NOVITAS-ROYAL
RESEARCH ON YOUTH AND LANGUAGE

2024, 18(2), 230–239
Novitas-ROYAL (Research on Youth and Language)
ISSN: 1307–4733

Research Article

Future Teachers' Attitudes Toward Using Interactive Technologies in Higher Education

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Article information

Submission	17/06/2024	Revision received	28/08/2024
Acceptance	15/09/2024	Publication date	22/10/2024

Keywords:
Interactive
Educational culture
Teacher candidate
Mixed method

Abstract: This research evaluates future teachers' attitudes regarding developing educational culture through interactive technologies in higher education. The study group of this mixed methods research consists of 388 teacher candidates. Research data were collected using a scale developed by the researchers and the teacher candidates' semi-structured interview forms. Statistical and descriptive analyses were conducted, and the results showed that teacher candidates' attitudes toward using interactive technologies in higher education were positive. Teacher candidates' attitudes towards using interactive technologies in education did not differ significantly according to sex, grade, and teaching fields. Teacher candidates suggested increasing technological opportunities in higher education to improve the effectiveness of interactive technologies in their classrooms.

Anahtar Sözcükler:
Etkileşim
Eğitim kültürü
Öğretmen adayı
Karma yöntem

Öğretmen Adaylarının Yüksek Öğretimde Etkileşimli Teknolojilerin Kullanılmasına Yönelik Tutumları

Özet: Bu çalışmada, yükseköğretimde etkileşimli teknolojiler aracılığıyla eğitim kültürünün geliştirilmesine ilişkin geleceğin öğretmenlerinin görüşleri alınmaktadır. Karma yöntemli bu araştırmanın çalışma grubu 388 öğretmen adayından oluşmaktadır. Araştırma verileri araştırmacılar tarafından geliştirilen bir ölçek ve öğretmen adaylarının yarı yapılandırılmış görüşme formlarına verdikleri yanıtlardır. İstatistiksel ve betimsel analizler yapılmış ve sonuçlar öğretmen adaylarının yükseköğretimde etkileşimli teknolojileri kullanmaya yönelik tutumlarının olumlu olduğunu göstermiştir. Öğretmen adaylarının eğitimde etkileşimli teknolojileri kullanmaya yönelik tutumları cinsiyet, sınıf ve öğretim durumları arasında anlamlı bir farklılık bulunamamıştır. Öğretmen adayları, sınıflarında etkileşimli teknolojilerin etkinliğini artırmak için yükseköğretimde teknolojik fırsatların artırılmasını önermiştir.

To Cite This Article: Uaidullakyzy, E., Jetpisbayeva, S., Zhorayeva, S. B., & Shadiyeva., N. (2024). Future teachers' attitudes toward using interactive technologies in higher education. *Novitas-ROYAL (Research on Youth and Language)*, *18*(2), 230–239. https://doi.org/10.5281/zenodo.13894311

1. Introduction

Developing and changing world conditions have caused some changes in the field of education, as in many other fields, and these changes have caused transformations in the technologies used in schools, students, and teachers. In this technological age, new teacher training programs that meet the needs of the age and where the educational culture of teacher candidates are developed through interactive technologies are designed and developed every year. Hence, "stakeholders in education should pay utmost attention to designing English classes with relevant technological tools and upgrading the systems to increase effectiveness" (Celik & Kara, 2024, p. 32). Accordingly, in this study, the attitudes and thoughts of future teachers regarding the development of educational culture through interactive technologies in higher education are examined to fill the gap in the relevant literature.

1.1. Related Research

In recent years, it has been seen that many studies have been conducted examining the multifaceted effects of interactive boards, which are frequently used at almost all levels of education and in all learning areas, on the teacher-learning process (Torff & Tirotta, 2010; Minor et al., 2013). E-books that offer interactive technology content (Reich et al., 2016) provide students with content that appeals to different senses, such as video-audio recordings, animated commands, games, and animations. In terms of providing a learning environment, researchers have frequently evaluated its contributions to education in recent years. In their research, Hung and Chen (2018) developed interactive learning activities under embodied interactive video lessons. As a result of the study, it was determined that the learning levels of students who received education with interactive video lessons were higher than other students. In their research, Liu et al. (2020) examined the effects of interactive virtual reality technologies on student success. As a result of their research, it was determined that students who received education with virtual reality applications achieved higher academic success compared to those who did not receive education.

1.2. Purpose of Research

This research aims to collect and interpret future teachers' attitudes regarding developing an educational culture through interactive technologies in higher education. The following research questions guided this study.

1. What are the opinions of teacher candidates regarding the advantages of using interactive technologies?
2. What are the opinions of teacher candidates regarding the disadvantages of using interactive technologies?
3. What are the suggestions of teacher candidates regarding increasing the effectiveness of interactive technologies?

2. Method

This section of the research includes information about the method determined following the purpose of the research. In addition, the working group, the development process of the data collection tool, the evaluation of the data, and ethical processes are included in this section.

2.1. Research Design

This research was designed as mixed methods research. Mixed method research is expressed as combining the views of researchers who adopt only a single research paradigm, researchers who adopt a research paradigm depending on the situation, and researchers who adopt a pragmatic research paradigm in a mixed method. This method combines quantitative and qualitative methods (Rossman & Wilson, 1985). In this research, the attitudes and thoughts of future teachers regarding the development of educational culture through the use of interactive instructional technologies.

2.2. Participants

The study group of the research consists of 388 teacher candidates. The demographic distribution of teacher candidates in terms of gender, grade, and teaching field is given in Table 1.

Table 1.
Demographics of Teacher Candidates

Gender	f	%
Female	213	54.9
Male	175	45.1
Class		
1st Class	119	30.7
2nd Class	145	37.4
3rd Class	124	31.9
Teaching Field		
Classroom Teaching	71	18.3
Math Teaching	75	19.4
English Teacher	77	19.8
Geography Teaching	80	20.6
Science Teacher	85	21.9
Total	388	100

Table 1 shows the distribution of the teacher candidates who participated in the study according to gender, grade, and the teaching field. 54.9% of teacher candidates are female and 45.1% are male. 30.7% of teacher candidates are studying in the 1st grade, 37.4% are in the 2nd grade, and 31.9% are in the 3rd grade. Moreover, 18.3% of the teacher candidates are enrolled in classroom teaching programs, 19.4% in mathematics education, 19.8% in English language teaching, 20.6% in geography education, and 21.9% in science education.

2.3. Data Collection

Research data were collected using the teacher candidates' attitudes towards using interactive technologies in the education scale developed by the researchers and with the teacher candidates' semi-structured interview form.

2.3.1. Scale of teacher candidates' attitudes towards the use of interactive technologies in education

In the first stage of the scale development process, research in the field was examined, and items related to interactive technologies in education were created. Care was taken to ensure that the scale items created were to measure teacher candidates' attitudes. There are 44 items in the created item pool. The linguistic and grammatical structure of the items containing content

related to the use of interactive technologies in education, designed to measure teacher attitudes, was evaluated by three linguists. Linguists evaluated the errors in the items together and made various corrections. Five field experts conducted the content validity of the items in the item pool. Field experts evaluated the items and stated that the items they thought were unsuitable for the research content should be removed from the scale. They also made various structural changes to the articles that they thought needed to be structurally changed in terms of scope. Experts stated that the items they found suitable in scope could be used directly in the research. In this regard, 24 items that were unanimously agreed upon by five experts and two items that they edited were included in the pilot scale. There are 26 items in the final form of the pilot scale. In the second stage, a pilot scale application group was formed. This group consists of 298 teacher candidates, and the teacher candidates who participated in this part of the research were not included in the sample group. One hundred fifty-five teacher candidates are women, and 143 are men. The pilot scale was administered to teacher candidates face to face and in groups at the universities where they studied.

Firstly, the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's sphericity test were calculated for the data set obtained as a result of the application. KMO value was found to be 0.871, and Bartlett's test was found to be below $p<0.05$ ($p=0.000$). These findings showed that the data set was suitable for factor analysis. Exploratory factor analysis was applied using the SPSS 25.0 statistical program. In the first stage, the eigenvalue and variance ratios of the data set were examined, and two factors with eigenvalues greater than one were found. The proportion of variance explained by the factors was 86.4%. When the scree plot was examined, it was seen that five items with item factor loads below 30 should be excluded from the scale. SPSS Amos 25.0 statistical program was used to verify the two-factor structure of the pilot scale, whose number of scale items decreased to 21. For this analysis, the goodness of fit indices of the data set were examined.

Acceptability value of the model CMIN /df (χ^2/df<5) = 3.677, GFI (Goodness -of-fit Index), (>0.90) = 1.219, CFI (Comparative Fit Index) (>0.90) = 1.860, NFI -TLI (Normed Fit Index - Turker-Lewis Index) (>0.80) = 0.960–0.950 and RMSA (Root Mean Square Error of Approximation) (<0.07) = 0.041 was found. The data obtained showed that the data set had a reasonable fit. Additionally, it was determined that all items were compatible with their sub-dimensions. The goodness of fit index results showed that the scale was applicable. In the last stage, the reliability coefficient of the scale was calculated. This calculation was made by determining Cronbach's Alpha internal consistency coefficient. The Cronbach Alpha value for the first factor of the scale was found to be 0.86, and the Cronbach's Alpha value for the second factor was found to be 0.80. For the entire scale, this value was calculated as 0.84. The scale's first factor is the attitude towards learning, and the second is the attitude towards teaching. There are ten items in the first factor and 11 in the second. The scale consists of 21 items and three demographic questions. All items on the scale are positive. The scale was created as a 5-point Likert type. As the scores decrease from 5 to 1, teacher candidates' attitudes toward using interactive technologies in education become negative. When item score ranges are taken equal, 5.00-4.20 very positive attitude, 4.19-3.40 positive attitude, 3.39-2.60 moderate attitude, 2.59-1.80 negative attitude, and 1.79-1.00 very. It was rated as a negative attitude.

2.3.2. Semi-structured interview form for teacher candidates

The semi-structured interview form created to collect the qualitative data of the research consists of 3 questions. Two language experts were asked these open-ended questions to evaluate their grammatical structure. After the corrections were made, the open-ended questions were directed

to 3 teacher candidates to assess their clarity. Teacher candidates found the questions clear and understandable. Three teacher candidates who participated in this evaluation part of the research were excluded from the sample group. The questions in the semi-structured interview form were asked face-to-face to 40 teacher candidates randomly selected from the research sample group. The structured interview questions developed by the researchers were created to be compatible with the research questions.

2.3.3. Data collection process

The quantitative data of the research were collected by applying the scale to prospective teachers face-to-face, in the classroom, and collectively. The qualitative data of the research were collected through face-to-face interviews with 40 teachers randomly selected from the research sample. Quantitative and qualitative data were collected simultaneously. It took approximately six weeks to collect research data.

2.4. Data Analysis

The study's quantitative data were analyzed using the SPSS 25.0 statistical program. The Smirnov test was applied to Kolmogorov's assumption of normality, which is the primary criterion of parametric statistical techniques in the data analysis process. As a result of the analysis, parametric tests were applied to the data set. The normal distribution of the data set was determined. In addition to standard deviation and weighted average calculations, an independent samples T-test was applied to analyze two-variable data, and a one-way analysis of variance ANOVA was applied to analyze data with more than two variables. The significance level of the research was determined to be 0.05. The descriptive analysis method was used to analyze the quantitative data. In this regard, prospective teachers' opinions on using interactive technologies in education were transformed into findings using the descriptive analysis method.

2.5. Ethical Issues

A research ethical approval form was created for all experts and teacher candidates who contributed to the research while developing and implementing data collection tools. In the consent form, a statement was made regarding the purpose of the study and that personal data would be kept confidential and not be used in any other research. Participants were informed of the consent form and signed the research voluntary participation form declaring they participated voluntarily. In addition, data collection processes at all stages of the research were carried out with the knowledge and approval of the institutions where data collection was carried out. During the writing phase of the study, action was taken under research ethics.

3. Findings

In this part of the research, the attitudes of prospective teachers towards using interactive technologies on an education scale and the findings obtained in the semi-structured interview form of prospective teachers are presented.

3.1. Findings regarding the scale of teacher candidates' attitudes towards the use of interactive technologies in education

Table 2 gives the overall scale's weighted averages and standard deviations and sub-dimensions of teacher candidates' attitudes toward using interactive technologies in education. In line with the answers given by the teacher candidates to the items in the scale, it was determined that they had positive attitudes in the sub-dimensions of attitude towards learning (M = 3.88, SD = 0.691) and attitude towards teaching (M = 3.81, SD = 0.659). It was determined that teacher

candidates (M = 3.83, SD = 0.670) had positive attitudes in parallel with the sub-dimensions throughout the scale of teacher candidates' attitudes towards using interactive technologies in education.

Table 2.

Weighted average and standard deviations of the scale

	M	SS
Attitude Towards Learning	3.88	0.691
Attitude Towards Teaching	3.81	0.659
Overall Scale	3.83	0.670

In Table 3, the attitudes of the prospective teachers who participated in the research towards using interactive technologies in education are discussed according to the gender variable. The results reveal no significant difference between the attitudes of male and female teacher candidates towards the use of interactive technologies in education (F = 4.220, P >.05).

Table 3.

T-test results of the teacher candidates' attitudes towards the use of interactive technologies in education scale according to gender variable

	N	X	SS	F	P.
Female	213	3.89	0.696	4.220	.280
Male	175	3.75	0.659		

The One-Way Analysis of Variance results were evaluated for the scale of prospective teachers' attitudes toward using interactive technologies in education according to the class variable (Table 4). The results showed no significant difference between the attitudes of prospective teachers studying in the 1st, 2nd, and 3rd grades towards the use of interactive technologies in education (F=4.233, P >.05).

Table 4.

One-way analysis of Variance (ANOVA) results of the teacher candidates' attitudes towards the use of interactive technologies in education scale according to the class variable in which they study

Class	N	X	SS	F	P.
1. Class	119	3.75	0.817	4.233	0.240
2. Class	145	3.85	0.830		
3. Class	124	3.89	0.839		

Table 5 shows that the results of the One-Way Analysis of Variance were evaluated for the scale of prospective teachers' attitudes toward using interactive technologies in education according to the variable of the teaching field they studied. The results showed no significant difference between the attitudes of teacher candidates studying in the fields of classroom teaching, mathematics teaching, English teaching, geography teaching, and science teaching towards the use of interactive technologies in education (F = 4.677, p >.05).

Table 5.

One-way analysis of Variance (ANOVA) results of the teacher candidates' attitudes towards the use of interactive technologies in education scale according to the field of study variable

Teaching field	N	X	SS	F	P.
Classroom teaching	71	3.77	0.648	4.677	0.210
Math teaching	75	3.80	0.867		
English teacher	77	3.91	0.696		
Geography Teaching	80	3.83	0.685		
Science teacher	85	3.90	0.690		

3.2. Findings Regarding the Semi-Structured Interview Form for Teacher Candidates

In Table 6, the teacher candidates' opinions about the advantages of using interactive technologies in developing the educational culture of teacher candidates were interrogated. Results show that interactive technologies make learning easier (85%) and permanent (65%) while bringing more opportunities for repetition (50%), followed by creating a positive learning environment in which students have fun (42.5%).

Table 6.

Participants' opinions about the advantages of using interactive technologies in developing educational culture

Opinions of Teacher Candidates	f	%
Making learning easier	34	85
Ensuring that learning becomes permanent	26	65
More opportunities for repetition	20	50
Providing a positive learning environment (fun)	17	42.5
Providing technological knowledge	14	35
Offering different learning opportunities	11	27.5
Increasing motivation	7	17.5

In Table 7, teacher candidates who participated in the research were prompted to answer the following question: "What are your opinions about the disadvantages of using interactive technologies in developing the educational culture of teacher candidates?" Their answers to the question were categorized, and it was found that 77.5% of them mentioned technological distraction, 75% technological disruptions, and 75% insufficient technological knowledge.

Table 7.

What are your views on the disadvantages of using interactive technologies in developing the educational culture of teacher candidates?

Opinions of Teacher Candidates	f	%
Technological distraction	31	77.5
Technological glitches	30	75
Lack of technological knowledge	30	75
Not applicable to all subjects	27	67.5
Teacher inexperience	21	52.5
Exposure to excessive stimulation	13	32.5
Don't be costly	10	25

The teacher candidates were asked about their suggestions for increasing the effectiveness of the use of interactive technologies in developing the educational culture in higher education (Table 8). Results show that 77.5% of teacher candidates responded that technological opportunities should be increased in universities, 72.5% responded that the competence of university teachers should be increased, and 55% responded that students should be trained on the use of interactive technologies.

Table 8.

What are your suggestions for increasing the effectiveness of interactive technologies in developing the educational culture of teacher candidates?

Opinions of Teacher Candidates	f	%
Increasing interactive technology opportunities in universities	31	77.5
Increasing the competence of university teachers	29	72.5
Providing training to students on the use of interactive technologies	22	55
Availability of interactive technologies in all course content	15	37.5
Introducing interactive technology tools by organizing seminars	9	22.5

4. Discussions

The results obtained from the research reveal that teacher candidates' attitudes towards the use of interactive technologies in education are positive. In his research, Özdamlı (2017) stated that teacher candidates had a positive attitude toward using technologies. As a result of the research, it was revealed that integrating technology into the learning processes increased the motivation and interest of teacher candidates on the subject. When prospective teachers' attitudes towards the use of interactive technologies in education were considered according to the gender variable, it was determined that there was no significant difference between the attitudes of male and female students. Shapka and Ferrari (2003) revealed in their research that, similar to the results of this study, the gender variable of prospective teachers did not create a significant difference in computer-aided applications. When teacher candidates' attitudes towards the use of interactive technologies in education were evaluated according to the variable of the grade in which they were educated, it was determined that the teacher candidates studying in the 1st grade, 2nd grade, and 3rd grade had similar attitudes.

The attitudes of the teacher candidates participating in the research towards the use of interactive technologies in education were discussed according to the teaching field in which they studied, and it was determined that the teacher candidates studying in the fields of classroom teaching, mathematics teaching, English teaching, geography teaching, and science teaching exhibited similar attitudes., The prospective teachers who participated in the research were asked their opinions on the advantages of interactive technologies in developing educational culture. Facilitating learning, making learning permanent, having more opportunities for repetition, providing a fun learning environment, providing technological knowledge, offering different learning opportunities, and increasing motivation were expressed as advantages by prospective teachers. The prospective teachers who participated in the research were asked their opinions on the disadvantages of using interactive technologies in developing educational culture. Technological distraction, disruptions, lack of technological knowledge, inability to apply to all subjects, teacher inexperience, exposure to excessive stimuli, and being costly were expressed as disadvantages by prospective teachers. Nath et al. (2017) stated in their research that there is an excellent trend in the simultaneous use of Internet technologies for teachers and students in today's classrooms. However, they noted that this situation caused a negative result in technological distraction in classroom processes and even in classroom management. On the other hand, the positive aspects stated in the research are that the use of interactive technologies in education diversifies learning and helps it to be permanent.

Teacher candidates participating in the research were asked for their suggestions on increasing the effectiveness of interactive technologies in developing educational culture. Increasing technology opportunities in universities, increasing the competence of university teachers, providing training to students on the use of interactive technologies, making interactive technologies available in all course content, and introducing interactive technology tools by organizing seminars are the suggestions prospective teachers offer. Suggestions from prospective teachers regarding increasing the effectiveness of interactive technologies in developing educational culture are categorized. Teacher candidates: They answered that increasing technology opportunities in universities, increasing the competence of university teachers, training students on the use of interactive technologies, making interactive technologies available in all course content, and introducing interactive technology tools by organizing seminars.

5. Conclusion

This study aims to evaluate the attitudes and thoughts of future teachers regarding the development of educational culture through interactive technologies in the university education process. The results obtained from collecting and evaluating quantitative and qualitative data revealed that teacher candidates' attitudes toward using interactive technologies in education were positive. When teacher candidates' attitudes towards using interactive technologies in education were evaluated according to the gender variable, it was determined that female and male teacher candidates had similar attitudes. Teacher candidates' attitudes towards using interactive technologies in education are similar depending on the class they study in and the teaching field in which they study. The results revealed that the grade level and teaching field of the prospective teachers did not cause a significant difference in their attitudes toward the use of interactive technologies. The majority of teacher candidates participated in the research. While they stated that using interactive technologies in developing educational culture facilitates learning, they expressed technological distraction as the most apparent disadvantage. In addition, the majority of teacher candidates made suggestions about increasing technology opportunities in universities to increase the effectiveness of the use of interactive technologies in developing educational culture.

6. Recommendations

The results obtained from the research reveal that teacher candidates generally have positive attitudes. However, teacher candidates revealed that technology opportunities should be increased in universities, the competence of university teachers should be increased, students should be trained on the use of interactive technologies, interactive technologies should be used in all course contents, and interactive technology tools should be introduced by organizing seminars. All these regulations are thought to increase the quality of teacher education programs and contribute to developing future teachers' use of interactive technologies in higher education.

Note on Ethical Issues

The authors confirm that a research ethical approval form was created for all experts and teacher candidates who contributed to the research while developing and implementing data collection tools. In addition, all participants signed the research voluntary participation and consent forms. (Date of Confirmation: 11/08/2024).

Conflict of Interest

The authors declare no conflict of interest.

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