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EVALUATION OF TEACHER CANDIDATES' ATTITUDES TOWARDS THE USE OF SMART LEARNING TECHNOLOGIES

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Abstract

Smart learning technologies employed in education encompass a range of tools and platforms that facilitate learning and instructional activities. Here are several significant smart learning technologies: E-learning platforms, smart learning content tools, video conferencing environments, virtual and augmented reality, game-based learning, smart learning assessment tools, and mobile applications. Determining the attitudes of prospective teachers towards smart learning technologies is an important research need. The purpose of this research was to valuate of teacher candidates' attitudes towards the use of smart learning technologies. In this study, the relational screening model, which is among the quantitative research methods, was used to examine teachers' smart learning competence levels and their relationships with various variables. The sample of the research consisted of 688 university students studying at various education faculty in universities in Kazakhstan. Research data were collected with the attitude scale towards smart learning technologies in education developed by the researchers. Research data were calculated using the SPSS 20.0 statistical package program. Parametric tests were applied to the data set. Weighted mean, standard deviation, independent variables t-test, and ANOVA were determined as the tests applied to the data set. The attitudes of university students participating in the research towards smart learning technologies in education were discussed according to the gender variable. The findings showed that there was no significant difference between the attitudes of male and female university students towards smart learning technologies in education. The attitudes of university students participating in the research towards smart learning technologies in education were discussed according to the variable of the class they were studying in. As a result of the findings, no significant difference was found between the attitudes of first-year, second-year, and third-year university students towards smart learning technologies in education.
Keywords – Teacher candidates, Smart learning technology, Attitude, Teaching and learning, Smart learning education, Student attitudes.

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1. Introduction

Smart learning technologies utilized in education include many tools and platforms that enhance learning and instructional processes. Several notable smart learning technologies include e-learning platforms, smart learning content tools, video conferencing environments, virtual and augmented reality, game-based learning, smart learning assessment tools, and mobile applications (Sagiroglu, Uzunboylu, Akcamete & Demirok, 2025). The incorporation of smart learning technologies into educational activities has emerged as a fundamental strategy in the modern academic landscape. The prospective instructors entering the field are crucial in shaping the utilization of smart learning technologies in classrooms (Mena-Guacas, López-Catalán, Bernal-Bravo & Ballesteros-Regaña, 2025). Therefore, it is crucial to comprehend their perspectives on this integration, as these viewpoints can profoundly impact future instructional frameworks.

Smart learning technologies (SLT) have become essential elements in modern educational settings, distinguished by their capacity to enhance teaching and learning through the use of sophisticated digital tools and resources. These technologies are characterized as systems that provide personalized, adaptive, and interactive learning experiences, utilizing data-driven insights to guide instructional methodologies. The significance of SLTs in education resides in their capacity to address diverse learning requirements, foster engagement, and facilitate collaborative learning settings. Recent advancements in artificial intelligence, cloud computing, and mobile technology have significantly altered conventional pedagogical methods, facilitating more dynamic and accessible learning experiences (Yaseen, Al-Hetari & Ali, 2025).

Recent years have seen a progressive expansion of literature addressing teacher candidates' perspectives of the usefulness and problems of SLT. The research reveals a diverse array of perspectives, with certain teaching candidates demonstrating enthusiasm for the possibility of SLTs to enhance their pedagogical skills and elevate student outcomes. Conversely, others have emphasized significant problems, including inadequate training, limited institutional support, and worries about the digital divide among pupils (Foulger, Buss & Su, 2021). A thorough review by Kimmons (2021) revealed that although numerous candidates acknowledge the transformative potential of SLTs, their implementation frequently falls short of expectations due to widespread difficulties. This duality prompts critical inquiries regarding the preparedness of future instructors to adeptly use these technologies into their practice.

The incorporation of technology in teacher training programs was pivotal in the studies by Galimullina, Ljubimova and Ibatullin (2020) and Hamzah, Abdullah and Ma (2024), which contend that comprehensive training in digital pedagogy is vital for equipping teacher candidates to utilize SLTs effectively. Galimullina et al. (2020) emphasize the necessity for educational institutions to establish organized professional development programs that integrate SLT training into the instructors' training curriculum. These activities enhance the applicants' technological proficiency while also refining their critical thinking and instructional abilities. Hamzah et al. (2024) emphasize the necessity of fostering a creative mindset among teacher candidates through experiential learning activities that enhance practical engagement with SLTs. These insights emphasize the necessity for congruence between teacher education courses and the evolving demands of modern educational practices.

Comprehending the attitudes and beliefs of teacher candidates is essential when assessing their readiness and inclination to use SLT in their future classrooms (Anwar, Wardhono & Budianto, 2022). Ha and Lee (2019) demonstrate that teacher candidates with favorable impressions of SLTs are more inclined to include technology as a fundamental aspect of their pedagogical approaches. The authors contend that these affirmative sentiments increase the likelihood of employing technology-enhanced instructional practices. Similarly, Chen and Zou (2024) assert that cultivating positive attitudes towards technology not only enhances teaching efficacy but also shapes the overall educational experience of students. Consequently, it is crucial to examine how teacher candidates' perceptions of student learning technologies (SLTs) can influence their dedication to technology-enhanced pedagogies, especially in an age where educational institutions are progressively dependent on digital advances.

The incorporation of smart learning technologies in educational settings is contingent upon the perspectives and experiences of novice instructors. A comprehensive review of the literature reveals that, despite enthusiasm for SLTs, the problems associated with their effective implementation require attention. A comprehensive understanding of the attitudes and views of teacher candidates regarding these technologies is crucial for modeling future teaching practices and enhancing educational outcomes. The perspectives of teacher candidates toward the implementation of smart learning technologies are significantly influenced by diverse emotional states and their self-efficacy in utilizing technology. Atabek (2020) emphasizes that emotional states, including worry and enthusiasm, profoundly affect candidates' perceptions of technology's role in their future classrooms. Hopcan, Türkmen and Polat (2024) further investigate the correlation between positive emotional states and enhanced self-efficacy, asserting that individuals who possess confidence in their technological abilities are more inclined to see smart learning technologies as effective teaching instruments. This trust fosters the inclination to incorporate these technologies into instructional practices while alleviating concerns regarding potential technological failures that may occur in classroom settings (Tahir, Salam, Mubarak, Fahmi, Sulaiman & Armia, 2024).

The significance of pedagogical content knowledge, particularly the technical aspect of this knowledge (TPACK), is crucial for assessing teacher candidates' beliefs on smart learning technologies (Ha & Lee, 2019). Folger, Poole and Stutman (2021) They assert that comprehensive training programs are essential, as they provide candidates with the technological competencies required to utilize smart learning tools effectively and the pedagogical strategies needed to integrate these tools meaningfully into their courses. Furthermore, Jammeh, Karegeya and Ladage (2024) assert that teacher candidates possessing a strong TPACK are more inclined to uphold favorable views towards the use of smart learning technologies and acknowledge its significant potential to enhance learning outcomes. The incorporation of TPACK into teacher education courses is essential to cultivate a generation of educators equipped to adopt novel technology in their instructional methods (Belda-Medina & Calvo-Ferrer, 2022a).

The convergence of educational technology and Technological Pedagogical Content Knowledge (TPACK) is crucial for promoting gender inclusion in science courses. Research indicates that comprehending TPACK enables educators to connect technological integration with pedagogical practices, especially in tackling gender gaps in STEM education. Ergen, Yelken and Kanadli (2019) performed a meta-analysis demonstrating that TPACK affects instructional efficacy about gender disparities, highlighting the necessity of gender-sensitive curricular strategies. Furthermore, Ozudogru and Ozudogru (2019) examined the demographic factors influencing mathematics teachers' TPACK, emphasizing that teachers' cognizance of gender issues can improve their pedagogical methods. Irmak and Yilmaz-Tüzün (2019) examined pre-service science teachers' perceived TPACK within science education, indicating that insufficient preparation may impede their ability to provide an inclusive environment for all genders in science courses.

Additionally, Antonio, Probitchado, Ricohermoso, Saavedra and de-la-Rama (2020) investigated gender disparities in technology proficiency among scientific educators, highlighting an ongoing necessity for training that promotes equal technological competencies. The cross-national analysis by Jiang, Schenke, Eccles, Xu and Warschauer (2018) highlighted substantial gender disparities in STEM course enrollment and completion, emphasizing the need for an inclusive educational environment. Self-efficacy views concerning TPACK have been demonstrated to affect technology integration, as indicated by Oskay (2017), while Bakar, Maat and Rosli (2020) highlighted mathematics teachers' confidence in integrating technology with pedagogical subject understanding. Palomares-Ruiz, Cebrián, López-Parra and García-Toledano (2020) emphasized the need of integrating ICT in science education in relation to the digital gender gap, arguing for solutions that foster a more inclusive educational environment. Collectively, these findings underscore the necessity for a unified initiative to integrate TPACK into educational technology frameworks to improve gender inclusion in science courses.

Nonetheless, with their optimistic dispositions, teacher candidates encounter many hurdles when integrating smart learning technology into educational settings. A primary hurdle found in the research is fear associated with technology use, which can substantially hinder candidates' trust and willingness to integrate these tools into their instruction. Pradana, Agustini, Dantes and Sudatha (2024) elucidate how this concern frequently stems from insufficient preparation and prior exposure to technology, resulting in candidates feeling ill-equipped for their prospective positions as educators. Moreover, the absence of institutional support, as articulated by Meccawy (2023), exacerbates these issues. Candidates frequently indicate a deficiency in resources, including access to contemporary technological tools and adequate time for practice and experimentation, which impedes their capacity to fully engage with smart learning technologies.

The obstacles encountered by teacher candidates in adopting smart learning technology may significantly impact their future teaching methodologies and student engagement. Ley, Tammets, Pishtari, Chejara, Kasepalu, Khalil et al. (2023) delineate that the extent to which candidates perceive assistance and sufficient training in utilizing these tools impacts not only their immediate attitudes but also their long-term dedication to integrating technology into their teaching. Tawafak, Al-Obaydi, Klimova and Pikhart (2023) assert that when technological integration encounters numerous impediments, the possibility for dynamic and engaging educational experiences diminishes. This issue escalates as teaching candidates transition to classrooms; their experiences and opinions toward technology will inevitably influence the learning environments they establish for their pupils. The existence of these challenges necessitates a thorough evaluation of the support systems provided for teacher candidates and the training they undergo, as these elements are crucial in influencing the efficacy of smart learning technologies and the broader educational outcomes achieved through their implementation.

The applicants' attitudes of the integration of smart learning technology in education are influenced by various elements, including training experiences, smart learning competency, and perceived advantages of technology. As prospective educators prepare to enter the classroom, their attitudes regarding smart learning tools will fundamentally impact their teaching techniques and the overall efficacy of technology in enhancing educational experiences (Belda-Medina & Calvo-Ferrer, 2022b). The use of smart learning technologies in educational settings presents a dynamic landscape for teacher candidates, who must confront many problems while preparing for their future jobs (Sharonova & Avdeeva, 2024). These obstacles profoundly affect their perspectives of smart learning technology utilization in educational settings.

Professional development programs might enable a smoother transition in technologically connected classrooms by educating teacher candidates with essential skills and confidence. The focus on smart learning competence not only equips candidates for the present educational landscape but also fosters a culture of lifelong learning to adapt to future technological advancements (Abidin, Muslimin, Utama, Pradanimas & Ali, 2024).

The analysis here shows that understanding the barriers that pre-service teachers face with smart learning technologies is essential to increase their readiness to work in modern educational environments. By recognizing the barriers, adopting entrepreneurial methodologies, encouraging creativity, and providing continuous professional development, education systems can ensure that future educators are prepared to effectively use smart learning technologies in their pedagogical practices. In the literature review, it can be said that there is not much research on the attitudes of pre-service teachers towards smart learning platforms, and that there is a research gap on this subject. However, knowing the attitudes of pre-service teachers towards smart learning environments at the beginning can provide great benefits. In fact, it is a necessity to examine the attitudes of pre-service teachers and present them within the framework of a scientific research.

1.1. Purpose of the Research

The purpose of this research is to evaluate the attitudes of university students towards smart learning technologies in education. In this regard, the following research questions were created.

1. What are the attitudes of university students participating in the research towards smart learning technologies in education?
2. Do the attitudes of university students participating in the research towards smart learning technologies in education differ according to gender?
3. Do the attitudes of university students participating in the research towards smart learning technologies in education differ depending on the class they study in?

2. Methods and Materials

2.1. Research Method

In this study, the relational scanning model, which is among the quantitative research methods, was used to examine teachers' smart learning competence levels and their relationships with various variables. The survey model is a popular research design in education with many applications and is a non-experimental model that researchers use to describe the attitudes, ideas, behaviors, or characteristics of a group (Duff, 2012).

2.2. Participants

The sample of the research consists of 688 students studying in programs that train teachers for higher schools in faculties of education at various universities in Kazakhstan. University students are studying in the 2024-2025 academic year. Demographic information about the students is given in Table 1.

Variables	n	%
Gender		
Female	315	45.8
Male	373	54.2
Class		
1st Class	221	32.2
2. Class	268	38.9
3rd Class	199	28.9
Total	688	100

Table 1. Demographic information of students

Table 1 shows the gender and grade distribution of the university students participating in the research. 45.8% of the students are female and 54.2% are male. 32.2% of university students are in the first year, 38.9% in the second year, and 28.9% in the third year.

2.3. Data Collection Tools

Research data were collected with the "attitude scale towards smart learning technologies in education" developed by the researchers. The following stages were followed while developing the attitude scale towards smart learning technologies in education.

Creation phase of the scale's items: While developing the draft form, research was conducted on smart learning technologies such as e-learning platforms, smart learning content tools, video conferencing environments, virtual and augmented reality, game-based learning, smart learning assessment tools, mobile applications and etc. The attitude scales developed and used on the attitudes of prospective teachers towards these areas were evaluated. After the research, 42 draft scale items were selected, revised, and developed. Later, the draft scale items were checked for compliance with Kazakh grammar and spelling rules by 2 linguistics professors. After the language check, the content validity was checked by 2 educational technology professors. 6 items were removed from the draft scale in line with the suggestions of the experts. The draft scale consisting of 36 items was made ready for pilot application. The student's degree of agreement with the items in the scale was defined as 1 "Strongly Disagree", 2 "Disagree", 3 "Partially Agree", 4 "Agree" and 5 "Strongly Agree".

Characteristics of the draft scale working group: 479 students studying at various universities in Kazakhstan participated in the validity and reliability study of the study. It was determined that the majority of the data of 11 students were left blank or the same options were randomly selected, so they were not included in the study. The study group meets the sample size criterion of five times the number of items recommended for the use of the factor analysis technique (Child, 2006). 42.6% of the students participating in this part of the study were female and 57.4% were male. Construct and Content Validity: The data obtained from the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett Sphericity test (KMO .82 and Bartlett Sphericity test $\chi 2=4341.59$, $p=.00$; $p<.05$) showed that factor analysis could be performed on the scale. At this stage, the construct validity of the scale was checked. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were examined for construct validity. EFA was evaluated with SPSS 25.0 statistics program. CFA was examined with SPSS Amos 25.0 statistics program. In order to determine how many factors the AFA items were gathered under, firstly the eigenvalues and explained percentages were examined. As a result of the fact that the number of factors covered 2/3 of the total variance and the examination of the scree plot according to the eigenvalues of the factors, it was found that the number of factors was 3. Three items loaded on another factor were removed from the scale. The eigenvalues and explained percentages for the remaining 33 items were examined again. It was accepted as a good result that the common factor variances of the items were close to 1.00 or above 0.66. According to the obtained results, the total loading value of all three factors was 0.71. This value reveals that the scale items explained a significant portion of the total variance in terms of loading value. As a result of factor rotation in the scale of attitudes towards smart learning technologies in education, the loading values of the items in the factors were found to be 0.596-0.781 for the first factor, 0.783-0.844 for the second factor, and 0.783-0.844 for the third factor, respectively. The goodness of fit indexes of the scale were examined in the confirmatory factor analysis. When the fit indexes of the model tested with CFA were examined, it was determined that the Chi-Square value was primarily significant. For the data set; RMSEA=0.043 (root mean square of approximation), SRMR=0.06 (standardized root mean square error), NNFI=0.94 (non-normed fit index), IFI=0.93 (incremental fit index), CFI=0.96 (comparative fit index), GFI=0.95 (goodness of fit index), AGFI=0.92 were determined. The values obtained reveal that the three-factor structure of the scale has high goodness of fit values. At this stage, it was accepted that the attitude scale towards smart learning technologies in education confirmed the three-factor structure.

The Tripartite Model of Attitudes, a prevalent and rational social psychology framework, posits that attitudes comprise emotional, cognitive, and behavioral (ACB) components. This model delineates the affective component as the emotions that prompt an individual's reactions and influence their attitude towards a situation; the cognitive component pertains to the beliefs and values acquired through life experiences; and the behavioral component centers on the actions and intentions of an individual confronted with a specific circumstance requiring a response (APA, 2015).

According to the ACB model this scale includes 33 items (direct and reverse) and three subscales corresponding to the cognitive, emotional and behavioral components of attitude. Affective Subscale (ES) includes 15 items (12 positive and 3 negative statements) aiming to determine the emotions and feelings of prospective teachers regarding smart learning technologies. Cognitive Subscale (CS) includes 13 items (11 positive and 2 negative statements) aiming to determine the perceptions and knowledge of prospective teachers regarding the possibilities of smart learning technologies. Behavioral Subscale (BS) includes 5 items (4 positive and 1 negative statements) aiming to evaluate how prospective teachers master smart devices and technologies during the learning process of smart learning technologies.

Sample items:

Emotional domain (ED); "I am pleased with the opportunity to attend online lessons in the courses I take" (ES); "Watching videos related to my course topics is quite interesting to me".

Cognitive domain (CD); "I know the pros and cons of online courses very well in the courses I take" (CS); "I can do the homework given by the teacher more accurately with the help of artificial intelligence".

Behavioral domain (BD); "It can be difficult to prepare materials in the online courses I take". "I can use Augment Reality devices very easily"

Reliability study and Spearman-Brown: The reliability coefficient obtained by dividing a scale into two halves is expressed as equivalent split-half reliability. The Cronbach Alpha coefficient of the three factors in the attitude scale towards smart learning technologies in education was calculated as 0.89 for the first factor (AD), 0.86 for the second factor (CD) and 0.85 for the third factor (BD). The total reliability coefficient obtained from the entire scale was found to be 0.87. The Spearman-Brown split-half test correlation was found to be between 0.60 and 0.85. At this stage, it was accepted that the attitude scale towards smart learning technologies in education confirmed the two-factor structure.

2.4. Data Collection Process

Google Forms was used to collect data. The e-mail addresses of the students were reached by obtaining the necessary permissions from the universities where they studied, and the created scale was sent to the students in Google Forms format. It was determined that the university students who constituted the study group of the research completed the scale application in an average of 10-15 minutes. It took approximately 3 weeks for all students to deliver the scales to the researchers.

All stages of the research were conducted in full compliance with ethical regulations and scientific research principles. Teacher candidates participating in the study were clearly and explicitly informed about the purpose, scope, procedures, and voluntary nature of the research beforehand. It was explicitly stated that participation was based on free will and that individuals could withdraw from the study at any time without any consequences. All participants were asked to carefully read and approve the "Voluntary Participation Consent Form" before proceeding to the main measurement instruments. Participants who did not approve were not allowed to proceed to the main measurement instruments.

All participant identities were kept confidential. The collected data were used solely for scientific purposes and were not shared with third parties under any circumstances. No procedures that could cause physical, psychological, or social harm to participants were applied during the research process. All stages of the study were conducted in a transparent and verifiable manner, respecting individual rights. Furthermore, the writing and reporting of the study were carried out in strict adherence to ethical publishing principles throughout the entire research process.

2.5. Data Analysis

Research data were calculated using the SPSS 20.0 statistical package program. Normality tests of the data set revealed that the Kolmogorov - Smirnov value ($p>.05$) was suitable for normal distribution. Thus, parametric tests were applied to the data set. Weighted mean, standard deviation, independent variables T-test, and one-way analysis of variance ANOVA were determined as the tests applied to the data set. Scale item score ranges were taken as equally spaced according to the formula "5-1=4, 4/5=0.80". The score range of 5.00-4.20 indicates very high attitude, 4.19-3.40 indicates high attitude, 3.39-2.60 indicates medium attitude, 2.59-1.80 indicates low attitude, and 1.79-1.00 indicates very low attitude.

3. Results

In Table 2, the weighted means and standard deviations of the attitude scale towards smart learning technologies in education were calculated for the overall scale and its two factors.

Scales	M	SD	Level
Emotional scale	3.66	0.542	High attitude
Cognitive scale	3.54	0.693	High attitude
Behavioral scale	3.57	0.564	High attitude
Total Scales	3.59	0.599	High attitude

Table 2. Weighted means and standard deviations of the attitude scale toward smart learning technologies in education

In Table 2, the weighted averages and standard deviations of the attitude scale towards smart learning technologies in education were calculated. University students' scores in the emotional sub-dimension (*M*=3.66, SD=0.542) and cognitive sub-dimension (*M*=3.54, SD=0.693), behavioral sub-dimension (*M*=3.57, SD=0.564) and in the overall attitude scale towards smart learning technologies in education (*M*=3.59, SD=0.671) It was determined that all of them had a high degree of attitude towards smart learning technologies in education.

In Table 3, the T-test results of the university students participating in the research according to gender variable are given within the scope of their attitudes towards smart learning technologies in education.

Gender	N	M	SD	t	p
Female	315	3.51	0.821	–2.217	0.026
Male	373	3.65	0.830		

Table 3. T-test results of independent variables according to gender variable

In Table 3, the attitudes of university students participating in the research towards smart learning technologies in education are discussed according to the gender variable. The findings showed that there was slightly significant difference between the attitudes of male and female university students towards smart learning technologies in education ($t=-2.217$, $p<.05$). The difference obtained is in favor of male university students. When we look at the mean and significance level in Table 3, it is seen that the significant difference is not large.

Table 4, the one-way analysis of variance (ANOVA) results of the university students participating in the research according to the variable of the class they study in are given within the scope of their attitudes towards smart learning technologies in education.

Class	n	M	SD	F	p
1. Class	221	3.53	0.659	1.801	0.165
2. Class	268	3.62	0.646		
3. Class	199	3.64	0.630		

Table 4. One-way analysis of variance (ANOVA) results according to the class variable

In Table 4, the attitudes of university students participating in the research towards smart learning technologies in education are discussed according to the variable of the class they study in. As a result of the findings, no significant difference was found between the attitudes of first-year, second-year, and third-year university students toward smart learning technologies in education ($F=1.801$, $p>.05$). This finding reveals that the attitudes of first-year, second-year and third-year students towards smart learning technologies in education are similar.

4. Discussions

It was determined that teacher candidates had high attitudes in the emotional sub-dimension, cognitive sub-dimension, behavioral sub-domain and attitude scale towards smart learning technologies in education. Instefjord and Munthe (2017) focused on the integration of professional digital competence into teacher education programs; They conducted a survey among teacher educators, counselors, and teacher candidates in Norway. As a result of the research, it was concluded that there are strong positive correlations between the digital competence of teacher educators. Contrary to the research findings, Garzón-Artacho, Martínez, Ortega-Martín, Marín-Justen and Gómez-García, (2020) conducted a study to evaluate the development of teachers' smart learning competence during the lifelong learning phase in Spain, and 142 teachers from different schools in this field participated. According to the research findings, it has been stated that there is a lack of teachers in the creation of smart learning content and as a result, the development of teachers' smart learning competence is an important element for the education system.

The research on smart learning technologies in education was discussed according to the gender variable. The findings showed that there was significant difference between the attitudes of male and female university students towards smart learning technologies in education. The fact that the observed difference is not significant allows us to discuss different viewpoints. Perhaps this difference stems from the higher number of male participants. This result needs to be considered and discussed. While some studies, particularly in the 2000s, showed higher attitudes towards technology in favor of male teachers, many studies in recent years have observed no significant differences. A total of 1704 faculty members from all over Spain participated in the study conducted by Guillén-Gámez, Mayorga-Fernández and Contreras-Rosado (2021) to analyze and compare the use of information communication technologies resources and smart (digital) learning competence levels of higher education staff in their research studies. As a result of the research, it was determined that there was no significant difference in the smart learning competence levels of faculty members between the two genders. Zakharov, Komarova, Baranova and Gulk (2022) similarly revealed in their research that the gender variable was not predictive of teachers' smart learning competencies.

Notwithstanding these findings, certain studies indicate that gender significantly influences educators' attitudes and interactions inside smart learning settings. Men and women may have distinct preferences about technology utilization and classroom management techniques (Dai, Xiong, Zhao & Zhu, 2023; Nguyen, Kanjug, Lowatcharin, Manakul, Poonpon, Sarakorn et al., 2022).In this research, , smart devices are utilized daily without regard to gender. For instance, the most often utilized devices from an early age are smartphones, tablets, and virtual reality tools. Consequently, even if studies identify gender disparities in the domain, they should no longer be regarded in the context of intelligent learning environments.

The attitudes of university students participating in the research towards smart learning technologies in education were discussed according to the variable of the class they were studying in. As a result of the findings, no significant difference was found between the attitudes of first-year, second-year, and third-year university students towards smart learning technologies in education. Diz-Otero, Portela-Pino, Domínguez-Lloria and Pino-Juste (2022), with the participation of 166 secondary school teachers from different branches during the COVID-19 pandemic in Spain, analyzed their degrees of smart learning competence and whether there was a relationship between individual variables (such as age, gender, degree work experience and smart learning competence prowess). A study was conducted to understand. According to the results obtained in the research, it was stated that there was no significant difference according to the variables analyzed.

Finally, supporting these research findings, MacLeod, Yang, Zhu and Li (2018), in their study on smart classroom preferences, found that pre-service teachers' prior experiences and attitudes towards using smart technologies also influenced overall learning outcomes. Teachers' perceptions of necessary changes in their educational settings may differ, leading to varying readiness to adopt smart learning environments (Bautista-Pérez, Rubio-Hurtado & Sánchez-Martí, 2022). Furthermore, effective classroom dynamics contribute to teacher competence in assessing student attention in these environments (Bdiwi, de-Runz, Faiz & Ali-Cherif, 2019). Therefore, understanding the effects of classroom dynamics is crucial for developing targeted instructional practices and improving teacher training to ensure all educators are prepared to promote inclusive and engaging smart learning environments.

5. Conclusion

As main conclusion of the research, it was determined that teacher candidates had high attitudes in the emotional sub-dimension, cognitive sub-dimension, behavioral sub-domain and attitude scale towards smart learning technologies in education. According to this conclusions, teacher candidates studying in education faculties of universities are attitudinally ready for smart learning applications. In addition, the attitudes of university students participating in the research towards smart learning technologies in education were discussed according to the gender variable. The findings showed that there was significant difference between the attitudes of male and female university students towards smart learning technologies in education. Last conclusion, the attitudes of university students participating in the research towards smart learning technologies in education were discussed according to the variable of the class they were studying in. As a result of the findings, no significant difference was found between the attitudes of first-year, second-year, and third-year university students towards smart learning technologies in education.

One of the most important conclusion of this research is that in developing countries like Kazakhstan, prospective teachers have a high level of positive attitude towards smart learning applications. Overall, prospective teachers are ready to use smart learning environments. In addition, there is a decreasing trend in the significant differences between genders in prospective teachers' attitudes towards new technologies. Class differences are no longer significant factors influencing prospective teachers' attitudes and practices towards the use of smart learning environments.

6. Recommendations

Increasing the smart learning competence levels of teachers can be achieved by integrating the courses given in education faculties during undergraduate education, which is the beginning of their professional lives, with smart learning technologies and by designing course outcomes for smart learning skills. By making course contents and outcomes suitable for use with smart learning technologies, alternative learning environments can be developed for teachers and students. As a result of the study, it was determined that the smart learning competence of the students was at a high level, but not at a very high level. Studies on this situation can be diversified and qualitative research can be conducted on why and how to increase smart learning competencies. Further research is needed to investigate the effect of gender on prospective teachers' attitudes towards technology.

Institutional Review Board Statement

This research proposal was approved by the for conduct on 5 February 2024.

Data Availability Statement

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

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Declaration of Conflicting Interests

The authors declare no conflict of interest.

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