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Alimova Sh.Zh.[a], Pashkaniyan D.V., Zhakienova A.A.

Alkey Margulan Pavlodar Pedagogical University, Pavlodar, Kazakhstan

THE COURSERA PROJECT REALIZATION ON THE EDUCATIONAL PROGRAM "PHYSICAL EDUCATION AND SPORT"

Alimova Sholpan Zhanbolatovna, Pashkaniyan Dariya Vladimirovna, Zhakienova Aliya Amangeldinovna

The Coursera project realization on the educational program "Physical education and sport"

Abstract. Coursera has positively impacted modern educational trends and transformed the way learners approach learning. The goal of the study is to describe the realization process of the Coursera project at the university and define its effect on future physical education teachers' academic performance. The authors utilized theoretical methods, including a review of literature and sources, content analysis of Coursera online courses, documentary analysis, and empirical methods, such as a pedagogical experiment and scientific observation. Furthermore, statistical methods, including the non-parametric Mann-Whitney U-test, and SPSS Statistics 27.0 software were used to compare the intervention and comparison groups. Eighty-six students of the 1st and 2nd years of study of the educational program "Physical Education and Sport" at Alkey Margulan Pavlodar Pedagogical University participated in this research. Data were analyzed based on the learning outcomes of 6 online courses. As a result, students of the intervention group became more receptive in acquiring soft skills, demonstrated increased adaptability, and exhibited an interest in online educational activities. Following the pedagogical experiment, the academic performance of the intervention group showed an improvement of 9,3 %.

Key words: Coursera platform, physical education, academic performance, online learning, soft skills, university students..

Алимова Шолпан Жанболатовна, Пашканьян Дарья Владимировна, Жакиенова Алия Амангельдиновна

«Дене шынықтыру және спорт» білім беру бағдарламасы бойынша Coursera жобасын жүзеге асыру

Аңдатпа. Coursera заманауи білім беру үрдістеріне және студенттердің оқуға деген көзқарасына оң әсер етеді. Зерттеудің мақсаты – университетте Coursera жобасын енгізу үдерісін сипаттау және оның болашақ дене шынықтыру мұғалімдерінің оқу үлгеріміне әсерін анықтау. Зерттеу барысында авторлар теориялық әдістерді, соның ішінде әдебиеттерге шолуды, Coursera онлайн курстарының мазмұнын талдауды, құжаттарды талдауды және педагогикалық эксперимент пен бақылау сияқты эмпирикалық әдістерді пайдаланды. Сонымен қатар, эксперименттік және бақылау топтарын салыстыру үшін параметрлік емес Манн-Уитни U-критериі және SPSS Statistics 27.0 бағдарламалық құралы сияқты статистикалық әдістер қолданылды. Бұл зерттеуге Әлкей Марғұлан атындағы Павлодар педагогикалық университетінің «Дене шынықтыру және спорт» білім беру бағдарламасының 1-2 курсының 86 студенті қатысты. Ұсынылған деректер 6 онлайн курстың оқу нәтижелері негізінде талданды. Сонымен, эксперименттік топтағы студенттер икемді дағдыларды меңгеруге дайын екендіктерін көрсетті, бейімділік пен онлайн білім беру қызметіне қызығушылық танытты. Педагогикалық эксперименттен кейін эксперименттік топтағы оқу үлгерімі 9,3 %-ға жақсарды.

Түйін сөздер: Coursera платформасы, дене шынықтыру, оқу үлгерімі, онлайн оқыту, soft skills, университет студенттері.

Алимова Шолпан Жанболатовна, Пашканьян Дарья Владимировна, Жакиенова Алия Амангельдиновна

Реализация проекта Coursera на образовательной программе «Физическая культура и спорт»

Аннотация. Платформа Coursera оказывает положительное влияние на современные образовательные практики, а также на отношение студентов к обучению. Целью настоящего исследования является описание процесса внедрения проекта Coursera в образовательный процесс университета и выявление его влияния на академическую успеваемость студентов – будущих учителей физической культуры. В исследовании применялись теоретические методы (обзор литературы, контент-анализ онлайн-курсов Coursera, анализ нормативной документации), а также эмпирические методы, включая педагогический эксперимент и наблюдение. Для статистического анализа данных и сравнения результатов экспериментальной и контрольной групп использовались непараметрический U-критерий Манна–Уитни и программа SPSS Statistics 27.0. В исследовании приняли участие 86 студентов 1–2 курсов образовательной программы «Физическая культура и спорт» Павлодарского педагогического университета имени Әлкей Маргулана. Анализ осуществлялся на основе результатов освоения шести онлайн-курсов. По итогам эксперимента студенты экспериментальной группы продемонстрировали повышение уровня готовности к освоению гибких навыков, проявили адаптивность и заинтересованность в онлайн-обучении. Успеваемость студентов экспериментальной группы улучшилась на 9,3 %.

Ключевые слова: платформа Coursera, физическая культура, академическая успеваемость, онлайн-обучение, soft skills, студенты университета.

Introduction. The widespread use of online courses in recent years is enabling the democratization of education and decreasing long-standing disparities. Massive open online courses (MOOCs) provide short online courses on a specific subject that have virtual enrollment capacity and no enrollment requirements other than access to the Internet. A university, organization, business, or individual that offers one or more MOOCs to learners through private or shared platforms might be considered a MOOC provider [1]. When considering the benefits of online courses, we can highlight aspects such as quick access, flexibility, a diverse range of subjects, and regular updates of content. From the beginning, supporters of MOOCs envisioned a revolutionary change in education where lectures from top educational institutions could be shared with people globally, including those in areas with inadequate local schools and restricted access to conventional education [2]. MOOCs have established a new educational opportunity in regions with less developed education systems; however, despite the availability of free educational resources, participation from individuals in these regions remains low. The explanation provided for this participation gap is that the courses are designed for higher education levels, whereas individuals in underdeveloped areas would benefit from content that is more important [3]. In addition to the challenge of course difficulty, a language barrier also plays a significant role, as the majority of these courses are conducted in English. Therefore, Coursera, the largest provider of MOOCs, was established with the aim of providing access to the best education globally, with courses focused on specific topics that can accommodate nearly unlimited registration and have almost no prerequisites [4].

The relevance of the study is that our research demonstrates the way the online courses incorporate into professional development and learners using Coursera often sing up with the goal of acquiring new skills to improve academic performance and later advance their career goals. These online courses are able to facilitate the spread of crucial elements related the quality improvement, education, enhancing knowledge, attitudes, self-confidence and system thinking in the field of study [5]. Coursera has influenced contemporary learning trends and has altered the way students approach learning. Courses feature reading materials and video resources along with problem-solving activities. Each course also includes a community where participants can engage with one another [6]. One significant aspect of Coursera is that participants have no direct engagement with instructors or fellow learners, resulting in a largely self-directed learning experience [7]. The platform assists individuals in obtaining knowledge independently by providing access to materials created by universities or renowned global companies. Besides gaining knowledge, learners also develop social skills through interactions with peers from various regions in the world. Currently, online learning platforms such as Coursera meet a significant rise in enrollment and become increasingly applicable, with their course certificates receiving greater recognition and value. Many educational institutions on the Coursera platform suggest a verified certificate upon completion, signaling to employers a participant's motivation, willingness to learn, and a set of skills [8].

Coursera provides various e-learning options: brief lectures (no cost, lasting up to 2 hours) courses (free a fee applies if a certificate is requested after completion) specializations (paid and consists of multiple courses and projects) certificates (paid awarded by a university or an educational organization) master track certificates (paid, covers specific modules of master's programs and awarded by a university) and degrees (paid, given by a university and regarded as equivalent to traditional in-person training) [3, p. 105]. One potential way that Coursera could boost career path, aside from gaining skills and improve academic performance, is providing microcredentials from reputable universities. The instructional approaches mainly include information delivery, automated assignments graded by computers, peer evaluations, chapter quizzes, and virtual study groups. The platform monitors the activity details of all students and staff as understanding learning behavior helps identify when participants disengage: after the first week, following the second week, or after viewing the introductory videos [9]. Through collaborations with over 200 universities, the platform offers flexible, job-relevant and free online education to both individuals and organizations. Higher educational institutions in Kazakhstan have integrated the Coursera initiative into the educational process. The initiatives offered by Ministry of Science and Higher Education significantly contribute to the development of students' competencies, including both technical abilities and essential soft skills like communication, teamwork and adaptability. The Coursera global platform enables the Ministry to fulfill its objectives by fostering an environment for growth while playing an active role in developing soft skills [10]. In the project "Coursera Qazaqstan", students should complete the online courses on the Coursera platform to master some competencies and their learning outcomes could also be transferred.

Thus, **the purpose of the study** is to describe the realization process of the Coursera project at the university and define its effect on future physical

education teachers' academic performance. **The objectives of our study** are (1) to identify the initial and final levels of students' academic performance; (2) to outline online courses available on the Coursera selected by students; (3) to determine the effectiveness of these online courses using mathematical statistics.

Materials and methods. In our study, we utilized both qualitative and quantitative research methods. The theoretical section of the article includes a review of literature and sources, content analysis of Coursera online courses, and the empirical section also features a pedagogical experiment. Moreover, methods including scientific observation, documentary analysis, and SPSS Statistics 27.0 software application and non-parametric Mann-Whitney U-test were used in this research [11].

In total, 43 1st and 2nd year students applied for the project "Coursera Qazaqstan" in the first semester of 2023-2024 academic year. Other 43 students, their groupmates were chosen as the participants of a comparison group in our pedagogical experiment. So the experiment involved 86 future physical education teachers. We gathered data from university sources that provided comprehensive details about intervention group students' interaction with Coursera. This encompassed information on whether participants had any activity on the platform if they enrolled in at least one online course, whether they completed a course successfully, and the number of courses they managed to complete.

In this article, we formulated three research questions that hold significant importance to the study:

RQ1 – What is the initial level of academic performance of the students from the intervention group and the comparison group?

RQ2 – Are there any changes in the intervention group students' academic performance after completing online courses?

RQ3 – How effective is the Coursera project for the students of the intervention group?

Results. 43 grants were allocated to the first and second-year students enrolled in the "Physical Education and Sport" educational program. Consequently, 86 1st and 2nd year students took part in the initial stage of the pedagogical experiment. The participants in the experiment were divided into two groups, each consisting 43 students named as the comparison and intervention groups. These two groups were examined based on the midterm test indicators of such general education disciplines as "Information and communication technologies" – 5 credits, "Module of socio-political knowledge (Culture Studies and Psychology)" – 4 credits, "Fundamentals of Economics and Law" – 4 credits, "Entrepreneurial Skills" – 5 credits, all of which were covered during the mentioned academic year period.

Table 1 presents the findings from assessing the academic performance of the comparison group (CG) at the outsets of the pedagogical experiment.

Table 1 – Findings of the comparison group (n=43)

Stage	Academic performance of the comparison group					
	high level		average level		low level	
	number of learners	%	number of learners	%	number of learners	%
Initial stage	4	9.3 %	24	55.8 %	15	34.9 %

The percentage illustrates that students of the comparison group at the initial stage of pedagogical experiment show academic performance in general education disciplines in a low level – 34.9 % or 15 students, in an average level – 55.8 % or 24 learners and in a high level – 9.3 % or 4 students respectively.

Table 2 demonstrates the findings from assessing the academic performance of the intervention group (IG) at the outsets of the pedagogical experiment.

Table 2 – Findings of the intervention group (IG) (n=43)

Stage	Academic performance of the comparison group					
	high level		average level		low level	
	number of learners	%	number of learners	%	number of learners	%
Initial stage	3	6.9 %	23	53.5 %	17	39.6 %

Findings from assessing the academic performance of the intervention group at the initial stage display that students demonstrate their academic achievements in a low level – 39.6 % or 17 learners, in an average level – 53.5 % or 23 students and in a high level – 6.9 % or 3 students.

Mann-Whitney U-test demonstrates that no differences were observed in the key characteristics between intervention and comparison groups during initial stage of the pedagogical experiment.

The criterion of statistical significance is presented as follows:

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

The sum of ranks for the intervention group is 1834, for the comparison group – 1907. The largest sum by F_x=1907 to be considered. We have two hypotheses to set [12].

Defining the value U_{emp} using the suggested formula gives us:

$$U_{emp} = 887$$

Therefore, U_{crit} = p≤0.01 – 654, p≤0.05 – 733. An analysis of the indicators for boundary comparison and intervention groups using Mann-Whitney U-test showed that the calculated empirical value U_{emp} falls within the insignificant range. This means that there are no statistically significant differences in academic performance between two samples and H0 is taken into consideration.

So, our university conducted free Coursera courses for university students including future teachers of physical education. During the development stage of the pedagogical experiment, the students of intervention group (n=43) completed six online courses covering various topics from the platform: “Excel Skills for Data Analytics and Visualization Specialization”, “Effective Problem-Solving and Decision Making”, “AI for Everyone”, “Prompt Engineering for ChatGPT”, “Financial Markets” and “Create and Design Digital Products Using Canva”. In the various categories on Coursera, the Computer and Data Science field gathered the highest number of entries from future physical education teachers with 4 out of 6 courses, followed by Psychology (1 course) focused primarily on problem-solving. Business comes in third place with 1 course where the modules aimed at aligned with the demands a contemporary financial situation. The anticipated weekly time commitment is 5-7 hours. After passing the course, all the materials are available asynchronously in their personal accounts. These online courses were chosen and attended by the intervention group students in multiple languages as well as Russian or Kazakh with English subtitles available (Table 3).

Table 3 – The list of online courses on the Coursera platform chosen by students of the intervention group (n=43)

#	Course title	Course description	Students number and %
1	Excel Skills for Data Analytics and Visualization Specialization	Data analytics and visualization feature in Excel are included among top 10 skills anticipated to experience double-digit demand growth. This course aims to enhance learners’ analytical capabilities, create a wide range of charts, interactive dashboards and explore a new aspect of Excel using PowerPivot, DAX and Get and Transform.	13 (30.2 %)
2	Effective Problem-Solving and Decision Making	The goal of the course is to uncover the underlying cause of any problem. During the course, participants will examine how mindset and personal biases can hinder the creativity in addressing the workplace issues. Learners will analyze different problem-solving styles and creativity-boosting techniques to develop a range of innovative solutions while considering constraints and limited resources.	11 (25.6 %)
3	AI for Everyone	This course provides the definitions of key artificial intelligence (AI) terms, the realistic capabilities and limitations of AI, the experience of creating data science project and machine learning, how to identify opportunities to implement AI, and how to engage with ethical discussions related to AI.	6 (14 %)
4	Prompt Engineering for ChatGPT	This course gives an introduction to the strategies and methods of creating effective prompts for large language models. During the course leaners will possess strong prompt engineering abilities and will good at utilizing language models for numerous tasks in educational context.	5 (11.6 %)

continuation of table 3

5	Financial Markets	The course offers an overview of current practices and an evaluation of future opportunities. An introduction to risk management and behavioral finance concepts to comprehend the practical operations of an insurance and banking system. Learners will acquire fundamental knowledge of financial markets, forecasting, debt, inflation and pricing.	4 (9.3 %)
6	Create and Design Digital Products Using Canva	After passing this course, participants will develop templates for digital products that a deal to be marketed. Learners will find out how to integrate a color palette and images, a multitude number of design elements to create visually appealing products. Producing digital image is an excellent way to illustrate the design expertise and run business without significant financial investments.	4 (9.3 %)

Diverse online courses on the Coursera platform provide different number of modules, videos, readings, assignments, discussion prompts and tests. The course "Excel Skills for Data Analytics and Visualization Specialization" suggested by Macquarie University was chosen by 30.2 % of participants (13 students). It consists of 3 modules. The skills to gain are data analysis software, big data, data visualization, data management and Microsoft Excel. The course is taught in 24 languages and upon completion learners receive a shareable certificate. Rating of the course is 4.8 out of 5.0. The next course is "Effective Problem-Solving and Decision Making" provided by the University of California Irvine was considered by 25.6 % of students (11 learners). It contains 4 module series, 4 videos, 22 readings, 4 assignments and 4 discussion prompts. 97 % of participants liked this course and overall rating is 4.6 points. The third most popular course among future physical education teachers is "AI for Everyone" that Deep Learning AI suggests to the audience. It provides 4 modules, 35 videos, 7 readings and 4 assignments. 6 students or 14 % of intervention group learners chose this course to study. The course rating is 4.8 points. The course titled "Prompt Engineering for ChatGPT" offered by Vanderbilt University ranks fourth among the courses available on the Coursera platform. 5 students out 43 or 11.6 % registered to this course. It contains 6 module series, 38 short videos, 24 readings, 6 assignments. The rating of the course is almost 4.8 scores. The next place takes the course titled "Financial Markets" from Yale University which was attended online by just 4 students (9.3 %). The skills to gain during this course are finance, risk management, innovation and critical thinking. The course provides 7 modules with 130 short videos, 1 reading, 25 assignments, 1 discussion prompt and 1 peer review. The rating of this course by Yale University is 4.8 points. The last and one of the least preferable among future physical education teachers' course is "Create and Design Digital Products Using Canva". The course was selected by only 4 participants of the intervention group or 9.3 %. It is offered by Coursera Project Network. The course has step-by-step instruction to create digital products on Canva and learners put into practice what the instructors teach. The rating of the course is 4.4 points out 5.0.

After organized pedagogical experiment, the information reveals certain changes in intervention group students' academic performance. The comparison group experienced minimal variations at an average level, with only a 4.7 % in midterm test indicators for the mentioned above disciplines.

A comparative table displaying the assessment of academic performance of both comparison and intervention groups at initial and final stages of the experiment (Table 4).

Table 4 – A comparative table of CG and IG at two stages of the experiment

Stage	Comparison group			Intervention group		
	levels in %					
	high	average	low	high	average	low
Initial stage	9.3 %	55.8 %	34.9 %	6.9 %	53.5 %	39.6 %
Final stage	13.9 %	60.5 %	25.6 %	13.9 %	62.8 %	23.3 %
Changes in %	+4.6 %	+ 4.7 %	- 9.3 %	+7.0 %	+ 9.3 %	- 16.3 %

At the final stage of the experiment, the comparison group could not show any significant changes in academic performance based on the statistical process applied to these students. In contrast, the intervention group students exhibited an increase in their average level of academic achievement (Figure 1).

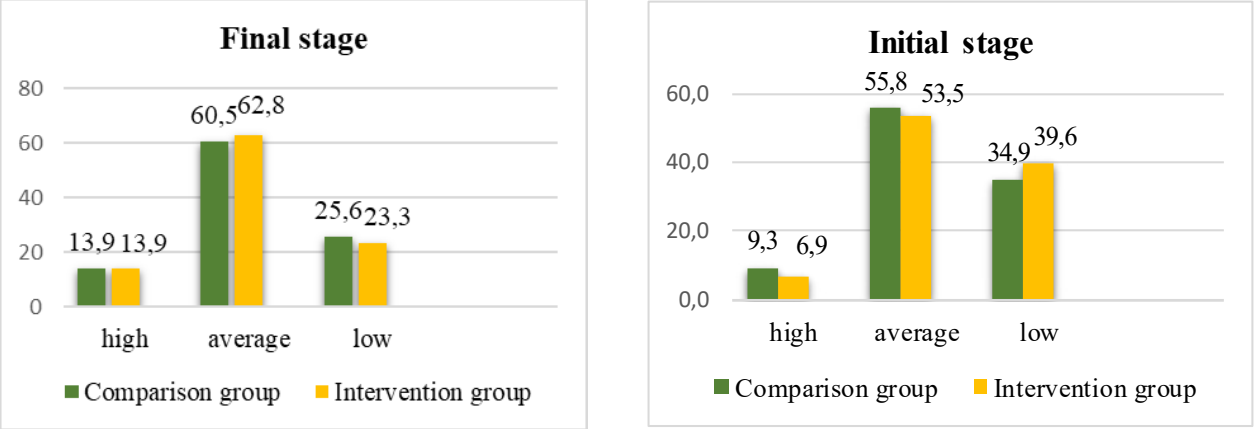

Figure 1 – A comparative figure of CG and IG at two stages of the experiment

Discussion. In response to the first research question: "What is the initial level of academic performance of the students from the intervention group and the comparison group?", we found out that regarding academic performance, the intervention group did not outperform the comparison group based on statistical analysis methods. We accept the null hypothesis H0 based on the outcomes of the non-parametric Mann-Whitney U-test. This indicates that the initial level of academic performance of students of both comparison and intervention groups is essentially similar. In addressing the second research question: "Are there any changes in the intervention group students' academic performance after completing online courses?", the intervention group participants completed six courses on the Coursera platform "Excel Skills for Data Analytics and Visualization Specialization", "Effective Problem-Solving and Decision Making", "AI for Everyone", "Prompt Engineering for ChatGPT", "Financial Markets", and "Create and Design Digital Products Using Canva". The academic performance of the comparison group improved at a high level, increasing from 9.3 % to 13.9 %, which represents a gain of +4.6 %, and +7.0 %, going from 6.9 % to 13.9 % of the intervention group. While the average level rose from 55.8 % to 60.5 %, a gain of +4.7 % of the comparison group and from 53.5 % up to 62.8 %, indicating a rise of +9.3 % in the intervention group. The 3rd research question was posed as "How effective is the Coursera project for the students of the educational program "Physical Education and Sport?". The results of our investigation reveal that participation in the Coursera project benefits students of "Physical Education and Sport" educational program. This benefit is evident not only in their academic performance but also in the enhancement of their soft skills. Students of the intervention group exhibited greater independence, improved communication with peers taking the same online courses and started to offer more feedback. Moreover, the intervention group students were able to transfer some of the credits of the general education disciplines such as "Information and communication technologies", "Module of socio-political knowledge (Culture Studies and Psychology)", "Fundamentals of Economics and Law", "Entrepreneurial Skills". The findings of the study demonstrated that students' academic performance was positively and effectively influenced by participating in the Coursera project. In comparison with other research in the field of education, numerous pedagogical studies explore the incorporation of digital tools to improve learning in various subjects, while other studies tend emphasize the overall effectiveness of e-learning and cognitive involvement [4, p. 570; 7, p. 15; 10, p. 9; 13, p. 105].

Despite the positive results of our study, several limitations should be considered when analyzing the data and planning further research. The pedagogical experiment was conducted only on 1 and 2-year students of a particular educational program, which affects the extent to which the results can be generalized. Future studies should aim to broaden the sample by including students from diverse educational programs and other pedagogical universities to enhance the reliability of the findings. Participation of students in the Coursera project may have stemmed from external motivation, such as encouragement from an adviser or a dean office,

rather than from internal motivation for pursuing these online courses. In future, it is necessary to take into account an assessment of both internal and external motivation levels when evaluating the effectiveness of such projects. While students demonstrated a level of digital literacy with online platforms that was above average, it remains important to offer technical assistance to ensure a successful completion of online courses.

Conclusions. The goal of our study was to describe the realization process of the Coursera project at the university and define its effect on future physical education teachers' academic performance. Our study presents data primarily in the information technology domain and showed enhancement in students' academic performance. Due to partnerships with renowned universities, the Coursera platform ranks first among those seeking high-quality learning. The students of the intervention group finished the following six online courses: "Excel Skills for Data Analytics and Visualization, Specialization", "Effective Problem-Solving and Decision Making", "AI for Everyone", "Prompt Engineering for ChatGPT", "Financial Markets", and "Create and Design Digital Products Using Canva". Upon completion their online courses the students of the IG showcased the skills they had acquired during the mid-term period in various theoretical disciplines such as "Information and communication technologies", "Module of socio-political knowledge (Culture Studies and Psychology) "Fundamentals of Economics and Law", "Entrepreneurial Skills". These students could manage to transfer some of the credits of the presented subjects. Students of the intervention group have become more receptive in acquiring soft skills, demonstrated increased adaptability, exhibited an interest in online educational activities. Following pedagogical experiment, the academic performance of the comparison group rose by 4.7 %, while the intervention group showed an improvement of 9.3 %. In later stages of the research, it is planned to conduct a longitudinal study focused on evaluating the persistence of the outcomes attained, including students' academic achievements.

Our research showed that utilizing the Coursera platform can improve students' academic performance and autonomy. The results discussed in this article might be applicable to other fields of subject in non-formal education. Learners of this educational program have adjusted effectively to online learning, proving that Coursera tools and methods are highly adaptable for students of other specialties. The recommendation following the realization of the Coursera project at a regional pedagogical university is to select online courses that foster not only soft skills but professional skills as well. It is also essential to expand the number of educational disciplines to transfer the credits of online courses on the Coursera platform from reputable universities, facilitating integrating and validating these courses with acknowledgment of gained skills and learning outcomes.

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Хат-хабарларға арналған автор (бірінші автор)	**Автор для корреспонденции (первый автор)**	**The Author for Correspondence (The First Author)**
Алимова Шолпан Жанболатовна – PhD, қауымдастырылған профессор, Әлкей Марғұлан атындағы Павлодар педагогикалық университеті, Павлодар, Қазақстан, e-mail: sholpan_alimova@mail.ru, ORCID ID: https://orcid.org/0000-0003-4254-1932	Алимова Шолпан Жанболатовна – PhD, ассоциированный профессор, Павлодарский педагогический университет имени Әлкей Марғұлан, Павлодар, Казахстан, e-mail: sholpan_alimova@mail.ru, ORCID ID: https://orcid.org/0000-0003-4254-1932	Alimova Sholpan Zhanbolatovna – PhD, associate professor, Alkey Margulan Pavlodar pedagogical university, Pavlodar, Kazakhstan, e-mail: sholpan_alimova@mail.ru, ORCID ID: https://orcid.org/0000-0003-4254-1932

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