

IRSTI 14.35.07

UDC 378.2

<https://doi.org/10.52269/SEPT2632022>

### FUTURE TEACHERS' ENTREPRENEURIAL INTENTIONS IN EDUCATION: BARRIERS AND OPPORTUNITIES OF ARTIFICIAL INTELLIGENCE

*Abykenova D.B. – PhD, Professor, Alkey Margulan Pavlodar Pedagogical University, Pavlodar, Republic of Kazakhstan.*

*Abildinova G.M. – Candidate of Pedagogical Sciences, Associate Professor, Department of computer sciences, L.N. Gumilyov Eurasian National University, Astana, Republic of Kazakhstan.*

*Zhanaidarov B.B. – PhD student, Alkey Margulan Pavlodar Pedagogical University, Pavlodar, Republic of Kazakhstan.*

*Kultenova M.T.\* – PhD student, L.N. Gumilyov Eurasian National University, Astana, Republic of Kazakhstan.*

*This research investigates the link between AI literacy and the entrepreneurial intentions of future teachers in the context of digitalization of education. It aims to address the systemic discrepancy between the growing possibilities of using generative AI to create educational products and the insufficient inclusion of entrepreneurial skills in traditional teacher education courses, especially in post-Soviet countries. A cross-sectional online survey was administered to a cohort of students of A. Margulan Pavlodar Pedagogical University (N = 100), using the author's questionnaire assessing AI literacy, entrepreneurial intentions and barriers. Methods such as descriptive statistics, reliability testing, principal component analysis, Spearman rank correlation, and exploratory group comparisons were used. Mean scores for AI literacy and entrepreneurial intentions were 4.12 (SD = 0.83) and 3.81 (SD = 1.09), respectively. A moderate positive correlation was found between these constructs ( $\rho = 0.398$ ,  $p < 0.001$ ). A preliminary comparison of the groups showed that students who were fully or partially employed in the field of education had higher entrepreneurial-intention scores. The most common obstacle was a lack of marketing/sales skills (59%). The results indicate the need for further study of interdisciplinary modules related to the ethical application of artificial intelligence, educational product development, marketing and entrepreneurship in the context of teacher education. Given the cross-sectional design and reliance on self-reported data, the study does not allow predicting, establishing cause-and-effect relationships, or identifying entrepreneurial behavior.*

**Key words:** AI literacy, entrepreneurial intentions, future teachers, educational products, teacher training.

### БОЛАШАҚ МҒАЛІМДЕРДІҢ БІЛІМ БЕРУДЕГІ КӘСІПКЕРЛІК НИЕТТЕРІ: ЖАСАНДЫ ИНТЕЛЛЕКТ МҮМКІНДІКТЕРІ МЕН КЕДЕРГІЛЕРІ

*Абыкенова Д.Б. – PhD, профессор, Әлкей Марғұлан атындағы Павлодар педагогикалық университеті, Павлодар қ., Қазақстан Республикасы.*

*Абильдинова Г.М. – педагогика ғылымдарының кандидаты, Информатика кафедрасының қауымдастырылған профессоры Л.Н. Гумилев атындағы Еуразия ұлттық университеті, Астана қ., Қазақстан Республикасы.*

*Жанайдаров Б.Б. – PhD докторанты, Әлкей Марғұлан атындағы Павлодар педагогикалық университеті, Павлодар қ., Қазақстан Республикасы.*

*Култеннова М.Т.\* – PhD докторанты, Л.Н. Гумилев атындағы Еуразия ұлттық университеті, Астана қ., Қазақстан Республикасы.*

*Бұл зерттеу білім беруді цифрландыру жағдайында жасанды интеллекттегі сауаттылық деңгейі мен болашақ мұғалімдердің кәсіпкерлік ниеттері арасындағы байланысты зерттейді. Бұл зерттеу білім беру өнімдерін жасау үшін генеративті Жасанды Интеллекттің пайдаланудың өсіп келе жатқан мүмкіндіктері мен дәстүрлі педагогикалық білім беру курстарына, әсіресе посткеңестік елдерге кәсіпкерлік дағдыларды жеткіліксіз енгізу арасындағы бар алшақтықты жою әрекеті болып табылады. А.Марғұлан Атындағы Павлодар Педагогикалық Университетінің студенттеріне кіріспе секциялық онлайн сауалнама (N = 100) жасанды интеллект саласындағы сауаттылық, кәсіпкерлік ниеттер мен кедергілер тақырыптары бойынша авторлық сауалнаманы пайдалана отырып жүргізілді. Сипаттамалық статистика, сенімділікті тексеру, зерттеу факторларын талдау, Спирмен дәрежесінің корреляциясы және зерттеу топтарын салыстыру сияқты әдістер қолданылды. Жасанды интеллект және кәсіпкерлік ниет саласындағы сауаттылықтың орташа мәні сәйкесінше 4,12 (SD = 0,83) және 3,81 (SD = 1,09) құрады. Осы конструкциялар арасында орташа оң корреляция табылды ( $\rho = 0.398$ ,  $p < 0.001$ ). Топтарды алдын-ала салыстыру көрсеткендей, білім беру саласында толық немесе ішінара жұмыспен қамтылған студенттердің кәсіпкерлік ниеттерінің деңгейі едәуір жоғары болған. Ең жиі кездесетін кедергі маркетинг/сату дағдыларының*

жетіспеушілігі болды (59%). Нәтижелер жасанды интеллектті этикалық қолдануға, білім беру өнімдерін әзірлеуге, маркетингке және кәсіпкерлікке қатысты пәнаралық модульдерді педагогикалық білім беру контекстінде одан әрі зерттеу қажеттілігін көрсетеді. Кросс-талдау мен өзіндік есептерді қолданудың арқасында зерттеу болжауға, себеп-салдарлық қатынастарды орнатуға немесе кәсіпкерлік мінез-құлықты анықтауға мүмкіндік бермейді.

**Түйінді сөздер:** жасанды интеллект сауаттылығы, кәсіпкерлік ниеттер, болашақ мұғалімдер, білім беру өнімдері, педагогтерді даярлау.

#### ПРЕДПРИНИМАТЕЛЬСКИЕ НАМЕРЕНИЯ БУДУЩИХ ПЕДАГОГОВ В ОБРАЗОВАНИИ: БАРЬЕРЫ И ВОЗМОЖНОСТИ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

Абыкенова Д.Б. – PhD, профессор, Павлодарский педагогический университет имени Әлкей Марғұлан, г. Павлодар, Республика Казахстан.

Абильдинова Г.М. – кандидат педагогических наук, ассоциированный профессор кафедры информатики, Евразийский национальный университет имени Л.Н. Гумилева, г. Астана, Республика Казахстан.

Жанайдаров Б.Б. – PhD докторант, Павлодарский педагогический университет имени Әлкей Марғұлан, г. Павлодар, Республика Казахстан.

Култеннова М.Т.\* – PhD докторант, Евразийский национальный университет имени Л.Н. Гумилева, г. Астана, Республика Казахстан.

В данном исследовании исследуется взаимосвязь между уровнем грамотности в области искусственного интеллекта и предпринимательскими намерениями будущих учителей в контексте цифровизации образования. Это исследование является попыткой преодолеть существующий разрыв между растущими возможностями использования генеративного ИИ для создания образовательных продуктов и недостаточным включением предпринимательских навыков в традиционные курсы подготовки учителей, особенно в постсоветских странах. Поперечный онлайн-опрос студентов Павлодарского педагогического университета им. А. Марғұлана ( $N = 100$ ) был проведен с использованием авторской анкеты на темы грамотности в области искусственного интеллекта, предпринимательских намерений и барьеров. Были использованы такие методы, как описательная статистика, тестирование надежности, исследовательский факторный анализ, ранговая корреляция Спирмена и исследовательские групповые сравнения. Средние значения грамотности в области искусственного интеллекта и предпринимательских намерений составили 4,12 ( $SD = 0,83$ ) и 3,81 ( $SD = 1,09$ ) соответственно. Между этими конструктами была обнаружена умеренная положительная корреляция ( $\rho = 0.398$ ,  $p < 0.001$ ). Предварительное сравнение групп показало, что студенты, которые были полностью или частично заняты в сфере образования, имели значительно более высокие показатели предпринимательских намерений. Наиболее распространенным препятствием было отсутствие навыков маркетинга/продаж (59%). Полученные результаты указывают на необходимость дальнейшего изучения междисциплинарных модулей, связанных с этическим применением искусственного интеллекта, разработкой образовательных продуктов, маркетингом и предпринимательством в контексте педагогического образования. Ввиду поперечного дизайна и использования данных самоотчета исследование не позволяет прогнозировать, устанавливать причинно-следственные связи или выявлять предпринимательское поведение.

**Ключевые слова:** грамотность в области искусственного интеллекта, предпринимательские намерения, будущие учителя, образовательные продукты, подготовка педагогов.

**Introduction.** The modern education system is undergoing a fundamental transformation driven by digitalization and AI implementation. Correspondingly, the EdTech sector is experiencing consistent expansion, personalized online courses, digital materials, and tutoring platforms comprise a significant share of the sector. We aim to empower educators to move from the role of traditional knowledge facilitators to the role of innovative content creators thereby allowing them to not only to act as knowledge conveyors but also as content creators, generating income by developing their own courses, digital materials, and engaging with social media.

At the same time, the standard requirements for teacher education in Kazakhstan, as in some other former Soviet states, pay little attention to entrepreneurial skills. However, generative artificial intelligence can be used to create presentations, lesson plans, assessment tools, visualizations, online course elements, educational materials, and educational media. Within the framework of this study, the results of the use of artificial intelligence, which correspond to certain educational needs and are aimed at distribution, distribution, exchange or sale, are considered educational products. Creating educational material using AI is not considered an entrepreneurial activity. Using AI to reduce production time is just one of the requirements for creating an educational product or service.

Recent research has identified that AI literacy is one of the most important competencies of future teachers [1]. Wang et al. proposed and verified a model of teacher readiness for AI, revealing the relation-

ship between AI readiness, threat perception, and innovation [2]. Kohnke et al. the ambivalence of the student-teachers' attitude to AI technologies has been revealed due to their perception of the potential of AI in individualized learning along with ethical and addiction problems [3]. Sperling et al. stated that there is no complete picture of teachers' professional knowledge in terms of AI literacy research [4].

Another aspect of how AI literacy affects students' entrepreneurial intentions was also explored. In particular, Weng et al. highlighted the advantages of learning entrepreneurship using artificial intelligence, such as the availability of information resources and personalization of experience, as well as disadvantages such as inaccurate data and lack of personal contact [5]. Vecchiarini and Somia argued that generative AI can help in generating ideas and optimizing the process, provided that the results are critically evaluated [6]. According to Şat and Le et al., attitudes towards artificial intelligence technologies, their acceptance, and self-efficacy improve after educational interventions [7, 8]. A study by Quishpe-Quishpe and co-authors. It turned out that contextual AI and entrepreneurial learning contribute to digital and entrepreneurial learning [9], whereas Celik et al. examines the systemic implementation hurdles and multifaceted challenges inherent in AI adoption [10]. In this investigation entrepreneurial intention is operationally defined as a student's latent interest and proactive willingness to conceptualize and commercialize educational assets. Entrepreneurial readiness is a broader concept that includes competencies and resources; entrepreneurial readiness is a state in which a person is ready to act; entrepreneurial behavior implies actions that have already been taken.

When it comes to the landscape of Kazakhstan, the research before has primarily focused on enhancing AI literacy or digital competence in specific fields, while the entrepreneurial aspects and marketing of developing educational products using artificial intelligence were not given sufficient attention. From the point of view of interpretation of intention and behavior, as well as the relationship of the former with attitudes, subjective norms and perceived behavioral control, finds its theoretical grounding in the theory of planned behavior [11]. Unlike the proven TPB model, the scale created by the author does not repeat it; therefore, it is considered an indicator of entrepreneurial intentions for research.

This investigation **aims** to examine the prevailing entrepreneurial intentions among the student cohort by focusing on tangible obstacles that restrain students from commercializing their educational ideas.

Research questions:

1. What is the level of self-assessment of AI literacy and entrepreneurial intentions of the participating students?
2. Is self-reported AI literacy associated with entrepreneurial intentions to develop and promote educational products?
3. What are the barriers preventing the creation and sale of educational products among future teachers?

The research went through theoretical, methodological and empirical stages. At the first stage, a modern approach to the problem of AI literacy and entrepreneurial intentions in teacher education was discussed and analyzed. Then the author developed a questionnaire and a statistical analysis methodology. In the next stage, the AI literacy and entrepreneurial intentions were measured, the correlation between AI literacy and entrepreneurial intentions was evaluated, and a research analysis was carried out depending on employment.

## **Materials and methods**

### *Research Design*

The present research employs a quantitative cross-sectional online survey methodology. The observation methodology allows for descriptive and associative research, but does not allow for causal or predictive conclusions.

### *Sample and Method of Data Gathering*

The survey was conducted online from October to December 2025 at Pavlodar Pedagogical University named after A. Margulan. The link to the questionnaire was provided through student discussion groups. Participation in the survey was completely voluntary and anonymous, and the respondents were informed about the objectives of the survey and the participants' right to opt out of the study. The final analysis was based on 100 questionnaires meeting pre-defined inclusion criteria, which include completing all seven questions about AI literacy and all four questions about entrepreneurial intentions, with one answer from each respondent and answers falling within the specified range.

### *Instrumentation of Research*

The author's questionnaire consisted of five sections: (1) demographic information; (2) seven questions about previous experience with AI (Yes/No/Not sure); (3) seven items score on a five-point Likert scale assessing AI literacy; (4) four items score on a five-point Likert scale assessing entrepreneurial intentions; and (5) multiple choice questions about the use of artificial intelligence, its tools, advantages, risks, barriers, opportunities, and preferred learning format. The questions in the section "AI Literacy" concerned knowledge about AI tools, voluntary use of AI, use for studying, awareness of possible mistakes, willingness to use AI for personalization, trust in AI results, and ethical use of AI. Examples include questions such as "I know that AI can make mistakes and requires verification" and "It is important to me that AI is used ethically in education." Questions about entrepreneurial intentions related to the importance of content pro-

motion, interest in marketing and entrepreneurship, readiness for integrated learning activities, and inclusion in the curriculum. The questions about the experience of working with AI were descriptive in nature and were not combined with the Likert-scale items. Composite mean scores were computed for seven questions about AI literacy and four questions about entrepreneurial intentions. The selection of elements for inclusion was made in accordance with the purpose of the study and using a retrospective comparison of constructs with elements. A review of potential and independent experts and a pilot study have not been conducted, so the tools are considered exploratory in nature.

#### *Statistical Processing*

The data was analyzed using SPSS. The internal consistency of the AI literacy scale (Cronbach's  $\alpha = 0.892$ ) and the entrepreneurial intent scale ( $\alpha = 0.929$ ) were calculated independently. The value  $\alpha = 0.557$  was calculated using an incompatible response format and, therefore, was not included in the analysis. A preliminary analysis of the main components was carried out based on the correlation matrix. Adequacy of the sample for AI literacy (KMO = 0.886;  $\chi^2(21)$  Bartlett = 386.43,  $p < 0.001$ ) and entrepreneurial intentions (KMO = 0.836; Coefficient  $\chi^2(6)$  Bartlett = 329.52,  $p < 0.001$ ) were considered acceptable. One component was allocated for each scale using eigenvalues exceeding 1 and the scree plot criterion. There was no rotation. The components accounted for 61.85% and 82.45% of the variance at component loadings in the range of 0.628–0.895 and 0.852–0.934, respectively.

Descriptive statistics provided an overview of the sample and variables used in the study. Spearman's rank correlation coefficient ( $\rho$ ) was used to measure the relationship between AI literacy and entrepreneurial intentions. The comparison of employment status was preliminary, as the number of people engaged in education was relatively small. Due to the unequal size of the groups, the Welch t-test was applied, and the Mann-Whitney U-test was applied to test reliability. The magnitude of the effect was estimated using Cohen's d-coefficient. Two-sided tests were performed at  $\alpha = 0.05$ . Age, education level, specialty, and previous work experience were not taken into account.

#### *Ethical Aspects*

The research met ethical principles of the Declaration of Helsinki. Research participants were explained its purpose, provided the information about their anonymity, and informed about their right to refuse to participate. The data were anonymized.

#### *Limitations*

Limitations of the study include the use of a single-institution sample, self-reporting, and a cross-sectional research design. Moreover, the questionnaire developed by the author was not independently analyzed by experts before conducting the study, and, therefore, additional validation in another sample is necessary to verify the factor structure of the questionnaire. The study did not evaluate either entrepreneurial behavior or entrepreneurial willingness. The sample of people working in the field of education was small ( $n = 17$ ).

### **Results and discussion.**

#### *Sample Description*

The analysis was performed on 100 complete records in chronological order in a spreadsheet. The demographic profile is presented in table 1 below.

Table 1 – Demographics of the sample (N = 100)

| Sign              | Category                                   | n  | %  |
|-------------------|--------------------------------------------|----|----|
| Gender            | Female                                     | 63 | 63 |
|                   | Male                                       | 37 | 37 |
| Age               | 17–20 years old                            | 69 | 69 |
|                   | 21–24 years old                            | 19 | 19 |
|                   | 25–30 years old                            | 3  | 3  |
|                   | Over 31 years old                          | 9  | 9  |
| Course            | 1st year                                   | 31 | 31 |
|                   | 2nd year                                   | 13 | 13 |
|                   | 3rd year                                   | 34 | 34 |
|                   | 4th year                                   | 7  | 7  |
|                   | Master's Degree                            | 6  | 6  |
|                   | Doctoral Degree                            | 9  | 9  |
| Employment status | I'm still studying                         | 58 | 58 |
|                   | Studying and working outside my field      | 25 | 25 |
|                   | Studying and working in education          | 17 | 17 |
| Direction         | Pedagogical sciences                       | 19 | 19 |
|                   | Humanities and arts                        | 38 | 38 |
|                   | Natural and physical-mathematical sciences | 24 | 24 |
| Direction         | Technical sciences and informatics         | 16 | 16 |
| Direction         | Physical culture and sport                 | 3  | 3  |

Female participants constituted 63% of the total cohort of the respondents; 69% were aged between 17 and 20 years, while 34% were third-year students. The majority of participants were 58% not employed and studying at the same time, while 17% were working in the education sector.

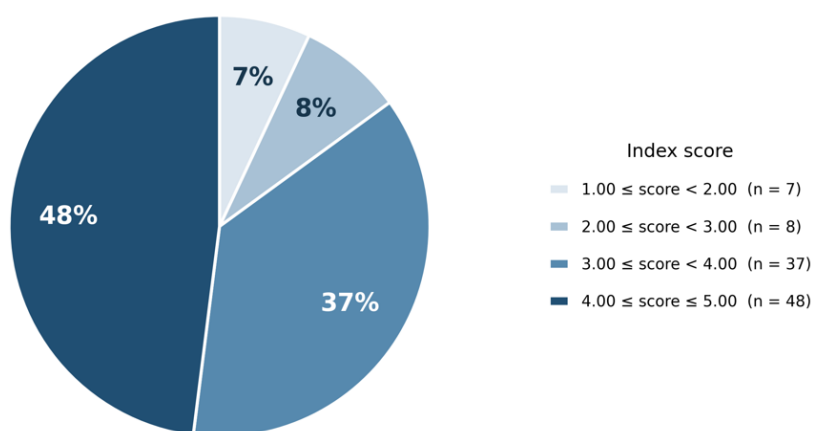
#### *Descriptive Statistics of Key Variables*

The descriptive statistics for both composite scores are presented in Table 2. The questions pertaining to AI experience are not included in the AI literacy index because they are categorical in nature.

*Table 2 – Descriptive Statistics of Key Variables*

| Value                                            | M     | SD    | Min  | Max  | Median | Asymmetry | Excess |
|--------------------------------------------------|-------|-------|------|------|--------|-----------|--------|
| AI Literacy Index                                | 4.121 | 0.827 | 1.00 | 5.00 | 4.214  | –         | –      |
| Entrepreneurial Intention Index                  | 3.805 | 1.089 | 1.00 | 5.00 | 3.875  | –         | –      |
| Generation Readiness for AI                      | 3.706 | 0.921 | 1.00 | 5.00 | 3.800  | –         | –      |
| Number of Learning Tasks Selected                | 4.330 | 2.441 | 1    | 10   | 4.000  | –         | –      |
| Number of AI Tools Selected                      | 7.450 | 3.013 | 1    | 15   | 7.000  | –         | –      |
| Number of AI Benefits Selected                   | 3.320 | 1.669 | 1    | 7    | 3.000  | –         | –      |
| Number of AI Risks Selected                      | 4.640 | 2.023 | 1    | 10   | 5.000  | –         | –      |
| Number of AI Skills Selected                     | 3.810 | 1.947 | 1    | 8    | 4.000  | –         | –      |
| Number of Barriers Selected                      | 2.540 | 1.193 | 1    | 6    | 3.000  | –         | –      |
| Number of Entrepreneurial Opportunities Selected | 3.720 | 1.902 | 1    | 9    | 4.000  | –         | –      |
| Number of Learning Formats Selected              | 2.350 | 1.306 | 1    | 6    | 2.000  | –         | –      |

The mean self-reported AI literacy score was 4.12 (SD=0.83), while the mean entrepreneurial intention score was 3.81 (SD=1.09). The above figures refer to the current sample and are not externally normed diagnostic levels. Figure 1 shows the actual distribution of points based on entrepreneurial intentions. Figure 1 shows an approximate distribution and does not measure actual entrepreneurial behavior.



*Figure 1 – Distribution of the Entrepreneurial-Intention Index*

#### *Scale Reliability and Exploratory Construct Evidence*

The alpha reliability coefficient for the AI literacy scale, which consisted of seven items, was 0.892, while for the entrepreneurial intentions scale, which consisted of four items, it was 0.929. The previous value,  $\alpha = 0.557$ , was false due to the inclusion of a contradictory response format and, therefore, was not taken into account.

#### *Exploratory Component Analysis*

KMO and Bartlett's tests indicated adequate factorability for both scales. One component with an eigenvalue greater than 1 was retained for each scale, and no rotation was applied because each solution contained one component.

*Table 3 – Exploratory Principal Component Analysis*

| Scale                      | KMO   | Bartlett $\chi^2$ (df) | p      | Variance explained | Loading range |
|----------------------------|-------|------------------------|--------|--------------------|---------------|
| AI literacy                | 0.886 | 386.43 (21)            | <0.001 | 61.85%             | 0.628–0.895   |
| Entrepreneurial intentions | 0.836 | 329.52 (6)             | <0.001 | 82.45%             | 0.852–0.934   |

### Association Analysis

Spearman's correlation revealed the existence of a moderate positive association between self-perceived AI literacy and entrepreneurial intentions ( $p = 0.398$ ,  $p < 0.001$ ). Those participants who exhibited higher self-perceived AI literacy were more likely to possess stronger entrepreneurial intentions. While the observed correlation identifies a significant link, the cross-sectional nature of the data excludes any definitive causal or predictive inferences. This finding corroborates the previous findings concerning the association of AI competencies with innovation learning [12-14].

### Exploratory Comparison by Employment Status

The comparison was made between the entrepreneurial-intention scores of students who studied entirely or partially in the field of education ( $n = 17$ ) and the scores of the rest of the students ( $n = 83$ ).

Table 4 – Exploratory Comparison of Entrepreneurial Intentions by Employment Status

| Group                               | n  | M    | SD   | Welch p | Mann–Whitney p | Cohen's d |
|-------------------------------------|----|------|------|---------|----------------|-----------|
| Not working in education            | 83 | 3.70 | 1.13 | 0.007   | 0.042          | 0.57      |
| Working wholly/ partly in education | 17 | 4.31 | 0.72 |         |                |           |

Entrepreneurial intention was higher for those who worked fully or partially in education ( $M = 4.31$ ,  $SD = 0.72$ ) than for others ( $M = 3.70$ ,  $SD = 1.13$ ), with Welch's t-test showing  $p = 0.007$ , characterized by a moderate effect size (Cohen's  $d = 0.57$ ), which indicates a substantial practical impact. In addition, the Mann-Whitney robustness test showed a significant difference ( $U = 924.5$ ,  $p = 0.042$ ). Since the sample sizes were low and non-equivalent, and since no potential confounders were controlled, the difference cannot be attributed to employment itself.

Table 5 – Frequency of Perceived Barriers to Educational Entrepreneurship

| Barrier                                        | % of those who chose |
|------------------------------------------------|----------------------|
| Lack of marketing and sales knowledge          | 59                   |
| Lack of start-up capital                       | 47                   |
| Uncertainty about demand for services/products | 44                   |
| Lack of time                                   | 44                   |
| Difficulty choosing digital platforms          | 24                   |
| Lack of self-confidence                        | 1                    |
| Regulatory barriers                            | 19                   |
| I don't see the need                           | 13                   |
| Already operating/no barriers                  | 1                    |

The most common barrier identified was insufficient marketing and sales skills (59%), followed by insufficient startup capital (47%), time constraints (44%), and uncertainty about market demand (44%). Such frequencies reflect perceptions of the respondents but not necessarily an overall deficit in the system. Nevertheless, the findings suggest that teacher education programmes may examine modules that teach ethical use of AI, needs assessment, product development, marketing, and entrepreneurship.

### Readiness for an Additional Interview

On the question of readiness to participate in another interview, 47% answered “yes,” 23% answered “no,” and 30% expressed a possibility of participation depending on the clarification. This recruitment question was approached from a descriptive perspective and could not be used as reflection, communication skills, or entrepreneurship since none of these concepts were addressed.

### Limitations and Future Perspectives

The future research will require validating the exploratory scales through prospective expert reviews, cognitive interviewing, piloting, factor analysis with an independent multi-university sample, and measurement invariance testing. It is necessary to conduct longitudinal or experimental studies in order to test whether learning how to ethically use AI, design educational products, marketing, or entrepreneurship influences intentions or behavior. It is important to separate product development and entrepreneurship from intention measures.

**Conclusion.** In summary, the present findings reveal a moderate positive association between the level of students' perceived AI literacy and their entrepreneurial intentions ( $p = 0.398$ ,  $p < 0.001$ ). In the exploratory analysis, higher mean scores on intention were observed for the students employed in the education field; yet, it is too early to claim that the difference can be attributed to the job type due to small and non-equivalent samples. Inability to apply proper knowledge related to the marketing and sales of the product/service was recognized as the most prevalent barrier (59%).

**Acknowledgement.** This article was prepared within the framework of the project «The use of artificial intelligence to create educational content: opportunities and challenges for future educators in the digital

media space», funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan (grant № AP26195083).

The authors would like to express their gratitude to Gulsum Khassenova, an undergraduate student in Accounting with AI at the Maqsut Narikbayev University (MNU), for her valuable assistance with the English language editing and translation of this manuscript.

**Conflict of interest:** The authors declare no conflict of interest.

#### REFERENCES:

- 1 Özüdogru G., Durak H.Y. Conceptualizing pre-service teachers' artificial intelligence readiness and examining its relationship with various variables: The role of artificial intelligence literacy, digital citizenship, artificial intelligence-enhanced innovation and perceived threats from artificial intelligence. *Information Development*, 2025, vol. 41, no. 3, pp. 916-932. <https://doi.org/10.1177/02666669251335657>.
- 2 Wang X., et al. Preparing for AI-enhanced education: Conceptualizing and empirically examining teachers' AI readiness. *Computers in Human Behavior*, 2023, vol. 146, art. 107798. <https://doi.org/10.1016/j.chb.2023.107798>.
- 3 Kohnke L., Zou D., Ou A.W., Gu M. Preparing future educators for AI-enhanced classrooms: Insights into AI literacy and integration. *Computers and Education: Artificial Intelligence*, 2025, vol. 8, art. 100398. <https://doi.org/10.1016/j.caeai.2025.100398>.
- 4 Sperling K., et al. In search of artificial intelligence (AI) literacy in Teacher Education: A scoping review. *Computers and Education Open*, 2024, vol. 6, art. 100169. <https://doi.org/10.1016/j.caeo.2024.100169>.
- 5 Weng X., Gu M., Xia Q., Chiu, T. SWOT analysis of AI empowered entrepreneurship education: Insights from digital learners in higher education. *Thinking Skills and Creativity*, 2025, vol. 56, art. 101763. <https://doi.org/10.1016/j.tsc.2025.101763>.
- 6 Vecchiarini M., Somià T. Redefining entrepreneurship education in the age of artificial intelligence: An explorative analysis. *The International Journal of Management Education*, 2023, vol. 21(3), art. 100879. <https://doi.org/10.1016/j.ijme.2023.100879>.
- 7 Şat M. The impact of AI integration in project preparation in education course on pre-service teachers' innovativeness, AI anxiety, attitudes, and acceptance. *BMC Psychology*, 2025, vol. 13, art. 1297. <https://doi.org/10.1186/s40359-025-03647-3>.
- 8 Le T.H., et al. Development and evaluation of artificial intelligence literacy training for teacher education students. *British Journal of Educational Technology*, 2026, pp. 1-32. <https://doi.org/10.1111/bjet.70047>.
- 9 Quishpe-Quishpe L., et al. Impact of a contextualized AI and entrepreneurship-based training program on teacher learning in the ecuadorian amazon. *Sustainability*, 2025, vol. 17(19), art. 8850. <https://doi.org/10.3390/su17198850>.
- 10 Celik I., Dindar M., Muukkonen H., Järvelä S. The promises and challenges of Artificial Intelligence for teachers: a Systematic review of research. *TechTrends*, 2022, vol. 66, pp. 616-630. <https://doi.org/10.1007/s11528-022-00715-y>.
- 11 Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 1991, vol. 50(2), pp. 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T).
- 12 Kariev A., Mambetalieva A., Turalbaeva A., Manabaeva S.E. Zhasandy intellekt negizinde bolashak bastauysh synyp mugalimderinin tildik kuzyrettilikterin kalyptastyrudyn modeli [A model for the formation of language competencies of future primary school teachers based on artificial intelligence]. *Abaj atyndagy KazUPU Habarshysy. Pedagogika gylymdary seriyasy*, 2025, vol. 87(3), pp. 223-236. <https://doi.org/10.51889/2959-5762.2025.87.3.020>. (In Kazakh)
- 13 Muslimova A., Elubaeva P. K., Tulegenova M. The impact of artificial intelligence tools on the development of communicative competence of high school students in the process of learning English. *3i: intellect, idea, innovation*, 2026, vol. 2, no. 1, pp. 194-204. <https://doi.org/10.52269/SRDG2612194>.
- 14 Hyrhynbaj Zh., et al. Bilim beru zhujesinde zhasandy intellektini koldanu [Use of artificial intelligence in the education system]. *Abaj atyndagy KazUPU Habarshysy. Pedagogika gylymdary seriyasy*, 2025, vol. 85, no. 1, pp. 53-61. <https://doi.org/10.51889/2959-5762.2025.85.1.006>. (In Kazakh)

**Received:** 27 June 2026. **Accepted:** 28 August 2026. **Published:** 30 September 2026.

#### Information about the authors:

Abykenova Dariya Bolatovna – PhD, Professor, Alkey Margulan Pavlodar Pedagogical University, Republic of Kazakhstan, 140000, Pavlodar, 60 Olzhabay Batyr Str., tel.: +77774181483, e-mail: [abykenovad@ppu.edu.kz](mailto:abykenovad@ppu.edu.kz).

Abildinova Gulmira Maratovna – Candidate of Pedagogical Sciences, Associate Professor of the Department of computer science, L.N Gumilyov Eurasian National University, Republic of Kazakhstan, 010000, Astana, 11 Pushkin Str., tel.: +77753340708, e-mail: gulmira\_2181@mail.ru.

Zhanaidarov Batyrkhan Beissengaliyevich – PhD student, Alkey Margulan Pavlodar Pedagogical University, Republic of Kazakhstan, 140000, Pavlodar, 60 Olzhabay Batyr Str., tel.: +77056314268, e-mail: batyrkhan97@gmail.com.

Kultenova Makhabbat Tulegenovna\* – PhD student, L.N. Gumilyov Eurasian National University, Republic of Kazakhstan, 010000, Astana, 11 Pushkin Str., tel.: +77085521100, e-mail: maxabbat.k@mail.ru.

Абыкенова Дария Болатовна – PhD, профессор, Әлкей Марғұлан атындағы Павлодар педагогикалық университеті, Қазақстан Республикасы, 140000 Павлодар қ., Олжабай Батыр көш. 60, тел.: +77774181483, e-mail: abykenovad@ppu.edu.kz.

Абильдинова Гульмира Маратовна – педагогика ғылымдарының кандидаты, Информатика кафедрасының қауымдастырылған профессоры, Л.Н. Гумилев атындағы Еуразия ұлттық университеті, Қазақстан Республикасы, 010000 Астана қ., Пушкин көш. 11, тел.: +77753340708, e-mail: gulmira\_2181@mail.ru.

Жанайдаров Батырхан Бейсенғалиевич – PhD докторанты, Әлкей Марғұлан атындағы Павлодар педагогикалық университеті, Қазақстан Республикасы, 140000 Павлодар қ., Олжабай Батыр көш. 60, тел.: +77056314268, e-mail: batyrkhan97@gmail.com.

Культепова Махаббат Тулегеновна\* – PhD докторанты, Л.Н. Гумилев атындағы Еуразия ұлттық университеті, Қазақстан Республикасы, 010000 Астана қ., Пушкин көш. 11, тел.: +77085521100, e-mail: maxabbat.k@mail.ru.

Абыкенова Дария Болатовна – PhD, профессор, Павлодарский педагогический университет имени Әлкей Марғұлан, Республика Казахстан, 140000 г. Павлодар, ул. Олжабай батыра 60, тел.: +77774181483, e-mail: abykenovad@ppu.edu.kz.

Абильдинова Гульмира Маратовна – кандидат педагогических наук, ассоциированный профессор кафедры информатики, Евразийский национальный университет имени Л.Н. Гумилева, Республика Казахстан, 010000 г. Астана, ул. Пушкина 11, тел.: +77753340708, e-mail: gulmira\_2181@mail.ru.

Жанайдаров Батырхан Бейсенғалиевич – PhD докторант, Павлодарский педагогический университет имени Әлкей Марғұлан, Республика Казахстан, 140000 г. Павлодар, ул. Олжабай батыра 60, тел.: +77056314268, e-mail: batyrkhan97@gmail.com.

Культепова Махаббат Тулегеновна\* – PhD докторант, Евразийский национальный университет имени Л.Н. Гумилева, Республика Казахстан, 010000 г. Астана, ул. Пушкина 11, тел.: +77085521100, e-mail: maxabbat.k@mail.ru.

IRSTI 14.35.09

UDC: 371.3:81'373.7:81'373.45

<https://doi.org/10.52269/SEPT2632029>

#### **GAMIFICATION IN PHRASEOLOGY PEDAGOGY: AN ETHNOLINGUISTIC APPROACH TO UNIVERSITY TEACHING**

Arynbayeva D.Zh.\* – PhD student, O. Zhanibekov South Kazakhstan Pedagogical University, Shymkent, Republic of Kazakhstan.

Yücel Gelişli – Doctor of Pedagogical Sciences, Professor, Gazi University, Ankara, Republic of Turkey.

Khalikova N.S. – Candidate of Philological Sciences, O. Zhanibekov South Kazakhstan Pedagogical University, Shymkent, Republic of Kazakhstan.

The study examines the integration of ethnolinguistic content into the teaching of Kazakh phraseological units through game-based, interactive, and digital activities. Its relevance is determined by the need to develop instructional approaches that help students interpret the figurative meanings of phraseological units and the cultural information embedded in them. The study combined theoretical and methodological analysis with empirical data. The instructional component included quizzes, matching tasks, role-playing, competitive activities, and digital exercises. A ten-week classroom implementation involved 40 second-year students, while the subsequent online survey included a total of 81 respondents. Classroom observation and descriptive analysis of survey responses were also used. The findings indicate that students generally perceive game-based and digital activities positively and consider them useful for increasing interest and participation in phraseology lessons. Respondents also reported difficulties in understanding figurative meanings, contextual use, and ethnocultural features of phraseological units. The results reflect students'