


The Predictive Power of the Problem-Solving and Emotional Intelligence Levels of Prospective Teachers on Their Self-Directed Learning Skills

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Keywords

Self-directed learning
Problem-solving
Emotional intelligence
Prospective teachers
Faculty of education

Article Info:

Received : 05-12-2021
Accepted : 10-03-2022
Published : 11-04-2022

Abstract

This study aims to determine the predictive power of the problem-solving and emotional intelligence levels of prospective teachers on their self-directed learning skills. This is a descriptive study with a relational screening model. The sample of the study consisted of 476 prospective teachers studying at the Faculty of Education and Sports Sciences at Yozgat Bozok University. "Self-Directed Learning Skills Scale" developed by Aşkın (2015), "the Problem-Solving Inventory" developed by Heppner and Peterson (1982) and adapted into Turkish by Şahin, Şahin, and Heppner (1993), and the "Schutte Emotional Intelligence Scale" prepared by Schutte, et al. (1998), revised by Austin, Saklofske, Huang and McKenney (2004), and adapted into Turkish by Tatar, Tok, and Saltukoğlu (2011) were used to answer research questions. In data analysis, descriptive statistics, Pearson's correlation coefficient, and multiple regression analysis were used according to the normality test results. It was found that the self-directed learning skill levels of the participants was high, there was a significant relationship between their levels of self-directed learning and their emotional intelligence and problem-solving levels, and problem-solving and emotional intelligence together explained 25% of the total variance in self-directed learning skills. Based on these findings, recommendations were offered, especially in educational environments, to carry out activities that support problem-solving skills and emotional intelligence, thus supporting self-directed learning.

DOI: 10.52963/PERR_Biruni_V11.N1.04

To cite this article: Peker Ünal, D. (2022). The predictive power of the problem-solving and emotional intelligence levels of prospective teachers on their self-directed learning skills. *Psycho-Educational Research Reviews*, 11(1), 46-58. doi: 10.52963/PERR_Biruni_V11.N1.04

INTRODUCTION

Self-directed learning, namely autodidacticism (Brookfield, 2009) or autonomous learning (Holec, 1980), is a learning style in which the design, implementation, and evaluation processes of learning are managed by the learner, and the learner themselves makes decisions about what content, how, and when to learn (Brookfield, 2009). Hiemstra (1994) asserted that self-directed learning takes place at the initiative of the student, and the individual has the primary responsibility for planning the effort and path to learn, implementing the plan, and evaluating the learning level. Self-directed learning is an effort made by the individual to meet their learning needs without the help of others, access information by making the necessary arrangements for themselves, acquire the necessary skills, and exhibit performance (Din, Haron, & Rashid, 2016; Herlo, 2017). Knowles (1975) stated that an individual with self-learning skills takes initiative, determines their learning needs and resources, creates learning goals, applies appropriate learning strategies, and teachers should be facilitators in the individual's acquisition of these skills. Clardy (2000) defined self-directed learning as the process of the learner to determine what they need to learn, know where they can find information, and evaluate their status of reaching their learning goals. Based on these arguments, self-learning means that the individual organizes the learning process, plans what they have to do to achieve their learning goals, implements the plan, and evaluates the result of the implementation.

Students who plan their learning, make changes in their learning routines to implement their plans and organize their study environment should take more responsibility for learning than students who do not have these qualifications, focus on the content they will learn, evaluate their acquisition of the content, and implement what they need to do according to the results of this evaluation. In other words, self-directed learners should complete their learning processes on their own without the guidance or supervision of another individual. Organizing the learning process by oneself first requires the individual to know themselves, as well as knowing what content and how the individual learns, being aware of what distracts them in the learning process, and identifying the elements that motivate them to facilitate the management of learning.

Having self-directed learning skills in higher education enables students to improve themselves, have high motivation for learning, have a desire to learn, analyze their emotions correctly and direct them positively in this process, believe that they can solve the problems they face, and in short, become lifelong learners. Especially since the knowledge and skills acquired in the four-year undergraduate education at education faculties are not sufficient in an average of 25 years of professional life, prospective teachers need to recognize their learning styles, make positive use of their emotions, and solve problems in this process.

Various researchers have reported the knowledge, skills, and attitudes of self-directed learners. Hiemstra (1994) stated that the learning capacity of individuals with self-directed learning skills increases, they learn from their experiences, respect themselves, have a curiosity-learning and desire to succeed, and their intrinsic motivation is high. Taylor (1995) suggested that these learners perceive problems as challenges to overcome, they want to change, they enjoy learning, they are persistent, independent, self-disciplined, self-confident, and goal-oriented, while Garrison (1997) underlined that self-directed learners have a high level of responsibility for making learning meaningful and monitoring themselves. Toit-Brits and Zyl (2017) stated that self-directed learners gain control in learning, determine their learning destiny, are assertive, and know their abilities and personality traits. Guglielmino and Guglielmino (2003) expressed that self-directed learners are self-confident, take responsibility in learning, do not shy away from problems, on the contrary, they see problems as challenges to overcome, are creative and independent in learning, can easily ask for help when needed, and use the available tools in learning, and they added that these learners create new learning tools when the available tools are insufficient, act in accordance with the time/work plan and believe that their learning is invaluable, and the authors likened such teachers and self-directed learners to a lone

wolf struggling to learn. These listed qualities question the relationship between self-directed learning skills and the concepts of emotional intelligence and problem-solving skills.

SELF-DIRECTED LEARNING AND EMOTIONAL INTELLIGENCE

Individuals with self-directed learning skills regulate their learning, are aware of the variables that affect the learning process, motivate themselves, are especially conscious of their emotions, and manage their emotions, and these qualities are all related to the concept of emotional intelligence (Zhoc, Chungb, & King, 2018). Emotional intelligence was defined by Law, Wong, and Song (2004) as an individual's ability to express their emotions, understand the emotions of others, use the information obtained in this process in their thoughts and behaviors, and know the effect of their emotions on different situations. According to Wolff (2005), emotional intelligence is the capacity to recognize our emotions and those of others, motivate ourselves, and effectively manage our emotions. Emotional intelligence makes it easier for the individual to accurately describe their emotions and control their reactions so that they gain the flexibility necessary to adapt to changing situations and can direct themselves correctly. In different definitions of emotional intelligence, understanding emotions, knowing the effects of emotions, using emotions in regulating behavior and thoughts, and using emotions for motivation are related to the concept of self-efficacy/self-regulation. Studies have also revealed that there is a strong relationship between self-directed learning and emotional intelligence, and having positive emotions towards learning and managing changing emotions in the learning process positively supports academic performance and self-management (Bansal, 2021; Buvoltz et al., 2008; McCombs & Whisler, 2010; Muller, 2008; Roger, 2009; Zhoc, Chung & King, 2018; Zull, 2006).

Determining the effects of managing emotions and self-directed learning is more important in higher education than other educational levels. In this respect, starting and maintaining personal development, which is one of the main goals of higher education, and taking responsibility for learning requires having self-directed learning skills and regulating and managing emotions to facilitate learning in this process. Individuals in higher education are expected to both organize their lives and make decisions about the future and take part in life as active citizens. The self-directed learning skills of prospective teachers and their management of emotions both support them to be lifelong learners and enable them to be a model for their students in these matters.

Studies on the self-directed learning skills of prospective teachers in Turkey have been aimed at determining their readiness for self-directed learning (Karataş, 2017; Kırılmazkaya, 2018) and their opinions about self-directed learning skills (Aşkın Tekkol & Demirel, 2016). Studies on emotional intelligence are mainly related to determining the emotional intelligence levels of students at departments of physical education and sports (Dorak, Vurgun, Uludağ Uyaniker & Çakır, 2012; Eraslan, 2015). Nevertheless, no previous study was found to determine the relationship between self-directed learning skills and emotional intelligence. Therefore, it is thought that this study could be beneficial for prospective teachers in motivating and directing their learning.

SELF-DIRECTED LEARNING AND PROBLEM-SOLVING SKILLS

The skill of problem-solving we encounter in many situations, from deciding which dress to buy while shopping to solving the most complex mathematics-physics problems, is the ability of the individual who has to solve the problem to produce a new solution by synthesizing the information they have for reasoning, being emotionally strong, not giving up on solving problems, and self-synthesizing. It requires motivation to solve problems. Woods et al. (2013) asserted that individuals with problem-solving skills could read, understand, gather information, understand the problem and develop tactics for solving the problem, think about problem-solving processes, do the right thing without haste, be organized and flexible, think systematically, and take risks, not to be afraid of uncertainty situations, and open to managing stress. In the problem-solving process, the individual should make a series of efforts to eliminate difficulties encountered in the process of reaching their

goal, reduce obstacles, think creatively, and combine intelligence-emotion-will and self-confidence (Oğuzkan, 1985).

Self-directed individuals are expected to take responsibility for their learning, so they look for causes of failure within themselves, not other individuals, determine what they need to do according to the results of their evaluation, think about alternative ways, see the problems they encounter as difficulties to overcome, and be goal-oriented. These listed qualities coincide with the qualities of individuals with problem-solving skills. Hence, it is thought that having self-directed learning skills could be related to problem-solving skills, as well as emotional intelligence. Previous studies have also reported the relationship between self-directed learning and problem-solving skills (Choi, Lindquist & Song, 2014; Eunyoung, Ruth, & Yeongsuk, 2014; Hwang & Oh, 2021; Loyens, Magda & Rikers, 2008).

Among studies on the problem-solving skills of prospective teachers in Turkey, it is seen that Aslan and Uluçınar Sağır (2012) aimed to determine the problem-solving skills of prospective science and technology teachers, Yiğitcan Nayir and Tekmen (2017) studied the contribution of learning environments to problem-solving skills from the perspective of prospective teachers, and Kiremitçi (2011) examined the relationship between the metacognitive awareness and problem-solving skills of prospective physical education teachers. However, there is no study investigating the relationship between problem-solving and self-directed learning. Besides, no study that investigated the effects of problem-solving skills and emotional intelligence on self-directed learning was found. In a study conducted by Kreber (2006), a significant relationship was seen between self-directed learning and critical thinking, and it was suggested that arrangements should be made to improve students' intuition and logical reasoning skills in higher education. It is thought that a similar relationship exists between self-directed learning and emotional intelligence.

Determining the relationship between the self-directed learning skills of prospective teachers and their emotional intelligence and problem-solving skills could guide those concerned in the organization of programs at faculties of education, help prospective teachers in directing their learning processes, improve their learning skills, and encourage instructors to include activities for the development of emotional intelligence and problem-solving skills while planning the course process.

In the COVID-19 pandemic period, several studies have been carried out about the advantages provided by the self-directed learning skills of students (Mahlaba, 2020; Morris, 2021; Grande, et al., 2022), and the importance of self-directed learning has been emphasized. Similarly, with the influence of the constructivist approach and active learning, the emotions of learners have also become one of the topics that are prioritized. Affective readiness, namely learner emotions, that was introduced into the literature with the mastery learning model has shown its effect in a broad area with the concept of emotional intelligence. The skill of problem-solving is also one of the basic capacities that individuals should have at different levels of education and in informal education processes. It is believed that determining the relationship between self-directed learning skills, which are some of the most important skills that prospective teachers should have to become lifelong learners, and emotional intelligence and problem-solving skills that affect learning will contribute to studies in this field.

Moreover, the review of studies published on the dissertation directory of the Turkish Council of Higher Education at Ulakbim Tr-Dizin did not reveal any study that was conducted with prospective teachers and aimed to determine the relationship between self-directed learning and the concepts of emotional intelligence and problem-solving skills. Accordingly, this study is considered important. In this context, this study aims to examine the opinions of prospective teachers on self-directed learning skills based on different variables and reveal the predictive power of their problem-solving skills and emotional intelligence on their self-directed learning skills. For this purpose, the study seeks answers to the following research questions:

- 1- What are the self-directed learning skill levels of prospective teachers?

2- Is there a significant relationship between the self-directed learning skills of prospective teachers and their problem-solving skills and emotional intelligence?

3- To what extent and in what priority do the problem-solving skills and emotional intelligence of prospective teachers explain their self-directed learning skill levels?

METHOD

RESEARCH DESIGN

This is a quantitative study aiming to determine the self-directed learning skill levels of prospective teachers and reveal the predictive power of their problem-solving skills and emotional intelligence on their self-directed learning skills. Relational screening, a descriptive method, was used in this study. A survey was conducted to answer the first research question, and correlational research was carried out to answer the second and third questions.

DATA COLLECTION

The sample of the study consisted of 476 prospective teachers who were studying at the Faculty of Education and Sports Sciences of a university in the Central Anatolia Region of Turkey that trains teachers on a voluntary basis. No sample selection method was used to include the participants.

The distributions of the demographic characteristics of the participants are presented in Table 1.

Table 1. Demographic Characteristics of the Participants

		f	%
Departments	Preschool education	45	24
	English language education	26	14
	Turkish language education	34	18
	Social studies education	10	5
	Form teaching	19	10
	Primary-secondary school mathematics education	10	5
	Science education	11	6
	Physical education	28	15
	Psychological counseling and guidance	5	3
Gender	Female	141	75
	Male	47	25
Class Year	First year	86	46
	Second year	74	40
	Third year	16	8
	Fourth year	11	6

As seen in Table 1, 24% of the participants were prospective preschool teachers, 75% were women, and 46% were first-year students.

DATA COLLECTION PROCEDURES AND TOOLS

This study aimed to measure the predictive power of the problem-solving skills and emotional intelligence levels of prospective teachers on their self-directed learning skills. For this purpose, the “Self-Directed Learning Skills Scale” developed by Aşkın (2015), “the Problem-Solving Inventory” developed by Heppner and Peterson (1982) and adapted into Turkish by Şahin, Şahin and Heppner (1993), and the “Schutte Emotional Intelligence Scale” prepared by Schutte, Malouff, Hall, Haggerty, Cooper, Golden, and Dornheim (1998), revised by Austin, Saklofske, Huang and McKenney (2004), and adapted into Turkish by Tatar, Tok, and Saltukoğlu (2011) were used to collect data. Due to the COVID-19 pandemic, the scales were prepared in Google Forms, and students were asked to fill them in by sending a link to their classroom WhatsApp groups. Students who filled in the data collection forms

with their official university e-mail addresses were first requested to fill in the personal information form, and with this form, their class years and departments were determined. The requirement of entry with their e-mail addresses prevented them from filling out the questionnaire more than once.

The “Self-Directed Learning Skills Scale” was developed by Aşkın (2015) to determine self-directed learning skill levels of university students. The 21-item five-point Likert-type scale consists of four dimensions (motivation, self-monitoring, self-control, and self-confidence). The values of the intervals in the scale are calculated according to the sequence width/number of groups ($(n-1)/n$) as $(5-1)/5=0.80$: “1.00- 1.80 Never,” “1.81- 2.60 Rarely,” “2.61- 3.40 Sometimes,” “3.41- 4.20 Usually,” and “4.21- 5.00 Always.” The Cronbach’s Alpha internal consistency coefficient of the scale was reported as 0.895 by Aşkın (2015). As a result of the exploratory factor analysis they conducted, Aşkın (2015) identified 4 factors with eigenvalues higher than 1 (motivation, self-monitoring, self-control, and self-confidence). These factors were determined to collectively explain 52.906% of the total variance in scale scores. The numbers of items in the dimensions of the scale were determined as 7, 5, 5, and 4 items for the respective dimensions stated above. The RMSEA value of the scale was reported as 0.069, which showed “acceptable fit” as a value below 0.08. The Cronbach’s Alpha internal consistency coefficient calculated with the data obtained within the scope of this study was .906. In the confirmatory factor analysis that was carried out with the data of this study, the Keiser-Meyer-Olkin (KMO) statistic of the scale was determined as 0.851.

The Problem-Solving Inventory was developed by Heppner and Petersen in 1982 and adapted into Turkish by Şahin, Şahin, and Heppner (1993) by administering it to university students. The scale consists of 35 items (among which items 9, 22 and 29 are not included in scoring) and three factors (problem-solving confidence, approach-avoidance style, and personal control) (Şahin, Şahin and Heppner, 1993). It is a six-point Likert-type scale where higher scores indicate the respondent’s self-perception of inadequacy about problem-solving. Taylan (1990) reported the test-retest reliability of the dimensions of the scale between .77 and .81. With the data collected in this study, the Cronbach’s Alpha internal consistency coefficient of the scale was calculated as 0.836, whereas its KMO statistic was found as 0.806 in the confirmatory factor analysis.

The Schutte Emotional Intelligence Scale was designed by Schutte, Malouff, Hall, Haggerty, Cooper, Golden, and Dornheim (1998), revised by Austin, Saklofske, Huang, and McKenney (2004), and adapted into Turkish by Tatar, Tok, and Saltukoğlu (2011). The scale consists of 41 items and three factors (optimism/mood regulation, utilization of emotions, and appraisal of emotions). It is a five-point Likert-type scale. The Cronbach’s Alpha internal consistency coefficient of the Turkish version of the scale was reported as 0.82. The internal consistency coefficients of the factors of the scale were reported as 0.75 for optimism/mood regulation, 0.39 for utilization of emotions, and 0.76 for appraisal of emotions. With the data collected in this study, the Cronbach’s Alpha internal consistency coefficient of the scale was determined as 0.874, while its KMO value was 0.859.

DATA ANALYSIS

Depending on the normality test results in the data analysis, descriptive statistics, Pearson’s correlation coefficient, and multiple regression analysis were used. The self-directed learning skill levels of the participants were determined by calculating frequencies and percentages as descriptive statistics. These levels were interpreted based on the interval value put forward by Aşkın (2015). Correlation coefficients were calculated to determine the relationships between self-directed learning and the variables of problem-solving and emotional intelligence. Before the multiple regression analysis, it was revealed that the data showed normal distribution, the relationships between self-directed learning skills and the variables of emotional intelligence and problem-solving levels were linear, and the relationship between emotional intelligence and problem-solving levels was weak ($r=0.139$, $p<0.001$). The regression analysis defined self-directed learning skills as the dependent variable and problem-solving and emotional intelligence as the independent variables.

FINDINGS

The frequency and percentage values of the Self-Directed Learning Skills Scale scores of the participants are presented in Table 2:

Table 2. Descriptive Statistics on Self-Directed Learning Skills

	Always	Often	Someti mes	Rarely	Never	Mean
	f %	f %	f %	f %	f %	f %
1. When I encounter a problem, I identify what I need to learn to solve that problem.	179 37.6	264 55.5	30 6.3	2 0.4	1 0.2	4.31
2. A new situation encountered is an opportunity for learning.	260 54.6	180 37.8	35 7.4	-	1 0.2	4.47
3. I clearly state my learning purpose.	179 37.6	229 48.1	63 13.2	4 0.8	1 0.2	4.23
4. I am open to learning.	298 62.6	151 31.7	26 5.5	-	1 0.2	4.57
5. The important thing is not that others see me as sufficient but that I find myself sufficient.	285 59.9	138 29.0	47 9.9	5 1.1	1 0.2	4.48
6. I believe that time spent on learning is not wasted.	314 66.0	139 29.2	20 4.2	2 0.4	1 0.2	4.61
7. At the end of the learning process, I check my level of achievement of my goals.	157 33.0	250 52.5	58 12.2	10 2.1	1 0.2	4.17
8. I think learning is a need.	330 69.3	133 27.9	12 2.5	-	1 0.2	4.67
9. I review my learning process regularly.	6 20.2	211 44.3	155 32.6	13 2.7	1 0.2	3.82
10. I evaluate my learning performance.	131 27.5	216 45.4	118 24.8	10 2.1	1 0.2	3.99
11. It is my responsibility to identify my learning deficiencies.	255 53.6	192 40.3	28 5.9	-	1 0.2	4.48
12. I complete my learning process in a planned way.	99 20.8	220 46.2	129 27.1	25 5.3	2 0.4	3.82
13. Learning something new is exciting.	282 59.2	161 33.8	29 6.1	3 0.6	1 0.2	4.52
14. I systematically monitor my learning process.	81 17.0	210 44.1	147 30.9	34 7.1	3 0.6	3.70
15. Self-criticism helps me learn better.	257 54.0	166 34.9	37 7.8	13 2.7	2 0.4	4.40
16. I benefit from different learning strategies (methods).	150 31.5	204 42.2	113 23.7	11 2.3	1 0.2	4.03
17. I want my learning process to continue throughout my life.	318 66.8	111 23.3	36 7.6	8 1.7	2 0.4	4.55
18. I identify my learning needs.	194 40.8	222 46.6	55 11.6	4 0.8	1 0.2	4.28
19. I am responsible for my learning decisions.	299 62.8	148 31.1	27 5.7	1 0.2	1 0.2	4.57
20. I manage my learning process effectively.	116 24.4	250 52.5	103 21.6	6 1.3	1 0.2	4.00
21. I enjoy learning.	265 55.7	189 39.7	21 4.4	-	1 0.2	4.51
	MEAN		4.29			

The mean Self-Directed Learning Skills Scale score of the participants was 4.29 out of 5. This value was in the “Always” range. In other words, the self-directed learning skill levels of the participants were high.

The highest mean scores of the participants was in the item “I think learning is a need” as 4.67, followed by the item “I believe that the time spent on learning is not wasted” with a mean value of 4.61 and the items “I am open to learning” and “I am responsible for my learning decisions” with a mean value of 4.57.

Of all items, the participants had the lowest mean score in the item “I systematically monitor my learning process” as 3.70, followed by the item “I evaluate my learning performance” with a mean value of 3.99, and the items “I regularly review my learning process” and “I complete my learning process in a planned way” with a mean value of 3.82.

The means scores of the participants in the dimensions of the scale are presented in Table 3.:

Table 3. Descriptive Statistics Regarding the Dimensions of the “Self-Directed Learning Skills Scale”

Dimensions	Mean	Standard deviation
Motivation	4.557	0.174
Self-Monitoring	4.196	0.6984
Self-Control	3.874	0.797
Self-Confidence	4.482	0.678

The participants had the highest mean score in the “motivation” dimension of the Self-Directed Learning Skills Scale (4.557), while they had the lowest mean score in the “self-control” dimension (3.874).

An answer to the second research question, “Is there a significant relationship between the self-directed learning skills of prospective teachers and their problem-solving skills and emotional intelligence?” was sought. Tables 4 and 5 present the results showing the relationships of self-directed learning skills with problem-solving skills and emotional intelligence.

Table 4. Correlation between Self-Directed Learning Skills and Problem-Solving Skills

		Self-directed learning	Problem solving
Self-directed learning	Pearson’s Correlation	1	.334**
	Sig. (2-tailed)		.000
	N	476	476
Problem solving	Pearson’s correlation	.334**	1
	Sig. (2-tailed)	.000	
	N	476	476

** p<.01

As seen in Table 4, there was a positive and significant relationship between self-directed learning skills and problem-solving skills (r=0.334, p<0.01).

Table 5. Correlation between Self-Directed Learning Skills and Emotional Intelligence

		Self-directed learning	Emotional intelligence
Self-directed learning	Pearson’s correlation	1	0.414**
	Sig. (2-tailed)		0.000
	N	476	476
Emotional intelligence	Pearson’s correlation	0.414**	1
	Sig. (2-tailed)	0.000	
	N	476	476

**p<.01

Table 5 shows that there was a positive and significant relationship between self-directed learning skills and emotional intelligence ($r=0.414$, $p<0.01$).

An answer was sought to the third research question, “To what extent and in what priority do the problem-solving skills and emotional intelligence of prospective teachers explain their self-directed learning skill levels?”

Table 6. Multiple Regression Analysis Results for Self-Directed Learning Skills

Model Summary				
Model	R	R-Squared	Adjusted R-Squared	Std. Error of the Estimate
1	0.499 ^a	0.249	0.246	0.31619

a. Predictors: (Constant), problem-solving mean, emotional intelligence mean

In Table 6, it is seen that problem-solving and emotional intelligence together explained 25% of the total variance in self-directed learning skills ($R=0.499$, $R^2=0.249$) ($F_{(2-473)}=78.573$, $p<0.01$). The rest of the change occurred for other reasons.

Table 7. Multiple Regression Analysis Results for Self-Directed Learning Skills

Coefficients ^a											
Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	Correlations			Collinearity statistics	
		B	Std. error	Beta			Zero-order	Partial	Part	Tolerance	VIF
		1	(Constant)	0.883			0.281		3.145	0.002	
	emotional intelligence mean	0.781	0.084	0.375	9.317	0.000	0.414	0.394	0.371	0.981	1.020
	problem-solving mean	0.304	0.043	0.282	7.005	0.000	0.334	0.307	0.279	0.981	1.020

a. Dependent Variable: self-directed learning skills mean

According to the standardized regression coefficients, the order of significance of the predictor variables for self-directed learning was emotional intelligence ($\beta=0.375$) and problem-solving ($\beta=0.282$). Considering the significance tests of the regression coefficients, emotional intelligence and problem-solving skills were significant predictors of self-directed learning skills. Additionally, according to the results of the regression analysis, the regression equation predicting self-directed learning skills was as follows:

$$\text{Self-directed learning level} = (0.781 \times \text{Emotional intelligence score}) + (0.304 \times \text{Problem solving score}) + 0.883.$$

DISCUSSION, CONCLUSION AND IMPLICATIONS

This study aimed to determine the self-directed learning skill levels of prospective teachers, the relationships between their self-directed learning levels and their problem-solving and emotional intelligence levels, and to what extent and in what priority their problem-solving skills and emotional intelligence explained their self-directed learning skill levels. The results suggested that the participants had high self-directed learning skill levels. In the Self-Directed Learning Skills Scale, the participants had the highest mean score in the motivation dimension, followed by the self-confidence, self-monitoring, and self-control dimensions, while the relationships of self-directed learning skills with emotional intelligence and problem-solving skills were strong. Problem-solving skill levels and emotional intelligence levels together explained 25% of the total variance in self-directed

learning skill levels, and according to the standardized regression coefficients, emotional intelligence was more effective on self-directed learning skills than problem-solving skills were.

The self-directed learning skill levels of the participants of this study were found high. In other words, the participants thought that they had high levels of self-directed learning skills. In various studies conducted in Turkey (Aşkın Tekkol & Demirel, 2016; Aydar, 2021; Çırak, 2021; Receptoğlu, 2021; Yılmazsoy & Kahraman, 2019), it has been seen that prospective teachers think their self-directed learning skill levels are high.

It was observed that the participants obtained the highest mean score in the Self-Directed Learning Skills Scale in the motivation dimension, followed by the self-confidence, self-monitoring, and self-control dimensions, respectively. This ranking has been reported the same in studies examining the self-directed learning skills of prospective music teachers (Çırak, 2021), prospective social studies teachers (Receptoğlu, 2021), and prospective early childhood teachers (Aydar, 2021). Aşkın Tekkol & Demirel (2016) also determined that prospective teachers displayed the desired behaviors in self-management in the dimensions of motivation, persistence (insistence in learning), and taking responsibility for learning. These findings may be interpreted as that prospective teachers are willing to take action towards their goal and reach the goal, but they are weaker in self-control, which can be defined as controlling behavior and emotions in learning.

In this study, it was observed that the participants had the highest mean score in the item "I think learning is a need." This finding coincided with the item in which prospective teachers had the highest mean score in the study conducted by Aydar (2021). The findings of studies conducted with prospective teachers in four universities in Turkey (Çukurova, Kocaeli, Fırat, and Kırıkkale Universities) also revealed that prospective teachers think that learning is a need.

Among the scores of the participants in this study in the Self-Directed Learning Skills Scale, the lowest mean scores were obtained in the items "I systematically monitor my learning process," "I evaluate my learning performance," "I regularly review my learning process," and "I complete my learning process in a planned way." Aşkın (2015) also observed that the item that university students gave the lowest score on the same scale was "I systematically monitor my learning process," followed by the item "I regularly review my learning process." As a result of the study conducted by Kılıç and Sökmen (2012), in which they examined the self-directed learning skills of prospective teachers, it was concluded that the dimension in which the prospective teachers had the lowest mean score was the dimension of "self-control."

In this study, positive significant relationships were identified between self-directed learning skills and the variables of emotional intelligence and problem-solving skills. Hwang and Oh (2021) and Kim and Shim (2018) also reported significant relationships between self-directed learning and problem-solving skills in nurses. Zhoc, Chung, and King (2018) stated that emotional intelligence is effective in self-directed learning because it can regulate one's own emotions and produce positive emotions. The relevant research results showed that emotional intelligence has a strong effect on self-directed learning, and students who are more emotionally intelligent are more self-directed. The findings obtained Kayıhan (2017) also indicated a positive and significant relationship between the self-directed learning skills of university students and their emotional intelligence levels.

In this study, it was observed that problem-solving skill levels and emotional intelligence levels together explained a part of the total variation in self-directed learning skill levels. In other words, the majority of the variation in self-directed learning skills was found to be caused by other factors. It will be beneficial to conduct studies that will reveal what these other factors are. For instance, Edmondson, Boyer, and Artis (2012) concluded that students with high self-directed learning skill levels are more creative, curious, show higher performance in the classroom, and are hopeful for the future. By making use of this finding, other factors affecting self-directed learning can be analyzed.

Based on these results, in higher education, it could be beneficial to organize activities that enable students to study by monitoring and controlling their learning and organize the course teaching process in a way that supports self-monitoring and self-control.

The scores of the participants of this study in the Self-Directed Learning Skills scale were found to be high, but it could be beneficial for prospective teachers to receive training on what self-directed learning is and how it is used more scientifically. It could be ensured that prospective teachers receive training on learning contracts,

samples, and individual study methods and techniques to enable them to use these elements when they become teachers and be a model for their learners.

In higher education, activities and case studies should be used to develop problem-solving skills and emotional intelligence in the course process.

To determine the factors that are effective on self-directed learning skills, it will be useful to conduct new studies covering state and private universities (or non-profit foundation universities in Turkey) in higher education, as well as the demographic characteristics of the families of prospective teachers. Studies that will also employ qualitative research methods and help us understand the topic in more depth may also be carried out. This study was performed with prospective teachers who voluntarily agreed to participate and in a small sample. More qualified studies to be conducted with broader samples will be beneficial.

REFERENCES

- Aslan, O. & Uluçınar Sağır, Ş. (2012). Fen ve teknoloji öğretmen adaylarının problem çözme becerileri. *Journal of Turkish Science Education*, 9(2), 82-94. <https://app.trdizin.gov.tr/publication/paper/detail/TVRNM05qSXpNdz09>
- Aşkın, İ. (2015). *Üniversite öğrencilerinin öz-yönetimli öğrenme becerilerinin incelenmesi*. (Publication No. 418179) [Doctoral Thesis. Hacettepe University]. YOK Tez Merkezi.
- Aşkın Tekkol, İ. & Demirel, M. (2016). Öğretmen adaylarının öz yönetimli öğrenme becerilerine ilişkin görüşlerinin incelenmesi. *Uluslararası Eğitim Programları ve Öğretim Çalışmaları Dergisi*, 6(12), 151-168. <https://app.trdizin.gov.tr/makale/TWpNM05qUTJOZ09>
- Aydar, G. (2021). *Okul öncesi öğretmen adaylarının öz yönetimli öğrenme becerilerinin yordanmasında bilişötesi farkındalık ve dijital okuryazarlık düzeylerinin rolü*. (Publication No. 677124). [Masters Thesis. Kocaeli University]. YOK Tez Merkezi.
- Bansal, K. (2021). A relative study of emotional intelligence on self-directed learning. *Materials Today: Proceedings*, 37, 2934-2937. <https://iranarze.ir/wp-content/uploads/2021/04/11738-English-IranArze.pdf>
- Brookfield S. D. (2009). *Self-directed learning*. International Handbook of Education for the Changing World of Work. (Wilson D.R. Ed.). Springer.
- Buvoltz, Katie, A., Powell, F., J., Solan, A. & Longbotham, G. (2008). Exploring emotional intelligence, learner autonomy and retention in an accelerated undergraduate degree completion program. *New Horizons in Adult Education and Human Resource Development* 22(3/4), 26–43. https://www.researchgate.net/publication/264228437_Exploring_Emotional_Intelligence_Learner_Autonomy_and_Retention_in_an_Accelerated_Undergraduate_Degree_Completion_Program
- Clardy, A. (2000). Learning on their own: Vocationally oriented self-directed learning projects. *Human Resource Development Quarterly*, 11, 105-125.
- Çırak, M., E. (2021). *Müzik öğretmeni adaylarının öz yönetimli öğrenme becerileri ile öğrenmeye ilişkin tutumlarının incelenmesi* (Publication No. 675625) [Masters Thesis. Trabzon University]. YOK Tez Merkezi.
- Din, N., Haron, S. & Rahman Mohd, R. (2016). Can self-directed learning environment improve quality of life? *Procedia-Social and Behavioral Sciences*, 222, 219-227. <https://doi.org/10.1016/j.sbspro.2016.05.150>
- Dorak, F., Vurgun, N., Uludağ, S. & Yıldız, L. (2012). Beden Eğitimi ve Spor Yüksekokulu Özel Yetenek Sınavına Giren Adayların Sürekli Kaygı Düzeyleri ile Duygusal Zeka Düzeylerinin Bazı Değişkenlere Göre İncelenmesi. *IIB International Refereed Academic Social Sciences Journal*, 3(8), 60-70. <https://app.trdizin.gov.tr/makale/TVRnNU5qTTVPUT09>
- Edmondson, D., R., Boyer, S., L. & Artis, A., B. (2012). Self-Directed Learning: A meta-analytic review of adult learning constructs. *International Journal Of Education Research*, 7(1), 40-48. <http://debavis.pbworks.com/w/file/fetch/96898755/edmondson%20boyer%20artis%20--%20selfdirected%20learning%20a%20meta-analytic%20review.pdf>
- Eraslan, M. (2015). Beden eğitimi ve spor yüksekokulu öğrencilerinin duygusal zeka özelliklerinin çeşitli değişkenlere göre incelenmesi. *Niğde Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi*, 9(3), 308-316. <https://app.trdizin.gov.tr/makale/TWpNMU1USTVPUT09/beden-egitimi-ve-spor-yuksekokulu-ogrencilerinin-duygusal-zeka-ozelliklerinin-cesitli-degiskenlere-gore-incelenmesi>

- Eunyoung, C., Lindquist, R. & Song, Y. (2014). Effects of problem-based learning vs. traditional lecture on Korean nursing students' critical thinking, problem-solving, and self-directed learning. *Nurse Educ. Today* 34(1), 52–56. <https://doi.org/10.1016/j.nedt.2013.02.012>
- Garrison, D.R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly*, 48(1), 18-33. <http://dx.doi.org/10.1177/074171369704800103>
- Grande, R. A. N., Berdida, D. J. E., Cruz, J. P., Cometa-Manalo, R. J., Balace, A. B., & Ramirez, S. H. (2022). Academic motivation and self-directed learning readiness of nursing students during the COVID-19 pandemic in three countries: A cross-sectional study. In *Nursing Forum*. 1-11. <https://onlinelibrary.wiley.com/doi/epdf/10.1111/nuf.12698>
- Lucy, M. & Paul, J. G. (2003). *Becoming a more self directed learner-why and how . Getting the most from online learning: A Learner's Guide*. Piskurich, G. M. Ed.). Pfeiffer Publisher.
- Herlo, D. (2017). Self-directed learning on teacher training studies programs. *Educația Plus*, 18(2), 7-17. <http://dx.doi.org/10.24250/jpe/2/2017/DH>
- Hiemstra, R. (2000). *Self-directed learning*. The International Encyclopedia of Education (2nd ed) (Husen,T. Ed.) T. N. Oxford: Pergamon Press.
- Holec, H. (1980). *Learner training: meeting needs in self-directed learning*. *Foreign Language Learning: Meeting Individual Needs* (Altman, H.B. & James C. V. Ed.) Oxford: Pergamon Press.
- Hwang, Y., Oh. J. (2021). The relationship between self-directed learning and problem-solving ability: The mediating role of academic self-efficacy and self-regulated learning among nursing students. *International Journal of Environmental Research and Public Health*. 18(4), 1-9. <http://dx.doi.org/10.3390/ijerph18041738>
- Karataş, K. (2017). Öğretmen adaylarının öz yönetimli öğrenmeye hazır bulunuşluk düzeylerinin üst bilişsel farkındalık düzeyleri açısından yordanması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*. 32(2), 451-465. <http://dx.doi.org/10.16986/HUJE.2016017218>
- Kayıhan, Ş., N. (2017). *Öz Yönetimli Öğrenme ve Duygusal Zeka Arasındaki İlişkinin İncelenmesi*. (Publication No. 471005) [Masters Thesis. Sakarya University]. YOK tez Merkezi.
- Kılıç, D., Yavuz Sökmen, Y. (2012). Sınıf Öğretmen Adaylarının Kendi Kendine Öğrenmeye Yönelik Hazırbulunuşluklarının İncelenmesi. *Eğitim ve Öğretim Araştırmaları Dergisi*, 1(3), 223-228. <https://avesis.atauni.edu.tr/yayin/44a7e28b-f806-4a47-8541-093b560f06dd/sinif-ogretmen-adaylarinin-kendi-kendine-ogrenmeye-yonelik-hazirbulunuşluklarinin-incelenmesi>
- Kırılmazkaya, G. (2018). Öğretmen Adaylarının Öz Yönetimli Öğrenmeye İlişkin Hazır Bulunuşluklarının İncelenmesi. *Turkish Studies*. 13(11), 865-877. <http://dx.doi.org/10.7827/TurkishStudies.12931>
- Kim, S., O. & Shim, M. S. (2018). Problem-Solving ability, self-directed learning ability and confidence of core fundamental nursing skill performance of nursing students. *Journal of Korean Public Health Nursing*. 32(3), 424-437. <https://www.koreascience.or.kr/article/JAKO201810063228510.page>
- Kiremitçi, O. (2011). Beden eğitimi öğretmen adaylarının üst bilişsel farkındalık ve problem çözme becerileri arasındaki ilişkinin incelenmesi. *Selçuk Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi*. 13(1), 92-99. <https://acikerisim.ege.edu.tr/xmlui/handle/11454/64908>
- Knowles, M: S. (1975). *Self Directed Learning*. Prentice Hall Regents.
- Kreber, C. (2006). The relationship between self-directed learning, critical thinking, and psychological type, and some implications for teaching in higher education. *Studies in Higher Education*. 23(1), 71-86. <https://doi.org/10.1080/03075079812331380502>
- Law, K., Wong, C. & Song, L. J. (2004). The construct and criterion validity of emotional intelligence and its potential utility for management studies. *Journal of Applied Psychology*, 89,783-496. <http://dx.doi.org/10.1037/0021-9010.89.3.483>
- Loyens, S. M. M., Magda, J. & Rikers, R., M., J. (2008). Self-directed learning in problem-based learning and its relationships with self-regulated learning. *Educational Psychology Review*. 20, 411-427. <https://doi.org/10.1007/s10648-008-9082-7>
- Mahlaba, S. C. (2020). Reasons why self-directed learning is important in South Africa during the COVID-19 pandemic. 34(6).120-136. <https://journals.co.za/doi/abs/10.20853/34-6-4192>
- McCombs, B., & Whisler, J. S. (2010). The role of affective variables in autonomous learning, *Educational Psychologist*, 24(3), 277–306. https://doi.org/10.1207/s15326985ep2403_4

- Morris, T. H. (2021). Meeting educational challenges of pre- and post-COVID-19 conditions through self-directed learning: considering the contextual quality of educational experience necessary. *On the Horizon*, 29(2), 52-61. <https://www.emerald.com/insight/content/doi/10.1108/OTH-01-2021-0031/full/pdf?title=meeting-educational-challenges-of-pre-and-post-covid-19-conditions-through-self-directed-learning-considering-the-contextual-quality-of-educational-experience-necessary>
- Muller, K.E. (2008). Self-directed learning and emotional intelligence: interrelationships between the two constructs, change and problem solving. *International Journal Of Self-Directed Learning*, 5(2) (2008):11–22. <https://www.oltraining.com/SDLwebsite/IJSDL/IJSDL5.2-2008rev.pdf#page=16>
- Oğuzkan, F. (1985). *Orta dereceli okullarda öğretim, amaç, ilke, yöntem ve teknikler*. Emel Matbaacılık.
- Rager, K. B. (2009). I feel, therefore, I learn: The role of emotion in self-directed learning. *New Horizons in Adult Education and Human Resource Development*, 23(2), 22–33. <https://files.eric.ed.gov/fulltext/EJ905789.pdf>
- Recepoğlu, S. (2021). Sosyal Bilgiler Öğretmen Adaylarının Yaşam Boyu Öğrenme Eğilimleri ile Öz Yönetimli Öğrenme Becerileri Arasındaki İlişkinin İncelenmesi” *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi*. 41(1), 551-569. <https://dergipark.org.tr/pub/gefad/issue/62024/867117>
- Sahin, N., Sahin, N. H. & Heppner, P. P. (1993). Psychometric Properties of The Problem Solving Inventory in a Group of Turkish University Students. *Cognitive Therapy and Research*, 17(4), 379–396. <https://doi.org/10.1007/BF01177661>
- Tatar, A., Tok, S. & Saltukoğlu, G. (2011). Gözden geçirilmiş schutte duygusal zeka ölçeğinin Türkçe’ye uyarlanması ve psikometrik özelliklerinin incelenmesi. *Klinik Psikofarmakoloji Bülteni*. 21(4), 325-338. <https://doi.org/10.5455/bcp.20110624015920>
- Taylan, S. (1990). *Hepner’in problem çözme envanteri, uyarılama, güvenirlik ve geçerlik çalışmaları*. (Publication No. 11910) [Masters Thesis, Ankara University] YOK Tez Merkezi.
- Taylor, B. (1995, November 1). *Self-directed learning: Revisiting an idea most appropriate for middle school students [Conference presentation]*. Combined Meeting of the Great Lakes and Southeast International Reading Association, Nashville, TN, United States. <https://www.semanticscholar.org/paper/Self-Directed-Learning%3A-Revisiting-an-Idea-Most-for-Taylor/f20223541f57d6e4a019e9e9706a6098c47798fd>
- Toit-Brits, C. & van Zyl, C.M. (2017). Self-directed learning characteristics: making learning personal, empowering and successful. *Africa Education Review*. 14(3-4), 122-141. <https://doi.org/10.1080/18146627.2016.1267576>
- Yılmazsoy, B. & Kahraman, M. (2019). Uzaktan eğitim öğrencilerinin öz yönetimli öğrenme becerilerini incelenmesi. *Kuramsal Eğitim Bilim Dergisi*. 12 (2), 783-818. <https://doi.org/10.30831/akukeg.429362>
- Woods, D. R. Hrymak, A., N., Marshall, R., R., Wood, P. E., Crowe, C., M., Hoffman, T., Wright, J.D., Taylor, P. A., Woodhouse, K. A. & Bouchard, C, G., K. (2013). Developing problem solving skills: The McMaster problem solving program. *Journal of Engineering Education*. 86(2), 75-91. <https://onlinelibrary.wiley.com/doi/abs/10.1002/j.2168-9830.1997.tb00270.x>
- Wolff, S. B. (2005). *Emotional Competence Inventory (ECI) Technical Manual*. Hay Group.
- Zhoc, K. C. H., Chung, T. S. H. & King, R. B. (2018). Emotional intelligence (EI) and self-directed learning: Examining their relation and contribution to better student learning outcomes in higher education. *British Educational Research Journal* 44 (6), 982–1004. <https://doi.org/10.1002/berj.3472>
- Zull, J. E. (2006). *Key aspects of how the brain learns, The neuroscience of adult learning*. (J. Sandra & Taylor, K. Ed.) Jossey-Bass. <https://doi.org/10.1002/ace.213>