

Emotional Intelligence and Problem Solving Among Pre-service Teachers: The Mediating Role of Creativity

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Abstract: The aim of this study is to examine the mediating role of creativity in the relationship between emotional intelligence and problem solving among pre-service teacher. The study was conducted using the relational screening model. 260 teacher candidates participated in the study. The ages of the participants ranged from 18 to 45, and the average age was 22. 37. 70 of the participants were in the 1st, 73 in the 2nd, 51 in the 3rd, and 66 in the 4th grade. The Emotional Intelligence Trait Scale–Short Form, Adult Problem Solving Scale, Individual Creativity Scale, and Demographic Information Form were used in the study. Regression-based bootstrapping analysis was used in the analysis of the data. As a result of the analyses, positive statistically significant relationships were found between emotional intelligence, problem solving, and creativity. In addition, the indirect effect of creativity on the relationship between emotional intelligence and problem solving was found. It was found that creativity has a partial mediating role in the relationships between emotional intelligence and problem solving in teacher candidates. According to the results, as emotional intelligence increases, so does creativity. This increased creativity also improves problem-solving.

Keywords: Emotional intelligence, problem solving, creativity, pre-service teachers

Öğretmen Adaylarında Duygusal Zeka ve Problem Çözme Becerisi: Yaratıcılığın Aracı Rolü

Öz: Bu araştırmanın amacı öğretmen adaylarında duygusal zekâ ile problem çözme becerisi arasındaki ilişkide yaratıcılığın aracılık rolünün incelenmesidir. Araştırma ilişkisel tarama modelinde yürütülmüştür. Araştırmaya Türkiye'nin farklı devlet üniversitelerine devam eden 260 öğretmen adayı katılmıştır. Bu öğrencilerin 197'si kadın ve 63'ü erkektir. Katılımcıların yaşları 18-45 arasında değişmekte ve yaş ortalamaları 22, 37'dir. Katılımcıların 70'i 1, 73'ü 2, 51'i 3 ve 66'sı 4. sınıfa devam etmektedir. Araştırmada Duygusal Zekâ Özelliği Ölçeği–Kısa Formu, Yetişkinler İçin Problem Çözme Ölçeği, Bireysel Yaratıcılık Ölçeği ve Demografik Bilgi Formu kullanılmıştır. Verilerin analizinde regresyon temelli bootstrapping analizi yapılmıştır. Analizler sonucunda duygusal zekâ, problem çözme ve yaratıcılık arasında pozitif yönlü istatistiksel olarak anlamlı ilişkiler bulunmuştur. Ayrıca duygusal zekâ ile problem çözme arasındaki ilişkide yaratıcılığın oluşturduğu dolaylı etkinin anlamlı olduğu bulunmuştur. Öğretmen adaylarında duygusal zekâ ile problem çözme ve problem çözmenin beş alt boyutu arasındaki ilişkilerde yaratıcılığın kısmi aracılık rolünün bulunduğu saptanmıştır. Elde edilen sonuçlara göre duygusal zekâ düzeyinin artmasıyla yaratıcılık düzeyleri de artmakta ve yaratıcılık düzeyindeki bu artış problem çözme düzeylerini de artırmaktadır.

Anahtar Kelimeler: Duygusal zekâ, problem çözme, yaratıcılık, öğretmen adayları

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Introduction

The concept of emotional intelligence was introduced by Salovey and Mayer in 1990 (Eröz, 2011; Tuğrul, 1999; Yeşilyaprak 2001). According to Salovey and Mayer (1990), emotional intelligence is defined as a person's ability to regulate their emotions by observing themselves and others, and to use their emotions to guide their thoughts and actions. In addition, emotional intelligence includes the use of emotions in problem solving. The use of emotions in problem solving includes motivation, flexible planning, refocusing attention, and creative thinking (Mayer & Salovey, 1993). In another definition, Goleman (2005) defines emotional intelligence as the ability to move forward despite undesirable events and to empathise. Cooper and Sawaf also mention the skills and tendencies that make up emotional intelligence, which can be grouped into 4 sub-dimensions. These include emotional literacy, which is knowledge of one's own emotions and the functions of emotions; emotional availability, which includes emotional rigidity and flexibility; emotional depth, which has emotional intensity and developmental potential; and the alchemy of emotions, which encourages emotions to reveal creativity (cited in Schutte et al., 1998).

Goleman (2005) defines emotional intelligence as a person's ability to take action, persevere with negative experiences, control impulsivity, have hope, empathise and regulate mood (Atilla, 2012; Karabulutlu et al., 2011). The characteristics of people with high emotional intelligence include coping with stress, influencing people and being creative (Davis & Peake, 2014; Zampetakis et al., 2009; Zhou & George, 2003). Goleman (2005) states that emotional intelligence is more important than cognitive intelligence. Accordingly, as the source of emotional thinking centres in the brain, fibres influence thinking centres and people with high emotional intelligence are more likely to spend their lives thinking that they are more creative (cited in Noorafshan & Jowkar, 2013). If the brain is considered as a structure that functions as a whole, emotional and intellectual intelligence can be considered as one (İşmen, 2001). Intelligence generally refers to a set of mental abilities. Mental abilities include problem solving and abstract thinking (Mayer et al., 1999).

Problem solving refers to a complex process that involves cognitive, affective and behavioural skills and continues from the moment a person feels a problem until they find a solution to their problem (Demirtaş & Dönmez, 2008). Since it is a factor that directly affects success in life, problem solving skills are an important factor of mental health that enables a person to live a happy and satisfied life (Sonmaz, 2002). Every person encounters problems that need to be solved from time to time in their lives. There is no specific age range or developmental period for the problem that will arise. Individuals encounter problems regardless of their developmental stage or age. It could be what clothes to wear that day, what toy to take to school, or conflict situations with a spouse or friends (Taylan, 1990). The ability to solve problems that arise in both daily life and developmental periods is important for individuals to continue their lives in a healthy way (Taylan, 1990). It is stated that people with high emotional intelligence can solve problems more efficiently and control their emotions better, which helps the individual to resolve the conflict between what they feel and what they think (Mayer & Salovey, 1993; Salovey & Mayer, 1990). Examining the studies conducted, it has been found that emotional intelligence is positively related to problem solving skills (İşmen 2001; Karabulutlu et al., 2011). Accordingly, increasing the level of participants' emotional intelligence will also increase their problem solving skills. In light of this information, it is understood that emotional intelligence is related to problem solving skills.

Emotions can be used as a resource for problem solving, creativity and coping with social events (Mishra, 2014, 198). Creativity is the ability of individuals to benefit from their experiences and resources at the highest level (Olatoye et al., 2010, 769). A person's emotional life and creativity are closely related (Kanhai, 2014). Tsai and Lee (2014) state that a person's ability to properly regulate their emotions can be beneficial in using creative thinking more. It is stated that people with higher levels of emotional intelligence are more creative (Polat & Aktop, 2010) and that emotional intelligence and creativity are related (Büyükalvarcı & Gündoğan, 2018; Noorafshan & Jowkar, 2013). According to Torrance (1963), creativity is a natural problem solving process that requires recognising obstacles, problems and lack of information, making predictions that can solve problems, developing assumptions, testing the assumptions and presenting the results.

Problem solving skills develop the ability to think about a problem when it arises, determine the appropriate methods for solving it, select the appropriate method, use the selected method, and analyse the results. Thus, it is a person's acquisition of the habit of solving the problems encountered in daily life (Altun, 2002; Ocak & Eğinir, 2014). At this point, it can be said that people with problem solving skills can also think independently, are creative, social and self-confident (Miller & Nunn, 2001). Bingham (2004) also states that creativity, emotion, reason and action form a whole in problem solving. Taking all this into account, it can be said that problem solving skills are related to characteristics such as creativity, emotional and mental intelligence, self-confidence and the ability to cope with difficulties.

Problem solving also requires different skills. Some problems can be solved with a cognitive approach, while others can be solved with a creative approach. The main goal is to solve the event that is seen as an obstacle (Karabulutlu et al.,

2011; Kurt Uyar, 2016). Problem solving and creativity are related concepts. In order for people to use their creativity, they usually have to face a problem. For this reason, researchers state that creativity is a problem-solving action (Butcher & Niec, 2005; Monahan, 2002; Vidal, 2003). Some research supports the idea that successful problem solvers are not impulsive and do not avoid problems, but rather systematically engage in various problem solving behaviours (Bloom & Broder, 1950; Parnes, 1967; Shaftel & Shaftel, 1967). Various studies in the literature have found a relationship between creativity and problem solving skills (Köse et al., 2016; Rotter, 1978; Sidar, 2011).

Goleman (2005) suggests that emotional intelligence can be developed and enhanced through appropriate education and training. Similarly, problem-solving skills can be developed through appropriate training. In this context, schools are the second most important structure after the family that will contribute to the development of children's emotional intelligence and problem-solving skills. Teaching these skills in schools will be effective in helping students overcome problems throughout their lives (Genç & Kalafat, 2007). The problem-solving process, which begins early in life, also contributes to the development of critical and scientific thinking skills in children. The development of people's problem-solving skills contributes to their self-confidence, willingness to solve problems, maintaining psychological health, and coping with problems encountered in daily life (D'Zurilla et al., 2004; Yıldırım, 2011).

In order to develop emotional intelligence and teach problem-solving skills in schools, teachers must also have developed creativity, emotional intelligence and problem-solving skills. Teachers with higher problem-solving skills contribute more to raising children with high levels of problem-solving skills (Ertuğrul & Kutluca, 2020). In his study, Özkök (2005) implemented a creative problem solving programme for primary school students and found that the average creative problem solving skills of the students at the end of the programme were high. Based on all this, it can be said that the education to be provided in schools is effective in developing students' emotional intelligence, problem solving skills and creativity.

Teachers need to be able to prepare and implement different programmes in the classroom according to students' interests, developmental characteristics, needs and abilities. This requires teachers to have the creativity to produce as many activities as the students in the classroom when needed (Yenilmez & Yolcu, 2007). Torrance, in his research on this topic, found that the relationship between teacher creativity and student creativity is quite high (Akt. San, 1985). In this context, it can be said that teachers with high levels of emotional intelligence, problem solving skills and creativity are more likely to raise students with these qualities. In addition, they may be more inclined to implement studies and activities aimed at developing these skills during students' critical periods. In this context, the question arises as to the level of these qualities in teachers and it is important to reveal the relationships between these qualities.

Examining the studies conducted on this topic in Türkiye, it can be seen that there are various demographic variables (Ocak & Eǧmir, 2014), emotional intelligence and problem-solving skills (Aslan, 2019; Ertuğrul & Kutluca, 2020; İşmen, 2019; Karabulutlu et al., 2011; Vural, 2010), emotional intelligence and creativity (Büyükalvarcı & Gündoğan, 2018), the relationship between problem solving skills and creativity (Arslan et al., 2016; Köse et al., 2016; Ocak & Eǧmir, 2014; Sonmaz, 2002; Zeytun, 2010), democratic attitudes and problem solving skills of teachers (Genç & Kalafat, 2007), and personality traits and problem solving skills (Dündar, 2009) were investigated. In contrast to all these studies, this study examines the levels of emotional intelligence, problem solving skills and creativity of teacher candidates and the relationships between them. It also examines the mediating role of creativity in the relationship between emotional intelligence levels and problem solving skills in this group. In this context, the aim of this research is to determine the levels of emotional intelligence, problem solving skills and creativity of teacher candidates and to investigate the mediating role of creativity between the levels of emotional intelligence and problem solving skills.

Method

This section of the research explains and presents the research model, the group, the data collection tools used in the research, and information about the data collection process and data analysis.

Research Model

The current research was conducted using a correlational research design based on a quantitative research approach. Correlational research investigates the relationship between multiple variables and determines the direction and level of the relationship detected (Creswell, 2014).

Research Group And Procedure

A total of 260 (197 female, 63 male) pre-service teachers participated in this study. Of the participants, 70 were in their first year, 73 in their second year, 51 in their third year and 66 in their fourth year. 242 of the participants were single and 18 were married. Of the participants, 73 were in Turkish, 54 in mathematics, 43 in preschool, 22 in primary, 19

in science, 16 in special education, 15 in foreign language, 14 in social studies, and 4 in computer science. The age of the participants ranged from 18 to 45 years ($M=22.37$, $SD=4.314$).

Prior to collecting the data to be used in the research, ethical approval, dated 10.05.2024 and numbered 136791-7-57 was obtained from the Ethics Committee of Muş Alparslan University Ethics Committee. The measurement tools were then transferred to the online environment and the form in which the data would be collected was created by the researchers. The informed/explicit consent form for participation was added at the beginning of this form. In this section, participants were informed about the research and their written consent was obtained. Participants were informed that they could withdraw from the research at any time, that their participation in the research was voluntary, and that the data would be collected online. A total of 260 trainee teachers took part in the study on a voluntary basis. Once the data had been collected, the researchers transferred them to the analysis programme and made them available for analysis.

Data Collection Tools

Four data collection instruments were used in this study. The first is the Demographic Information Form, which was prepared by the researchers to determine the participants' age, gender, grade level, marital status, and the programme they were attending.

Problem solving scale for adults.

Developed by Yaman and Dede (2008). The scale is a five-point Likert type. The scale, consisting of 18 items, has five sub-dimensions: "thinking about the effects of solving the problem", "solving the problem by modelling", "exploring alternative solutions", "determination in applying the solution found" and "analysing the problem encountered". The scores that can be obtained from the scale according to the answers given vary between 18 and 90. An increase in the score indicates that the individual's problem-solving skills have increased. The validity and reliability study of the scale was carried out on 550 adults. It was found that the Cronbach alpha internal consistency coefficient of the entire scale was .88, and the internal consistency coefficients of the sub-dimensions varied between .82-.98 (Yaman & Dede, 2008). In this study, analyses were conducted for both the total score and the sub-dimensions. In this study Cronbach alpha internal consistency coefficient of the entire scale was .86.

Emotional Intelligence Trait Scale-Short Form (EIT-SF).

This scale was developed by Petrides and Furnham (2000; 2001) and adapted to Turkish culture by Deniz, Özer, and Işık (2013). The scale is a seven-point Likert-type scale with 20 items. A high total score of the scale indicates that people perceive their emotional competence as high, while a low score indicates that their emotional competence is low. The scale has four sub-dimensions called "subjective well-being", "self-control", "emotionality" and "sociability". As a result of the analysis conducted to determine reliability, it was found that the internal consistency coefficients of the scale varied between .66 and .81. The test-retest reliability coefficient of the scale is .86. In this study Cronbach alpha internal consistency coefficient of the entire scale varied between .70-82.

Individual Creativity Scale.

Developed by Zhou and George (2001) to measure individual creativity, it was adapted to Turkish as a result of the study conducted by Yıldız et al. (2022). The scale consists of 11 items and a single dimension in a five-point Likert type. There are no reverse items in the scale and the scores that can be obtained from the given answers vary between 11 and 55. In order to determine the reliability, the scale was applied to two different groups and according to the results of the analysis conducted, the Cronbach alpha (α) internal consistency coefficient was determined as .95 for the first data set and .92 for the second data set. In this study Cronbach alpha internal consistency coefficient of the scale was .93.

Data Analysis

Before starting the data analysis, the assumptions of extreme values, normality, linearity, homogeneity, and multicollinearity (Tabachnick & Fidell, 2013) were examined, respectively. The scores obtained for univariate normality were converted into standard z-scores, and it was checked whether the scores were within the limits of ± 3.29 and no extreme values were found. The Mahalanobis distance value was calculated for the multivariate normality criteria and it was determined that there was no observation that did not meet the criteria. The skewness and kurtosis values of the variables were examined and are presented in Table 1. In this regard, it was determined that the kurtosis and skewness values were within the acceptable range (± 1.5) (Tabachnick & Fidell, 2013). Accordingly, it was determined that the scores of the 260 participants met the assumptions of normality.

The problem of multicollinearity was tested using the Durbin-Watson method. As a result of the analysis, the Durbin-Watson value was found to be 1.830. In addition, the condition index ($CI=13.08-17.78$), variance inflation factor ($VIF=1.64$), and tolerance values ($Tolerance = .60$) were found to be within the appropriate reference ranges. In order to

examine the relationships between the variables in the study, the Pearson Product Moment Correlation Coefficient was calculated and the results are shown in Table 1. The results obtained support that there is no problem of multicollinearity between the variables (Field, 2013). After all these investigations, a regression-based mediation macroanalysis was conducted to determine the direct and indirect effects. Here, the process was carried out taking into account the analyses suggested by Preacher and Hayes (2008), and according to this analysis, the necessity of not having a zero value in the lower and upper limits of the obtained confidence interval was taken as a basis to determine the significance level of the detected indirect effect (Hayes, 2013).

Findings

The findings obtained as a result of the analyses conducted in this section of the research are presented and explained. Table 1 shows the descriptive statistics regarding the variables of problem solving, emotional intelligence and creativity, and the findings obtained as a result of the analyses conducted to calculate the Pearson Product Moment Correlation Coefficient.

Table 1.

Relationships Between Emotional Intelligence, Problem Solving and Creativity and Descriptive Statistics

	Correlations			Descriptive Statistics		
	1	2	3	Mean (SD)	Skewness	Kurtosis
Emotional Intelligence	-			92.31(16.81)	-.012	-.183
Problem Solving	.476**	-		70.05(10.83)	-.211	-.517
Creativity	.553**	.627**	-	41.27(7.80)	-.084	-.652

As seen in Table 1, emotional intelligence, problem solving and creativity meet the normality assumption in terms of skewness and kurtosis values. When the correlational relationships between variables are considered, it is seen that emotional intelligence has positive and significant relationships with problem solving ($r = 0.476$; $p < .001$) and creativity ($r = 0.553$; $p < .001$). In addition, a positive and significant relationship was found between problem solving and creativity ($r = 0.627$; $p < .001$). After determining the significant relationships between the variables considered, mediation analyses were carried out.

Table 2.

Path Coefficients and Indirect Effect Results Regarding the Mediation Model (Problem Solving Total Score)

Path Coefficients	Bootstrap Indirect Effect				
				%95 CI	
	To Problem Solving	To Creativity	Coefficients (SE)	Lower Limit	Upper Limit
Model					
From Emotional Intelligence	.12(.037)	.25(.024)			
From Creativity	.72(.079)				
EI→PS→C			.18(.031)	.131	.252
Not: ** $p < .01$, EI = Emotional Intelligence, PS = Problem Solving, C = Creativity, CI = Confidence Interval, SE = Standart Error					

Table 2 presents the bootstrapped results for the mediating role of creativity between emotional intelligence and problem solving. According to the direct effects, emotional intelligence predicts problem solving ($BSE = 0.12037$) and creativity ($BSE = 0.25024$). In addition, creativity was found to predict problem solving ($BSE = 0.72079$). When examining the indirect effect, creativity was found to play a mediating role between emotional intelligence and problem solving (bootstrap coefficient = .18, $SE = .031$; 95% CI = .131, .252). With the inclusion of creativity as a mediating variable in the model, the statistically significant relationship between emotional intelligence and problem solving did not become insignificant. Consistent with these results, creativity was found to have a partial mediating role in this model.

Table 3.

Path Coefficients and Indirect Effect Results Regarding the Mediation Model (sub-dimension of Considering the Effects of Solving the Problem)

Path Coefficients	Bootstrap Indirect Effect

			%95 CI		
	Considering the Effects of Solving the Problem	To Creativity	Coefficients (SE)	Lower Limit	Upper Limit
Model					
From Emotional Intelligence	.03(.012)	.25(.024)			
From Creativity	.19(.026)				
EI→CESP→C			.05(.009)	.034	.070
Not: ** p < .01, EI = Emotional Intelligence, CESP = Considering the Effects of Solving the Problem, C = Creativity, CI = Confidence Interval, SE = Standart Error					

Looking at Table 3, we see bootstrapped results for the mediating role of creativity between emotional intelligence and thinking about the impact of problem solving. According to the direct effects, emotional intelligence predicts thinking about the impact of problem solving (BSE = 0.03012) and creativity (BSE = 0.25024). In addition, creativity was found to predict thinking about the implications of problem solving (BSE = 0.19026). When examining the indirect effect, creativity was found to have a mediating role between emotional intelligence and thinking about the impact of problem solving (bootstrap coefficient = .05, SE = .009; 95% CI = .034, .070). With the inclusion of creativity as a mediating variable in the model, the statistically significant relationship between emotional intelligence and thinking about the impact of problem solving did not become insignificant. In line with these results, creativity was found to have a partial mediating role in this model.

Table 4.

Path Coefficients and Indirect Effect Results for the Mediation Model (Sub-Dimension of Problem Solving Through Modelling)

Path Coefficients			Bootstrap Indirect Effect		
			%95 CI		
	Problem Solving Through Modelling	To Creativity	Coefficients (SE)	Lower Limit	Upper Limit
Model					
From Emotional Intelligence	.02(.007)	.25(.024)			
From Creativity	.14(.016)				
EI→PSTM→C			.04(.006)	.027	.049
Not: ** p < .01, EI = Emotional Intelligence, PSTM = Problem Solving Through Modelling, C = Creativity, CI = Confidence Interval, SE = Standart Error					

Looking at Table 4, we see the bootstrapped results for the mediating role of creativity between emotional intelligence and problem solving through modelling. According to the direct effects, emotional intelligence predicts problem solving through modelling (BSE = 0.02007) and creativity (BSE = 0.25024). In addition, creativity was found to predict problem solving through modelling (BSE = 0.14016). When examining the indirect effect, creativity was found to have a mediating role between emotional intelligence and problem solving through modelling (bootstrap coefficient = .04, SE = .006; 95% CI = .027, .049). When creativity was included as a mediating variable in the model, the statistically significant relationship between emotional intelligence and problem solving through modelling did not become insignificant. In line with these findings, creativity was found to have a partial mediating role in this model.

Table 5.

Path Coefficients and Indirect Effect Results for the Mediation Model (Sub-Dimension of Seeking Alternative Solutions)

Path Coefficients			Bootstrap Indirect Effect		
			%95 CI		
	Seeking Alternative Solutions	To Creativity	Coefficients (SE)	Lower Limit	Upper Limit
Model					

From Emotional Intelligence	.03(.010)	.25(.024)		
From Creativity	.17(.022)			
Model EI→SAS→C			.04(.008)	.028 .062
Not: ** p < .01, EI = Emotional Intelligence, SAS = Seeking Alternative Solutions, C = Creativity, CI = Confidence Interval, SE = Standart Error				

Looking at Table 5, we see the bootstrapped results for the mediating role of creativity between emotional intelligence and alternative solution seeking. According to the direct effects, emotional intelligence predicts alternative solution seeking (BSE = 0.03010) and creativity (BSE = 0.25024). In addition, creativity was found to predict the search for alternative solutions (BSE = 0.17022). When examining the indirect effect, creativity was found to play a mediating role between emotional intelligence and alternative solution seeking (bootstrap coefficient = .04, SE = .008; 95% CI = .028, .062). With the inclusion of creativity as a mediating variable in the model, the statistically significant relationship between emotional intelligence and alternative solution seeking did not become insignificant. In line with these results, creativity was found to have a partial mediating role in this model.

Table 6.

Path Coefficients and Indirect Effect Results for the Mediation Model (Sub-Dimension of Determination to Implement the Solution Found)

Path Coefficients			Bootstrap Indirect Effect		
			%95 CI		
	Determination to Implement the Solution Found	To Creativity	Coefficients (SE)	Lower Limit	Upper Limit
Model					
From Emotional Intelligence	.018(.008)	.25(.024)			
From Creativity	.13(.017)				
Model EI→DISF→C			.03(.006)	.022	.045
Not: ** p < .01, EI = Emotional Intelligence, DISF = Determination to Implement the Solution Found, C = Creativity, CI = Confidence Interval, SE = Standart Error					

Table 6 shows the bootstrapped results for the mediating role of creativity between emotional intelligence and the search for alternative solutions. According to the direct effects, emotional intelligence predicts determination in implementing the identified solution (BSE = 0.018008) and creativity (BSE = 0.25024). In addition, creativity was found to predict determination in implementing the identified solution (BSE = 0.13017). When examining the indirect effect, creativity was found to play a mediating role between emotional intelligence and determination in implementing the solution (bootstrap coefficient = .03, SE = .006; 95% CI = .022, .045). With the inclusion of creativity as a mediating variable in the model, the statistically significant relationship between emotional intelligence and determination in implementing the identified solution did not become insignificant. In line with these results, creativity was found to have a partial mediating role in this model.

Table 7.

Path Coefficients and Indirect Effect Results for the Mediation Model (Sub-Dimension of the Analysis of the Problem Encountered)

Path Coefficients			Bootstrap Indirect Effect		
			%95 CI		
	Analysis of the Problem Encountered	To Creativity	Coefficients (SE)	Lower Limit	Upper Limit
Model					
From Emotional Intelligence	.021(.008)	.25(.024)			
From Creativity	.09(.017)				

EI→APE→C	.023(.006)	.013	.035
Not: ** p < .01, EI = Emotional Intelligence, APE = Analysis of the Problem Encountered, C = Creativity, CI = Confidence Interval, SE = Standart Error			

Table 7 shows the bootstrapped results for the mediating role of creativity between emotional intelligence and problem analysis. According to the direct effects, emotional intelligence predicts problem analysis (BSH = 0.021008) and creativity (BSH = 0.25024). In addition, creativity was found to predict problem analysis (BSH = 0.09017). When examining the indirect effect, creativity was found to play a mediating role between emotional intelligence and problem analysis (bootstrap coefficient = .023, SE = .006; 95% CI = .013, .035). With the inclusion of creativity as a mediating variable in the model, the statistically significant relationship between emotional intelligence and problem analysis did not become insignificant. In line with these results, creativity was found to have a partial mediating role in this model.

Discussion & Conclusion

According to the results of this study, positive relationships were found between emotional intelligence, problem solving skills and creativity. Furthermore, it was concluded that the indirect effect of creativity in the relationship between emotional intelligence and problem solving skills was statistically significant. In other words, creativity has a partial mediating role in the relationship between emotional intelligence and problem solving skills among teacher candidates. As a result, as teacher candidates' levels of emotional intelligence increase, their levels of creativity may also increase, and this increase will enhance and strengthen their levels of problem solving skills.

One of the findings of this study is the identification of a positive relationship between emotional intelligence and problem solving skills. These findings show that increasing the level of emotional intelligence in teacher candidates also increases their problem solving skills. Mayer et al (1999) state that emotional intelligence is related to the ability to make sense of emotions and their interrelationships, and to find solutions to problems based on this. Zeidner, Matthews, Roberts and MacCann (2003) also suggest that one of the basic components of emotional intelligence is successful problem solving. Looking at the literature, there are various studies that have found a positive relationship between emotional intelligence and problem-solving skills, similar to the findings of this research (Deniz, 2013; Karabulutlu et al., 2011). As a result of the study conducted by İşmen (2001) with university students, a positive relationship was found between emotional intelligence and problem solving skills.

Emotional intelligence can be taught and developed at any stage of life (Yeşilyaprak, 2001). The fact that emotional intelligence can be taught and developed highlights the importance of the educational environment. For these reasons, it is important for teachers and academics working in educational institutions from pre-school to undergraduate education to develop both emotional intelligence and problem-solving skills (Kaynak, 2013). Furthermore, in the study conducted by Duman et al. (2014) with teacher candidates, it was found that the emotional intelligence levels of the participants did not differ according to the departments. The qualitative interviews conducted in the study revealed that the undergraduate courses were structured according to cognitive areas, but the emotional learning and teaching processes were not sufficiently considered. Similarly, Önen's (2008) study found that the emotional intelligence levels of teacher candidates did not differ between departments. These results suggest that studying in a particular teacher education department may not be related to the level of emotional intelligence, and considering the improvable characteristic of emotional intelligence, it can be suggested that courses aimed at increasing the emotional intelligence level of candidates should be added.

As a result of this research, a significant positive relationship was found between problem solving and creativity. This finding suggests that an increase in people's problem solving skills will also increase their creativity. It is understood that there are studies in the literature that support this finding (Arslan et al., 2016; Sonmaz, 2002; Zeytun, 2010). Problem solving is a high-level skill, and people who acquire it are successful in solving the problems they encounter. Problem solving skills, which are an important factor in people's ability to progress in life today, are also included in general and basic skills when creating curricula (Erdem & Genç, 2014). For this reason, problem solving skills have been emphasised in curricula since 2005-2006. Problem solving skills, which are difficult to learn and acquire in everyday life, need to be taught by educators within a plan (Yıldız & Ekşisu, 2011).

This study found a significant positive relationship between emotional intelligence and creativity. In other words, it shows that an individual's recognition of their own and others' emotions can increase creativity. Similar to these findings, there are various studies that have found a positive relationship between emotional intelligence and creativity, taking into account cultural differences (Duman et al., 2014; Jenaabadi et al., 2015; Reindel, 2006). As a result of the study conducted with adolescents by Noorafshan and Jowkar (2013), it was found that emotional intelligence positively and significantly predicted creativity. These findings can be interpreted to mean that individuals with higher emotional intelligence are more creative. Given this emphasis on creativity, adding emotion education to the curriculum in schools such as Spain is an example. However, adding emotional education to the curriculum is not enough. It is important that

teachers who will be implementing this curriculum have knowledge of the course content and what they can apply in practice (Ogoemeka, 2011).

The results of a study conducted by Salavera et al. (2017) to define emotional intelligence and creativity in first and second grade primary school students showed that there was a difference between students' levels of creativity, but no difference between their levels of emotional intelligence. These results show that despite being creative, students give short, concise and practical answers when answering questions. Various studies have shown that academic success is related to emotional intelligence (Fallahzadeh, 2011; Mansouri, 2001; Torrance, 1963; Zare, 2001) and creativity (Jabeen & Khan, 2013; Hansenne & Legrand 2012; Zarak & Ahmadian, 2015). In light of these findings, the importance of emotional intelligence skills and creativity for students' academic success in school can be seen. Furthermore, Petrides et al (2004) found that individuals with high emotional intelligence skills are less likely to be excluded from school, have unexcused absences and be expelled from school. These findings show that emotional intelligence is also important for the academic and social development of students.

Having seen the importance of emotional intelligence and creativity in students through various studies, the question arises as to how teachers can teach these skills to their students. For this purpose, it can be suggested to use creative teaching programmes that include emotional intelligence and emotional skills based on the ability to perceive, understand and regulate emotions, based on the model proposed by Mayer and Salovey (Mayer & Salovey, 1993). A creative school environment motivates students to discover something about themselves, both psychologically and socially, and helps children to develop their creative personality traits (Sălceanu, 2016). Teachers have the biggest role to play in making this happen.

This study has some limitations that may be useful in guiding future studies. Firstly, this study was conducted with pre-service teachers and the results of this study cannot be generalised to other samples. It is not known whether the participants had previous experience of developing emotional intelligence, problem solving or creativity and whether they had attended training, seminars or symposia. For this reason, the effect on the study results could not be determined. A detailed study can be carried out by including this information in future studies. At the same time, according to the results of this research, the course content for teachers can be increased to develop emotional intelligence, problem solving and creativity skills while they are still studying at university, considering the impact of teachers on the emotional, cognitive and physical development of students in schools. In addition, seminars, symposia and training can be organised by universities to develop these skills in future teachers.

The Ethical Committee Approval

In this study, permission was first obtained from Muş Alparslan University Ethics Committee (10. 05.2024 /136791-7-57)

Conflict of Interest

No conflict of interest between the authors

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Genişletilmiş Özet

Giriş

Goleman (2005) duygusal zekâyı; kişinin harekete geçirebilmesi, yaşanan olumsuzluklarla birlikte devam edebilmesi, dürtüselliğini kontrol edebilmesi, umut besleyebilmesi, empati yapabilmesi ve ruh halini düzenleyebilmesi olarak tanımlamaktadır (Atilla, 2012; Karabulutlu vd., 2011). Duygusal zekâsı yüksek kişilerin özellikleri arasında stresle başa çıkma, insanları etkileme ve yaratıcı olma yer almaktadır (Davis & Peake, 2014; Zampetakis vd., 2009; Zhou & George, 2013). Goleman (2005) duygusal zekânın bilişsel zekâdan daha önemli olduğunu ifade etmektedir. Buna göre beyinde duygusal düşünme merkezlerinin kaynağı olarak liflerin düşünme merkezlerini etkilemesiyle birlikte, yüksek duygusal zekâyâ sahip insanların yaşamlarını daha yaratıcı olduklarını düşünerek geçirmeleri daha olasıdır (Akt. Noorafshan & Jowkar, 2013).

Problem çözme, bilişsel olduğu kadar duyuşsal ve davranışsal becerilerin kullanıldığı, kişinin problemi hissettiği an itibarıyla problemine çözüm buluncaya kadar devam ettirdiği karmaşık bir süreci ifade etmektedir (Demirtaş & Dönmez, 2008). Yaşam başarısını doğrudan etkileyen bir faktör olması nedeniyle problem çözme becerisi kişinin mutlu ve doyumlu bir yaşam sürdürmesini sağlayan ruh sağlığının önemli bir faktörüdür (Sonmaz, 2002). Her insan, yaşamında zaman zaman çözülmesi gereken problemlerle karşı karşıya kalmaktadır. Ortaya çıkacak problemin belirli bir yaş aralığı veya gelişim dönemi yoktur. Bireyler, hangi gelişim dönemi veya yaşta olursa olsun problemlerle karşılaşmaktadırlar (Taylan, 1990).

Yaratıcılık, kişilerin deneyim ve kaynaklarından en yüksek düzeyde yararlanabilmesidir (Olatoye vd., 2010, 769). Kişinin duygusal hayatı ile yaratıcılığı birbirleriyle yakından ilgilidir (Kanhai, 2014). Tsai ve Lee (2014), kişinin duygularını doğru olarak düzenleyebilmesinin, yaratıcı düşünmeyi daha çok kullanabilmesinde faydalı olabileceğini belirtmektedir. Duygusal zekâ düzeyi daha yüksek kişilerin daha yaratıcı olduğu (Polat & Aktop, 2010) ve duygusal zekâ ile yaratıcılığın ilişkili olduğu belirtilmektedir (Büyükşalvarcı & Gündoğan, 2018; Noorafshan & Jowkar, 2013). Torrance (2003)'a göre yaratıcılık engelleri, problemleri, bilgi eksikliklerini fark edip problemleri çözebilecek tahminlerde bulunup varsayımlar geliştirilen, varsayımları deneyip sonuçlarını ortaya koymayı gerektiren doğal bir problem çözme sürecidir. Goleman (1995), uygun eğitim ve öğretim vasıtasıyla duygusal zekânın geliştirilebileceğini ve artırılabilirliğini öne sürmektedir.

Öğretmenlerin öğrencilerin ilgi, gelişim dönemi özellikleri, ihtiyaçları ve yetenekleri doğrultusunda sınıf içerisinde çeşitli programlar hazırlayıp uygulayabilmesi gerekmektedir. Bu da öğretmenlerin gerektiğinde sınıfta bulunan öğrenci kadar etkinlik üretebilecek yaratıcılığa sahip olmasını gerektirmektedir (Yenilmez & Yolcu, 2007). Toplumun ihtiyacı olan yaratıcı kişilerin yetiştirilmesinde sorumlu olan öğretmenlerin önce kendilerinin yaratıcı kişiler olmaları gerektiği düşünülmektedir. Yaratıcı olmayan bir öğretmenin sınıfta yaratıcılık gerektiren iş ve eylemlerde başarılı olamaması öğrencilerin yaratıcılığını engelleyebilmektedir (Sönmez Ektem, 2017). Bu bağlamda duygusal zekâ, problem çözme becerileri ve yaratıcılık düzeyi yüksek öğretmenlerin bu niteliklere sahip öğrenciler yetiştirmesinin daha olası olması söylenebilmektedir. Bu bağlamda öğretmenlerde bu niteliklerin ne düzeyde olduğu merak edilmekte ve bu nitelikler arasındaki ilişkilerin ortaya konulması önemsenmektedir.

Yöntem

Mevcut araştırma nicel araştırma yaklaşımına dayalı olarak korelasyonel araştırma deseninde yürütülmüştür. Korelasyonel araştırmalarda birden fazla değişken arasındaki ilişkiler araştırılarak, saptanan ilişkilerin yönü ve düzeyleri belirlenmektedir (Creswell, 2014). Bu araştırmaya 260 (197 kadın, 63 erkek) öğretmen adayı katılmıştır. Katılımcıların 242'si bekar, 18'i evlidir. Katılımcıların 73'ü Türkçe, 54'ü matematik, 43'ü okul öncesi, 22'si sınıf, 19'u fen bilgisi, 16'sı özel eğitim, 15'i yabancı dil, 14'ü sosyal ve 4'ü de bilgisayar öğretmenliğinde eğitimini sürdürmektedir. Katılımcıların yaşları 18-45 arasında değişmektedir (Ort=22,37, SS=4,314). Araştırmada veri toplamak amacıyla demografik bilgi forumunun yanı sıra Yetişkinler İçin Problem Çözme Ölçeği (Yaman ve Dede, 2008), Duygusal Zekâ Özelliği Ölçeği-Kısa Formu (DZÖÖ-KF) (Petrides ve Furnham, 2000; 2001) ve Bireysel Yaratıcılık Ölçeği (Zhou ve George, 2001) kullanılmıştır.

Veri analizine başlamadan önce sırasıyla uç değerler, normallik, doğrusallık, homojenlik ve çoklu bağlantı varsayımları (Tabachnick & Fidel, 2013) incelenmiştir. Tek değişkenli normallik için elde edilen puanlar standart z puanlarına dönüştürülerek puanların ± 3.29 sınırları içinde olup olmadığı incelenmiş ve herhangi bir uç değere rastlanmamıştır. Çok değişkenli normallik kriterleri için Mahalanobis uzaklığı değeri hesaplanmış ve burada da kriterlere uymayan herhangi bir gözlem olmadığı belirlenmiştir. Değişkenlerin çarpıklık ve basıklık değerleri incelenmiş ve Tablo 1'de verilmiştir. Bu kapsamda basıklık ve çarpıklık değerlerinin kabul edilebilir ($\pm 1,5$) aralıklarda olduğu tespit edilmiştir (Tabachnick & Fidell, 2013). Buna göre 260 katılımcıya ait puanların normallik varsayımlarını karşıladığı tespit edilmiştir.

Çoklu bağlantı sorunu Durbin-Watson yöntemi kullanılarak test edilmiştir. Analiz sonucunda Durbin-Watson değeri 1,830 olarak bulunmuştur. Ayrıca durum indeksi (CI=13.08-17.78), varyans enflasyon faktörü (VIF=1.64) ve tolerans

değerlerinin (Tolerans =.60) uygun referans aralıkları içerisinde olduğu görülmüştür. Araştırmada değişkenler arasındaki bağlantıları incelemek için Pearson Momentler Çarpımı Korelasyon Katsayısı hesaplanarak Tablo 1’de sonuçlar gösterilmiştir. Elde edilen sonuçlar değişkenler arasında çoklu bağlantılılık sorunu olmadığını desteklemektedir (Field, 2013). Bütün bu incelemelerden sonra doğrudan ve dolaylı etkilerin tespit edilebilmesi için regresyon temelli aracılık makrosu analizi yapılmıştır. Burada Preacher ve Hayes’in (2008) önerdiği analizler dikkate alınarak süreç yürütülmüş ve bu analize göre tespit edilen dolaylı etkinin anlamlılık düzeyine karar vermek üzere elde edilen güven aralığının alt ve üst sınırlarında sıfırı değerinin bulunmaması gerekliliği baz alınmıştır (Hayes, 2013).

Bulgular

Bulgulara göre duygusal zekânın problem çözme ve yaratıcılık ile pozitif yönde anlamlı ilişkilere sahip olduğu görülmektedir. Ayrıca problem çözme ile yaratıcılık arasında da pozitif yönde anlamlı bir ilişki olduğu saptanmıştır.

Duygusal zekâ ile problem çözme arasında yaratıcılığın aracılık rolüne yönelik bootstrapping sonuçlarında doğrudan etkilere göre duygusal zekâ problem çözme ve yaratıcılığı yordamaktadır. Ayrıca yaratıcılığın da problem çözme yordadığı saptanmıştır. Dolaylı etki incelendiğinde yaratıcılığın, duygusal zekâ ile problem çözme arasında aracı rolü olduğu bulunmuştur. Aracı değişken olan yaratıcılığın modele girmesiyle, duygusal zekâ ile problem çözme arasındaki istatistiksel olarak anlamlı ilişki anlamsız hale gelmemiştir. Bu sonuçlar doğrultusunda yaratıcılığın bu modelde kısmi aracılık rolüne sahip olduğu saptanmıştır.

Doğrudan etkilere göre duygusal zekâ, problem çözümünün etkilerini düşünmeyi ve yaratıcılığı yordamaktadır. Ayrıca yaratıcılığın da problem çözümünün etkilerini düşünmeyi yordadığı saptanmıştır. Dolaylı etki incelendiğinde yaratıcılığın, duygusal zekâ ile problem çözümünün etkilerini düşünme arasında aracı rolü olduğu bulunmuştur. Bu sonuçlar doğrultusunda yaratıcılığın bu modelde kısmi aracılık rolüne sahip olduğu saptanmıştır.

Duygusal zekâ ile modelleme yoluyla problem çözme arasında yaratıcılığın aracılık rolüne yönelik bootstrapping sonuçlarında doğrudan etkilere göre duygusal zekâ, modelleme yoluyla problem çözme ve yaratıcılığı yordamaktadır. Ayrıca yaratıcılığın da modelleme yoluyla problem çözme yordadığı saptanmıştır. Dolaylı etki incelendiğinde yaratıcılığın, duygusal zekâ ile modelleme yoluyla problem çözme arasında aracı rolü olduğu bulunmuştur. Bu sonuçlar doğrultusunda yaratıcılığın bu modelde kısmi aracılık rolüne sahip olduğu saptanmıştır.

Duygusal zekâ ile alternatif çözümleri araştırma arasında yaratıcılığın aracılık rolüne yönelik bootstrapping sonuçlarında doğrudan etkilere göre duygusal zekâ, alternatif çözümleri araştırmayı ve yaratıcılığı yordamaktadır. Ayrıca yaratıcılığın da alternatif çözümleri araştırmayı yordadığı saptanmıştır. Dolaylı etki incelendiğinde yaratıcılığın, duygusal zekâ ile alternatif çözümleri araştırma arasında aracı rolü olduğu bulunmuştur. Bu sonuçlar doğrultusunda yaratıcılığın bu modelde kısmi aracılık rolüne sahip olduğu saptanmıştır.

Duygusal zekâ ile alternatif çözümleri araştırma arasında yaratıcılığın aracılık rolüne yönelik bootstrapping sonuçlarında doğrudan etkilere göre duygusal zekâ, belirlenen çözümü uygulamada kararlılık ve yaratıcılığı yordamaktadır. Ayrıca yaratıcılığın da belirlenen çözümü uygulamada kararlılığı yordadığı saptanmıştır. Dolaylı etki incelendiğinde yaratıcılığın, duygusal zekâ ile belirlenen çözümü uygulamada kararlılık arasında aracı rolü olduğu bulunmuştur. Bu sonuçlar doğrultusunda yaratıcılığın bu modelde kısmi aracılık rolüne sahip olduğu saptanmıştır.

Duygusal zekâ ile karşılaşılan problem analiz etme arasında yaratıcılığın aracılık rolüne yönelik bootstrapping sonuçlarında doğrudan etkilere göre duygusal zekâ, karşılaşılan problem analiz etme ve yaratıcılığı yordamaktadır. Ayrıca yaratıcılığın da karşılaşılan problem analiz etmeyi yordadığı saptanmıştır. Dolaylı etki incelendiğinde yaratıcılığın, duygusal zekâ ile karşılaşılan problem analiz etme arasında aracı rolü olduğu bulunmuştur. Bu sonuçlar doğrultusunda yaratıcılığın bu modelde kısmi aracılık rolüne sahip olduğu tespit edilmiştir.

Tartışma ve Sonuç

Bu araştırmanın sonuçlarına göre duygusal zekâ, problem çözme becerisi ve yaratıcılık arasında pozitif ilişkiler tespit edilmiştir. Ayrıca duygusal zekâ ile problem çözme becerisi arasındaki ilişkide yaratıcılığın oluşturduğu dolaylı etkinin istatistiksel olarak anlamlı olduğu sonucuna ulaşılmıştır. Başka bir ifadeyle öğretmen adaylarında duygusal zekâ ile problem çözme becerisi arasındaki ilişkide yaratıcılığın kısmi aracılık rolü bulunmaktadır. Sonuç olarak öğretmen adaylarında duygusal zekâ düzeylerinin artmasıyla yaratıcılık düzeyleri de artabilmekte ve bu artış problem çözme becerisi düzeylerini de artırarak güçlendirmektedir.

Mayer vd. (1999), duygusal zekânın duyguları ve birbirleriyle olan ilişkilerini anlamlandırma ve bunlara dayanarak sorunlara çözüm bulma yeteneği ile ilişkili olduğunu ifade etmektedir. Matthew ve Zeidner (2001) de duygusal zekânın temel parçalarından birinin başarılı problem çözme olduğunu ileri sürmektedir. Literatüre bakıldığında duygusal zekâ ve problem çözme becerileri arasında bu araştırma bulgularına benzer şekilde pozitif ilişkinin tespit edildiği araştırmalar yer aldığı görülmektedir (Deniz, 2013; Karabulutlu vd., 2011). Duygusal zekânın hayatın her döneminde öğretilip

geliştirilebildiği belirtilmektedir (Yeşilyaprak, 2001). Duygusal zekânın öğretilip geliştirilebilir olmasının özellikle eğitim ortamlarının önemini ön plana çıkardığı ifade edilebilir. Okul öncesi eğitim sürecinden lisanse kadar eğitim kurumlarında çalışacak öğretmen ve akademisyenlerin hem duygusal zekâ hem de problem çözme becerilerinin geliştirilmesi bu sebeplerle önem taşımaktadır (Kaynak, 2013). Ayrıca Duman vd. (2014) tarafından öğretmen adaylarıyla yapılan araştırmada duygusal zekâ düzeyinin katılımcıların okudukları bölümlere göre farklılık göstermediği, çalışmada yapılan görüşmeler sonucunda lisansta alınan derslerin bilişsel alana göre yapılandırıldığı ancak duygusal öğrenme ve öğretme süreçlerinin yeterince dikkate alınmadığı görülmüştür.

Araştırmanın duygusal zekâ ve yaratıcılık arasındaki ilişkiye ilişkin ulaştığı sonuç ele alındığında ise bu sonuçlara benzer olarak, kültürel farklılıklar göz önüne alınarak duygusal zekâ ile yaratıcılık arasında pozitif ilişki bulunan çeşitli araştırmalara rastlanmaktadır (Duman vd., 2014; Jenaabadi vd., 2015; Reindel, 2006; Torrance, 1997). Noorafshan ve Jowkar (2013) tarafından ergenlerle yürütülen çalışma sonucunda duygusal zekânın yaratıcılığı olumlu ve anlamlı şekilde yordadığı tespit edilmiştir. Bu sonuçlar daha yüksek duygusal zekâyı sahip olmanın bireylerin daha fazla yaratıcı güce sahip olması yönünde yorumlanabilmektedir. Yaratıcılığa yapılan bu vurgu göz önüne alındığında, İspanya gibi okullarda ders müfredatlarına duygu eğitiminin eklenmesi bir örnek teşkil etmektedir.