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DIGITAL TECHNOLOGIES IN THE DEVELOPMENT OF INTERCULTURAL COMMUNICATIVE COMPETENCE OF FUTURE TEACHERS

Abstract

In the context of globalization and growing international cooperation in sports and tourism, developing intercultural communicative competence (ICC) among future physical education teachers and coaches is a key task of pedagogical education. Traditional English language teaching methods need to be supplemented by digital tools in the formation of competencies necessary for intercultural interaction. Research objectives: To develop, test, and prove the effectiveness of a psychological-pedagogical methodology for developing ICC in pedagogical profile students during English lessons using digital technologies. Research methods: Within the framework of the psychological-pedagogical experiment, online surveys were used (on the Google Forms platform in Kazakh and Russian languages), data analysis in Excel and IBM SPSS Statistics, as well as diagnostic methods for determining the structural components of ICC: online lexical-grammatical tests for assessing the level of English language proficiency, questionnaires on cultural intelligence, motivation, emotional intelligence, and tolerance. The research work involved overall 60 students from control and experimental groups with mixed B1 and A2 level. The results of the study showed positive dynamics in some subcomponents of ICC of future physical education teachers through the use of digital technologies and online platforms.

Keywords: intercultural communicative competence, digital technologies, foreign language, online platforms, AI chatbots.

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БОЛАШАҚ МҰҒАЛІМДЕРДІҢ МӘДЕНИЕТАРАЛЫҚ КОММУНИКАТИВТІК ҚҰЗЫРЕТТІЛІКТЕРІН ҚАЛЫПТАСТЫРУДАҒЫ ЦИФРЛЫҚ ТЕХНОЛОГИЯЛАР

Аңдатпа

Ғаламдану мен спорт, туризм салаларындағы халықаралық серіктестіктің күшеюі аясында болашақ дене шынықтыру мұғалімдері мен бапкерлерінің мәдениетаралық коммуникативтік құзыреттілігін қалыптастыру педагогикалық білім берудің басты міндеттерінің бірі. Дәстүрлі шетел тілін оқыту әдістері мәдениетаралық өзара әрекет етуге қажетті құзыреттіліктерді қалыптастыруда цифрлық құралдар толықтыруды қажет етеді. Зерттеу жұмысының мақсаты болашақ дене шынықтыру мұғалімдерінің мәдениетаралық коммуникативтік құзыреттілігін шетел тілі сабағында қалыптастыру. Зерттеудің әдістері онлайн Google forms арқылы қазақ және орыс тілдерінде жүргізілді, алынған нәтижелер Excel, IBM SPSS Statistics арқылы талданды. Мәдениетаралық коммуникативтік құзыреттіліктің компоненттерін бағалау үшін лексика-грамматикалық тест, толеранттылық индексі, оқу және кәсіби мотивация, мәдени және эмоциялық интеллект диагностикалық әдістемелері қолданылды. Студенттердің тілдік деңгейі оқу жылының басында анықталып бірнеше B1 тілдік деңгейлі, ал басым бөлігі A2 деңгейлі болғандықтан аралас 2 топтарға 30 студенттен топталып бақылау және эксперименттік топтарды құрды. Зерттеу жұмысының нәтижесі цифрлық технологиялар мен онлайн платформаларды қолдану арқылы болашақ дене шынықтыру мұғалімдерінің МКК кейбір субкомпоненттерінің оң динамикасын көрсетті.

Түйін сөздер: мәдениетаралық коммуникативтік құзыреттілік, цифрлық технологиялар, шетел тілі, онлайн платформалар, ЖИ чат-боттар.

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ЦИФРОВЫЕ ТЕХНОЛОГИИ В ФОРМИРОВАНИИ МЕЖКУЛЬТУРНЫХ КОММУНИКАТИВНЫХ КОМПЕТЕНЦИИ БУДУЩИХ УЧИТЕЛЕЙ

Аннотация

В условиях глобализации и укрепления международного сотрудничества в сфере спорта и туризма формирование межкультурной коммуникативной компетенции будущих учителей и тренеров физической культуры становится одной из ключевых задач педагогического образования. Традиционные методы обучения иностранным языкам требуют добавления цифровых технологий формирование компетенции необходимые для межкультурного взаимодействия. Цель исследования формирования межкультурных коммуникативных компетенции будущих учителей физической культуры на уроках иностранного языка. Методы исследования эксперимента использовались онлайн-опросы с помощью Google forms на казахском и на русском языках, анализ данных с помощью Excel, IBM SPSS Statistics. Для оценки компонентов межкультурной коммуникативной компетенции использовались диагностические методы лексико-грамматического теста, индекс толерантности, учебной и профессиональной мотивации, культурного и эмоционального интеллекта. Языковой уровень студентов определялся в начале учебного года, поскольку некоторые имели B1, а большинство уровень A2, они были разделены на две смешанные группы по 30 студентов, сформировав контрольную и экспериментальную группы. Результаты исследования показали положительную динамику в некоторых субкомпонентах МКК будущих учителей физической культуры при использовании цифровых технологий и онлайн платформ.

Ключевые слова: межкультурная коммуникативная компетенция, цифровые технологии, иностранный язык, онлайн платформы, чат-боты ИИ.

Introduction. In today's digital society intercultural communication competence (ICC) is one of the most important competencies that future specialists in each field needs, along with professional skills require in order to communicate with foreign countries. The importance of research work was influenced by the professional needs of future physical education specialists and the fact the COVID-19 pandemic has made digital technologies one of the most important tools for the formation competences in the education sphere. The presence of misunderstanding between multicultural groups during sports events requires quickly adaptation of the students, also digital technologies and the transition to online

learning during the pandemic have provided opportunities for learning artificial intelligence as well as disadvantage of starting academic year offline and then studying the second semester online.

The famous models of intercultural communicative competence are Byram, M. (2016), Deardorff K.D.(2005), Kunanbayeva S.S. (2010), Byram, M. (1997) intercultural communicative competence is ability to establish relationship with representatives of other cultures, which consisting of communicative and competence components. Deardorff D, K. (2015) proposed two interconnected models of intercultural communicative competence. Relationship, knowledge, internal and external factors are considered as components that are always in the process. According Kunanbayeva S.S., (2005) the highest level of intercultural competence is a second language person, and the minimum level is an effective cultural mediator and limited linguistic communication. These models are based on the object of research and the goals set by scientists, and in our research work we focus the model of intercultural communicative competence on a non- linguistic a future physical education teachers.

The use of authentic materials by creating a learning environment with the help of digital tools in the field of education plays an important role in the formation of intercultural communicative competence and also allows the development of educational materials based on the principles of online learning (Basantes-Andrade et.al (2025), Godwin-Jones, R.(2019), Haznedar, B. et al.(2024), Parmaxi, A and Zaphiris, (2017), Kern, R. (2014), Mayer (2001), O'DOWd (2017), , Torekeyev, B. et al. (2020), Yoldosheva, T. A. (2025)). In addition, recent studies have described the importance of gaming platforms and artificial intelligence in providing virtual role-playing games and real-life experiences.

The aim of the research work is the formation of the intercultural communicative competence of future physical education teachers in a foreign language lesson. The objectives of research work are: to analyze the theoretical basis of intercultural communicative competence, to conduct a pedagogical and psychological experiment and to analyze the dynamics of the components of intercultural communicative competence. The importance of the study is to prepare educational materials on online platforms and digital tools for future physical education teachers based on the analysis of intercultural communicative competence model and online and offline learning.

Basic Provisions. Three components (communicative, motivational, intellectual) and six subcomponents of the ICC of future education teachers were identified. The communicative component consists of language and tolerance. Along with knowledge of the language, respect for the peculiarities of the other countries and cultures or to communicate with tolerance. Motivational component: defined as self-development (striving for independent study of cultural features) and professional growth (awareness of ICC's role in career advancement, for example, in working with international teams). Motivation is enhanced through gamified digital platforms that reward progress in cultural learning. The intellectual component of ICC combines cultural intelligence (the ability to understand and interpret nonverbal signals and traditions) and emotional intelligence (the ability to manage one's own emotions and respond adequately to the emotions of others during intercultural stress).

The use of digital technologies allowed to test authentic materials and components of ICC. Online platforms Kahoot, Edpuzzle, LearningApps, Padlet, Wardwall allow create assignments and use other ready-made materials. In addition, AI chatbot play role-playing games with students with a high language level in the lesson, and build confidence. The basis of the methodology was the combination of project-based learnin (PBL) and online platfroms, AI chatbots integrated with digital tools.

Materials and methods. The research was conducted with first year students of the Kazakh Academy of Sport and Tourism. The language level of the students determined at the beginning of the academic year and divided into groups. There are students with pre-intermediate B1 level, but since the majority are at the elementary A2 level, mixed level group was filled with 60 students, divided into control and experimental groups. Previously research work on the formation of the ICC was not conducted with these students but they may have only personal and multicultural experience.

The study was conducted using an online test using Google forms. In order to determine the components of the ICC, the language placement test, tolerance index, methods for determining learning motivation and professional motivation, as well as Hall's emotional intelligence and cultural intelligence tests were used. The results were analyzed in Excel and SPSS programs.

Results. Correlation analysis

The results shown in Table 1 show a descriptive and correlative analysis of the components of intercultural communicative competence. There are not significantly statistical relationships among ICC components, but the results show that tolerance and cultural intelligence are slightly positively correlated.

Table 1. Correlation analysis

		Correlations				
		Motivation	CQ	Emotional	Learning	Tolerance
Motivation	Pearson Correlation	1	-.007	.050	-.208	-.053
	Sig. (2-tailed)		.960	.705	.111	.685
	N	60	60	60	60	60
Cultural	Pearson Correlation	-.007	1	-.015	.097	.207
	Sig. (2-tailed)	.960		.911	.463	.112
	N	60	60	60	60	60
Emotional	Pearson Correlation	.050	-.015	1	-.037	-.046
	Sig. (2-tailed)	.705	.911		.778	.730
	N	60	60	60	60	60
Learning	Pearson Correlation	-.208	.097	-.037	1	-.105
	Sig. (2-tailed)	.111	.463	.778		.425
	N	60	60	60	60	60
Tolerance	Pearson Correlation	-.053	.207	-.046	-.105	1
	Sig. (2-tailed)	.685	.112	.730	.425	
	N	60	60	60	60	60

The experiment results confirmed positive dynamics in the development of several ICC components. The detailed results of the Pre- and Post-testing. Also table 2 summarizes all components of ICC.

Dynamics of language proficiency. During the post-test, students showed different scores on the pronunciation and vocabulary-grammar test, based on the elementary and pre-intermediate language levels, but it can be seen that although few students rose to a higher language level, their scores increased. In the control group, the average increase was 8% compared to the test, and in the experimental group, it was 11% higher on average. It is necessary to take into account the students' offline learning at the beginning of the academic year and online learning at the end of the academic year.

Tolerance indicators. Based on the post-test, the level of tolerance in the control group was 6.7% high, the average level was 93.3%, and there was no low level. In the experimental group, the high level was 3.3%, the average level was 96.7%, and there was no low level. Comparing the results of the post-test and pre-test, there were no significant substantial differences between the control and experimental groups, they were stable. And there was no low level in the levels of tolerance in both groups. The average level of tolerance of students is characterized by a combination of tolerance and intolerance, that is, they can show tolerance in social situations, and in some cases they can be intolerant. A high level indicates a tolerant personality at this level, and sometimes this high level may be associated with indifference. However, there is a slight change in the sub-levels of tolerance. In the control group, the ethnic tolerance scale did not show a low level, the average level was 96.7%, and the high level was 3.3%. The low level in the social tolerance scale showed 10%, the average level was 80%, and the high level was 10%. Tolerance as a personal trait showed a low level of 3.3%, an average level of 80%, and a high level of 16.7%. Ethnic tolerance in the experimental group did not show a low result in terms of personal trait dimensions. Ethnic tolerance measured a medium level of 96.7%, a high level of 3.3%. Social tolerance measured a low level of 3.3%, an average level of 93.3%, and a high level of 3.3%. Tolerance as a personal trait showed a medium level of 80%, and a high level of 20%. In general, there was no significant difference in the sub-levels of the two groups, but the average percentage in the three dimensions, the low level was 3.3% in both groups, the medium level was 85.57% in the control group, and 88.87% in the experimental group. The high level was 10% in the control group, and 8.9% in the experimental group. During the pre-test and post-test, ethnic tolerance did not show a low level in the

control and experimental groups, it was stable. However, in the subscales of tolerance, the average level of social tolerance increased by 6.7% in the control group and the experimental group. At the test, it was 3.3%, the average level was 90% in the control group, and the average level was about 86.6% of students in the experimental group. According to the results of the general research, there are no significant substantial differences in the level of tolerance, but according to the results of its subscales, a positive social and personal development of students can be observed.

Dynamics of learning motivation (figure 1). According to the post-test results, intrinsic motivation in the control group was 96.7%, in the experimental group 90%, and extrinsic motivation was 3.3% in the control group, in the experimental group 10%. It can be seen that intrinsic motivation prevails among students. The control group is 6.7% higher than the experimental group.

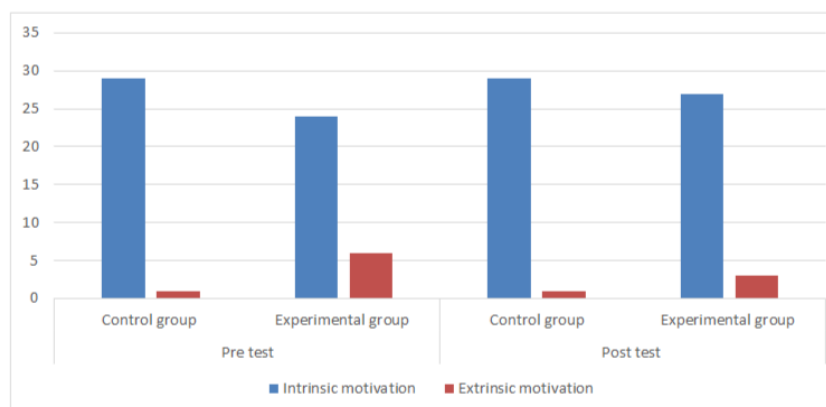


Figure 1. Dynamics of learning motivation

However, compared to the test results, the motivation indicators of students in the control group did not change. In the experimental group, intrinsic motivation increased by 10%, and extrinsic motivation decreased by 10%.

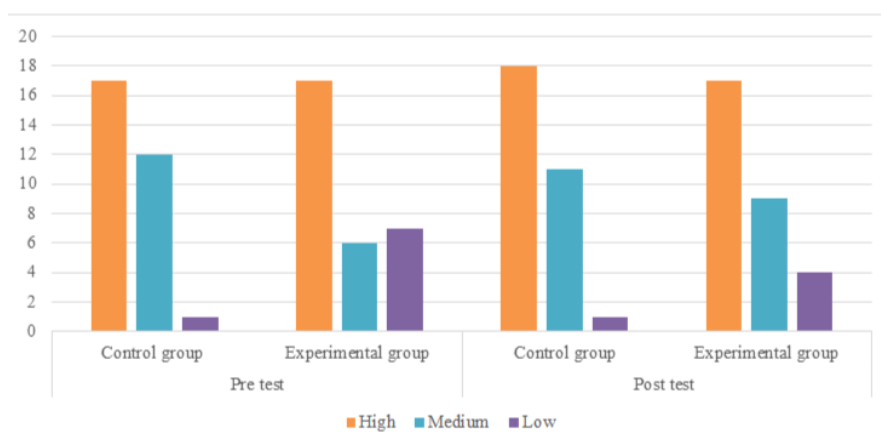


Figure 2. Learning motivation by test results

Post-test results for intrinsic motivation indicators (figure 2): high level in the control group 60%, experimental group 56.7%, medium level in the control group 36.7%, experimental group 30%. Low level in the control group 3.3%, experimental group 13.3%. According to the pre- and post-test results, the control group increased the high level by 3.4%, the medium level decreased by 3.3%, and there was no change in the low level indicators. According to the pre- and post-test results, the experimental group did not change the high level, the medium level increased by 10%, and the low level decreased by 10%.

According to the post-test professional motivation results, the control group achieved 26.7% in intrinsic motivation indicators, 73.3% in extrinsic motivation. The experimental group achieved 33.3% in intrinsic motivation indicators, 66.7% in extrinsic motivation.

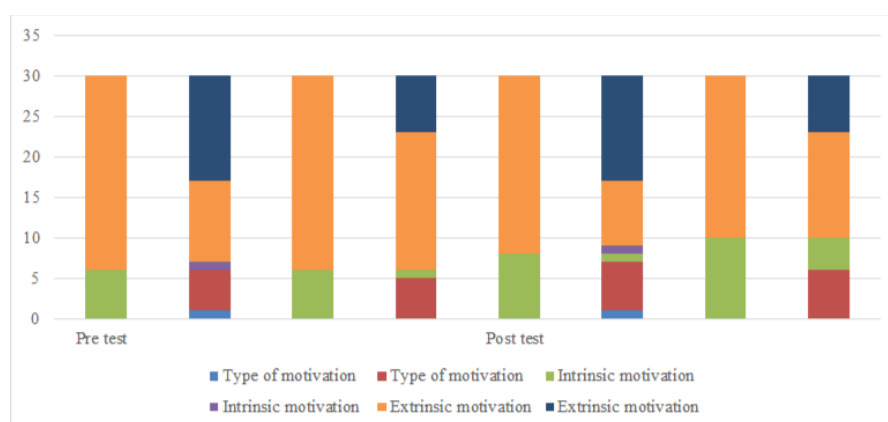


Figure 3. Professional motivation results

Post-test, it can be seen (figure 3) that the internal motivation of the control group for general study is high, and professional motivation has appeared, and the motive for entering a higher education institution is stable. Professional motivation has shown a high level for external motivation. The motive for general study and studying in a higher education institution are stable. Post-test, the experimental group for internal motivation has increased, the motive for general study has decreased slightly, and there is no motive for entering a higher education institution. Professional motivation has increased in external motivation, the motive for general study has decreased, and there is no motive for entering a higher education institution. Compared with the pre-test results, the control group's internal motivation has increased by 6.7%, and external motivation has decreased by 6.7%. The experimental group has increased by 13.3%, and external motivation has decreased by 13.3%. Compared with the pre-test results, the control group's internal motivation has increased by 3.3%, and professional motivation by 3.3%. And there is no change in the motives for external motivation. Compared with the experimental group, the internal motivation and professional motivation have increased by 10%. And there is no change in the motives of external motivation.

The level of cultural intelligence, as a result of the study, showed a very low level of 10% in the control group, a low level of 16.7%, an average level of 46.6%, a high level of 16.7%, and a very high level of 10%. In the experimental group, a very low level of 3.3%, a low level of 10%, an average level of 56.7%, a high level of 16.7%, and a very high level of 13.3%. If we compare the results of the pre-test and post-test, the very low level of 6.6% decreased in the control group, and all low and high levels increased, respectively. And in the experimental group, the very low level decreased by 10%, and other levels of cultural intelligence increased, especially at the average level.

Emotional intelligence. In the control group, the high level of emotional intelligence was 26.6%, the average level was 43.3%, and the low level was 30%. In the experimental group, the high level of emotional intelligence was 26.6%, the average level was 46.6%, and the low level was 26.6%. When comparing the test results with the control group, the low level of emotional intelligence was 3.3%, the average levels increased, and the high level remained stable. When comparing the test results with the experimental group, the low level of emotional intelligence was 10%, the high and average levels increased, respectively. According to the scales of emotional intelligence, it was found that in the control group, the control group had a high level of self-management of emotions and empathy, recognition of emotions of others, and a low level of emotional awareness. However, the high level of self-motivation was higher than the two levels. In the experimental group, the control group had a high level of self-motivation, and a high level of emotional awareness, a medium level of self-management of emotions, and a medium level of empathy and recognition of emotions of others. Compared with the

pre-test results, there is no substantial difference in the emotional intelligence subscales in the control group, while a positive change is observed in the emotional management subscale in the experimental group.

The obtained pre-test and post-test results show the effectiveness of the modified teaching strategies in the complex formation of all components of the ICC (motivational, intellectual and communicative). In the experimental group, a positive increase in the emotional indicators, language proficiency and intrinsic motivation was observed. These results show that integrating emotional intelligence into foreign language lessons positively increases not only language competences, but also personal and intercultural communicative competences of students.

Table 2 - Pre- and Post-testing Results

Component	Indicator	Control group	Experimental group
Communicative	Language proficiency	+8%	+11%
	Tolerance	$\Delta=0$	$\Delta=0$
Motivational	Learning motivation	Internal motivation $\Delta=0$	Internal motivation +10%
	Professional motivation	Internal motivation 6,7%	Internal motivation 13,3%
Intellectual	Cultural intelligence	VL -6,6 L -3,3 M +0,1 H +6,7 VH +10	VL -10 L -10 M +10,1 H +3,4 VH +6,7
	Emotional intelligence	L -6,6 M +6,7 H 0	L -10 M +6,6 H +3,3

Note: H-high level, M-medium, L-low, VL-very low, VH-very high

The results showed different patterns of change across six indicators of intercultural communicative competence. Communicative component: Language proficiency increased by +8% control group, by +11% in experimental group. The results of the tolerance subcomponent in the control group and the experimental group are stable. And the tolerance subscales: ethnicity and personality traits did not change. However, the average level of social tolerance in both groups showed an increase in indicators from a low level of 6.7% in the control group, and 6.6% in the experimental group.

In terms of learning motivation, there was no change in intrinsic and extrinsic motivation in the control group, but it moved from an average level to a high level of 3.3%. In the experimental group, intrinsic motivation increased by 10% from extrinsic motivation, this percentage increased from a low level to an average level.

In terms of professional development motivation, both groups showed positive dynamics, the control group increased by 6.7%, the experimental group increased by 13.3%, the experimental group is higher than the control group.

In terms of cultural intelligence indicators, there was a positive change in the high level of 6.7% and the very high level of 10% in the control group, there was no change in the average level, and the remaining low level and very low level decreased accordingly. In the experimental group, the average level increased by 10.1%, the high level by 3.4%, the very high level by 6.7%, and the very low and low level indicators decreased, respectively. The experimental group showed a decrease in the low level compared to the control group.

Emotional intelligence indicators in the control group increased by 6.7% from the low level to the average level, while in the experimental group there was an increase of 10% from the low level to the average and high levels. The results of the formative experiment in the experimental and control groups were analysed using the Mann-Whitney U test in SPSS.

Table 3 Results of the hypothesis test

<i>Results of the hypothesis test</i>				
	Null hypothesis	Criteria	value. a,b	Decision
1	The Tolerance distribution is the same for the Group categories.	Mann-Whitney U test for independent samples	,158	The null hypothesis is accepted.
2	The distribution of Learning_languages is the same for the Group categories.	Mann-Whitney U test for independent samples	,151	The null hypothesis is accepted.
3	Distribution of Prof.motivation is the same for the Group categories.	Mann-Whitney U test for independent samples	,482	The null hypothesis is accepted.
4	The distribution of Cultural_intelligence is the same for the Group categories.	Mann-Whitney U test for independent samples	,559	The null hypothesis is accepted.
5	The distribution of Emotion_intelligence is the same for the Group categories.	Mann-Whitney U test for independent samples	,149	The null hypothesis is accepted.
<i>a. The significance level is ,050</i>				
<i>b. The asymptotic significance is derived</i>				

As can be seen from the table, the results of the formative experiment revealed no statistically significant differences between the experimental and control groups, and the null hypothesis was not rejected.

Table 3.1 Summaries of the Mann-Whitney U-test for each component

<i>Summary of the Mann-Whitney U-test for independent samples</i>					
	Tolerance	Learning languages	Prof.motivation	Cultural intelligence	Emotional intelligence
Total	60	60	60	60	60
U Manna-Whitney	545,500	545,000	497,500	489,500	547,500
W Wilcoxon	1010,500	1010,000	962,500	954,500	1012,500
Criteria statistics	545,500	641,500	497,500	489,500	547,500
Standard error	67,578	66,205	67,606	67,611	67,608
Standardized criterion statistics	1,413	1,435	,703	,584	1,442
Asymptotic significance (2-way criterion)	,158	,151	,482	,559	,149

Discussion. The study results indicate positive changes in developing ICC, especially for non-language specialties. More pronounced changes in experimental group in language proficiency, learning and professional motivations and selected level of cultural and emotional intelligences. A descriptive and correlative analysis of the components of intercultural communicative competence showed no statistically significant correlation among ICC components, but the results showed that tolerance and cultural intelligence are slightly positively correlated. Comparison with the experience of other scholars shows that: 1) Integration of PBL and online learning platforms: which provided opportunities to use English language. Comprehensive approach where language serves not as a goal, but as a means to solve intercultural tasks, corresponding to the spirit of ICC. 2). For beginners (A2), digital tools provided language support, and for pre-intermediate level (B1) – in-depth cultural interaction, creating learning environment; 3) Specificity of online platforms and AI chatbots. The limitations of the study include mixed level group (but at the same time its motivation for other learners), the lack of the internet access, and the need for some offline adaptations. In addition, the results of the study may be influenced by external factors. The age of the students, the offline and online learning during the academic year, the influence of mass media and the result of the multicultural environment and trilingual education in our country. Future longitudinal studies larger randomized groups and longer interventions periods, also control of external variables. Overall, this approach not only improved some indicators of ICC but also

prepared students for real-world multicultural sports collaborations, such as organizing cross-border training camps or participating in global tournaments.

Conclusion. The conducted psychological and pedagogical experiment showed positive dynamics in several indicators of intercultural communicative competence in first-year prospective physical education teachers. The study examined six indicators in three interrelated intercultural communicative competence components: language proficiency and tolerance in the communicative component; learning and professional motivation in the motivational component; and cultural and emotional intelligence in the intellectual component.

Descriptive analysis showed that language proficiency increased by 8% in the control group and by 11% in the experimental group. The level of overall tolerance remained stable in both groups, although slight changes were observed in the individual tolerance subscales. In the control group, learning motivation remained stable, while in the experimental group, intrinsic motivation increased by 10 percentage points. Professional motivation showed positive dynamics in both groups, increasing by 6.7 percentage points in the control group and by 13.3 percentage points in the experimental group. Positive changes were also observed in the distribution of cultural and emotional intelligence levels.

Overall, the study results demonstrate the potential of digitally supported, professionally oriented foreign language teaching to facilitate the development of selected intercultural communicative competence among prospective physical education teachers. The limitations of the study include mixed level group (but at the same time its motivation for other learners), the lack of the internet access, and the need for some offline adaptations. In addition, the results of the study may be influenced by external factors. The age of the students, the offline and online learning during the academic year, the influence of mass media and the result of the multicultural environment and trilingual education in our country.

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PREPARATION OF A TRILINGUAL MOBILE THESAURUS AIMED AT REDUCING THE COGNITIVE LOAD OF FUTURE AVIATION SPECIALISTS

Abstract

Communication errors remain a critical factor in aviation accidents, often rooted in language barriers and the cognitive load associated with complex terminology. While English is the global standard, the trilingual operational environment in Central Asia (Kazakh-English-Russian) presents unique challenges in conceptual equivalence and professional training. This research addresses the “descriptive-only” gap in current tools for training of future aviation specialists by developing an integrated linguistic and technological framework for a trilingual aviation thesaurus. Unlike traditional linear dictionaries, this project utilizes a “Concept Node” architecture based on ICAO, EASA, and IATA standards, mapping semantic relationships (hypernyms, hyponyms, and collocations) to facilitate intuitive understanding. The study analyzed a robust corpus of 5,800 specialized terms, with a projected expansion to 10,000 units. The framework was operationalized into a mobile application featuring 3D visual contextualization, fuzzy-match search algorithms, and standardized audio modules to mitigate psycholinguistic stress. The effectiveness and practical relevance of the developed tool were validated through official expert evaluations from SCAT Airlines and the 405 Aviation Repair Plant. The results demonstrate that a multidimensional thesaurus approach significantly reduces translation latency and cognitive errors, providing a scalable solution for enhancing global aviation safety and specialist training.

Keywords: future specialist, trilingual thesaurus, aviation, cognitive load, aviation communication, semantic modeling.