# Predictors of career adaptability: Self-efficacy perception towards technology integration and attitude towards technology

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**Abstract**

The purpose of this study is to examine whether pre-service teachers' career adaptability is predicted by their self-efficacy perceptions towards technology integration and their attitudes towards technology. The research group consists of 421 pre-service teachers studying at various universities in the 2024-2025 academic year. The research data were obtained by using " Technology Integration Self-Efficacy Scale " adapted into Turkish by Ünal and Teker (2018), "Career Adapt-Abilities Scale Short Form " adapted into Turkish by Erdoğmuş-Zorver and Yeşilyaprak (2021), "Attitude Towards Technology Scale" developed by Aydın and Karaa (2013), and "Personal Information Form" developed by the researchers. SPSS 27.0 program was used to analyse the data and multiple linear regression analysis was performed. According to the findings, it was determined that there was a statistically significant positive relationship between self-efficacy perception towards technology integration, attitudes towards technology and career adaptability levels. Attitudes towards technology and self-efficacy perception towards technology integration were found to be significant positive predictors of career adaptability level.

**Keywords:** Career adaptability, self-efficacy, technology integration, attitude towards technology, technology.

## Introduction

The society we live in, continues to experience constant change. As we move forward in the Information Age, technological developments have brought about changes in the functioning of many organizations and have also affected education (Griffin, 2003). This progress in information and communication technologies and the reflections of technological and economic developments and changes in organizational structures have also created changes in the concept of career (Gerni & Denizli, 2021). Therefore, considering the changing working and living conditions, it is extremely important for teachers / pre-service teachers to stay abreast of technological developments and to be active in how to use these technological developments in the field of education and how to integrate them in the process. As a matter of fact, worldwide expenditures on educational technologies are projected to reach 342 billion dollars by 2025 (World Economic Forum [WEF], 2020). Therefore, it seems that utilizing the innovative potential of technology in shaping the education and training process will continue to maintain its importance in the future.

The effective use of ICT in schools can positively affect the school learning environment by creating a more dynamic interaction between teachers and students, triggering the creativity of both teachers and students, increasing teamwork and collaboration in problem-solving activities, and enabling students to observe and control their own learning (Organisation for Economic Co-Operation and Development [OECD], 2006). However, in order to integrate technology into the classroom, the teachers need to feel competence to use technology in their teaching (Ashrafzadeh & Sayadian, 2015). As a matter of fact, teacher training programs of higher education institutions have the responsibility to train teachers who can use technology effectively and efficiently (Abbitt & Klett, 2007). Although there is a significant change in the courses designed to train pre-service teachers to use technology effectively in their teaching practices (Abbitt & Klett, 2007), the way teachers integrate technology into their teaching, how much they use technology, and how successful they are may be related to their level of technology acceptance, their thoughts about technology, and their beliefs and concerns about integrating technology (Ashrafzadeh & Sayadian, 2015).

According to Hew and Brush (2007), technology integration involves using computing devices to achieve educational goals. Similarly, Earle (2002) emphasizes that the focus in technology integration is not on the type or amount of technology used but on the relationship of technology with curriculum, teaching practices and content. In other words, technology integration focuses on the use of technology in accordance with the content to achieve the identified goals and thus aims to realize effective learning (Ünal & Teker, 2018). Therefore, it is important to equip pre-service teachers with various skills to integrate technology in their classrooms before they start their professional life. However, pre-service teachers' integration of technology in their classrooms may be due to different reasons as mentioned before.

Previous studies (Çakır & Yıldırım, 2009; Ertmer, 1999; Hew & Brush, 2007; Kaya & Koçak- Usluel, 2011; Kopcha, 2012; Inan & Lowther, 2010; Sang et al., 2010) show that the barriers faced by teachers/pre-service teachers in the integration of information and communication technologies are various. For example, Hew and Brush (2007) identified the most common barriers to technology integration in six categories: resources, organization, subject culture, knowledge and skills, assessment, and beliefs/attitudes. Ertmer (1999) makes this classification as first and second order barriers. According to Ertmer (1999), first-order barriers, which are seen as external barriers, include lack of time, lack of technical and administrative support, lack of computers and software, while second-order barriers, which are seen as internal barriers, include factors such as established classroom practices, beliefs about teaching/computers, and lack of willingness to change. According to him (1999), overcoming second-order barriers requires relatively more effort than first-order barriers. Therefore, it is thought that at the point of providing technology integration; understanding and supporting pre-service teachers' self-efficacy beliefs can help to prevent the negativities that may be experienced in their professional lives.

Perceived self-efficacy includes beliefs about how well a person can perform the actions necessary to cope with possible situations and become successful (Bandura, 1982; Bandura, 1997). Such beliefs affect how much effort and resistance a person will make in the face of obstacles, the courses of action they choose, their resilience to difficulties, the extent to which they experience stress and depression in the face of environmental demands, whether their thought patterns are an obstacle or help for them, and how much they realize their achievements. Perceived self-efficacy belief is a belief in what one can do with one's existing skills rather than

an indicator of having certain skills (Bandura, 1997). In other words, what is valuable in self-efficacy is the belief in what one can do with one's existing skills rather than having certain skills. From this point of view, even if a person does not have enough skills, he/she can achieve certain success in a subject with his/her own beliefs. It is not surprising that this is a valid situation for teachers' self-efficacy beliefs towards technology integration in the classroom.

According to Albion (1999), one of the factors affecting teachers' success in technology integration is their self-efficacy beliefs. Self-efficacy for technology integration is teachers' belief in their ability to successfully integrate technology into education (Dikmen & Demirer, 2016). In fact, teachers with high self-efficacy for technology integration believe that they can provide their students' teaching by utilizing technology in their classrooms (Perkmen, 2014). As mentioned earlier, according to Bandura (2012), self-efficacy affects how much people motivate themselves as well as their choices in important decision moments. At the same time, when we consider the effect of self-efficacy expectations on behaviours in career selection and adaptation processes (Betz & Hackett, 1986), it is thought that pre-service teachers' self-efficacy beliefs towards technology integration are likely to affect their career adaptability. Because, considering the digital speed of the current century, it is likely that pre-service teachers will encounter situations that require them to use technology in teaching activities in their classrooms both in their current education processes and when they start their professional lives. It is thought that this situation will affect the harmony in their careers.

Career adaptability, which was first used by Super and Knasel (1981), was later constructed by Saviskas (1997) to replace career maturity. Career adaptability is the readiness of individuals to cope with predictable tasks such as preparing for or participating in job roles as well as unpredictable changes brought about by work conditions (Saviskas, 1997). Although people have some readiness for change, there are differences in their resources to help them manage change (Saviskas, 2013). As part of the Career Structuring Theory, Saviskas (2013) called these resources, which he sees in the psychosocial structure, adaptive abilities. According to the career structuring theory, career adaptability is handled in four dimensions. These dimensions are anxiety, curiosity, control and confidence (Saviskas, 2013). Anxiety, in essence, involves future orientation and helping to prepare for it (Saviskas & Porfeli, 2012; Saviskas, 2013). Curiosity involves wondering and discovering how compatible one's own characteristics and the characteristics of the world of work are (Saviskas, 2013). Control is related to managing professional development tasks and professional transition processes and shaping both themselves and their environment (Saviskas & Porfeli, 2012; Saviskas, 2013). Confidence dimension includes the sense of self-efficacy that individuals can take the necessary actions to realize their educational and professional choices (Saviskas, 2013). In other words, confidence includes self-efficacy perceptions about how easily an individual can overcome the difficulties he/she will face in career development. Therefore, pre-service teachers' belief that they can successfully overcome the challenges of technology integration can play a role in increasing their career adaptability. For this, it is thought that pre-service teachers' having self-efficacy beliefs towards technology integration can shape career adaptability, especially as a feeder source for the confidence dimension of career adaptability. According to the results of a study conducted by Kumi et al. (2024), people's technology readiness also increases career adaptability. The researchers explained this result based on the fact that technology readiness may cause people to nurture their thoughts that they can progress effectively in their career paths. It is predicted

that a similar situation will be valid for self-efficacy and career adaptability for technology integration.

In human behaviour management, perceptions of personal efficacy and social environment are dominant rather than the actual characteristics of the individual. Individuals who perceive themselves as inadequate have a limited possibility of making a change despite having opportunities, while those who believe in their competence can maintain control despite many restrictions (Bandura & Wood, 1989). Therefore, we can say that individuals' self-efficacy perceptions can affect their career adaptability with the changes they can control and realize. At this point, Gerni and Denizli (2021) found a positive relationship between general self-efficacy and career adaptability. Köker (2024) reported that the sub-dimensions of the self-efficacy scale predicted career adaptability. However, there is no research directly examining the relationship between self-efficacy for technology integration and career adaptability in the accessible literature.

Technological, social and economic changes have made it desirable to adapt, adjust and exhibit adaptability (Johnston, 2018). In order for pre-service teachers to be successful in their professional lives, they must first accept that; technology plays a role in education and have the ability to use technology (Erdemir et al., 2009). According to Topaloğlu (2008), teachers' attitudes towards technology are as important as the importance of using technology in education. Because teachers should have positive attitudes towards technology to use technology effectively in learning environments (Topaloğlu, 2008). What is meant by the concept of attitude here; is a relatively permanent organization of feelings, thoughts and behaviours towards a person or object, and although they cannot be directly observed, they lead to observable behaviours (Kağıtçıbaşı & Cemalcılar, 2014; Morris, 2013). Although attitudes towards technology appear abstract or phenomenological, they are actually linked to behaviours (Ardıç, 2021). Attitudes consist of three components. These are: cognitive, emotional and behavioural components. The cognitive component includes all the beliefs, knowledge, experiences and thoughts that the individual has about the subject of attitude; the affective component includes positive, negative and neutral emotional attitudes; and the behavioural component includes behavioural tendencies (İnceoğlu, 2010). Therefore, pre-service teachers can show their attitudes towards technology in their behaviours in a way that reflects their career adaptability. Denizli and Taçgın (2018) found that attitudes towards information and communication technologies have a significant positive relationship with career adaptability. However, it is clear that; teachers' attitudes towards technology in general need to be understood more. In this direction, based on the related literature and empirical studies, it is aimed to examine whether pre-service teachers' career adaptability is predicted by their self-efficacy perceptions towards technology integration and their attitudes towards technology. In line with the purpose of the study, the question "Are pre-service teachers' career adaptability predicted by their self-efficacy perceptions towards technology integration and their attitudes towards technology?" was sought to be answered.

## Method

The necessary permissions were obtained from Trabzon University Social and Human Sciences Scientific Research and Publication Ethics Committee.

## Participants

The study group of the research consists of 421 pre-service teachers studying at various universities. In the study, the participants were reached using Google Form with the convenience sampling method. Convenient sampling method involves collecting data from an easily accessible sample (Büyüköztürk et al., 2018). 81.7% (n=344) of the participants were female and 18.3% (n=77) were male. 22.1% (n=93) of the participants were 1st grade students, 21.4% (n=90) were 2nd grade students, 32.1% (n=135) were 3rd grade students and 24.5% (n=103) were 4th grade students. It was also observed that 6.7% (n=28) of the participants spent 0-2 hours, 60.1% (n=253) spent 3-5 hours and 33.3% (n=140) spent 6 hours or more with technological tools.

## Data collection tools

### Technology integration self-efficacy scale

Technology Integration Self-Efficacy Scale was developed by Wang et al. (2004) and adapted into Turkish by Ünal and Teker (2018). The scale adapted into Turkish is a 5-point Likert-type scale consisting of 19 items and 2 factors. As a result of the exploratory and confirmatory factor analyses conducted to test the construct validity of the adapted scale, the fit indices of the 2-factor scale were found as $\chi^2$=509.47, $\chi^2$/sd= 3.73 (509.47/151), RMSEA=.056, GFI=.93, AGFI=.92 SRMR=.034, NNFI=.98, CFI=.99. For criterion validity, "Techno pedagogical Education Competencies Scale" was used and the correlation coefficient between it and the adapted scale was calculated as 0.74. As a result of reliability analysis, Cronbach's alpha internal consistency coefficient was determined as .936. The highest score of the scale is 95 and the lowest score is 19. These scores show that as these scores approach 95, self-efficacy perceptions towards technology integration increase and as they approach 19, they decrease (Ünal & Teker, 2018).

### Attitude towards technology scale

The scale developed by Aydın and Karaa (2013) is a 5-point Likert-type scale consisting of 17 items and one dimension. As a result of the reliability analysis, both the Cronbach's Alpha reliability coefficient and the correlation coefficient calculated for the two-half test reliability were determined as 0.87. Item analysis and exploratory and confirmatory factor analysis were performed for the construct validity of the scale. There are 2 negative and 15 positive items in the scale. The score to be obtained from the scale is in the range of 17-85. The increase in the score indicates that the pre-service teacher's positive attitude towards technology has increased.

### Career adapt-abilities scale short form

The 12-item short form of the 24-item original scale developed by Saviskas and Porfeli (2012) was prepared by Maggiori et al (2017). The adaptation of the Career Adapt-Abilities Scale Short Form was carried out into Turkish by Erdoğmuş-Zorver and Yeşilyaprak (2021). The adapted scale is a 5-point Likert-type scale consisting of 12 items and four factors. The scores that can be obtained from the scale are between 12-60. The high score obtained from the scale indicates a high level of career adaptability. For the validity studies of the adapted scale, item-total score correlation, language equivalence, confirmatory factor analysis to test construct validity, criterion-referenced validity and measurement invariance by gender were examined. In the reliability studies of the scale, the Cronbach's Alpha internal consistency coefficient for the whole scale was determined as .88 (Erdoğmuş-Zorver & Yeşilyaprak, 2021).

### Personal information form

The Personal Information Form was prepared by the researchers to collect information about the participants' gender, grade level and time spent with technological tools.

## Data analysis

Before starting the data analysis, firstly, the assumptions that must be met to perform multiple linear regression analysis were checked. Multivariate outliers were analysed by using the Mahalanobis distance value. Mahalonobis distance values were compared with the values in the chi-square table. In this direction, according to the critical value table for chi-square (Tabachnick & Fidell, 2007), 4 outliers with Mahalonobis distance values above 13.82 at $p < .001$ significance level were removed from the data set and the analysis continued with 421 data.

The assumption about whether the research data were normally distributed was decided by considering the skewness and kurtosis coefficients. In this study, self-efficacy for technology integration skewness value was found as = -.456, kurtosis value was = 1.062; attitude towards technology skewness value was = -.289, kurtosis value= .659; career adaptability skewness value was = -.677, kurtosis value was = 1.019. According to George and Mallery (2016), skewness and kurtosis values in the range of +2 to -2 indicate that the distribution is normally distributed. As a result of the analysis, it can be said that the data are within the relevant range and all values show a normal distribution. For the linearity assumption, the linearity of the relationship between the predictor and the dependent variable was examined by examining the bivariate scatterplot (Tabachnik & Fidell, 2007). At the same time, the correlation between the independent variables of the research should not be greater than .80 (Berry et al., 1985). In this direction, the relationships between the variables were examined with Pearson correlation analysis and it was determined that this assumption was met.

In order to determine whether there is a multicollinearity problem, VIF and tolerance values were examined. Also, to avoid multicollinearity problem, the VIF value should not exceed 10 (Chartterjee & Hadi, 2012) and the tolerance value should be greater than .10 (Field, 2005; Mertler & Vannatta, 2005: as cited in Çokluk et al., 2016). Accordingly, it was observed that there was no multicollinearity problem. Whether there is autocorrelation between the variables was checked with the Durbin-Watson value. A Durbin-Watson test value between 1 and 3 indicates that there is no autocorrelation between the variables (Field, 2013). As a result of the analysis, the Durbin-Watson value was determined as 1.969 and it was seen that there was no autocorrelation.

## Findings

### Correlation results of variables

The correlation results between the scores of the individuals who participated in the research on career adaptability, self-efficacy perception towards technology integration and attitudes towards technology are given in Table 1.

**Table 1** Pearson correlation analysis results between scale scores

| Variables | 1 | 2 | 3 |
|---|---|---|---|
| 1.ca | 1.000 | .340* | .340* |
| 2.septti | .340* | 1.000 | .660* |
| 3.att | .340* | .660* | 1.000 |

*p<.05 ca=career adaptability septti= self-efficacy perception towards technology integration att=attitude towards technology

As seen in Table 1, a statistically significant positive relationship (r= .340, p<.05) was found between pre-service teachers' career adaptability levels and their self-efficacy perceptions towards technology integration. At the same time, a statistically significant positive relationship (r=.660, p<.05) was found between pre-service teachers' career adaptability levels and their attitudes towards technology.

## Multiple linear regression analysis results related to the prediction of career adaptability scores

Multiple linear regression analysis was conducted to determine whether pre-service teachers' self-efficacy perception towards technology integration and attitudes towards technology significantly predict their career adaptability levels.

**Table 2** Multiple linear regression analysis results related to the prediction of career adaptability scores

| Variable | B | Standard error | β | t | p |
|---|---|---|---|---|---|
| Fixed | 28.907 | 2.401 | | 12.039 | <.001 |
| Septti | .141 | .042 | .204 | 3.386 | <.001 |
| Att | .162 | .048 | .205 | 3.397 | <.001 |
| $F_{(2,418)}= 33,794$ p= <.001 R=.373 $R^2$ =.139 $\Delta R^2$ =.135 | | | | | |

According to the Table 2, as a result of the multiple linear regression analysis, the model was found statistically significant (F (2,418)=33,794, p= < .05). When the $R^2$ value is examined, self-efficacy towards technology integration and attitudes towards technology together explain 13.9% of the change in career adaptability level. Attitudes towards technology (B=.162 , p<.05) and self-efficacy perception towards technology integration (B=.141, p<.05) are significant positive predictors of career adaptability level. In other words, a 1-unit increase in attitude towards technology scores leads to a .162-unit increase in career adaptability scores, while a 1-unit increase in self-efficacy perception towards technology integration scores leads to a .141-unit increase in career adaptability scores. The standardized regression coefficient β indicates the level of importance of the predictor variables (Can, 2023). According to this, attitudes towards technology (β=.205 p<.05) has a greater effect on career adaptability level than self-efficacy perception towards technology integration (β=.204 , p<.05).

## Discussion

In this study, the role of self-efficacy perceptions towards technology integration and attitudes towards technology in predicting pre-service teachers' career adaptability levels was examined. As a result, it was determined that there is a statistically significant positive relationship between self-efficacy perceptions towards technology integration and attitudes towards technology and career adaptability levels. In other words, pre-service teachers' self-efficacy perceptions towards technology integration and attitudes towards technology contribute positively to their career adaptability levels.

A statistically significant positive relationship was found between pre-service teachers' self-efficacy perceptions towards technology integration and their career adaptability. This result is similar to the finding of Kumi et al. (2024) that individuals' technology readiness also increases career adaptability. Thus, as mentioned before, among the dimensions of career adaptability, especially control and confidence dimensions, include the sense of self-efficacy that individuals can take the necessary actions to realize their educational and professional choices and the ability to manage professional development tasks and professional transition processes

(Saviskas & Porfeli, 2012; Saviskas, 2013). The high self-efficacy perceptions of pre-service teachers at the point of integrating technology into their classrooms or any educational environment may be fuelled by the pre-service teachers' belief that they can be successful in providing such an integration in the future. Thus, their current perceptions of efficacy may have a positive value for them in terms of coping with difficulties in the future. As a matter of fact, using these self-efficacy perceptions to cope with any difficulties related to technology in the professional transition process of pre-service teachers may play a supportive role in their adaptability. On the other hand, previous research findings (Gerni & Denizli, 2021; Köker, 2024; Marcionetti & Rossier, 2021) show that self-efficacy can predict the adaptation dimension. In other words, an individual's self-efficacy perceptions may shape career adaptability.

According to another finding obtained from the research, a statistically significant positive relationship was found between pre-service teachers' attitudes towards technology and their career adaptability. Considering that attitudes towards technology are essentially related to behaviours (Ardıç, 2021), it is quite normal for pre-service teachers to reflect their attitudes in their behaviours. Because attitudes can be inferred from an individual's behaviours and reactions (Tavşancıl, 2018). As a matter of fact, the findings showing that teachers' attitudes towards technology affect their use of technology (Al- Zaidiyeen et al., 2010; Karasakaloğlu et al., 2011) are evidence for this. Therefore, the fact that pre-service teachers have positive attitudes towards technology may support their level of career adaptability by creating the idea that they can use technology in different ways in their classrooms in the future. Similarly, Denizli and Taçgın (2018) found that attitudes towards information and communication technologies have a significant positive relationship with career adaptability. Pre-service teachers' attitudes towards technology are important for them to become teachers who will respond to the requirements and qualifications of the age (Karakuyu & Karakuyu, 2015). Therefore, the positive presence of these attitudes is considered as a factor that positively affects career adaptability in a way to keep up with the age.

## Limitations and future directions

In this study, it was found that pre-service teachers' self-efficacy perceptions towards technology integration and their attitudes towards technology are predictors of their career adaptability. The findings of the study emphasize the importance of structuring teacher education programs in a way to provide opportunities for active use of technology that will positively support pre-service teachers' attitudes towards technology and self-efficacy beliefs towards technology integration.

The participants of the study are individuals who have not yet started their professional life actively. However, many factors such as the level of technological equipment in schools, classroom climate, and students' acceptance of technology may affect teachers' attitudes towards technology and their perceptions of self-efficacy towards the integration of technology and may lead to changes in their career adaptability. In addition, the experience gained over time can also affect career adaptability. Therefore, new studies can be conducted with individuals who are new to the profession or who have professional experience.

On the other hand, regardless of the conditions in their professional lives, opportunities can be provided for pre-service teachers to have experiences that will make them well-equipped in terms of technology integration, understand their strengths and weaknesses, and strengthen their self-efficacy beliefs. Additional courses can be included in teacher training programs to increase their

career adaptability.

## Statement of researchers

### Researchers' contribution rate statement

Contributor 1: Conceptualization, Methodology, Analysis, Writing- original draft, Writing -review and editing.

Contributor 2: Conceptualization, Data collection, Methodology, Analysis, Writing- original draft, Writing -review and editing

### Conflict statement

The authors do not have any conflicts of interest to report.

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Does not exist

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