

The Examination of Prospective ICT Teachers' Attitudes towards Application of Computer Assisted Instruction

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Abstract—Nowadays, thanks to development of technology, integration of technology into teaching and learning activities is spreading. Increasing technological literacy which is one of the expected competencies for individuals of 21st century is associated with the effective use of technology in education. The most important factor in effective use of technology in education institutions is ICT teachers. The concept of computer assisted instruction (CAI) refers to the utilization of information and communication technology as a tool aided teachers in order to make education more efficient and improve its quality in the process of educational. Teachers can use computers in different places and times according to owned hardware and software facilities and characteristics of the subject and student in CAI. Analyzing teachers' use of computers in education is significant because teachers are the ones who manage the course and they are the most important element in comprehending the topic by students. To accomplish computer-assisted instruction efficiently is possible through having positive attitude of teachers. Determination the level of knowledge, attitude and behavior of teachers who get the professional knowledge from educational faculties and elimination of deficiencies if any are crucial when teachers are at the faculty. Therefore, the aim of this paper is to identify ICT teachers' attitudes toward computer-assisted instruction in terms of different variables. Research group consists of 200 prospective ICT teachers studying at Necmettin Erbakan University Ahmet Keleşoğlu Faculty of Education CEIT department. As data collection tool of the study; "personal information form" developed by the researchers and used to collect demographic data and "the attitude scale related to computer-assisted instruction" are used. The scale consists of 20 items. 10 of these items show positive feature, while 10 of them show negative feature. The Kaiser-Meyer-Olkin (KMO) coefficient of the scale is found 0.88 and Barlett test significance value is found 0.000. The Cronbach's alpha reliability coefficient of the scale is found 0.93. In order to analyze the data collected by data collection tools computer-based statistical software package used; statistical techniques such as descriptive statistics, t-test, and analysis of variance are utilized. It is determined that the attitudes of prospective instructors towards computers do not differ according to their educational branches. On the other hand, the attitudes of prospective instructors who own computers towards computer-supported education are determined higher than those of the prospective instructors who do not own computers. It is established that the departments of students who previously received computer lessons do not affect this situation so much. The result is that; the computer experience affects the attitude point regarding the computer-supported education positively.

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Keywords—Attitude, computer based instruction, information and communication technologies, technology based instruction, teacher candidate.

I. INTRODUCTION

THE rapid progression of technology enabled the emerging of information communities today. With the development of technology, communities also changed and developed by complying with technological developments. Thanks to the rapid developments in technology, equipment and tools we can use in the educational process also increase. In order that we comply with the information communication age, the education and its structure delivered to teenagers is very important. In order to be an information community, new technologies and methods should be used for easy compliance of individuals to developing technology. For providing this, the education delivered to prospective teachers is important principally. The attitudes of teachers towards technology are particular for the effective usage of technologies in their lessons [1]. Thus, the teachers, first of all, need to adopt the technology and to develop positive attitudes towards it in order to use it effectively [2]. Attitude is the tendency to react negatively or positively towards a person or a concept [3].

The most important device among technological tools used in educational system in today's world is the computer. It is inevitable for computer teachers to play a big role with current innovations. The studies regarding the usage of computers in education system in Turkey began firstly in 1984 with the New Information and Communication Technology program conducted by Computer Training in Secondary Education Expertise Commission formed by National Education Ministry. 1100 micro-computers were bought for secondary schools. 1111 computers were bought for 10+1 (10 students & 1 teacher) in 101 secondary schools by 1985–1986 academic year. After this process, in-service training was delivered to teachers working in selected schools for five weeks [4].

In terms of benefiting efficiently from computers in education, computer-supported education (BDE) is very important. BDE is the principal option providing the most effective usage of computers. BDE is defined as the usage of computers in all activities regarding education and school management [5]. It is known that computer usage in education system provide many benefits such as increasing the students' motivation and interaction and providing lessons more visual and effective. The most particular benefit is; students in BDE classes have more positive attitudes and are more successful in

examinations than those in classes which do not include BDE [6]. BDE is the utilization of the computer as a tool helping educators that enhance and elevate the quality of teaching-learning activities [7]. BDE consists of applications regarding the usage of computers as an educating tool in activities such as directly providing course content, repeating things learned by other methods, problem solving and exercising [8].

The most important factor in the pursuit of success in BDE which has an important role in education system is the attitudes of teachers and prospective teachers towards BDE. The attitudes of prospective teachers towards BDE is one of the most important factors [9]. One of the most particular factors for prospective teachers' professional success and consciousness is attitude [10]. In order to efficiently use technology in education, it will be beneficial to determine negative or positive attitudes of prospective teachers towards technology and to take the necessary measures if they have negative attitudes [1]. The knowledge of prospective teachers' attitudes towards computers is important in terms of efficient usage of computers in educational processes to benefit efficiently from computers in education [11]. Efficient realization of BDE is only possible with positive attitudes of teachers.

II. LITERATURE

Reference [12] realized his study regarding the research of Greek citizens' attitudes towards computers with four groups of 185, 354, 222 and 99 people, 860 participants in total. He performed his studies with data obtained from the scale applied to participants by researchers. He established that participants in general have positive attitudes towards computers. Besides this general result, he also sought for other research questions. In terms of gender, although he estimated that males have more positive attitudes than females, he only came across to a meaningful difference in one group with the analysis of data. In another hypothesis, he analysed if there are any links between the ages of the participants and their attitudes towards computers. According to the data he obtained, he could not reach any meaningful results in three groups but confirmed a negative correlation in one group. He stated that there are restrictions by indicating that the participants in that group are near each-other in terms of age. In another question, he researched the correlation between the attitudes of participants towards computers and their experiences with computers and confidences to them. He determined that those who possess computers have a more positive attitude and there is a high relation between those who have confidences to computers and their attitudes.

Another study performed in this area is conducted by [14]. The researchers analysed the answers they obtained from the participants given to questions by which they intended to determine the perceptions of computer-supported language education of prospective teachers. In addition, they aimed at determining the important obstacles to computer-supported language education application. As a result of their research conducted with 14 students aged 20-21 in Malaysia, they established that there are two main obstacles to computer-

supported language education applications; its insufficient usage and the affecting of educators' attitudes by bureaucracy.

In the research performed by [15], the questions of how and why teachers use information and communication technologies in their lessons are sought. They performed their research according to the data obtained by 340 participants from different branches and levels. They analysed the answers given to questions such as; how and where do they use ICTs in their lessons, whether they use or not these technologies in their homeworks, from which areas of these technologies do they benefit while educating, etc. As a consequence they reached to the fact that; with the positive attitudes of teachers towards and their usage of ICTs, students focus on lessons more and that these technologies provide much more developed methods.

Within the scope of study performed by [16] regarding the adaptation of technology to education and the preparation of prospective teachers to technology usage, training was delivered to 70 prospective mathematics teacher and the determination of the place of educational programs in preparation of prospective teachers to technology usage in education and of their self-confidence in this subject are sought with interview method. At the end of the research, he stated that the educational programs that prospective teachers receive in their preparation of technology usage in education provided them to be aware of their capabilities and to have confidence thus they are of big importance and that their awareness increased after the training.

The biggest role in computer usage in educational platforms is on computer teachers' shoulders. Modern-day students desire to see and apply the technologies they use also in the educational platforms due to their being born in technology already. It is important that computer lessons reach educational goals and that conscious and efficient usage of ICTs which students often use is acquired by students. From this point of view, the role of the computer teachers is a little bit more than other branch teachers. Not only in computer lessons but also in general the computer teachers' support regarding BDE in schools will increase the quality of education. Therefore, the attitudes of prospective computer teachers towards BDE are important. Thus the purpose of this research is to analyse the attitudes of prospective computer teachers towards computer-supported education. In accordance of this general purpose, the answers of the following research questions are sought;

1. Do the attitudes of prospective computer teachers towards BDE differ in terms of their genders?
2. Do the attitudes of prospective computer teachers towards BDE differ in terms of their possession of internet and internet technologies?
3. Do the attitudes of prospective computer teachers towards BDE differ in terms of their possession of mobile device?
4. Do the attitudes of prospective computer teachers towards BDE differ in terms of their weekly internet usage durations?
5. Do the attitudes of prospective computer teachers towards BDE differ in terms of their competence levels of mobile

technologies usage?

6. Do the attitudes of prospective computer teachers towards BDE differ in terms of their mobile device and technologies possession durations?
7. Is there any meaningful correlation between the attitudes of prospective computer teachers towards BDE and their cumulative academic averages?

III. METHOD

A. The Model of the Research and Study Group

This study, performed with quantitative research, is conducted according to the screening model. The study group consists of 200 prospective teachers receiving education in Computer and Educational Technologies Department in Ahmet Keleşoğlu Faculty of Education, Necmettin Erbakan University in 2015-2016 Fall.

B. Data Collection Tools

As the data collection tool, personal information form and "attitude scale regarding BDE" in which demographical data is collected prepared by researchers are used. The scale comprises of 20 items. Among these 20 items, 10 items demonstrate positive, the other 10 items demonstrate negative features. KMO co-efficient of the scale is 0.88, Barlett Test relevance value is 0.000. The Cronbach- alpha reliability co-efficient of the scale is 0.93. In addition, the scale is 5 point likert type.

C. The Analysis of Data

The data obtained in scope of the research is analysed with SPSS (The Statistical Package for The Social Sciences) package program and all hypotheses are tested in 0.95 reliability level ($p = 0.05$). Since the obtained data correspond to parametric test assumptions, parametric tests are used in the analysis of data. Within this concept, tests used for each sub-goal are explained below.

Demographical data collected from the participants is explained with descriptive statistic methods. In order to determine whether the attitudes of participants demonstrate meaningful differences in terms of their genders, possessions of internet and of mobile technologies, t-test for unrelated samples is used. Furthermore, in order to determine whether the grades of participants demonstrate meaningful differences in terms of their weekly internet usage durations, mobile device usage competence levels and mobile device possession durations, single-factorial variance analysis (ANOVA) for unrelated samples is used. In addition, for the determination of any relation between the cumulative academic averages of the participants and their attitudes towards BDE, simple correlation is used.

IV. FINDINGS AND INTERPRETATIONS

Table I includes the descriptive results regarding the genders of students in the study group.

As it is clear in Table I, among 200 students, 95 (47.5%) are male and 105 (52.5%) are female.

TABLE I
 GENDERS OF THE STUDY GROUP

| Gender | N | % |
|--------|-----|-------|
| Female | 105 | 52.5 |
| Male | 95 | 47.5 |
| Total | 200 | 100.0 |

Findings regarding the first research question is as follows: Table II includes the findings regarding whether the attitudes of prospective computer teachers towards BDE differ meaningfully or not in terms of their genders.

TABLE II
 RESULTS OF ATTITUDE SCALE GRADES REGARDING BDE ACCORDING TO GENDER

| Groups | N | \bar{X} | S | Sd | t | p |
|--------|-----|-----------|-------|-----|-------|------|
| Female | 105 | 78.17 | 17.69 | 198 | -.539 | .591 |
| Male | 95 | 79.47 | 16.34 | | | |

*P<0.05

As it is clear in Table II, the result is not meaningful because it is $.591 > .05$ for $*p<.05$ relevance level. The averages ($=7.47$ for males; $=78.17$ for females) of grades participants obtained in the scale are not near to each-other, therefore the result is $.591 > .05$ for $*p<.05$ relevance level and is not meaningful. In other words, the attitudes of participants towards BDE do not differ meaningfully in terms of their genders.

Findings regarding the second research question is as follows: Table III includes the findings of whether the grades of participants regarding BDE differ meaningfully or not in terms of their possessions of internet.

TABLE III
 RESULTS OF ATTITUDE SCALE GRADES REGARDING COMPUTER-SUPPORTED EDUCATION ACCORDING TO POSSESSIONS OF INTERNET

| Situation | N | \bar{X} | S | Sd | t | p |
|-----------|-----|-----------|-------|-----|-------|------|
| YES | 171 | 79.75 | 16.63 | 193 | 1.952 | .052 |
| NO | 24 | 72.54 | 19.14 | | | |

*P<0.05

The average ($=79.75$ for those who possess internet; $=72.54$ for those who do not possess internet) of grades participants obtained in the scale are near to each-other, therefore the result is $.052 > .05$ for $*p<.05$ relevance level and is not meaningful. In other words, the attitudes of participants towards computer-supported education do not differ meaningfully in terms of their possessions of internet.

Findings regarding the third research question is as follows: Table IV includes the findings of whether the grades of participants regarding BDE differ meaningfully or not in terms of their possessions of mobile technologies.

TABLE IV
 RESULTS OF ATTITUDE SCALE GRADES REGARDING BDE ACCORDING TO POSSESSIONS OF MOBILE TECHNOLOGIES

| Situation | N | \bar{X} | S | Sd | t | p |
|-----------|-----|-----------|-------|-----|-------|------|
| YES | 161 | 80.85 | 15.24 | 198 | 3.589 | .000 |
| NO | 39 | 70.25 | 21.17 | | | |

*P<0.05

The average ($=80.85$ for those who possess mobile technologies; $=70.25$ for those who do not possess mobile technologies) of grades participants obtained in the scale are different, therefore the result is $.000 < .05$ for $*p < .05$ relevance level and is meaningful. In other words, the attitudes of participants towards BDE differ meaningfully in terms of their possessions of mobile technologies.

Findings regarding the fourth research question is as follows: Table V includes the findings of whether the grades of participants regarding BDE differ meaningfully or not in terms of their weekly internet usage durations.

TABLE V
RESULTS OF ATTITUDE SCALE GRADES REGARDING BDE ACCORDING TO WEEKLY INTERNET USAGE DURATIONS

| Weekly Internet Usage Durations | | N | \bar{X} | S | | |
|---------------------------------|--------------|------------------|-----------|--------------------|------|------|
| 0-3 hours | | 45 | 76.95 | 17.66 | | |
| 3-6 hours | | 53 | 76.49 | 16.70 | | |
| 6-9 hours | | 30 | 80.46 | 13.19 | | |
| 9 hours and over | | 72 | 80.93 | 18.24 | | |
| Total | | 200 | 78.79 | 17.03 | | |
| Source of Variance | | Total of Squares | sd | Average of Squares | F | P |
| Weekly Internet Usage Durations | Intergroups | 845.90 | 3 | 281.96 | .971 | .407 |
| | Intra-groups | 56911.27 | 196 | 290.36 | | |
| | Total | 57757.18 | 199 | | | |

As it is clear in Table V, according to the findings obtained with single-factorial variance analysis (ANOVA) for unrelated samples, there is not any meaningful difference among the grades of participants obtained from the attitude scale according to their weekly internet usage durations [$F(3-196) = .971, p > .05$ ($.407 > .05$)]. In other words, the attitudes of participants towards BDE do not differ meaningfully in terms of their weekly internet usage durations.

Findings regarding the fifth research question is as follows: Table VI includes the findings of whether the grades of participants regarding BDE differ meaningfully or not in terms of their competence levels of mobile technologies usage.

TABLE VI
RESULTS OF ATTITUDE SCALE GRADES REGARDING BDE ACCORDING TO COMPETENCE LEVELS OF MOBILE TECHNOLOGIES USAGE

| Competence levels of mobile technologies usage | | N | \bar{X} | S | | |
|--|--------------|------------------|-----------|--------------------|-------|------|
| Very inadequate | | 4 | 72.50 | 14.93 | | |
| Inadequate | | 15 | 79.80 | 12.87 | | |
| Medium-level adequate | | 68 | 72.51 | 17.00 | | |
| Adequate | | 75 | 83.73 | 15.26 | | |
| Very Adequate | | 38 | 80.52 | 18.99 | | |
| Total | | 200 | 78.79 | 17.03 | | |
| Source of Variance | | Total of squares | sd | Average of Squares | F | p |
| Competence levels of mobile technologies usage | Intergroups | 4798.65 | 4 | 1199.66 | 4.417 | .002 |
| | Intra-groups | 52958.52 | 195 | 271.58 | | |
| | Total | 57757.18 | 199 | | | |

As it is clear in Table VI, according to the findings obtained with single-factorial variance analysis (ANOVA) for unrelated

samples, there is a meaningful difference among the grades of participants obtained from the attitude scale according to their competence levels of mobile technologies usage [$F(4-195) = 4.417, p < .05$]. In other words, the attitudes of participants towards BDE differ meaningfully in terms of their competence levels of mobile technologies usage.

When considering homogeneity situation from Levene test, 354 data is found to be homogenous. Thus; according to One-way ANOVA LSD results, there is a meaningful difference between "Medium level adequate" and "Adequate".

Findings regarding the sixth research question is as follows: Table VII includes the findings of whether the grades of participants regarding BDE differ meaningfully or not in terms of their mobile device and technologies possession durations.

TABLE VII
RESULTS OF ATTITUDE SCALE GRADES REGARDING BDE ACCORDING TO MOBILE DEVICE AND TECHNOLOGIES POSSESSION DURATIONS

| Mobile device and technologies possession durations | | N | \bar{X} | S | | |
|---|--------------|------------------|-----------|--------------------|-------|------|
| 0-3 years | | 23 | 71.17 | 14.29 | | |
| 3-6 years | | 37 | 79.54 | 17.19 | | |
| More than 6 years | | 140 | 79.84 | 17.19 | | |
| Total | | 200 | 78.79 | 17.03 | | |
| Source of Variance | | Total of Squares | sd | Average of Squares | F | p |
| Mobile device and technologies possession durations | Intergroups | 1510.144 | 2 | 755.072 | 2.645 | .074 |
| | Intra-groups | 56247.036 | 197 | 285.518 | | |
| | Total | 57757.180 | 199 | | | |

As it is clear in Table VII, according to the findings obtained with single-factorial variance analysis (One Way ANOVA) for unrelated samples, there is not any meaningful difference among the grades of participants obtained from the attitude scale according to their mobile device and technologies possession durations [$F(2-197) = 2.645, p > .05$]. In other words, the attitudes of participants towards BDE do not differ meaningfully in terms of their mobile device and technologies possession durations.

Findings regarding the seventh research question is as follows: Correlation is a magnitude which can be specified with two values. First of these figures is the direction, second is the magnitude. If the correlation coefficient is 1.00, that means there is an excellent positive relation; if it is -1.00, that means there is an excellent negative relation. If the correlation coefficient shows 0.00, that means there is no relation. Although there is not a complete consensus regarding the interpretation of correlation coefficient in terms of magnitude in the literature, it may be appropriate to define the following; high relation if the correlation coefficient's absolute value is between 0.70-1.00; medium relation if it is between 0.30-0.70; and low relation if it is between 0.00-0.30 [17].

Table VIII includes the findings of the relation between the attitudes of participants regarding BDE and their cumulative academic averages.

As it is clear in Table VIII, there is a low, positive and meaningful correlation between the attitudes and general

academic averages. From this point of view, it can be stated that prospective teachers who have high academic success have high-levels of attitude towards BDE.

TABLE VIII
 RELATION BETWEEN THE ATTITUDES REGARDING BDE AND CUMULATIVE
 ACADEMIC AVERAGES

| | GPA (General Academic Average) |
|--------------|--------------------------------|
| Scale Points | .123* |

*Correlation is meaningful in 0.01 level.

V. CONCLUSION AND SUGGESTIONS

The study group of this research in which the attitudes of prospective computer teachers towards BDE is analysed, comprises of 200 prospective teachers; of which 95 (47.5%) are male and 105 (52.5%) are female. The averages (=7.47 for males; =78.17 for females) of grades participants obtained in the scale are near to each-other, therefore as it is clear in Table II, the result is $.591 > .05$ for $*p < .05$ relevance level and is not meaningful. The average (=79.75 for those who possess internet; =72.54 for those who do not possess internet) of grades participants obtained in the scale are near to each-other, therefore as it is clear in Table III, the result is $.052 > .05$ for $*p < .05$ relevance level and is not meaningful. The average (=80.85 for those who possess mobile technologies; =70.25 for those who do not possess mobile technologies) of grades participants obtained in the scale are different, therefore as it is clear in Table IV, the result is $.000 < .05$ for $*p < .05$ relevance level and is meaningful. There is not any meaningful difference among the grades of participants obtained from the attitude scale according to their weekly internet usage durations [F (3-196) = .971, $p > .05$ (.407 > .05)]. There is a meaningful difference among the grades of participants obtained from the attitude scale according to their competence levels of mobile technologies usage [F (4-195) = 4.417, $p < .05$]. There is not any meaningful difference among the grades of participants obtained from the attitude scale according to their mobile device and technologies possession durations [F (2-197) = 2.645, $p > .05$]. There is a low, positive and meaningful correlation between the attitudes and general academic averages. From this point of view, it can be stated that prospective teachers who have high academic success have high-levels of attitude towards BDE.

In this study, the attitudes of prospective teachers towards BDE are analysed in terms of different variables. By determining the mentioned attitudes, it is possible to realize negative or positive feelings of prospective teachers towards these technologies and to estimate whether they will use or not computers in their lessons [18]. It can be assumed that the positivity of prospective teachers' attitudes towards BDE and their usage of these technologies in their lessons will also affect their students' attitudes towards this kind of education positively in the future. In his study, [19] established that this positive attitude of teachers also affect those of the students positively. As a consequence of results compared with data obtained from demographical data in the research, it can be assumed that BDE will be successfully utilized in lessons and schools of prospective teachers. Computer literacy and

competencies of prospective teachers are important criteria for the successful utilization of BDE [20], [21].

The attitudes of prospective teachers towards BDE are analysed in terms of different variables. By this means, according to which qualifications of prospective teachers do their attitudes differ is analysed and interpreted. In the research question in which the fact that whether the attitudes of prospective computer teachers towards BDE differ or not according to their genders is analysed, it is determined that there is not any meaningful correlation among the attitudes according to the genders. As defined by [22], since female individuals have less experience in computer and technology fields when compared to male individuals, it was assumed that they would have negative attitudes towards computer-based applications. However, in this study the results are near to each-other and there is not any meaningful difference among the attitudes according to the genders. Considering previous researches, [4], [11], [13], [23]-[26] it can be stated that there is no meaningful difference among such attitudes according to genders.

When analysed whether the attitudes of prospective computer teachers towards BDE differ or not according to their possessions of internet and internet technologies, it is established that prospective teachers who possess internet and its technologies have a more positive attitude towards computer-based education but there is not any meaningful difference among them. Considering Turkish Statistical Institute [27] data, access to internet in Turkey is 95.2% and the usage of internet is 54.8%. To interpret this data, it can be stated that there is a very high rate of internet access and the internet usage rate is above the average. Therefore, the analysis of whether the attitudes differ meaningfully or not in terms of possession of internet and its technologies and the determination that there is not any difference among them in terms of the mentioned variable can be explained with the high rate of internet access. When analysed whether the attitudes of prospective computer teachers towards BDE differ or not according to their weekly internet usage durations, it is established that prospective teachers who spare longer time for internet weekly have a more positive attitude towards computer-based education but since there is not any meaningful difference, it can be stated that the attitudes do not differ according to the weekly internet usage durations. Another research question is whether the attitudes of prospective computer teachers towards BDE differs meaningfully or not in terms of their possessions of mobile technologies. It is established that prospective teachers who possess mobile technologies have a more positive attitude towards computer-based education and there is a meaningful difference among them. In research question of analysing attitudes in terms of competence levels of mobile technologies usage, the mentioned attitudes are analysed with single-factorial variance analysis (ANOVA) for unrelated samples in 5 segmented-level. When considering the obtained data, it is established that there is a meaningful difference between "Medium-level Adequate" and "Adequate". According to the results of another research question regarding whether the

attitudes of prospective computer teachers towards BDE differs meaningfully or not in terms of their mobile devices and technologies possession durations, it is established that most of the participants possess mobile devices and technologies for more than 6 years. In addition, there is not any meaningful difference among attitudes in terms of mobile devices and technologies possession durations of prospective teachers. In the last research question in which the fact that whether there is a meaningful correlation between the attitudes of prospective computer teachers towards BDE and their general academic success is analysed, it is determined that there is a low and positive correlation between the attitudes and general academic success. This research is limited to students receiving education in CIT Teaching Department of Ahmet Keleşoğlu Faculty of Education, Necmettin Erbakan University in Konya. The usage of different levels of samples in different studies in the future will contribute to the literature. With the "Movement of Enhancing Opportunities and Improving Technology" Project (FATİH), every classroom is equipped with interactive board and every teacher and student is provided with tablet computers. Thus BDE is being inevitably used in every school. In line with these projects, by applying attitude scales to groups of teachers, students, managers and parents etc., the data obtained in previous studies can be compared to each-other and researches in which changes are explained can be performed. As a result of this research in which positive attitudes of prospective teachers are established towards BDE, it is suggested that the comfortable utilization of computer-based education infrastructures by prospective teachers when they begin their professional life should be ensured by providing such infrastructures in schools and other education institutions. By virtue of these applications, it is estimated that the academic success of students will increase.

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