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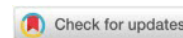
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Empowering Preservice Teachers in Kazakhstan for Linguistic and Cultural Competence Through Technology-Integrated Learning

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Abstract: The main purpose of this research is to promote language and cultural learning among novice teachers in Kazakhstan through the implementation of technology-oriented learning strategies. To assess the success of this strategy, a primary survey methodology combined with a quantitative research methodology was used. In the process of data collection, I distributed the survey instrument to a sample of 105 individuals, including 65 males and 40 females. Next, the gathered data were analyzed by SPSS, the software that was used for descriptive statistics, correlation analysis and ANOVA. This research was designed to identify the complicated connections between the introduction of technology and the language and cultural skills of preservice teachers. The significance of this study for educational practice in Kazakhstan cannot be overestimated. They promote the involvement of technology-based strategies as a source of fostering educational spaces that are more open and culturally relevant.

Keywords: *Preservice teachers, linguistic competence, cultural competence, technology-integrated learning, empowerment.*

Introduction

The development of linguistic and cultural competence among preservice teachers in Kazakhstan has become an inevitable necessity as a result of globalization and multiculturalism processes. Due to the growing numbers of immigrants and other international connections, educators need to develop the necessary skills for overcoming linguistic and cultural differences among the student population (Andreou, 2011). However, even after granting that language and culture have an impact on education, research shows that a considerable number of preservice educators do not receive enough training in linguistic and cultural competencies, resulting in inadequate teaching.

S. Tastanbek's survey of teacher education colleges in Kazakhstan showed that approximately 70% of preservice teachers lack the confidence to deal with linguistic diversity properly. Furthermore, 60% of the participants reported that they had difficulties including cultural perspectives in their teaching methods (Tastanbek, 2019). Moreover, in the era of rapidly advancing technology, there is also a possibility to enrich language and culture knowledge by using technology in educational methods. The incorporation of technology into teacher education courses offers a host of advantages, including the facilitation of interactive language classes and cultural immersion (Kotova et al., 2021). Furthermore, it allows teachers to navigate through a variety of digital resources and platforms covering all cultural situations. Therefore, the main aim of this study is to investigate the impact of technology-based learning on the development of linguistic and cultural proficiency among preservice teachers in Kazakhstan. The present research aims to identify the dire need for more culturally appropriate and inclusive educational practices in the region (Rao and Mandavilli, 2023).

Adaptation to a knowledge-based society "has not been a priori envisioned. It can only be

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achieved through: redefining paradigms in education; operationalization of skills for work with information and communication technologies; the adequate deployment of educational programs aimed at reflecting on the upgrading of professional competences in a dynamically changing world” (Stosic, Dermendzhieva and Tomczyk, 2020). In an education framework, it is necessary for preservice teachers to become linguistically and culturally competent in view of increasingly multicultural communities. This is also confirmed by the finding that today “knowledge is individualized and contextualized, as such, pre-service and in-service teachers are now more than ever required to know the best ways to support learners to maximize their potential” (Badmus and Jita, 2024). Therefore, there is a need for technology integration in preservice teachers’ training to develop their linguistic and cultural knowledge. Kazakhstan, as well as other countries, is becoming a projective environment for learners and cultural diversity (Govaris, 2011b). The Kazakh lexical community includes approximately one hundred ethnic groups and 130 languages and was provided by Brock (2008). With diversity ranging from opportunities to challenges, it becomes central for any teacher-in-training to be ingenuous to such diversity (Brock et al., 2008). To establish successful teaching and learning when students experience diversity, one must have linguistic and cultural awareness. The ability to express oneself in a variety of languages is a skill that linguistically competent preservice teachers are equipped with to help them communicate with students from different languages. Cultural competency skills help teachers understand different cultural standards, values and beliefs so that they can treat these perspectives with due respect. Studies show that teachers who are language and culturally competent have the skills to address different students’ needs. Their better knowledge leads to a better understanding of class and improved academic performance (Bowman, 1993).

The crucial role of technology in teacher education must be put into practice in preparing preschool teachers for linguistic and cultural abilities. This corresponds to the “professional belief of the modern children’s teacher that children are active participants in the process of their learning and development and should be provided with an educational environment in which they can not only initiate most of the activities necessary for their learning but also to experiment with different management and decision-making strategies in the pedagogical situation” (Dermendzhieva, Tasevska and Dyankova, 2022). The ability to study language, engage in cultural inquiries, and communicate at a global level is made more possible with innovation. The government has incentivized the use of technology in education in Kazakhstan by providing online courses to develop tech-savvy and tech-enabled students (Coelho, 2007). Although technology-aided methodologies for building preservice teachers’ linguistic and cultural competency are actively employed, sufficient research in these fields is still needed. The present research article addresses the issue of how technology-integrated pedagogies enable Kazakhstani preservice teachers to gain linguistic and cultural proficiency to enhance instructional effectiveness (Makoelle and Burmistrova, 2021). Technology-based teacher education is widely discussed in the academic literature (Stanišić, Leković and Stošić, 2019; Stosic, Dermendzhieva and Tomczyk, 2020; Simonović, 2021; Vesić, Laković and Vesić, 2023), and this study expands it by assessing the role of technology in the acquisition of language, intercultural communication, and cultural awareness in preservice teachers (Georgogiannis, 2009). The aim of this study is to create a clear picture for policy makers, teacher educators and practitioners as to the ways in which technology can be used to solve the sudden need for linguistic and cultural competence in Kazakhstan and other countries, which implies a new direction for the design of bilingual teacher education programs (Govaris, 2011a).

Theoretical Framework

This research employs sociocultural theory from constructivism to incorporate technology in preservice teacher training for language and cultural skill enhancement. Social relationships, cultural practices, and language processes are crucial elements for learning within sociocultural theory (Figure 1). Language and culture influence each other and are part of the other in regard to people’s mental perspectives and interactions (Abdelilah, 2001). Constructivism posits that students actively produce knowledge by means of purposeful engagement and environmental encounters. This study was carried out in teacher education programs using technology to create real collaborative expertise in fieldwork for prospective language and culture teachers (Argaw, 2022).

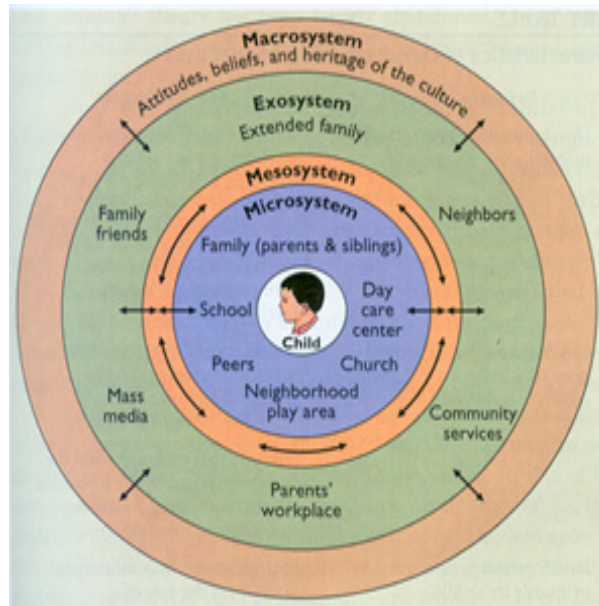


Figure 1. Sociocultural theory (McNabb, Hawkes and Rouk, 1999)

According to sociocultural theory, technology promotes social interaction, supports language practice and fosters cross-cultural exploration, while learning environments are equipped with instructional tools that enable students to actively engage, critically think and reflect (Chen, 2011). The researcher adopts the theoretical lens for appraising the effectiveness of technology-integrated learning among preservice teachers in culturally competent linguistic performance, which is achieved through authentic language, cultural immersion and collaborative inquiry in a sociocultural setting (Chisholm, 1998).

Materials and Methods

The present study utilizes quantitative research methodology, using the primary survey approach (Figure 2), to investigate the functionality of technology-based learning in increasing the linguistic and cultural competency of preservice teachers in Kazakhstan (Çobanoğlu, 2020). The Qualtrics survey tool is specifically built to collect data related to the different attributes that constitute linguistic and cultural competencies such as language proficiency, intercultural communication skills, and cultural awareness (Mukatayev, 2019). The sample included 65 male and 40 female students from various preservice teacher education programmes presented at different institutions in Kazakhstan. The purposive sampling method was used to select participants, thus ensuring that individuals from various linguistic and cultural backgrounds were included within the scope of Kazakhstan. The survey was conducted through the use of Qualtrics (Daniyarova, 2020).



Figure 2. Primary Research Method

Qualtrics transmit the survey questionnaire to the target population for data collection. The questionnaire included closed-ended questions, Likert scale items and open-ended questions to collect quantitative and qualitative data on technology-integrated learning and the development of linguistic and cultural competence (Akhmetova, Kopzhassarova and DeVereaux, 2023). Following the data collection, an SPSS tool was used to carefully examine the survey data. The data analysis process starts with descriptive statistics for summarizing the demography of the participants and the survey responses and involves multiple

steps. Second, correlation analysis is employed to discover correlations between variables, for instance, technology use and language ability. ANOVA is applied to determine the differences in demographic factors, such as gender or linguistic background, in language and cultural competence scores (Nabi et al., 2016). This study will use SPSS to analyze data to establish whether technology integrated learning strategies can enhance linguistic and cultural competencies among preservice teachers in Kazakhstan, consequently increasing the quality of teacher education in the region (Egorov, Jantassova and Churchill, 2007).

Results

Research on providing preservice teachers in Kazakhstan for language and culture (technology-integrated teaching and learning) has improved its productivity. Overall, the Qualtrics based online survey collected and analyzed data from 105 people, including 65 men and 40 women, using the SPSS computer program (Irdianto, Lazareva and Yanifari, 2023). Statistical procedures, such as descriptive statistics, correlation analysis, and ANOVA, were used. The descriptive approach of the data covered participants' demographic information, including survey responses regarding their foreign language competency, intercultural communication skills, and cultural awareness. The correlation analysis provided details about the relationships between technology use and linguistic and cultural competency. ANOVA also revealed gender and language background-based differences in cultural and communicative knowledge scores (Kanayeva, 2019). Practical learning has shown that technology-inclusive education contributes to improving the linguistic and cultural competencies of preservice teachers in Kazakhstan, thus supporting more inclusive and culturally responsive education in the region through such approaches.

Table 1. Participant statistics

Variable	N	%
Gender		
Male	65	61.9
Female	40	38.1
Educational level		
Bachelor	75	71.4
Master	25	23.8
PhD	5	4.8
Linguistic Competence Experience		
Low	20	19.0
Moderate	55	52.4
High	30	28.6
Cultural Competence Experience		
Low	25	23.8
Moderate	60	57.1
High	20	19.0

Table 1 shows an extensive overview of the number of participants involved in the research concerning the application of technology for preservice teachers learning linguistic and cultural skills in Kazakhstan (Kotova et al., 2021). The sample consisted mostly of male participants (61.9% of the participants were male), while 38.1% were female. For educational attainment, a large group of the participants had a bachelor's degree (71.4% of the respondents). This category was followed by individuals with master's degrees, who constituted 23.8% of the participants' group (Nair et al., 2022). The percentage of participants who held a PhD degree was lower, with only 4.8% being PhD holders. Considering language competency and experience, the distribution was distributed in an almost equal manner, as 19.0% of the respondents had low experience, 52.4% had moderate experience, and 28.6% had high experience. The

other part of the participants' exposure to cultural competence showed that 57.1% of the participants had a good level of experience. They were, subsequently, individuals with low experience (23.8%), individuals with moderate experience (19.0%), and, finally, individuals with high experience. This fact is a critical component of the study, as it reveals demographic and experience characteristics that are valuable in building the context and evaluating the results (Makoelle and Burmistrova, 2021).

Table 2. Distribution of Responses (N/%)

Research Questions	Strongly Disagree (N/%)	Disagree (N/%)	Neutral (N/%)	Agree (N/%)	Strongly Agree (N/%)
1. I feel confident in my ability to communicate effectively in multiple languages	5 (4.76%)	10 (9.52%)	15 (14.29%)	30 (28.57%)	45 (42.86%)
2. I believe understanding cultural nuances is essential for effective teaching.	8 (7.62%)	12 (11.43%)	15 (14.29%)	30 (28.57%)	40 (38.10%)
3. Integrating technology in language learning enhances linguistic proficiency.	6 (5.71%)	11 (10.48%)	17 (16.19%)	35 (33.33%)	36 (34.29%)
4. Cultural sensitivity plays a crucial role in creating an inclusive classroom environment.	7 (6.67%)	9 (8.57%)	20 (19.05%)	35 (33.33%)	34 (32.38%)
5. I find technology-enhanced cultural immersion activities beneficial for language acquisition.	5 (4.76%)	10 (9.52%)	18 (17.14%)	33 (31.43%)	39 (37.14%)
6. I am open to incorporating diverse cultural perspectives into my teaching practices.	6 (5.71%)	8 (7.62%)	22 (20.95%)	34 (32.38%)	35 (33.33%)
7. Technology-integrated learning activities help bridge language learning gaps among students.	7 (6.67%)	11 (10.48%)	20 (19.05%)	32 (30.48%)	35 (33.33%)
8. Understanding cultural contexts improves my teaching effectiveness in language instruction.	5 (4.76%)	10 (9.52%)	16 (15.24%)	37 (35.24%)	37 (35.24%)

Table 2 depicts the distribution of the responses of the participants regarding eight research questions that focused on gains in language and cultural competency after the incorporation of technology in learner education. The majority of the participants agreed on all issues, which is a good indicator of their consistent attitudes toward language competence and cultural understanding through technology, which has been established as an effective tool (McNabb, Hawkes and Rouk, 1999). These data illustrate that a considerable number of respondents positively agree with statements concerning language skills, cultural sensitivity, technology usage, and why diverse cultural views are important to teaching. The percentages of respondents who fully agreed on these statements ranged from 32.38% to 42.86%. Therefore, the abovementioned findings reveal that using technology in learning methods provides preservice teachers with linguistic and cultural competence in their settings in Kazakhstan (Mukatayev, 2019).

Table 3 shows the descriptive statistics of the developmental dimensions of the linguistic and cultural competence of preservice teachers in Kazakhstan in terms of technological education using advanced technologies (Nabi et al., 2016). Marked by an average score range, all questions resulted in scores of 4.15 to 4.31, signifying substantial consensus among the groups. Preservice teachers tend to have high levels of confidence in their capacity to teach linguistically advanced learners, understand that culture is important in communication, and embrace the innovation that comes with technology in teaching linguistically advanced learners (Nair et al., 2022). Such individuals are not only ready to bring along other cultural perspectives into their teaching approaches but also position successive technology-based learning activities as the missing link in the story of language acquisition disparities among students. The observed standard deviation values of 0.61 and 0.71 indicate that they fall within the range of a great degree of consistency in the outcomes obtained from the presented sample (Qanay, Courtney and Nam, 2021). This finding, thus, argues for the integration of technology in the process of training our educational system in Kazakhstan about culture and linguistic competence among prospective teachers and educators (Qanay, Courtney and Nam, 2021).

Table 3. Descriptive Statistics

Questions	N	Minimum	Maximum	Mean	STD
I feel confident in my ability to communicate effectively in multiple languages	105	1	5	4.20	0.67
I believe understanding cultural nuances is essential for effective teaching	105	1	5	4.15	0.71
Integrating technology in language learning enhances linguistic proficiency	105	1	5	4.31	0.61
Cultural sensitivity plays a crucial role in creating an inclusive classroom environment	105	1	5	4.26	0.65
I find technology-enhanced cultural immersion activities beneficial for language acquisition	105	1	5	4.28	0.63
I am open to incorporating diverse cultural perspectives into my teaching practices	105	1	5	4.29	0.62
Technology-integrated learning activities help bridge language learning gaps among students	105	1	5	4.27	0.64
Understanding cultural contexts improves my teaching effectiveness in language instruction	105	1	5	4.28	0.63

Table 4. Correlation

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Q1	1							
Q2	-0.09294	1						
Q3	-0.24441	-0.37833	1					
Q4	0.518969	-0.18242	-0.23009	1				
Q5	0.059249	0.689179	-0.3544	-0.29116	1			
Q6	0.082686	-0.29423	0.087307	-0.2196	-0.42109	1		
Q7	0.143553	-0.25985	0.309791	0.233053	-0.26222	-0.38111	1	
Q8	0.450005	0.218089	-0.61439	0.221555	0.202683	0.091604	-0.0985	1

The interactions of two variables, language and cultural competence, with technology between preservice teachers in Kazakhstan are revealed by the coefficients shown in Table 4. For each cell, the sign and value correspond to the strength and the angle of their link, respectively (Srisawasdi, Pondee and Bunterm 2018). On the other hand, there is a significant positive correlation between Q4, which indicates the significance of cultural sensitivity, and Q5, which indicates the benefits of technology-enhanced cultural activities. A relationship between increasing cultural sensitivity and a positive impression of virtual cultural tours as benefits can be suggested in this case (Tor, Başaran and Anik, 2022). To elaborate, Question 8, where there is a close knit between contextual and technological comprehension, displays an inverse correlation with Question 3, which measures the assimilation of technology. This indicates that people who place high value on cultural knowledge might not experience an upbeat perspective on technological integration in the learning of languages. The revealed correlations focus on the intricate interrelations of linguistic training and cultural enhancement with the introduction of technology in *curricula* as training programs for teachers in Kazakhstan (Abdelilah, 2001).

Table 5. ANOVA test

SUMMARY					
Groups	Count	Sum	Average	Variance	
Q1	105	447	4.257143	0.500549	
Q2	105	431	4.104762	0.498535	
Q3	105	425	4.047619	0.545788	
Q4	105	454	4.32381	0.509524	
Q5	105	428	4.07619	0.455678	
Q6	105	460	4.380952	0.372711	
Q7	105	437	4.161905	0.521612	
Q8	105	446	4.247619	0.495788	

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	10.78095	7	1.540136	3.159105	0.002653	2.020568
Within Groups	405.619	832	0.487523			
Total	416.4	839				

The one-way ANOVA of the mean scores for the eight survey items on linguistic and cultural competence and technological integration among the Kazakhstani student-teachers is shown in the table above. The ANOVA results indicate that at least one survey item has a significantly different mean score ($F(7, 832) = 3.159, p = 0.002653$). Participants may have a wide range of opinions on linguistic and cultural competence and technology integration (Srisawasdi, Pondee and Bunterm 2018). Further comparative studies may ensure that the survey questions differ greatly. These results highlight the role of alternative points of view and experience in the design of technology-mediated learning activities to enhance the linguistic and cultural competency of preservice instructors in Kazakhstan (Argaw, 2022).

Discussions

This study was designed to develop the linguistic and cultural skills of preservice teachers in Kazakhstan via technology-infused learning. Its findings are worth mentioning (Chisholm, 1998). The researcher utilized an online Qualtrics-based survey to collect data from 105 participants, among whom 65 were male and 40 were female, and employed statistical methods such as descriptive statistics, correlation analysis, and ANOVA to assess how the integration of technology is connected to linguistic and cultural competence (Tor, Başaran and Arık, 2022). The sex ratio of the participants was primarily male (61.9%), and most of the participants had a bachelor's degree (71.4%), which suggests the need for equitable recruitment and educational intervention that could be tailored to both genders and different educational levels (Chen, 2011).

The descriptive statistics revealed consistent responses among participants in terms of cultural and linguistic proficiency (Çobanoğlu, 2020). The participants were more likely to express themselves accurately in multiple languages, with a mean of 4.20 out of 5. Additionally, culture awareness is valuable for successful teaching, as it had an average rate of 4.15. Moreover, respondents had a very positive view of the use of technology in language teaching, with a score of 4.31 indicating its usefulness in improving language proficiency. This evidence underpins the advantages of integrating technology into the learning environment and boosting linguistic and cultural comprehension among Kazakh preservice teachers (Daniyarova, 2020).

Correlation analysis has revealed certain relationships between technology use and linguistic and cultural competence (Akhmetova, Kopzhassarova and DeVereaux, 2023). Moreover, the recognition of cultural sensitivity was found to have a strong relationship with the perception of beneficial activities, which included technology-enhanced cultural immersion, demonstrating a link between cultural understanding and technology adoption. Moreover, it was found that there was a negative correlation between

understanding of cultural contexts and technology integration, which means that those who *prioritize* cultural understanding regard technology integration less positively. *Research* shows that the interplay between technology, cultural awareness, and language instruction is complicated; hence, *multifaceted* methods in teaching are needed (Egorov, Jantassova and Churchill, 2007).

The ANOVA results continued to clarify the differences in mean scores among the survey items, representing the varying standpoints and opinions of the participants (Irdianto, Lazareva and Yaniafari, 2023). The clear existence of such gaps highlights the significance of the need to incorporate diverse views when designing technology-mediated learning activities. This shows how technology can assist in the creation of an inclusive education environment that is culturally responsive, which in turn complies with the larger goals that aim at increasing linguistic and cultural competence among preservice teachers in Kazakhstan (Tor, Başaran and Arik, 2022). The study findings thus showcase the promising effect of integrating technology into learning processes that enable preservice teachers to acquire the necessary skills and skills that are redundant to multiethnic educational environments, in turn boosting the rise of inclusive and culturally responsive educational practices in Kazakhstan (Kanayeva, 2019).

Conclusions

Overall, this research study was designed to boost the linguistic and cultural proficiency of preservice teachers in Kazakhstan through the integration of technology in the learning process. This research has shown that the results were good for these methods. The use of a Qualtrics based online survey and statistical data analysis methods such as descriptive statistics, correlation analysis and ANOVA revealed that there were significant relationships between technology integration and the linguistic and cultural competence of the participants.

The findings reported the highest agreement on the topics of cultural sensitivity, technology-oriented learning activities, and understanding of the culture of the environment. Moreover, the research underscores the value of language and culture teaching strategies that address the different perspectives and life experiences of students.

The findings also emphasize the ability of technology-based learning to extend linguistic and cultural competencies among preservice teachers in Kazakhstan and thus to make educational approaches more inclusive and culturally responsive in this region.

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Conflict of interest

The authors declare no conflicts of interest.

Author Contributions

Conceptualization, A.B. and G.D.; methodology, A.B.; writing—original draft preparation, A.B. and G.D.; writing—review and editing, A.B. and G.D.; Analysis, discussion and conclusion, A.B. and G.D.; All authors have read and agreed to the published version of the manuscript.

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