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Determination of the factors affecting pre-service teachers' technological self-efficacy beliefs by logistic regression analysis

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ABSTRACT

Technology transfer to classes has become very important for teachers, regardless of their field. The purpose of this study is to determine how pre-service teachers with high and low level of technological self-efficacy beliefs are predicted by the independent variables. These variables are attitude towards technology, attitude towards instructional technologies and material design course, having a personal computer. The study sample of this relational study consisted of 193 pre-service teachers. As data collection tools, Technological Self-Efficacy Belief Scale, Attitude towards Technology Scale, Attitude towards Instructional Technologies Scale, and a questionnaire developed by researchers were administered. Logistic regression analysis, which is used when the dependent variable is categorical, was employed in data analysis. According to analysis results, the variables of having a personal computer (Wald = 4.23, df = 1, $p < 0.05$), attitude towards technology (Wald = 13.66, df = 1, $p < 0.01$) and attitude towards instructional technologies and material design course (Wald = 6.17, df = 1, $p < 0.01$) had a significant effect on pre-service teachers' technological self-efficacy beliefs. Particularly, the variable of having a personal computer significantly increased pre-service teachers' technological self-efficacy beliefs by 20%. In this context, various recommendations were offered to the researchers, institutions and instructors.

Keywords: Self-efficacy, computer, instructional technology, logistic regression.

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INTRODUCTION

With advances in technology, the need for equipping and organizing teaching environments with technology is increasing. Therefore, it has become more important for teachers who use technology-supported teaching practices in their classes to have digital efficacy (Yanpar Yelken, 2019). Self-efficacy can be defined as an individual's self-confidence in performing a certain performance (Bandura, 1977). According to Bandura (1995), self-efficacy can be influenced by past experiences, observational experiences, the persuasion process and affective experiences. Computer self-efficacy is the assessment of a person's ability to use a computer (Lamb et al., 2014). Therefore, the term technological self-efficacy is the evaluation of individuals' use of technology.

Technology-supported teaching practices include augmented reality, mobile learning, social media and products developed on various platforms. These applications mainly affect information technology courses directly; on the other hand, teachers of other disciplines use them in their classrooms or utilize technological tools or practices in their lessons. Çilenti (1984, as cited in Seferoğlu, 2014, p. 20) argued that, with technology-supported teaching practices, it is possible to ensure more permanent learning by addressing more sensory organs of the students. Transferring technology-supported applications to the course can of course be achieved in environments where not only teachers but

also students are active in order to contribute to their own learning. In many countries, transferring technology to educational environments has become an important component of education (Chen et al., 2009). Similarly, in Turkey, the "Movement for Increasing Opportunities and Improving Technology (MIOIT)" project has been implemented to make all students have an easy access to the innovations and education with equal opportunities (Sezer and Korucu, 2019). The Ministry of National Education (MoNE, 2020) has revealed five main components related to the MIOIT Project: Providing hardware and software infrastructure, providing and managing educational e-content, effective use of information technologies in teaching curriculum, in-service training of teachers and conscious, safe, manageable and measurable use of information technologies. These components support the necessity of using technology in the learning-teaching process (Sarıtepeci et al., 2016).

According to Bakaç and Özen (2016), the courses taken by pre-service teachers (PSTs) during their undergraduate years further their subject area knowledge, as well as having effects such as increasing their self-efficacy beliefs towards the teaching profession and developing positive attitudes towards the profession. With the revision of the education programs of the education faculties in 2017, in Turkey, one of the courses that PSTs have to take is the Instructional Technologies course (Council of Higher Education [CHE], 2017). According to CHE (2017), the purpose of the Instructional Technologies course is to enable PSTs to gain efficacy in stages such as selecting, designing, developing and evaluating information material by getting knowledge about the information design principles that can be used in the teaching process by means of the instructional technologies.

Teachers who want to teach utilizing technological education should have technology-related pedagogies and approaches (Kent and Giles, 2017). Successful use of technology in classrooms allows students to engage in something, understand concepts, and develop their spatial intelligence (Hennessy et al., 2006). The term self-efficacy, considered among the affective dimensions of learning, is regarded as an important factor in learning (Tuncer and Tanaş, 2011). The term technology-related self-efficacy can be considered as a major component in determining the success and frequency of individuals using. However, Kutluca and Ekici (2010) stated that the most important point in computer-supported education practices is attitude towards computer-supported education and self-efficacy perception.

Literature review

Considering the importance of self-efficacy in terms of learning, there are various studies examining the general self-efficacy of teachers (Bandura, 1995), attitudes towards technology (Çetin et al., 2012; Kol, 2012; Yavuz and Coşkun, 2008) and practices towards material design (Kolburan Geçer, 2010). For example, in their study with third year classroom PSTs, Yavuz and Coşkun (2008) examined the attitudes and thoughts of pre-service teachers towards technology. They reached the conclusion that PSTs developed a positive attitude towards technology with technology-supported teaching practices. On the other hand, according to Lennon (2010), individuals with high self-efficacy level have a positive perspective on the events around them. If individuals are more social and have more developed cognitive skills, they generally have higher self-efficacy beliefs. The positive experiences gained from the factors faced by individuals ensure that their attitudes and self-efficacy perceptions are high (Levine and Donitsa-Schmidt, 1998). In addition, according to Kolburan Geçer (2010), the Instructional Technology Material Design course helps PSTs design effective materials related to their fields. The studies emphasized the importance of using instructional technologies in classrooms and how pre-service teachers' productivity and positive attitudes towards the profession can be improved with the technological materials they use in classrooms.

When the literature related to the technological self-efficacy of PSTs is examined, there are studies examining the technological self-efficacy in general (Kent and Giles, 2017), technological self-efficacy according to different variables (Huffman et al., 2013; Tuncer and Tanaş, 2011) and the relationship between technological self-efficacy and other efficacies (Arslan, 2008; Bakaç and Özen, 2016; Çetin et al., 2012; Çetin and Güngör, 2014). Kent and Giles (2017) aimed to determine the technological self-efficacy of PSTs, it was concluded that the participants had a high level of technological self-efficacy and 91% would use technology in their classrooms. Tuncer and Tanaş (2011) investigated the computer self-efficacy of PSTs and revealed that there was no significant difference in PSTs' computer self-efficacy perceptions according to the gender, age and year, but there was a significant difference according to the major they had. In Huffman et al (2013) study, the role of gender in technological self-efficacy was examined. Results of the study revealed that males had a high level of self-efficacy. They interpreted the result that the difference was not only caused by gender but also by computer-related troubles such as slow file downloads or lack of necessary software. Bakaç and Özen (2016) determined a low level positive and significant relationship between PSTs' material design self-efficacy beliefs and their creativity perceptions, and a moderate level positive and significant relationship between material design self-efficacy beliefs and attitude scores.

When studies on technological self-efficacy are examined, the importance of education equipped with technology is revealed once again. Changing the

efficacies of experienced teachers is quite difficult (Hoy, 2000). Therefore, the fact that PSTs have technological self-efficacy can be considered a positive indicator in the process of using instructional technologies after graduation. According to Moore-Hayes (2011), technology must be integrated into effective teaching for positive teacher efficacy. Integrating technology into education has become one of the most important factors for today's teachers (Clausen, 2007; Peng, 2006). According to Groth et al. (2007), PSTs integrating technology into their daily lives encourage them to integrate technology in their future classes. Also, according to Kent and Giles (2017), if students feel good about using technology, they can manage to use technology as a tool in their education. Henson (2002) stated that teaches' self-efficacy is linked to students' self-efficacy. Thus, it can be said that PSTs ho have technological self-efficacy will also transfer this in their own lessons.

According to Kadijevich and Haapasalo (2008), educational technology standards should be examined qualitatively and quantitatively. These standards include important components such as behavior, willingness, attitude, support or experience. Şimşek and Yazar (2016) expressed that educational technology standards are constantly being developed and current studies are needed. It is believed that it is very important to examine the technological self-efficacy closely related to educational technology standards in order for PSTs to teach more efficiently in this fast-moving process.

Within the scope of MIOIT Project, which has been in practice for many years in Turkish universities, pre-service teachers are trained in classrooms where technology integration is provided in primary and secondary education. In addition to, providing PSTs with internet access at the faculty, their accommodation or individual access provides fast access of students to all kinds of Web 2.0 technologies. Especially nowadays, distance education is becoming more common, high self-efficacy of PSTs; it will facilitate them not only in technology-related lessons, but also in many learning areas.

Aim of the research

Considering that PSTs will be effective in raising individuals with technological self-efficacy, it can be said that determination of the independent variables predicting this variable will be an important research subject. PSTs with high technological self-efficacy beliefs will endure more permanent learning by integrating technology into their classes as expected from teachers and by addressing more sensory organs of their students. From this point of view, determining the variables that may be important in training PSTs with high self-efficacy beliefs is important both in theory and in practice. It can be said that the study is also important in this respect. In addition, when the literature is examined, there is no study examining all these variables discussed in this study together. It can be said that the study is also important in this respect.

The purpose of this study is to determine the factors affecting PSTs' technological self-efficacy beliefs. In line with this purpose, the answer to the question of "To what extent does the independent variables of attitude towards technology, attitude towards Instructional Technology course and having a personal computer predict PSTs with high and low level of technological self-efficacy beliefs?" was sought.

MATERIALS AND METHODS

This study is a relational study since it aims to determine the factors affecting PSTs' technological self-efficacy beliefs. In relational studies, the extent of the covariance between two or more variables is examined (Karasar, 2013).

Study group

The study group consisted of 193 undergraduate students who took the Instructional Technologies course at an Education Faculty in Turkey from central Anatolian during the fall semester of 2019-2020. In addition, Research Ethics Committee Approval was obtained at the beginning of the data collection procedure.

According to the descriptive statistics of the study group, 72.5% of the study group was female and 27.5% is male. While the majority of the study group consisted of elementary education (29.5%) majors, followed by mathematics (26.4%) and English language education (22.3%) majors respectively, a few of them were Turkish language (17.6%) and art education (4.1%) majors. 60% of students were between the ages of 20 and 21, 31% between the ages of 18-19 and about 9% over the age of 22. While most of the students in the study group graduated from Anatolian high schools or science high schools, about 36% of them graduated from other type of high school such as religious vocational high schools or social sciences high school. More than half of the study group (55.4%) had a personal computer.

Research instruments and procedures

In this study, in accordance with the purpose of the study and due to the sufficient validity and reliability evidence, the data was collected using Attitude Towards Instructional Technologies and Material Design Course Scale (ATITMDCS), Material Design Self-Efficacy Scale (MDSES), Attitude Towards Technology Scale (ATTS)

and with the help of a questionnaire developed by the researchers to collect PSTs' demographic information. The validity and reliability information of the administered scales are presented below.

The first scale, ATITMDCS, was developed by Çetin et al. (2013), the scale's construct validity, item analyses and Alpha internal consistency coefficient were tested on one group; concordance validity was tested on a second group; and test-retest reliability was tested on a final third group. In order to analyze the construct validity, the authors applied Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to the data obtained from the scale. According to EFA and CFA results, the scale consists of three dimensions. These dimensions were named as Usefulness, Enjoyment and Repudiation by the authors. Calculated to determine the reliability, Cronbach Alpha coefficients are 0.95 for the Usefulness sub-dimension, 0.87 for the Enjoyment sub-dimension, 0.78 for the Repudiation sub-dimension, and 0.94 for the whole scale. According to item analysis results, the corrected item total correlations of the sub-dimensions were between 0.32 and 0.71. In order to determine the concurrent validity of the scale, the relationship between the scale and the Attitude Towards Instructional Technologies Scale developed by Metin et al. (2012) was examined. The correlation between the two scales was 0.54. The scale was administered twice with an interval of three weeks in order to examine the test-retest reliability of the scale. The correlation coefficients between the scores obtained from the two applications were 0.90 for the whole scale, 0.88 for the Usefulness sub-dimension, 0.80 for Enjoyment sub-dimension, and 0.76 for the Repudiation sub-dimension. While getting permission from the authors to use their scale for this study, it was learned that the researchers forgot to remove one of the excluded items from the scale that is included in the appendix section of their study. Taking this information into consideration, this item was not included in the application form.

The second scale, MDSES, was developed by Bakaç and Özen (2016) to determine students' material design self-efficacy beliefs, this 25-item scale has three dimensional, and explains 48.34% of the total variance. After the CFA, the chi-square ($\chi 2$) was computed as 654.62, and degree of freedom (df) as 272. The $\chi 2/df$ ratio was 2.4. In this context, the $\chi 2/df$ value shows a perfect fit. t. The fit index values were found as RMSEA = 0.061, NFI = 0.95, NNFI = 0.95, CFI = 0.95, IFI = 0.90, RFI = 0.93, RMR = 0.052, GFI = 0.90 and AGFI = 0.93. These fit index values revealed that the model data fit is good.

The third scale, ATTS, was developed by Yavuz (2005), the 5-point Likert type scale aims to determine students' attitudes towards technological tools. According to EFA, there are five dimensions in this 19-item scale. Item factor loads of the items in the scale are between 0.53 and 0.78 and the item-total correlations between 0.24 and 0.68. The total variance explained by the dimensions is 60.64% and the Alpha reliability coefficient calculated for the entire scale is 0.87. The questionnaire was developed by the researchers of the study to collect PSTs' demographic information as gender, majority, age and so on.

During the data collection phase, for the aforementioned three scales, the necessary permissions were taken from the owner of scales (authors) and from Human Research Ethics Committee of the University that carried out this study. During the fall semester of 2019-2020, the scales were administered to 193 Education Faculty students who voluntarily participated in the study during the Instructional Technologies course inside. The data collection lasted for half an hour. Demographic information about the independent variables of the study was collected using a questionnaire developed by the researchers.

Data analysis

Before data analysis, the responses given to the scale were first transferred to Excel. The error status that could be made in data entry was checked by examining the responses in Excel and the randomly selected scales. Reverse scoring of the reverse items was done, and whether the data set had any missing data was checked. After testing the assumptions of the Logistic Regression (LR) Analysis, LR was employed in data analysis. The assumptions of the LR, the assumption tests' results and the analysis process are presented below.

Logistics Regression (LR) analysis is used when the dependent variable is not continuous or quantitative, in other words, it is used when the dependent variable is categorical or classified. It does not require meeting the basic assumptions of linear regression analysis such as normality (Çokluk et al., 2010). An alternative to linear regression analysis, LR aims to establish an acceptable model that can show the relationship between dependent and independent variables explaining the best fit with the fewest variables (Atasoy, 2001 cited in Çokluk et al., 2010, p. 58).

According to Tabachnick and Fidell (2007) there are some points to be considered in the use of LR. The first of these is the requirement of having a sufficient number of observations in each category of categorical independent (predictive) variables. If the discrete predictive variables have too many categories, the number of observations in these categories is low and the expected frequencies in cells are too small, a number of problems may occur. In such cases it is recommended to combine categories, delete the offending category, or delete the discrete variable. In this research, only one of these independent variables (having a personal computer) is discrete and it has two categories (in other words a binary variable): Yes/No. Considering the

descriptive statistics of the study group, the number of observations is adequate in both categories of this binary variable. Accordingly, the data set meets this requirement of the analysis.

According to Tabachnick and Fidell (2007) another requirement of LR is to examine the multicollinearty problem. LR is sensitive to extremely high correlations among predictor variables. In such cases it is recommended to only one of the variables be analyzed (Tabachnick and Fidell, 2007). In order to test this assumption before LR analysis, the relationship between PSTs' attitude scores towards technology and attitude scores towards instructional technologies and material design course, which are the continuous independent variables of the study, was examined. Due to the normal distribution of these two variables according to descriptive statistics and Kolmogorov-Smirnov test results, the Pearson Correlation Coefficient was calculated. It has been found that there is a moderate correlation at the error level of 0.01 between PSTs' attitude scores towards technology and attitude scores towards instructional technologies and material design course ($r = 0.565$; $p = 0.000$). So, it can be said that there is no multicollinearty problem between these independent variables. In order to examine the relationship between the other binary independent variable of the research, -having a personal computer-, and the other two continuous variables, the point biserial correlation coefficient, which is a correlation technique suitable for these type of variables, was calculated in R (R Core Team, 2013). It was found that there is a low correlation between the PSTs' attitude towards the instructional technology and material design course and having a personal computer ($r = 0.16$); and attitude towards technology and having a personal computer ($r = 0.24$). According to all these results, it was found that there is no multicollinearty and/or singularity problem between these three independent variables.

According to Çokluk et al. (2010) if LR analysis is to be used, the sample size should also be sufficient. The reliability of the model established in situations with few observations decreases. It is said that in order to reach stable results in LR analysis, there should be groups of at least 50 people in each independent variable (Çokluk et al., 2010). In this study, there are three independent variables: One is binary and the others are continuous. Accordingly, it was thought that it would be sufficient to have at least 150 observations in the data set. It is found that this assumption is also met, as the study sample consists of 193 pre-service teachers. Lastly, Tabachnick and Fidell (2007) are suggested to examine outliers by residuals and standardized residuals. It was found that the z values of the residuals calculated in this study were in the range of (-3.3).

Before the analysis, Pearson correlation coefficients were calculated, because the variables provide the assumption of normality based on the descriptive statistics. It was found that there is a moderate correlations between the pre-service teachers' attitude towards technology and technological self-efficacy beliefs ($r = 0.58$, $p < 0.01$); between the pre-service teachers' attitude towards instructional technologies and material design course and technological self-efficacy beliefs ($r = 0.48$, $p < 0.01$). So, it could be said that the dependent variable and the independent variables have a significant relationships and the variables could be taken into the regression analysis.

At the beginning of the logistic regression analysis, the study sample was divided into two groups as the lowest 50% (low-scoring) and the highest 50% (high-scoring) based on the total scores obtained from the self-efficacy scale in order to determine the students with low and high self-efficacy scores. Hence, the dependent variable was transformed into two artificial categories. The independent variables included in the analysis were PSTs' attitude scores towards technology, attitude scores towards Instructional Technologies course and having a personal computer. This targeted model was analyzed by comparing it with the null model and taking into account the regression coefficients, Wald values, the significance levels of Wald values, and the percentages of correct classification calculated as a result of LR.

RESULTS

With Logistic Regression (LR), to what extent does the independent variables of attitude towards technology, attitude towards Instructional Technology course and having a personal computer predict PSTs with high and low level of technological self-efficacy was examined. For this purpose, the significance between the null model containing only one invariant and the targeted model with the independent variables included in the analysis was tested with -2 Log Likelihood (-2LL) values. The results of this test are interpreted from the chi-square ($\chi 2$) values and significance levels with the Omnibus test. The p-value of the $\chi 2$ calculated as a result of the Omnibus test being less than 0.05 indicates a significant difference between the null model where there is only one invariant and the targeted model with the independent variables and shows that the targeted model outperforms the null model (Çokluk et al., 2010). According to the analysis result, $\chi 2$ was significant at the 0.01 error level [$\chi 2 = 54.734$ with $df = 3$; $p < 0.01$]. Thus the established model was more significant than the null model. However, it is possible to say that the error chi-square value for variables not included in the null model was significant ($p < 0.01$) and accordingly, adding one or more of the independent variables to the model would increase the predictive power of the model.

As a result of the analysis, Nagelkerke R^2, which is interpreted similarly to R^2 in multiple regression, was calculated as 0.329. Based on this finding, it can be said

that 33% of the variance in the dependent variable was explained by the independent variables in the targeted model. According to this, 33% of the variance/variability in PSTs' technological self-efficacy beliefs originated from attitude towards technology, attitude towards Instructional Technology course and having personal computer independent variables.

Another finding is that, PSTs with high and low self-efficacy were classified with 50% accuracy by the null model and this classification increased to 73% with the targeted model in which the independent variables were included in the prediction. Accordingly, a classification with higher accuracy can be made with the independent variables in the targeted model. In other words, the independent variables in the model show the characteristic of being a good predictor of technological self-efficacy. In the Table 1, the regression coefficients (B) obtained as a result of LR, the standard error of the regression coefficient (S.E.), Wald statistics, degree of freedom (df), significance level (p) and odds ratios (Exp(B)) are presented.

According to the significance levels (p) of Wald statistics calculated in Table 1, in PSTs' having low or high technological self-efficacies, PSTs' attitudes towards the Instructional Technologies course, attitudes towards technology and the constant value in the model are significant at the 0.01 error level, and having a personal computer is significant at the 0.05 error level. Accordingly, it can be interpreted that all three independent variables included in the analysis had a statistically significant effect on PSTs' technological self-efficacy. When Exp(B) values (odds ratios) in the Table 1 are analyzed, the following results can be concluded:

- A one-unit increase in PSTs' attitudes towards technology will result in a positive 11.1% increase in the odds of having high technological self-efficacy belief.
- A one-unit increase in PSTs' attitudes towards the Instructional Technology course will result in a positive 10.3% increase in the odds of having high technological self-efficacy belief.
- PSTs' having a personal computer will result in a positive 20% increase in the odds of having high technological self-efficacy belief. Based on this finding, having a personal computer significantly increases PSTs' technological self-efficacy beliefs.

Table 1. Logistic regression analysis results in relation to PSTs' having low or high technological self-efficacies.

Independent variables	B	S.E.	Wald	df	p	Exp(B)	95.0% C.I. for Exp(B)	
							Lower	Upper
Attitude towards technology	0.10	0.02	13.66	1	0.00*	1.11	1.05	1.17
Attitude towards the instructional technologies course	0.03	0.01	6.17	1	0.01*	1.03	1.01	1.06
Having a personal computer	0.70	0.34	4.23	1	0.04**	2.00	1.03	3.88
Constant	-12.35	2.20	31.57	1	0.00*	0.00		

** p < 0.01; ** p < 0.05.*

DISCUSSION

This study aimed to determine the variables predicting the technological self-efficacy beliefs of PSTs. As a result of the logistic regression analysis carried out for this purpose, it was concluded that the significant predictors of PSTs' technological self-efficacy beliefs are variables such as attitude towards technology, attitude towards the Instructional Technology course and having a personal computer. In the literature, there was no study examining all these variables together and analyzing the technological self-efficacy as a categorical dependent variable. Therefore, variables are addressed one by one while interpreting the study findings.

According to the results, the increase in PSTs' technological self-efficacy beliefs depends on their attitudes towards technology and the Instructional Technologies course. As PSTs' attitudes of towards technology and the Instructional Technology course increase, their technological self-efficacy beliefs also increase. Çetin et al. (2012) revealed a moderate and positive significant relationship between PSTs' attitudes towards technology and technology efficacies. Arslan (2008) determined that there is a moderate and positive relationship between self-efficacy and attitude towards using computer-assisted education. Similarly, Çetin and Güngör (2014) presented a moderate and positive relationship between elementary school teachers' computer self-efficacy beliefs and their attitudes towards computer-supported teaching. Bakaç and Özen (2016) supported the above-mentioned studies by reaching the conclusion that there is a moderate and positive relationship between PSTs' attitudes towards the Instructional Technologies and Material Design course and their self-efficacy beliefs. At this point, it can be said that the results of this study match up with the literature. According to Arslan (2008), a positive increase in attitude or self-efficacy will lead to an increase in the other variable. In order to increase PSTs' attitudes towards technology and Instructional Technology course, technological equipment should be used in the classrooms at faculty, and PSTs' access to computers

should be gained for those who may not have a computer.

Another and the most important result of this study is that PSTs having a personal computer has great effect on their technological self-efficacy beliefs. The results revealed that having a personal computer increased PSTs' technological self-efficacy beliefs by 20%. This rate is quite high compared to the odds ratio of other variables. There are several studies that came up with similar results (Aesaert and van Braak, 2014; Çetin et al., 2012; Çetin and Güngör, 2014; Özçelik and Kurt, 2007). Among these, Çetin et al. (2012) put forth PSTs' having a personal computer revealed a significant difference in their attitudes towards technology and technology efficacies at the 0.01 error level and that PSTs with personal computers had higher scores in terms of these two variables. Similarly, the literature shows that computer self-efficacy of teachers with computers is higher compared to other teachers (Çetin and Güngör, 2014; Özçelik and Kurt, 2007; Sezer et al., 2010). In his study examining PSTs' attitudes and self-efficacy perceptions, and attitudes towards computer-supported education, Berkant (2013) concluded that the PSTs with a computer have significantly higher attitudes and self-efficacy perceptions. In another study, Aesaert and van Braak (2014) stated that information-communication technologies self-efficacy is positively related to computer and internet usage. This result of the present study shows parallelism with the literature. According to Cassidy and Eachus (2002), an individual having a computer increases his or her computer self-efficacy. On the other hand, in their study examining PSTs' perception about computer-supported education, Kutluca and Ekici (2010) concluded that PSTs' self-efficacy perceptions about computer-supported education did not differ according to the variable of having a computer. Kutluca and Ekici (2010) attributed the reason for this result to the fact that many students can easily access a computer nowadays. According to current study result in the broad sense, PSTs who do not have a personal computer will have low self-efficacy perceptions.

According to the present study, allocating a special fund for PSTs who do not have a personal computer or supporting such ideas with various projects can be recommended to administrators of education faculties or universities and policy makers. After all, it can be suggested to including more technology-integrated lessons during the process of pre-service teachers' training. In addition to, especially in order to provide an environment where they can use technology in their own classrooms increasing the use of applications in their education life.

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