization of education, the Ministry of Science and Higher Education of the Republic of Kazakhstan began to cooperate with the MOOC-platform Coursera. An important feature of such courses is an open access mode. Since their creation, MOOCs have evolved into three typological models:

1) cMOOCs apply the principles of connectivism – a system of pedagogical perspectives based on the concept of coherent knowledge, within the process of learning, is identified with the process of creating a network. The objective of the participants is to search and provide in the form of subject-related materials and social connections, jointly to develop the course topic through the production of coherent knowledge. The subject of reflection is the organization of cooperation with Internet resources, as well as ways for professional development in the context of such cooperation. According to this model, learning is the growth and development of a learner. This type involves searching for and solving problems together with students and teachers, collaborating to improve the information offered, and updating it. The learning objective in such courses is determined by students. Expert discussions and video meetings are an integral part of the course curriculum. Participants are encouraged to create their blogs to join the course. The main advantages of the structure are openness for all participants, equality, and accessibility of educational material for all participants. The disadvantages of this type include too much information lack of control on the part of a teacher, and some unmastered educational materials. cMOOCs are very promising in terms of organizing professional development courses in special communities [11];

2) xMOOCs are open courses from large international universities. Such courses, as a rule, are focused on independent work; students master courses along a certain trajectory. They have a clear, fixed course structure, and the learning goal is set by a teacher. This type is categorized by an institutional model of the educational process. Registration for these courses is free: anyone can enroll, regardless of location, networking skills, social status, and age. xMOOCs contain proof that the content of methodological and educational materials from top universities is publicly and freely available and teaching technologies satisfy worldwide requirements. There are not many observers in the courses and educators' primary responsibilities are supervisory. The courses are focused on the study of the subject and, if possible, automate the verification of finished assignments. Learners do assigned tasks with the possibility to reflect on their learning outcomes, validate the subject comprehension, and develop relevant competencies. Students also study educational resources independently that are created by experts, and find and familiarize themselves with the additional permanent information. Furthermore, it is expected that students would participate actively in class discussions and communicate with other participants. Throughout the learning activities, participants are provided with a formal assessment procedure to confirm self-correction and peer input. The primary benefits include having a qualified instructor, a clear schedule of the educational process, divided into modules, automated monitoring of the progress of studying the material, and final certification of the student. This model provides students with access to any necessary

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information at a convenient time, technical assistance and support, and a platform for public discussion [12];

3) task-based MOOCs are courses based on tasks, the implementation of which can be carried out in various ways and take various forms such as article, audio, video, joint problem-solving creation of group projects, and storytelling. Digital storytelling can include interactivity and is an open resource where anyone can join using a range of tools. A student can perform tasks either independently or together with other students. There are some assignments that can be completed in a variety of options but a certain number of assignments should be accomplished to demonstrate the obtained skills. This typological model of the course includes scaffolding indexed to permanent course material. This task-based MOOC culminates in a final project that requires students to apply and synthesize concepts they have learned throughout the course. This model integrates the key features of cMOOC and xMOOC. The course offers participants either a choice of solution method or complete free activities, which can grow into projects [11].

MOOCs as the basis of a new form of education have some disadvantages. Many students sign up for the course out of curiosity or a desire to see the content of the course and evaluate the level of information delivery. Not all participants complete the entire course and receive certificates upon completion.

500 grants are awarded to regional universities annually by the Ministry of Science and Higher Education of the Republic of Kazakhstan for completing the xMOOC type on the Coursera platform. In the first cohort, 34 grants were assigned for the educational program "Foreign Language: Two Foreign Languages" at Pavlodar Pedagogical University named after Alkey Margulan. Thus, 68 3rd year students of this educational program took part in the ascertaining stage of the pedagogical experiment. The experiment participants were divided into control and experimental groups of 34 students per group. To evaluate mid-term control indicators of the disciplines as "Practical course of English (reading, speaking, listening, writing) and "Practice of oral and written speech", both groups were given a test to determine their language proficiency level".

The findings from the assessing the control group' language level at the ascertaining stage of the pedagogical experiment are presented in Table 1.

Table 1 – The findings from the assessing the control group' language level (n=34)

Stage	**Language level of the control group**					
	high		average		low	
	number of students	%	number of students	%	number of students	%
Ascertaining	10	29.4%	20	58.8%	4	11.8%

At the ascertaining stage of pedagogical experiment, the indicators illustrate that students of the control group (CG) acquire language proficiency in a high level – 29.4% (10 students), in an average level – 58.8% (20 students) and in a low level – 11.8% (4 students).

Table 2 shows the outcomes of diagnosing the experimental group's language level at the ascertaining stage.

Table 2 – The findings from the assessing the experimental group' language level (n=34)

Stage	**Language level of the experimental group**					
	high		average		low	
	number of students	%	number of students	%	number of students	%
Ascertaining	8	23.5%	20	58.8%	6	17.7%

ISSN-p 2306-7365
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Findings from the diagnostic phase of the experimental group's (EG) language proficiency at the ascertaining stage demonstrate that students gain this language level in a high one – 23.5% (8 students), in an average level – 58.8% (20 students) and in a low level – 17.7% (6 students).

The verification of statistically significant differences in the outcomes of the control and experimental groups were ascertained by utilizing the method of mathematical statistics of the non-parametric Mann-Whitney U-test [13]. This criterion proves the absence of differences in the levels of the studied characteristics between the experimental group and the control group at the ascertaining stage of the experiment.

The criterion statistics are presented as follows:

$$U = n_1 \cdot n_2 + \frac{n_x \cdot (n_x + 1)}{2} - R_x$$

The sum of ranks for the experimental group is 1155, for the control group – 1191. Let us denote the largest sum by R_x=1191.

The criterion statistics allows to formulate hypotheses:

H0: the experimental group does not exceed the control group in terms of language level.

H1: The experimental group outperforms the control group in language level.

Determining the value U_{emp} using the proposed formula we get:

$$U_{emp} = 560$$

Thus, U_{crit} = p≤0.01 – 387, p≤0.05 – 443, therefore, the samples have statistically insignificant differences and the H0 (null hypothesis) that the experimental group and the control group are homogeneous is accepted. Hence, at the ascertaining stage, the EG does not exceed the CG in terms of language level.

During the forming stage of pedagogical experiment, the students of experimental group studied 4 massive open online courses on the Coursera platform. The courses chosen by students of the experimental group (n=34) on the Coursera platform in English are presented in Table 3:

Table 3 – Choice of courses on the Coursera platform by students of the experimental group (n=34)

#	Course title	Number of students enrolled
1	Work Smarter, Not Harder: Time Management for Personal & Professional Productivity	15
2	Programming for Everybody (Getting Started with Python)	11
3	Project Management: The Basics for Success	5
4	Leading teams: Building Effective Team Cultures	3

After studying the course, students are able to find, process and analyze information from various sources; assess the accuracy and consistency of information, independently plan and organize, create and achieve goals, work with information systems and databases, become proficient in scientific research methods and techniques, create and design, and carry out the application of research findings in the area of foreign language teaching methods.

The courses on the Coursera platform include from 4 to 7 modules. The most preferred course by students is "Work Smarter, Not Harder: Time Management for Personal & Professional

ISSN-p 2306-7365
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Productivity" from the University of California consists of 4 modules. This course teaches students the ways to effectively prepare for reaching their individual and professional objectives, handle and recognize crises, overcome time management obstacles, and manage resources efficiently and effectively. The second most important course among students in the experimental group is "Programming for Everybody (Getting Started with Python)" from the University of Michigan, which offers 7 modules. This course is aimed at teaching the basics of programming using Python to everyone. The course covers the basics of program construction through a series of simple instructions in Python, the four basic programming patterns, and program creation cycles. In third place among students' choice is the course "Project Management: The Basics for Success" from the University of California, consisting of 4 modules. In this course, students learn the roles of high-performance teams in project management, tools and methods for developing and strengthening teams, stages of the project cycle, and planning and control of projects. The last place is taken by the course "Leading teams: Building Effective Team Cultures" from the University of Illinois, which has 5 modules. The course teaches how to build an effective team culture. In this course, students learn a culture of safety, inclusion, and growth toward a culture that promotes the most effective teamwork.

The listed courses contained an introduction to the course, content modules, videos, reading materials, assignments assessed by other participants, forums, and quizzes. Assessment involves asking for written assignments and computer tests. Certificates of successful completion were awarded to 34 experimental group students after they finished their online courses.

The table data illustrates some changes in the language proficiency of students in the experimental group after they completed courses in English. The control group also experienced positive changes, mainly at an average level. The use of the nonparametric Mann-Whitney U test showed that quantitative transformations occurred in the experimental group at the language level.

A comparative table for diagnosing the language level of the control and experimental groups at the final stage of the pedagogical experiment is presented in Table 4.

Table 4 – Comparative table for diagnosing the language level of the CG and EG at the ascertaining and final stages of the experiment

Stage	Control group			Experimental group		
	levels in %					
	high	average	low	high	average	low
Ascertaining	29.4%	58.8%	11.8%	23.5%	58.8%	17.7%
Final	35.3%	55.9%	8.8%	47.1%	44.1%	8.8%
Comparison	+5.9%	- 2.9%	- 3.0%	+23.6%	- 14.7%	- 8.9%

This statistical process was utilized with the control group of the pedagogical experiment, which did not reveal statistically significant changes at the language level at the last stage of the experiment. On the contrary, the experimental group demonstrated the growth in high level of language proficiency. The data are shown in Figure 1.

ISSN-p 2306-7365
ISSN-e 2664-0686

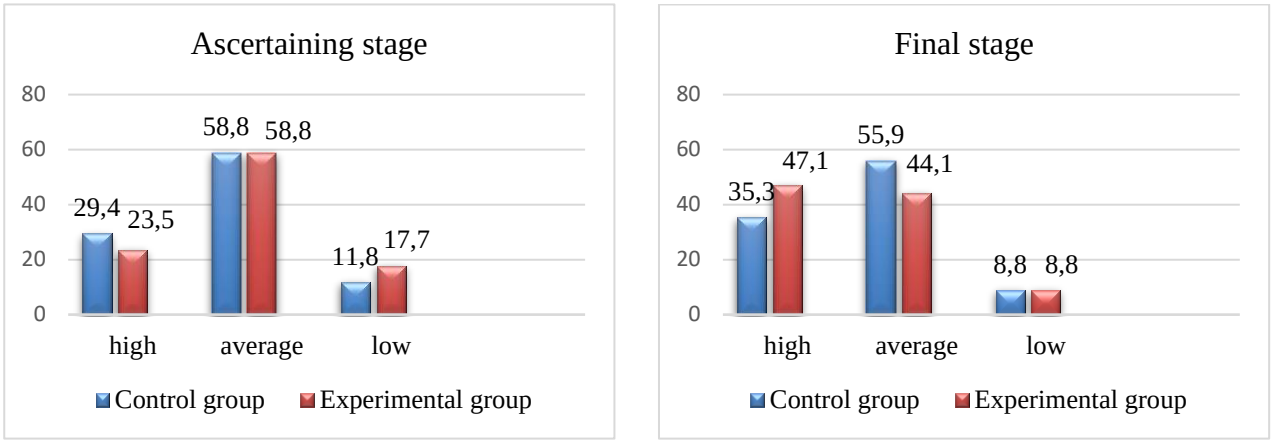

Figure 1 – Comparison of the language level diagnostics

In response to the first research question: "Which differences in language level can be observed between control and experimental groups before the pedagogical experiment?", according to testing hypothesis H0 using the method of mathematical statistics of the nonparametric Mann-Whitney U-test, the experimental group does not exceed the control group in terms of language level. At the ascertaining stage of the experiment, the control and experimental groups were homogeneous. Answering the second research question: "What changes in language level are distinguished in control and experimental groups after the pedagogical experiment?", it turned out that after completing massive open online courses on the official Coursera platform, the control group's high language level increased from 29.4% up to 35.3%, i.e. +5.9%. The level of high language proficiency of the experimental group increased by 23.6%, from 23.5% to 47.1%. The third research question was "What impact did non-formal education courses have on students' language proficiency?". We came to the conclusion that taking massive open online courses has a positive effect not only in terms of the level of English language proficiency but also on the development of metacognitive abilities. Students in the experimental group became more independent, able to search not only for current information, but filter secondary and tertiary information, illustrated persistence in completing complex tasks in class, and began to give more feedback. The study demonstrated that massive open online courses on the Coursera platform have a positive impact on students' academic performance.

Conclusion

Our research revealed the impact of massive open online courses on the Coursera platform on increasing students' level of English language proficiency in the educational program "Foreign Language: Two Foreign Languages". Students of the experimental group finished 4 massive open online courses on the Coursera platform with certificates of completion: "Work Smarter, Not Harder: Time Management for Personal & Professional Productivity", "Programming for Everybody (Getting Started with Python)", "Project Management: The Basics for Success" and "Leading teams: Building Effective Team Cultures". After the pedagogical experiment, the language level of the control group increased by 5.9%, and the experimental group grew by 23.6%. Thus, non-formal education is an important part of the educational policy of a regional pedagogical university. An analysis of the literature on the problem of the study indicates the active development of the practice of non-formal education. MOOCs can be an effective tool for developing non-formal education when it is used as autonomous alternative sources of knowledge acquisition. The potential of non-formal education allows one to choose individual learning paths, taking into account the interests and educational needs of students.

ISSN-p 2306-7365
ISSN-e 2664-0686

Our recommendations to the learners of this educational program next time to select the online courses not only to advance self-development and computer skills but enhance their core language teaching competencies. The quantity of online courses for regional universities steadily increases. Since the Coursera platform offers courses for future English teachers, advisers should provide the consultations for interested students.

Thus, the outcomes of the study verify the effectiveness of incorporating massive open online courses into the educational process of a regional university. Further research is needed on non-formal education and the possibility of recognizing and validating competencies acquired outside formal education.

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ISSN-p 2306-7365
ISSN-e 2664-0686

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