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The Multilingual Approach and Artificial Intelligence in the Development of a Specialist’s Intercultural Competence in a Digital Educational Environment

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Abstract: Problem statement. *The article examines the problem of developing specialists’ intercultural competence in the context of educational digitalization and the use of artificial intelligence. The authors emphasize that modern education involves working with multilingual materials, automated translation, and generative models that can both support communication and reproduce cultural stereotypes. Therefore, the pedagogically grounded integration of the multilingual approach and AI tools for culturally sensitive professional communication is highly relevant.* ***Materials and methods.*** *The methodological basis of the study includes the principles of intercultural communication, digital pedagogy, multilingual learning, and the competence-based approach. The methods used were analysis, systematization, generalization, and comparison of scientific sources on the use of AI in language education, professional training, and the development of intercultural competence.* ***Results.*** *The study identified the main AI-based practices for developing intercultural competence: linguistic and cultural adaptation of messages, simulation of professional interaction,*

reflective analysis of communicative situations, multilingual work with texts, and personalized learning support. It was proved that AI is an effective tool for analyzing language forms, cultural differences, and professional communication situations. At the same time, the importance of critically evaluating AI-generated responses due to possible cultural generalizations and stereotypes was emphasized. ***Conclusions.*** *It was concluded that combining the multilingual approach with artificial intelligence contributes to the development of intercultural competence, emotional intelligence, and a culture of professional communication. The effectiveness of AI depends on pedagogical support, verification of generated content, and the development of learners' critical thinking.*

Keywords: *artificial intelligence; intercultural competence; multilingual approach; digital educational environment; professional communication; generative artificial intelligence; intercultural communication; digital pedagogy; emotional intelligence; AI-mediated learning.*

Мультилінгвальний підхід і штучний інтелект у формуванні міжкультурної компетентності фахівця в цифровому освітньому середовищі

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Анотація: ***Постановка проблеми.*** *У статті розглядається проблема розвитку міжкультурної компетентності фахівців в умовах цифровізації освіти та використання штучного інтелекту. Автори наголошують, що*

сучасне навчання передбачає роботу з багатомовними матеріалами, автоматизованим перекладом і генеративними моделями, які можуть як підтримувати комунікацію, так і відтворювати культурні стереотипи. Актуальним є педагогічно обґрунтоване поєднання багатомовного підходу та AI для формування культурно чутливого професійного спілкування. ***Матеріали і методи.*** *Методологічну основу дослідження становлять принципи міжкультурної комунікації, цифрової педагогіки, багатомовного навчання та компетентнісного підходу. Використано методи аналізу, систематизації, узагальнення та порівняння наукових джерел щодо застосування AI у мовній освіті, професійній підготовці та розвитку міжкультурної компетентності.* ***Результати.*** *У результаті дослідження визначено основні практики використання AI для розвитку міжкультурної компетентності: лінгвокультурна адаптація повідомлень, моделювання професійної взаємодії, рефлексивний аналіз комунікативних ситуацій, багатомовна робота з текстами та персоналізована підтримка навчання. Доведено, що AI є ефективним інструментом для аналізу мовних форм, культурних відмінностей і професійних комунікативних ситуацій. Водночас підкреслено важливість критичного оцінювання AI-відповідей через можливість культурних узагальнень і стереотипізації.* ***Висновки.*** *Зроблено висновок, що поєднання багатомовного підходу та штучного інтелекту сприяє розвитку міжкультурної компетентності, емоційного інтелекту та культури професійного спілкування. Ефективність AI залежить від педагогічного супроводу, перевірки згенерованого контенту та розвитку критичного мислення здобувачів освіти.*

Ключові слова: *штучний інтелект; міжкультурна компетентність; багатомовний підхід; цифрове освітнє середовище; професійна комунікація; генеративний штучний інтелект; міжкультурна комунікація; цифрова педагогіка; емоційний інтелект; AI-mediated learning.*

Problem Statement. The digitalization of professional education changes not only access to knowledge, but also the nature of communication between participants in the educational process. Learners increasingly work with multilingual materials, automated translation, generative language models, digital simulations, and professional cases in which linguistic and cultural differences become part of the learning interaction. Under these conditions, a specialist's intercultural competence cannot be seen only as an addition to foreign language training. It becomes the ability to act in situations of linguistic, cultural, ethical, and communicative ambiguity.

Intercultural competence includes the ability to understand the cultural basis of behavior, interpret different communication styles, show sensitivity to linguistic and social differences, adapt one's own messages correctly, and avoid stereotypical judgments. For a specialist, this means not only knowing another culture or speaking a foreign language, but also being able to interact professionally with people with different experiences, values, and communication norms.

Artificial intelligence tools can support translation, reformulation, dialogue modeling, and analysis of tone and cultural appropriateness of statements. However, their use does not automatically develop intercultural competence. Generative models can reproduce stereotypes, simplify complex cultural phenomena, provide inaccurate explanations, and create a false feeling of full understanding of another culture. Therefore, the pedagogical problem is not the use of AI itself, but the way these tools are integrated into the educational process.

In this regard, the multilingual approach becomes especially important. It enables work not only with one foreign language but also with several linguistic resources, to compare meanings, to examine the limits of automatic translation, and to analyze the cultural specificity of language forms. Therefore, it is relevant to justify the use of AI that supports not a superficial acquaintance with other cultures, but the development of the ability for critical, professionally appropriate, and culturally sensitive communication.

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Analysis of Current Research. The problem of developing intercultural competence in the context of the digitalization of education is studied at the intersection of intercultural communication, language education, professional training, digital pedagogy, and artificial intelligence research. Studies on international language education emphasize that the role of the teacher is gradually changing. The teacher not only transmits knowledge about language or culture, but also designs learning situations, selects digital resources, organizes reflection, and helps learners critically understand cultural differences [2]. This idea is important for this study because the use of AI requires not a purely technical, but a pedagogically justified integration.

Studies on the use of AI in language education show a common idea: digital tools can support not only language skills, but also the development of intercultural communicative competence. Meng [14] connects AI with the modeling of language situations close to real communication. Ma and Yang [13] focus on learners' linguistic and cultural adaptability. Sultan, Dautova, and Dalle [19] examine the relationships among AI literacy, cultural literacy, and intercultural communicative competence. Thus, in these studies, AI is viewed not only as a tool for language support but also as a means of working with cultural meanings, communication norms, and critical understanding of digital content.

Studies that consider generative AI as a tool for metacognitive support are also important. Akhrenova and Moradkhani [1] propose a metacognitive-cultural model of AI-mediated intercultural learning. Its main idea is that chatbots and generative language models do not simply provide information about culture. They help learners become aware of their own assumptions, identify stereotypes, compare different interpretations of a situation, and reflect on their own communicative decisions. This approach shifts attention from learning ready-made facts about culture to the development of critical intercultural awareness.

Another research direction is connected with natural language processing, adaptive systems, and multimodal environments. Wei [21] points to the potential of

NLP for explaining language forms, levels of politeness, culturally marked expressions, and pragmatic differences. Devi et al. [5] studied AI-based tools to support cross-cultural communication among English language learners. Chen and Wei [3] analyze the influence of AI-based learning environments on engineers' intercultural communicative competence and emphasize the role of learning adaptability. Tang [20] describes an intelligent speech-teaching system that incorporates an intercultural perspective. These approaches show that intercultural competence is developed not only through knowledge about culture, but also through the accurate choice of language means according to the addressee, situation, status relations, and professional purpose of communication.

Some studies focus on professional training. Cong [4] analyses the use of AI in professionally oriented English courses, in particular for developing intercultural competence in automotive English. Liu and Zhu [12] study the training of visual communication specialists for cross-border e-commerce and show that AI can support the creation of culturally adapted visual content. Saudabayeva et al. [16] propose a model of digital-intercultural competence for educational managers. These studies show that intercultural competence is increasingly viewed as a professional characteristic of a specialist, not only as a language-related one.

At the same time, the literature consistently emphasizes the risks of using AI. Farrelly and Baker [7] state that generative AI in higher education requires ethical reflection because it affects academic integrity, authorship, responsibility, and the quality of educational results. Yan et al. [22], in their systematic review, highlight the practical and ethical challenges of large language models in education, including transparency, privacy, the reliability of answers, and pedagogical control. For the development of intercultural competence, these risks are especially important. Inaccurate or stereotypical explanations of cultural differences can not only undermine learning quality but also reinforce biased ideas.

The problem of cultural representation in AI systems increases the need for a critical approach. Guo et al. [8] analyze cultural awareness in language models and emphasize the importance of multilingual human-preference learning to improve cultural sensitivity. This idea is directly related to the topic of this article. The multilingual approach can be seen as a pedagogical way to resist a monolingual or culturally limited view of the world. When learners work with several languages, they see that translation does not always transfer pragmatic, emotional, and social shades of meaning.

Studies on teacher training for AI use also stress that the teacher should not only be a user of digital tools, but also a facilitator of responsible use of them. Zulianti et al. [23] describe the development of novice EFL teachers' competence through a TPACK-based professional development program. Pokryshen [15] examine staff training for the use of AI in foreign language teaching. Fakhar et al. [6] summarize approaches to AI-based online professional development for teachers. These studies support the idea that the development of intercultural competence through AI is impossible without the teacher's professional readiness to evaluate the quality of generated content, select tasks, and organize reflection.

Therefore, the analysis of current research shows that the use of AI for developing intercultural competence is already discussed in relation to language education, adaptive learning, professional training, chatbots, NLP, multimodal environments, and ethical challenges. At the same time, existing studies do not fully explain how the multilingual approach can serve as a pedagogical basis for using AI in a digital educational environment. This gap determines the focus of the present article.

The aim of the article is to theoretically justify the relevance of combining the multilingual approach and artificial intelligence tools for the development of a specialist's intercultural competence in a digital educational environment. To achieve this aim, the pedagogical potential of AI was clarified; the practices of using AI for linguistic and cultural adaptation, professional communication, and reflection were

described; the role of the multilingual approach was justified; and the risks of AI-mediated learning were outlined.

Methods of the Study. The methodological basis of the study includes the principles of intercultural communication, digital pedagogy, multilingual learning, and the competence-based approach to professional training. The study is theoretical and analytical. The methods used include analysis, systematization, and generalization of scientific sources on the use of AI in language education, professional training, and the development of intercultural competence; comparative analysis of approaches to the use of chatbots, generative language models, automated translation tools, NLP, and adaptive digital environments; and conceptual modeling of practices for developing intercultural competence by means of AI.

The material for the analysis consisted of recent scientific publications on the use of artificial intelligence in foreign language and professional education, the development of intercultural communicative competence, multilingual educational practices, and ethical risks of generative AI.

Results and Discussion. The result of the theoretical analysis is the identification of five groups of AI-based practices for developing a specialist's intercultural competence: linguistic and cultural adaptation of messages; simulation of intercultural professional interaction; reflective analysis of communicative situations; multilingual work with texts and meanings; and personalized learning support. These practices are united by their aim not to learn isolated facts about other cultures, but to compare language forms, communication norms, emotional reactions, and professional roles.

Practices of linguistic and cultural adaptation involve using AI to translate, reformulate, and compare professional messages across languages. Learners can analyze the level of formality, directness, politeness, emotional neutrality, or expressiveness of a text. This work helps them see that intercultural misunderstanding often arises not from a grammatical error, but from an inappropriate tone, literal

translation, or lack of understanding of pragmatic norms of another language. In this practice, the multilingual approach helps learners work with several linguistic resources as a space for comparing meanings, not as a set of parallel translations.

Simulation of intercultural professional interaction involves creating role dialogues, negotiations, consultations, conflict situations, or professional discussions using generative AI. Such tasks allow learners to practice communicative actions safely, compare response options, and see possible consequences of their language behavior. At the same time, these tasks should be supported by explanation, self-assessment, and group discussion. In this regard, studies on communicative tasks as a means of developing emotional intelligence are important, as intercultural communication requires not only knowledge of language norms but also emotional sensitivity, empathy, and the readiness to adjust one's own behavior [17].

Reflective analysis of communicative situations means using AI to explain intercultural misunderstandings, identify stereotypical judgments, and generate alternative responses. The pedagogical effect occurs when learners do not accept the AI answer as final but check it critically: whether the description of culture is simplified, whether the behavior of one person is presented as typical for the whole group, whether the wording is ethically correct, and whether the situation needs additional explanation. Hrona et al. [9] and Semenog et al. [18] argue that the system "teacher - learner - language training" can be a productive environment for developing emotional intelligence through a communicative approach. For the development of intercultural competence, this is important because learners need to understand not only the content of a message but also the interlocutor's emotional state, hidden tensions, and the limits of acceptable communicative behavior.

Multilingual work with texts and meanings includes the analysis of authentic materials in different languages, comparison of machine and human translation, work with culturally marked vocabulary, professional terminology, idioms, politeness formulas, and genre features of communication. It is here that the relevance of the

multilingual approach becomes especially clear. This approach develops the ability to see that language not only transmits information, but also structures social relations, emotional meanings, and professional interaction. In this case, AI gives faster access to possible variants, but it does not replace semantic analysis. Learners can use AI to explain the differences among several formulas for requests, apologies, or arguments, and then check these explanations against dictionaries, corpora, authentic examples, or teacher comments.

Personalized learning support means selecting AI-based tasks according to the learner's language level, professional field, and communicative needs. However, personalization should not isolate the learner in an individual learning path, because intercultural competence requires interaction, discussion, and comparison of positions. The optimal model is one in which AI is used for preparation and initial feedback, while further understanding occurs through group communication with the teacher's participation.

The connection between intercultural competence, emotional intelligence, and the culture of professional communication should be emphasized separately. Hrona et al. [10] show that tools for developing emotional intelligence in native-language teaching can be linked to learners' cognitive, communicative, and reflective work. Semenog et al. [18] demonstrate the effectiveness of communicative tasks in developing emotional intelligence. Kharchenko and Semenikhina [11] study the links between the culture of professional communication and emotional intelligence. These ideas support the view that digital tasks with AI should include not only a language or information component, but also the analysis of tone, emotional coloring, hidden evaluation, and possible influence of the message on the addressee.

The practical potential of generative AI for language training is also confirmed by the local Ukrainian experience with ChatGPT in native-language teaching. Hrona et al. [10] show that ChatGPT can be used to create language tasks, analyze texts, support independent work, and increase the variety of learning situations. For the

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multilingual approach, this experience is important. It shows that intercultural competence is developed not by replacing the native language with a foreign language, but by consciously comparing language resources and cultural meanings.

The discussion of the results allows several generalizations to be formulated. First, AI is pedagogically relevant for developing intercultural competence when it is used not as a source of ready-made knowledge about culture, but as a tool for analysis, modeling, comparison, and reflection. Second, the multilingual approach strengthens this process by helping learners see differences in language worldviews, pragmatic norms, and cultural ways of expressing meaning. Third, the development of intercultural competence should be connected with the development of emotional intelligence, because professional interaction in a culturally diverse environment requires empathy, self-regulation, sensitivity to the interlocutor, and readiness to adjust one's communicative behavior.

At the same time, AI can generate culturally inaccurate or stereotypical statements, offer overly generalized explanations, imitate confidence where verification is needed, and reduce learners' need for their own analysis. Therefore, the use of AI in developing intercultural competence requires clear pedagogical limits: checking generated content, working with several sources, discussing cultural generalizations, analyzing incorrect or doubtful answers, explaining the limits of automatic translation, and organizing obligatory reflection after tasks.

Thus, the multilingual approach and AI can be productively combined in a digital educational environment when used in a pedagogically balanced way. The most effective practices are those in which AI does not replace live communication or substitute cultural experience for ready-made answers. Instead, it creates additional opportunities for language comparison, professional modeling, critical analysis, emotionally sensitive interaction, and reflection.

Conclusions. The study justified the relevance of combining the multilingual approach with artificial intelligence tools in developing a specialist's intercultural

competence in a digital educational environment. It was found that the pedagogical potential of AI is revealed not through the mechanical use of translation or text generation, but through modeling professional communicative situations, comparing linguistic and cultural meanings, analyzing pragmatic differences, and reflecting on communicative decisions.

The multilingual approach acts as a methodological condition of this process. It allows learners to work with several linguistic resources, see the limits of automatic translation, compare ways of expressing meaning across languages, and critically evaluate AI-generated texts. The most productive practices include linguistic and cultural adaptation of messages, simulation of intercultural professional interaction, reflective analysis of communicative situations, multilingual work with texts, and personalized learning support.

The development of intercultural competence is closely linked to the development of emotional intelligence and a culture of professional communication. Therefore, digital tasks with AI should include the analysis of tone, emotional coloring, hidden evaluation, and possible influence of the message on the addressee. At the same time, the use of AI is associated with risks such as algorithmic bias, cultural stereotyping, inaccurate answers, and excessive reliance on digital tools. This requires pedagogical support, source verification, work with alternative interpretations, and the development of a critical attitude to digital content.

Further research may focus on empirically verifying the effectiveness of these practices across different fields of professional training, developing criteria for assessing intercultural.

Use of artificial intelligence (AI) tools. During the preparation of the manuscript, AI (Grammarly) was used as an auxiliary tool for the technical review of selected author-written text fragments at the levels of grammar, spelling, and punctuation. The AI tool was not used to generate the substantive parts of the article, including the formulation of the aim, methodology, results, discussion, conclusions, or

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references. All language corrections suggested by the AI tool were verified by comparing them with the original text, checking terminology, content accuracy, and consistency with the cited sources. The use of AI did not affect the research results, their interpretation, or the conclusions.

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