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THE ROLE OF PERSONALITY AND SCHOOL CLIMATE ON PRE-SERVICE TEACHERS' MOTIVATION TOWARDS TECHNOLOGY INTEGRATION IN EDUCATION

ABSTRACT
The main purpose of the current study was to uncover interrelationships among the internal (personality, self-efficacy) and external variables (school climate and support) that influence pre-service teachers' outcome expectations regarding the use of technology in their future classroom. Social Cognitive Theory and Big Five Model of Personality served as the theoretical frameworks for the current study. The participants were 106 pre-service teachers enrolled in two different departments (early childhood and mathematics education). Results revealed that personality, school climate and self-efficacy are interrelated and each is positively associated with outcome expectations. Conscientiousness dimension of personality made a significant contribution to predicting outcome expectations when the effects of self-efficacy were controlled.
        Keywords: Technology Integration, Personality,
                School Climate, Self-Efficacy, Outcome Expectations

TEKNOLOJİ ENTEGRASYONUNA YÖNELİK ÖĞRETMEN ADAYLARININ MOTİVASYONLARI ÜZERİNDE KİŞİLİK VE OKUL İKLİMİNİN ROLÜ

ÖZET
Bu araştırmanın temel amacı, öğretmen adaylarının teknoloji kullanımı ile ilgili beklentilerine etki eden içsel (kişilik, öz-yeterlik) ve dışsal faktörler (okul iklim ve desteği) arasındaki ilişkiyi açıklamaktır. Araştırmanın teorik çerçevesi Sosyal Bilişsel Teori ile Büyük Beş Modeli olarak belirlenmiştir. Araştırma, okul öncesi ve ortaöğretim matematik öğretmenliği bölümünden toplam 106 öğrenci ile yürütülmüştür. Araştırmanın sonucunda; kişilik, okul iklim ve desteği ile öz-yeterliğin hem birbirleriye hem de beklentiler ile pozitif ve anlamlı ilişkisi olduğunu belirlenmiştir. Kişiliğin öz-disiplin boyutu, öz-yeterliğin etkisi kontrol edildikten sonra beklentileri yordamaya katkıda bulunduğu görülmüştür.
        Anahtar Kelimeler: Teknoloji Entegrasyonu, Kişilik,
                Okul İklimi, Öz-Yeterlik, Beklenti

1. INTRODUCTION (GİRİŞ)

Researchers have made a great deal of effort for many years to identify which factors affect teachers' motivation and use of Information and Communication Technology (ICT) in their classroom. Research evidence gathered from numerous studies indicated that both internal factors including ability (Anderson and Maninger, 2007), knowledge (Pamuk, 2011), attitude (Tezci, 2009; Tezci, 2011a), personality (Perkmen ve Cevik, 2010), self-efficacy, outcome expectations (Sahin, 2008; Niederhauser and Perkmen, 2010), teacher philosophy (Liu, 2011; Honey and Mooler, 1990), openness to change (Vannatta and Fordham, 2004; Marcinkiewicz, 1994) and external factors including access to computers (Ertmer, 1999), technical and administrative support (Papanastasiou and Angeli, 2008; Inan and Lowther, 2010), school culture and climate (Lim, 2002; Tezci, 2011b) play an important role in pre-service teachers' level of motivation for ICT integration and practicing teachers' ICT use level in their classroom. In a path analytic study conducted with 1382 Tennessee public school teachers, Inan and Lowther (2010) found that administrative, peer and community support influences ICT integration level directly and indirectly through its influences on internal factors including readiness and beliefs about ICT integration in education.

School climate and support (SCS) is a critical external factor that plays an important role in teachers' level of ICT use (Tezci, 2011b) and computer confidence (Papanastasiou and Angeli, 2008). Climate can be defined as "the attitudinal warmth of an organization and as the extent to which an organization is supportive to its members" (Berry, 1998:363). In a study conducted with 1540 primary school teachers in Turkey, Tezci (2011b) found a moderate correlation between SCS and the level of ICT usage. Papanastasiou and Angeli (2008) developed a 12-item SCS scale for ICT integration and found a significant correlation between SCS and computer confidence. In schools where positive and supportive ICT climate exists, "teachers probably do not feel alone in their ICT integration efforts and believe that their school will support them when they encounter ICT integration problems" (Tezci, 2011b:439).

In addition to external factors, internal factors are important for successful ICT integration. Among the internal factors, self-efficacy (SE) and outcome expectancy (OE) received a great deal of attention in the ICT literature (Niederhauser and Perkmen, 2008; Compeau, Higgins, 1995). SE refers to people's judgments about their abilities to produce the desired outcome (Bandura, 1986). Teachers high in technology integration SE tend to believe that they can teach effectively use technology in their classroom to enhance student learning. OE refers to anticipated outcomes of an action and can be formularized as "If I do X, Y might happen?" (Lent, Brown and Hackett (2002). In the context of technology integration, OE may take a form such as ''If I integrate technology into my classroom activities, I will probably increase my productivity as a teacher".

SE and OE are motivational variables and positively related to each other (Bandura, 1986). In other words, the more SE people possess in a given task, the more likely that they will anticipate positive outcomes. For example, if teachers believe that they have the necessary skills to teach with technology (High SE), they will probably anticipate improvement of their students' learning through the use of technology in the classroom (Positive OE). Two studies conducted with pre-service teachers in the US revealed a moderate correlation between technology integration SE and OE (Niederhauser and Perkmen, 2010; Perkmen and Pamuk, 2011). That is, the more SE pre-

service teachers possess regarding technology integration in education, the more likely they believe that technology will help them to promote their students' learning in their future classroom.

A number of studies examined the role of SE and OE on individuals' intentions to integrate technology in the classroom (Anderson, Groulx and Maninger, 2011; Anderson and Maninger, 2007; Niederhauser and Perkmen, 2010; Sahin, 2008). Niederhauser and Perkmen (2010) found that pre-service teachers' OE had a higher correlation with intentions to integrate technology than did their SE. Anderson and Maninger (2007) found that self-efficacy was the best predictor of pre-service teachers' intentions, with gender and OE also making small but significant contributions to the prediction of intentions. In a more recent study (Anderson, Groulx and Maninger, 2011), OE emerged as best predictor of intentions with SE also contributing to the regression equation predicting intentions. In a path analytic study (Sahin, 2008), while OE was found to influence faculty members' intentions to use educational technology both directly and indirectly, the influence of self-efficacy beliefs on their intentions was only exerted through OE and interests.

Some researchers examined the role of SE and OE on pre-service teachers' technology integration performance. Niederhauser, Perkmen and Toy (2012) found that SE predicted performance better if pre-service teachers had positive OE. That is, OE moderated the relationship between SE and performance. In another study (Perkmen and Pamuk, 2011), although OE was initially found to be significantly related to performance, it did not make a significant contribution to the prediction of performance above and beyond the effects of SE in the regression equation.

In addition to motivational factors such as SE and OE, trait factors like personality are an important construct that influences people's behavior (Barrick and Mount, 1991; Seibert, and Kraimer, 2001) and beliefs (Cevik, 2011). Personality can be defined as "distinctive thoughts, emotions, and behaviors that characterize the way an individual adapts to the world" (Santrock, 2006, p.126). Vannatta and Fordham (2004) found that openness to change was a significant predictor of K-12 teachers' level of technology use in the classroom.

Big Five Model of Personality (Goldberg, 1981) posits that personality can be examined in five broad categories: **O**penness, **C**onscientiousness, **E**xtraversion, **A**greeableness and **N**euroticism. It is important to note that big five structure "does not imply that personality differences can be reduced to only five traits. Rather, these five dimensions represent personality at the broadest level of abstraction, and each dimension summarizes a large number of distinct, more specific personality characteristics" (John and Srvastave, 1999, p. 7). This model is also called OCEAN model. Table 1 shows pairs of opposite adjectives in each dimension of personality.

Table 1. The big five model of personality (Santrock, 2006)
(Tablo 1. Beş faktörlü kişilik modeli (Santrock, 2006))

Openness	**C**onscientiousness	**E**xtroversion	**A**greeableness	**N**euroticism
Imaginative or unimaginative	Organized or disorganized	Sociable or retiring	Cooperative or Competitive	Calm or anxious
Curious or incurious	Careful or careless	Fun-loving or somber	Modest or Conceited	Optimist or pessimist
Innovative or conventional	Disciplined or impulsive	Talkative or quiet	Reconcilable or stubborn	Patient or impatient

Openness is also called culture and intellectual. Those high in openness like innovation and change, have a vivid imagination, spend time reflecting on things and are interested in arts. Those high in conscientiousness like order, follow a schedule in doing their duties and pay attention to details whereas those low in this dimension tend to shirk their duties and leave their belongings around. Extrovert individuals feel comfortable around other people, like starting conversations and enjoy attending social activities such as going to parties. On the other hand, introverted individuals are quiet, like spending their time alone and have few friends. Agreeable individuals tend to have a soft heart, feel concern for others and make other people feel at ease. Neuroticism is also called emotional stability. Those low in emotional stability have frequent mood swings, get stressed out easily and worry about things (Costa and McCrae, 1992).

Big Five of Model of Personality has received extensive attention to understand the role of personality in technology use. Researchers have focused on the role of personality dimensions in the use of the Internet (Abdul Karim, Zamzuri and Nor, 2009; Swickert, Hittner, Harris and Herring, 2002), social network (Amichai-Hamburger and Viniztkyz, 2010), facebook (Moore and McElroy, 2012), technology acceptance (Devaraj, Easley and Crant, 2008), computer self-efficacy (Saleem, Beaudry and Croteau, 2011) and intentions (Perkmen and Cevik, 2010). While Swickert et al. (2002) did not find a significant relationship between personality and the level of internet use, Devaraj et al. (2008) found that personality dimensions were useful predictors of users' attitudes and beliefs. In one study (Saleem, Beaudry and Croteau, 2011), neuroticism, extraversion and agreeableness were found to be significantly related to computer self-efficacy for women but not for men. In another study (Perkmen and Cevik, 2010), openness, extroversion and conscientiousness were found to be positively correlated with pre-service music teachers' intentions to use technology in their future classroom.

2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMİ)
Based on the literature and previous research findings, it seems clear that motivational variables (e.g. SE and OE), trait variables (e.g. personality) and external variables (e.g. SCS) are interrelated and external factors influence internal factors. The researcher of the current study failed to identify any study in the literature that investigated the interrelationships among this particular combination of variables. To fill this gap, the current study was conducted. The main purpose of this study was to uncover interrelationships among the variables that influence pre-service teachers' motivation towards the use of ICT in their future classroom. More specifically, this study investigated the utility of SE, personality and SCS in predicting the level of OE. Understanding the role of above variables in ICT integration motivation can help guide teacher education programs in preparing pre-service teachers to integrate technology effectively in their future classrooms.

3. METHOD (YÖNTEM)
3.1. Participants (Katılımcılar)
The participants were drawn from 120 pre-service teachers who enrolled in a Western Turkish University. 106 pre-service teachers (76 female, 30 male) agreed to participate in the study. 64 students (36 male, 28 female) were pre-service teachers enrolled in the department of mathematics education while 42 students (2 male, 40 female) enrolled in the department of early childhood education. The pre-service mathematics teachers received a course titled "computer

assisted mathematics education" thought by the researcher of the current study. The pre-service early childhood teachers received a course titled "instructional technology and material development" thought by another instructor with the help and guidance of the researcher of the current study. The research instruments were administered to the pre-service teachers in the last week of these courses. To ensure anonymity and privacy, the participants did not indicate their name in the research instruments.

3.2. Research Instruments (Veri Toplama Araçları)
3.2.1. Self-Efficacy for Technology Integration Scale
(Teknoloji Entegrasyonu Öz-Yeterlik Ölçeği)

The Turkish version of the self-efficacy for technology integration scale (Semiz and İnce, 2012; Sahin, 2008) originally created by researchers in the US (Wang, Ertmer and Newby, 2004) and modified by other researchers (Perkmen and Niederhauser, 2008) was used in this study to measure pre-service teachers' self-efficacy regarding how they can effectively use technology in the classroom. The scale consisted of 6 items. Some of the items included "I feel confident that I have the skills necessary to use computer for instruction", "I feel confident that I can help students when they have difficulty with instructional technology". The participants indicated their response on a scale ranging from 1 (do not agree at all) to 5 (totally agree). Items were summed and divided by the number of items to find self-efficacy scores. Thus, scores ranged from 1 to 5 with higher scores indicating higher self-efficacy.

3.2.2. Instructional Technology Outcome Expectations Scale
(Öğretim Teknolojileri Beklenti Ölçeği)

The Turkish version of the Instructional Technology Outcome Expectations Scale (Semiz and İnce, 2012; Sahin, 2008) originally created in the US (Niederhauser and Perkmen, 2008) was used to measure pre-service teachers' perceptions about the possible outcomes of integrating technology into their future classroom activities. The stem for all of the scale items was "Integrating technology into my future activities will likely allow me to…" Examples of the items included "…increase my effectiveness as a teacher", "… do work that I would find satisfying". The participants indicated their response on a scale ranging from 1 (do not agree at all) to 5 (totally agree). Items were summed and divided by the number of items to find outcome expectations scores. Thus, scores ranged from 1 to 5 with higher scores indicating more positive outcome expectations.

3.2.3. School Climate and Support Scale
(Okul İklim ve Desteği Ölçeği)

School climate and support scale was created by the researcher of the study based on social cognitive theory and another school climate scale developed by Papanastasiou and Angeli (2008). It consisted of 3 items: "The undergraduate classes on instructional technology *(or classes which involve this topic)* in my faculty helped to increase my knowledge and skills regarding how I can use instructional technology in the classroom effectively to enhance learning", "The faculty members in my faculty served as a role model for me by using technology in their classroom activities effectively", "My faculty's ICT infrastructure was good enough to learn how technology can be used as a tool to promote student learning". The participants indicated their response on a scale ranging from 1 (do not agree at all) to 5 (totally agree). Items were summed and divided by 3 to find SCS scores. Thus, scores ranged from 1 to 5 with higher

scores indicating more positive school climate and support. This scale was validated with 65 pre-service teachers who enrolled in the department of elementary education. All of the scale items loaded on one factor, which accounted for 71% of variance in the scale.

3.2.4. The Adjective-Based Personality Test
(Sıfatlara Dayalı Kişilik Testi)

The Adjective-Based Personality Test (Bacanli, İlhan and Aslan, 2009) was used to examine the pre-service teachers' personality in five dimensions: **O**penness, **C**onscientiousness, **E**xtroversion, **A**greeableness and **N**euroticism. All of the personality dimensions had 4 items. The test consisted of 20 pairs of opposite adjectives (e.g. quiet-talkative, conventional-innovative) (See Appendix A). Percentages in each opposite adjective indicated in this Appendix shows the distribution of students in this study who fell in the respective category. The participants were asked to indicate for each item the extent to which they agree with the left or right half of the item responding on a 7-point scale ranging from 0 to 6. For instance, the ninth item in the test is intended to assess personality in the **E**xtroversion dimension. If an individual believes that 'talkative' is a very appropriate adjective that describes himself or herself, he/she obtained the maximum score of 6 points for this item. On the other hand, if he/she believes that 'quiet' is a very appropriate adjective that describes himself/herself, he/she obtained the minimum score of 0 for this item. Item ratings were added up and divided by four in the respective dimension to calculate the total personality score for each dimension. Scores on each dimension ranged from 0 to 6 with higher scores indicating higher reflection of personality in the respective dimension. It is important to note that neuroticism items were reverse scored, meaning that higher scores indicated higher emotional stability in this study.

The original version of the adjective-personality consisted of 40 items (Bacanli, İlhan, and Aslan, 2009) and was used in two different studies (Çevik, 2011; Perkmen and Çevik, 2010). Principal component analysis was conducted on data from these two studies to examine its construct validity. Several items had low factor loadings in their respective dimension. Thus, the researcher of the current study chose 4 opposite adjectives for each dimension of personality which had high loadings. Thus, the short version of the adjective personality test consisted of 20 items and was validated with 122 students enrolled in the department of computer education and instructional technology. The principal component analysis resulted in a five-factor solution, which accounted for 61% of variance among the scale items. All of the scale items loaded in their respective dimension, which provided evidence for the construct validity of the scale.

3.3. Data Analysis (Verilerin Analizi)

Data analysis for the current study consisted of four major steps. In the first step, reliability analysis on the research instruments was conducted to examine the internal consistency of the participants' responses to the scales' items. In the second step, descriptive statistics were calculated to measure the participants' SE, OE, SCS and personality scores. The t-test was used to compare the mathematics pre-service teachers and early childhood pre-service teachers' scores in each scale. In the third step, pearson correlation analysis was conducted to examine the interrelationships among the variables used in the current study. Higher correlations indicated stronger relationships. The last step involved two types of regression

analysis. Since prior research suggests that OE had a higher correlation with pre-service teachers' intentions to use technology in the future classroom than did SE (Niederhauser and Perkmen, 2010) OE served as the major motivational variable in this study and became the dependent variable in both regression analyses. These analyses helped understand relative contribution of each variable in predicting the level of OE. In the first regression analysis, variables entered into the equation by the researcher based on social cognitive theory and the findings of other research studies. In the second regression analysis, stepwise regression analysis was used to examine which variable is the best predictor of OE. In stepwise regression analysis, selection of predictor variables is carried out by an automatic procedure.

4. RESULTS (SONUÇLAR)

Cronbach's alpha coefficient for the overall personality test was found to be 0.82. The subscale coefficient values were 0.78 for Openness, 0.77 for Conscientiousness, 0.79 for Extraversion, 0.74 for Agreeableness, and 0.71 for Neuroticism. Cronbach alpha coefficients for the SE, OE and SCS scales were found to be 0.86, 0.82 and 0.74, respectively. These findings provided evidence that the participants were consistent in their responses to the items in the research instruments. A close examination of the participants' scores in the SE, OE and SCS scales revealed that they, in general, had positive OE (M = 4.17, SD = .59), which suggests that they anticipated positive outcomes of integrating technology into their future classroom activities. In contrast, their SE (M = 3.61, SD = .66) was not as high as their OE, which suggested that some of the pre-service teachers did not believe that they have necessary skills to use technology in their classroom. In addition, the pre-service teachers' perception of their school's climate regarding ICT was not very positive (M = 3.46, SD = .76). Results of t tests revealed no significant department and gender difference between the pre-service teachers. Results of correlation analysis presented in Table 2 showed that OE had the highest correlation with SE (r = .63, p <.01) followed by Conscientiousness dimension of personality (r = .40, p <.01). Except for Neuroticism, all of the personality dimensions and SCS were found to be significantly related to OE. No significant relationship between SCS and dimensions of personality existed.

Table 2. Descriptive statistics and correlation matrix
(Tablo 2. Betimsel analiz sonuçları ve korelâsyon matrisi)

		M	SD	2	3	4	5	6	7	8	9	10
1	O	4.37	1.06	.35**	.45**	.30**	-.11	.03	.31**	.25**	-.11	.11
2	C	4.31	1.05	–	.45**	.31**	.04	.14	.43**	.40**	-.16	.11
3	E	3.89	1.23		–	.30	-.11	.00	.31**	.23*	-.17	.11
4	A	3.65	1.31			–	.35**	.16	.25**	.24**	-.14	.08
5	N	3.81	1.41				–	.18	.20*	.06	.00	.10
6	SCS	3.46	0.76					–	.44**	.33**	.04	.07
7	SE	3.61	0.66						–	.63**	-.16	.16
8	OE	4.17	0.59							–	-.07	.02
9	G	1.28	0.45								–	na
10	Dep	1.40	0.49									–

**p<.001; *p<.05; G= Gender;
Note: Possible scores ranged from 0 to 6 for the personality dimensions and 1 to 5 for SCS, SE and OE. Correlations indicated with * and ** are significant at 0.05 and 0.01 levels, respectively. M: mean; SD: Standard devitation. Gender: female = 1, male = 2. Department: mathematics education = 1, early childhood education = 2

Appendix B provides the list of the 20 items of the Big-5 factors of personality along with their mean, standard deviation and correlations with SCS, SE and OE. The results showed that impulsive-disciplined adjective pair (Conscientiousness) had the highest correlation with SE (r=.41, *p*<.01) and OE (r=.32, *p*<.01). In addition, it was found that two pairs of adjectives under Neuroticism (calm-nervous; r=.25, *p*<.01) and Agreeableness (rebellious-meek; r=.28, *p*<.01) were significantly correlated with SCS. In other words, pre-service teachers who saw themselves calm and meek reported more positive SCS than those who saw themselves nervous and rebellious.

Following correlation analysis, forced-order hierarchical regression analysis was conducted. The OE served as the dependent variable. Predictor variables were entered into the equation in the following order: Background variables (department and gender), SCS, personality dimensions as a block, and SE. Results presented in Table 3 revealed that SCS accounted for 12% of variation in OE. Personality dimensions, collectively, accounted for additional 15% variance above and beyond the effects of SCS. Finally, SE accounted for 17% of variance in OE above and beyond the effects of personality dimensions and SCS. The whole model accounted for 44% of variation in OE.

Table 3.Forced-order Hierarchical Regression Predicting OE
(Tablo 3.Beklentiyi Yordayan Değişkenlere İlişkin Hiyerarşik Regresyon Analizi)

Variable	R	R^2 change	F change
Background Variables	.07	.00	.25
SCS	.35	.12	13.29**
Personality	.51	.15	3.83**
SE	.66	.17	29.09**

**p<.01

To find the best predictor of OE, stepwise regression analysis was conducted in the final step. The personality dimensions were entered to the equation separately not as a block. The results revealed that only SE (ß=.55, *p*<.01) and **C**onscientiousness dimension of personality (ß=.17, *p*<.05) emerged as significant predictors of OE in the regression equation. SE accounted for 38% of variation in OE alone. **C**onscientiousness accounted for additional 3% of variation above and beyond SE. SCS and other dimensions of personality were not found to be significant predictors of OE.

4. DISCUSSION (TARTIŞMALAR)

The main purpose of the current study was to investigate the role of SE, personality and SCS in understanding pre-service teachers' OE regarding technology integration in education. The findings revealed that motivational variables, personality and SCS are inter-related. SE was found to be the best predictor of OE. Among the personality dimensions, only Conscientiousness made a significant contribution to predicting OE after controlling for the effects of other variables. SCS were found to be positively related to SE and OE. However, it was not found to be significant predictor of OE after controlling for the other variables.

To begin with, consistent with other research findings (Anderson and Maninger, 2007; Niederhauser, Perkmen, 2010; Perkmen and Pamuk, 2011) and theoretical predictions (Bandura, 1986), SE and OE were found to be moderately related. This result suggests that pre-service teachers OE for technology integration in education depends partly on their SE. In other words, the more SE they possess, the more likely

that they have high OE. Thus, interventions designed to enhance pre-service teachers' SE are likely to increase their OE.

Some personality dimensions were found to be related to SE and OE, which supports the research evidence that personality is one of the sources of SE (Saleem, Beaudry and Croteau, 2011) and motivation (Perkmen and Cevik, 2010). Moreover, Conscientiousness accounted for additional significant variance in OE above and beyond SE. This result suggests that if the technology integration SE levels of two pre-service teachers are the same; the one who is higher in Conscientiousness is more likely to possess higher OE. People high in Conscientiousness are organized and have good planning skills. Since good planning is a critical step in successful technology integration (Liu and Velazques-Bryant, 2003), those high in Conscientiousness are more likely to be more motivated to integrate technology in the classroom. Consistent with the results of another research study (Vannatta & Fordham, 2004), another dimension of personality, openness, was found to be related to SE and OE. Since technology is ever changing, pre-service teachers high in Openness seem to be more motivated integrate technology in their future classroom than those low in Openness.

SCS was found to be associated with motivational variables (SE and OE) in the current study. In other words, pre-service teachers who believe that the teacher education program they enroll in possesses good ICT infrastructure, beneficial ICT integration courses and teachers who served them as a role model for ICT integration in the classroom reported higher levels of SE and OE. This finding was consistent with other findings which revealed that SCS was positively associated with between teachers' level of technology use in the classroom (Inan and Lowther, 2010; Tezci, 2009; Tezci, 2011a) and computer confidence (Papanastasiou and Angeli, 2008). Besides personality, SCS seems to be another source of motivation. It is likely that personality affects SCS. SCS, in turn, affects motivation for ICT integration.

The current study has a number of limitations that must be considered in interpreting the results. Since the participants came from two different departments in one institution, the generalizability of the findings to wide-ranging departments and other institutions may be limited. Second, personality test used in this study assesses the participants' perception of their own personality traits. Although participation was anonymous and voluntary, some pre-service teachers may have responded to the test items in a socially desirable manner. Third, the study was correlational in nature. Thus, caution should be taken in inferring the direction of causality between the variables of interest. For example, a positive correlation perceived SCS and SE might indicate (a) perceived SCS affects SE, (b) SE affects perceived SCS, (c) there is a reciprocal relationship between perceived SCS and SE, (d) a third variable (e.g. personality) affects both perceived SCS and SE.

Despite its limitations, the current study has a number of implications and opens new doors to future researchers interested in uncovering interrelationships among factors that influence ICT integration motivation. Pre-service teachers will become in-service teachers in the future, who are likely to be expected to integrate technology in their classroom. Thus, it is important that they need to be educated in teacher education programs in a way that maximizes their motivation for technology integration. At first glance, SCS affects technology integration motivation based on the findings. If the pre-service teachers receive education for ICT integration in teacher education programs which have beneficial ICT integration

classes and teachers who serve as a role model by using technology effectively, they are more likely to be motivated to use technology in their future classroom. We could have come to this conclusion if the pre-service teachers in the current study came from different institutions. It is important to note that the participants were from the same teacher education program. They received education in the same program, used the same computer labs, and were exposed to the same teachers in courses (except for few elective courses); however, each perceived SCS differently. Some perceived it positive, some negative. It is possible that motivation (SE and OE) affects perceived SCS. Those who have low SE and OE may think that their teachers did not do well in teaching them how to integrate ICT in the classroom and thus perceive SCS negative. Their negative perception of school environment, in turn, might hinder their motivation for learning how to use technology in the classroom.

Prior research seems to propose a one way relationship in which SCS affects motivation and other internal variables (Inan and Lowther, 2010; Papanastasiou and Angeli, 2008; Tezci, 2011a). However, Social Cognitive Theory (Bandura, 1986) posits a reciprocal between personal factors and environment. From the theoretical point of view, it is likely that there is a reciprocal between perceived SCS and motivation. SCS might affect SE and OE. SE and OE, in turn, might affect perceived SCS.

It is also likely that a third variable (e.g. personality) accounts for the relationship between perceived SCS and motivation. That is, personality might affect SCS and motivation. People with certain types of personality may tend to perceive SCS more positive and have higher levels of ICT integration motivation. Figure 1 shows a hypothetical model that depicts possible relationships among the variables in the current study.
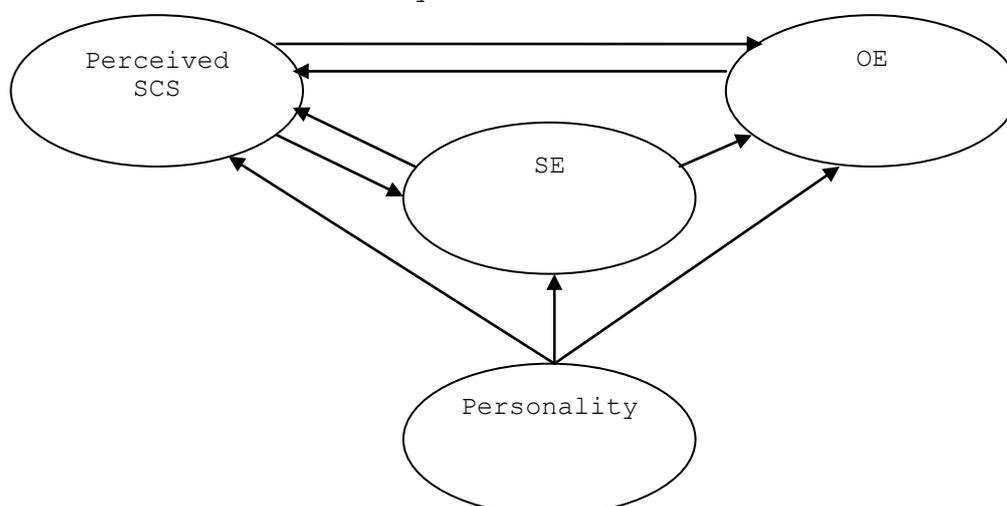

Figure 1. Hypothetical Model for Understanding Pre-service Teachers' Technology Integration Motivation
(Şekil 1. Öğrencilerin Teknoloji Entegrasyon Motivasyonlarını Anlamaya Yönelik Hipotetik Model)

Due to the small sample size of the current study, the researcher failed to test this model. Through path analytic studies with sufficient sample sizes, future researchers may test this model for understanding pre-service teachers' ICT integration motivation. If future studies provide empirical support for this model in different contexts, it will be evident that development of pre-service teachers' ICT integration motivation in teacher education programs is more

complicated than the literature suggested. In addition, if this model is found to be useful, it will provide a different and helpful perspective for teacher educators and administrators to understand why some students have low ICT integration motivation and some high.

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APPENDIX A (EK A)

Item Number	Dimension	Adjective (Left Side)	Very Appropriate (0)	Considerably Appropriate (1)	Slightly Appropriate (2)	Neither Appropriate Nor Inappropriate (3)	Slightly Appropriate (4)	Considerably Appropriate (5)	Very Appropriate (6)	Adjective (Right Side)
1	N	Calm	10%	39%	17%	11%	12%	9%	2%	Nervous
2	E	Retiring	5%	14%	14%	13%	11%	30%	14%	Sociable
3	C	Disorganized	2%	4%	13%	13%	15%	32%	21%	Organized
4	N	Patient	12%	27%	26%	9%	10%	9%	7%	Impatient
5	O	Not interested in arts	2%	4%	13%	18%	22%	26%	15%	Interested in arts
6	N	Relaxed	12%	18%	16%	21%	19%	13%	2%	Anxious
7	E	Indolent	2%	7%	14%	14%	11%	31%	21%	Energetic
8	A	Competitive	6%	6%	8%	16%	17%	25%	24%	Cooperative
9	E	Quiet	4%	15%	15%	18%	13%	22%	13%	Talkative
10	A	Conceited	9%	12%	7%	6%	22%	24%	11%	Modest
11	C	Careless	5%	7%	10%	11%	22%	29%	16%	Careful
12	N	Optimist	18%	30%	16%	20%	7%	8%	2%	Pessimist
13	E	Somber	2%	0%	2%	16%	18%	36%	26%	Fun-loving
14	O	Incurious	0%	2%	7%	15%	22%	29%	25%	Curious
15	A	Rebellious	7%	7%	9%	17%	26%	21%	13%	Meek
16	C	Lazy	1%	3%	2%	9%	22%	37%	26%	Hard working
17	C	Impulsive	1%	0%	7%	10%	19%	45%	18%	Disciplined
18	O	Unimaginative	2%	2%	0%	9%	19%	35%	33%	Imaginative
19	O	Conventional	0%	6%	9%	11%	23%	34%	17%	Innovative
20	A	Stubborn	8%	11%	15%	13%	7%	35%	11%	Reconcilable

APPENDIX B (EK B)

Descriptive Statistics and Correlation Analysis for the Items in the Personality Test

Item Number	Dimension	Adjective (Left Side)	Adjective (Right Side)	Correlation (r)			
				M (SD)	SCS	SE	OE
5		Disinterested in Arts	Interested in arts	3.93 (1.49)	.06	.14	-.03
14	O	Incurious	Curious	4.44 (1.29)	-.07	.25**	.21*
18		Conventional	Innovative	4.80 (1.27)	.09	.25**	.23*
19		Unimaginative	Imaginative	4.21 (1.41)	.04	.33**	.26**
3		Disorganized	Organized	4.15 (1.57)	.07	.30**	.29**
11	C	Careless	Careful	3.91 (1.68)	.07	.22*	.25**
16		Lazy	Hardworking	4.65 (1.25)	.10	.37**	.36**
17		Impulsive	Disciplined	4.54 (1.18)	.18	.41**	.32**
2		Retiring	Sociable	3.55 (1.84)	.05	.21*	.14
7	E	Indolent	Energetic	4.03 (1.66)	.00	.22*	.20*
9		Quiet	Talkative	3.40 (1.78)	.08	.17	.14
13		Somber	Fun-loving	4.01 (1.26)	.06	.35**	.28**
8		Competitive	Cooperative	4.01 (1.76)	-.06	.17	.23*
10	A	Conceited	Modest	3.46 (1.82)	.06	.15	.08
15		Rebellious	Meek	3.65 (1.68)	.28**	.29**	.20*
20		Stubborn	Reconciliatory	3.49 (1.87)	.18	.13	.20*
1		Calm	Nervous	3.92 (1.57)	.25**	.26**	.24**
4	N	Patient	Impatient	3.70 (1.74)	.07	.14	-.04
6		Relaxed	Anxious	3.35 (1.64)	.06	.04	-.04
12		Optimist	Pessimist	4.03 (1.57)	.00	.07	.09

Note: Neuroticism items were reverse scored.
*p < .05,   **p < .01