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RESEARCH ON PROBLEM SOLVING SKILLS OF TEACHER CANDIDATE

ABSTRACT

This research was carried out to determine the problem-solving skills of teacher candidates in Education Faculty. The sample of the research consisted of 883 students. In the research a survey model has been used. An information form prepared by the researcher and Heppner and Petersen's problem solving inventory has been used for data collecting. Analysis of the data has been made using SPSS 11.5. In the research among all the departments it was determined that science teacher candidates have the best problem solving abilities and physical education teacher candidates have the worst. In grade level the final grade and according to gender, girls were better in problem solving. In all grades there is no meaningful difference according to teaching type, high school from which they graduated or activity number in leisure. According to the reasons why they prefer that department, there are meaningful differences found. In problem solving skill sub dimensions,the differences are determined according to departments.

Keywords: Problem Solving Skill, Teacher Education, Teacher Candidate, Problem Solving, Problem Solving Skill Sub Dimension

ÖĞRETMEN ADAYLARININ PROBLEM ÇÖZME BECERİLERİNİN İNCELENMESİ

ÖZET

Bu araştırma Eğitim Fakültesi öğrencilerinin problem çözme becerilerinin incelenmesi amacıyla yapılmıştır. Toplam 883 öğrencinin katıldığı araştırmada alan taraması yöntemi kullanılmıştır. Araştırmacının hazırladığı bilgi formu ve Heppner ve Petersen'in Problem çözme envanteri ile veri toplanmıştır. Verilerin analizinde SPSS 11.5 kullanılmıştır. Araştırmada tüm bölümler arasında fen bilgisi öğretmen adaylarının problem çözme algılarının en yüksek olduğu, beden eğitimi öğretmen adaylarının ise en düşük olduğu belirlenmiştir. Sınıf düzeyinde ise son sınıfların ve cinsiyete göre kızların problem çözme becerilerinin yüksek olduğu tespit edilmiştir. Öğretim türüne göre, mezun olunan lise türüne göre problem çözme becerilerinde anlamlı fark bulunmamıştır. Okuduğu bölümü seçme nedenlerine göre ise farkın anlamlı olduğu bulunmuştur. Alt boyutlarda ise bölümlere göre farklılıklar belirlenmiştir.

Anahtar Kelimeler: Problem Çözme Becerisi, Öğretmen Eğitimi, Öğretmen Adayı, Problem Çözme, Problem Çözme Becerisi Alt Boyutları

1. INTRODUCTION (GIRIŞ)

In today's conditions in which social, economic, scientific and technologic developments are getting faster, individuals come across different problems every day. To solve these problems it is compulsory to find different ways and various skills. That's why, developing individuals problem solving skills has become one of the targets of education programs.

When an individual comes across different situations and problems, she/he can not pass another situation without solving them. (For example, to be able to tie shoelace, to be able to get on well with another individual, to understand concepts, emotions and situations, to see the relations between objects and situations, speculative or expression related problems.) Problem solving is a necessary skill for an individual to adapt himself to society.

Moreover, a desire to reach a goal is the primary condition to unearth a problem. A problem is defined as confusing to an individual's mind, challenging it and making belief uncertain; every situation which prevents one from reaching an aim, the difference between a thing's present situation and which it should be; a difficulty to be removed or a question whose answer is searched; and conflict when an individual comes across in reaching an aim (Baykul, 1996; Kneeland, 2001; Aksu, 1985; Bingham, 1998; Morgan, 1981). Generally, the three main features of problems are aim, the barrier in the way reaching the aim, and that an individual feels tense to reach the aim (Bingham, 1998).

Problem solving is consciously to make planned research openly on a subject consciously in order to reach an aim which is not able to be reached easily. In problem solving, an individuals reorganize and uses concept and skills she/he already has. Problem solving is a process in which new concepts are formed by connecting them with the old ones (Riley, Greeno and Heler, 1983). Problem solving is to select and use effective and beneficial means and behaviors among different possibilities in order to reach the target wanted (Tertemiz and Çakmak, 2004). While Anderson (1980), defines the problem solving as directing cognitive operations into one target, D'Zurilla and Goldfried (1971) define it as behavioral process that involves forming effective reaction selections and selecting the most suitable one.

According to Bingham (1998), effective problem solving, in order to meet a difficult situation and past experiences, impressions and feelings, into useful force to bring people together to activate. Heppner and Krauskopf (1987) describe real life to solve personal problems, to adapt to internal or external requests for the purpose of a series of cognitive, affective and behavioral processes.

The development and maturation of individual-level problem solving, ability-level privileges, motivation, education and the socio-cultural environment affects education and training (Taylan, 1990). The factors influencing the success of problem-solving, cognitive, affective and experience, factors are examined under three headings (Baykul, 2005). Cognitive factors are the concept of knowledge, logical thinking and reasoning skills, spatial reasoning ability, calculation ability, memory and creates a forecast. Affective factors are created by willingness to approach problem solving, self-confidence, stress and worry, uncertainty, patience and perseverance, attention, motivation and desire to show success. Experience factors involve such cases like meeting (before certain subject) and using solving strategies previously. To solve a problem is a kind of work which involves intelligence, emotion, intent and action regarding needs, goals, values, beliefs, skills, habits and attitudes (Karasar, 1987, Bingham, 1998). Problem-solving ability means to understand the

nature of the problem, to select appropriate strategies for the solution and to use this strategy to develop the ability to interpret the results. Problem-solving process, better quality results should be taken that the process better, planned and conscious control and time-savings goals for individuals' problem-solving skills development, mental exercises to make them problem-solving opportunity recognition is required (King, 1981). Problem solving skills are a fundamental skills used in all areas of life. It is necessary for people to adapt in communal life and change, to socialize, to develop self qualifications, in order to be successful and independent. This skill is acquired first with pre-school and family with school life, it gains a certain systematic word and is a longlife process. To develop problem-solving skills on individuals composes the main aim of education programs.

2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMI)

University education aims not only for students to have a job, but also to develop analytic thinking, investigating and problem solving individuals. Teacher candidates will use their education to develop qualified manpower which society needs. It is important for teachers to have problem-solving skills when they grow up to be individuals who are investigating, problem solving, producing and looking at situations in critical way.

The purpose of this study is to examine problem-solving skills of teacher candidates, who are students at the different departments of the Faculty of Education in 1st and 4th years, using different variables. Problem solving skills showing differences according to department; class; teaching type; gender; high school; the reason why a students his prefer their department; and how leisure time is passed was researched. The problem sentence of the research is "How do teacher candidates' problem solving skills change according to different variations?". Sub problems are:

- Are there any differences between teacher candidates abilities to solve problems with sub dimensions according to their departments?
- Are there any differences between teacher candidates abilities to solve with sub dimensions problems according to grade level?
- Are there any differences between teacher candidates abilities to solve with sub dimensions problems according to teaching type?
- Are there any differences between teacher candidates abilities to solve with sub dimensions problems according to gender?
- Are there any differences between teacher candidates abilities to solve with sub dimensions problems according to high school type they graduated?
- Are there any differences between teacher candidates abilities to solve with sub dimensions problems why they chose their departments?
- What are the relationship between leisure time and problem solving skills of teacher candidates?

3. METHOD (YÖNTEM)

3.1. Research Model (Araştırma Modeli)

In the research, the survey method was used. This method is planned to analyse, interpret, classify, compare and recognize the related problem of a group which occurs at any time and any place (Cohen & Manion, 2007).

3.2. Research Group (Araştırma Örneklemi)

The work group of the research composed of 883 students in 1st and 4th year studying in 7 different departments at the Faculty of Education in Amasya University in the 2008-2009 education year. The data belonging to distribution from 1st year 462 and 4th year 421 students is given in Table 1.

Table 1. The distribution of research sample according to the department, grade, teaching type and gender.
(Tablo 1. Araştırma örnekleminin bölüm, sınıf, öğretim türü ve cinsiyete göre dağılımı)

		1. grade		4. grade		
Variable		N	%	N	%	Total
Departments	Science teaching	96	20.8	65	15.4	161
	Mathematic teaching	72	15.6	77	18.3	149
	Clasroom teaching	131	28.4	74	17.6	205
	Turkish teaching	66	14.3	69	16.4	135
	Social sciences teaching	32	6.9	60	14.3	92
	Pre school teaching	33	7.1	37	8.8	70
	Physical education teaching	32	6.9	39	9.3	71
Teaching types*	Daytime	279	60.4	273	64.8	552
	Evening time	183	39.6	148	35.2	331
Gender	Female	297	64.3	203	48.2	500
	Male	165	35.7	218	51.8	383
	Total	462	100	421	100	883

*Note: The university education is two type in Turkey. One of them is daytime teaching that it is taken among 8.00 and 17.00 hours, other is evening time teaching is taken among 17.00 and 23.00 hours in daily program.

The distribution of students according to departments are that science teacher, 161 (18.2%); mathematic teacher, 149 (16.9%); classroom teacher, 205 (23.2%); Turkish teacher, 135 (15.3%); social sciences teacher, 92 (10.4%); pre-school teacher, 70 (7.9%); physical education teacher, 71 (8.1%). In the sample there are 500 females (%56,6), 383 males (%43,4), 552 persons are daytime students (62.5%), while 331 persons are evening time (37.5%) students.

3.3. Data Collection Tools (Veri Toplama Araçları)

As a data collection tool in the research, the personal data form used was developed by the researcher, the problem solving inventory developed by Heppner and Petersen and of which translation into Turkish was made by Şahin. In the personal data form students have been asked such questions as branch, gender, teaching type, graduated high school and why they selected their department, with the aim of examining the demographic features. Problem solving inventory likert type of six scales consisting of 35 items involving negative and positive statements. 3 items will be out of scoring and the minimum score will be 32 and the best score will be 192. The inventory measures individuals' ability to perceive and determine the depression of another individual, relations with other people, job selection, divorce personal and social problem solving. Moreover, it is important to perceive and determine problem-solving skills and the individual's self confidence (Ferah, 2000). The scale was formed with a thinking approach measuring positive terminal behavior approach types (5 items), self confident approaches (7 items), assessor approaches (4 items), planned approaches (4 items) precipitous approaches measuring

negative ineffective approaches (9 items) and avoidant approaches (4 items). The total scale for Cronbach's alpha reliability in this study: 0.833. The reliability coefficients for subscales are as follows: precipitant approach: 0.559, thinking approach: 0.478, avoidant approach: 0.669, assessor approach: 0.619, self-confident approach: 0.680, planned approach: 0.544.

3.4. Data Analysis (Verilerin Analizi)

Data analysis was performed using SPSS 11.5 statistical software. In the research one-way analysis of variance, post-hoc tests and independent sample t-tests were used. Calculated from the scale total score and subscale scores belonging to normal distribution was checked with the Q-Q point distribution and K-S test homogeneity of variances was checked with Levene's test. A *p*-value of less than 0.05 was considered to be statistically significant.

4. FINDINGS AND DISCUSSION (BULGULAR VE TARTIŞMA)

Part of a total score of problem-solving skills in order to examine the change of the results of the single-factor ANOVA is presented in Table 2.a and Table 2.b.

Table 2.a .Descriptive statistics results of problem solving skills according to the departments
(Tablo 2.a. Bölümlere göre problem çözme becerilerinin betimsel istatistik sonuçları)

Departments	N	$\overline{X}$	s
Science teaching	161	137.04	17.34
Mathematic teaching	149	131.73	20.42
Classroom teaching	205	134.61	18.44
Turkish teaching	135	133.19	20.09
Social sciences teaching	92	134.15	17.12
Pre school teaching	70	137.49	18.26
Physical education teaching	71	127.14	22.32
Total	883	133.93	19.18

Table 2.b. ANOVA results of variance of problem solving skills according to the departments
(Tablo 2.b. Bölümlere göre problem çözme becerilerinin değişimi ANOVA sonuçları)

Source of variance	Sum of squares	df	Mean of square	F	p
Between Groups	6612.592	6	1102.099	3.037	.006
Within Groups	317933.055	876	362.937		
Total	324545.647	882			

(N: frequency; $\overline{X}$: average; s: Standard deviation; df:degree of freedom; F and t: statistics values; p: meaningfulness)

According to Table 2.b it was determined that there are significant differences in total scores between departments (F_{6-876}=3.037 p=0.006) (p<0.05). To determine the source of the difference, homogeneity of variances are controlled with Levene's test, then the Bonferonni post hoc test is performed. Problem-solving skill scores were found to be significant in favor of science teacher candidates; compared to physical education teacher candidates. Dimension of solving problems taken from the scale scores were examined according to the department changes, the descriptive statistics in Table 2.c are also given (PA: Precipitant Approach TA: Thinking Approach AvA:

Avoidant Approach AA: Assessor Approach SCA: Self Confident Approach PLA: Planned Approach).

Science in PA, SCA and AVA, pre-school in TA and PLA, social sciences in AA mean scores are higher departments (Table 2.c). When in sub dimensions the differences between problem-solving skill scores are examined with ANOVA, meaningful differences are seen between departments in TA (F_{6-876}:3.448; p=0.002), in AA (F_{6-876}=2.193; p=0.042) and in SCA (F_{6-876}=2.795; p=0.011). Significant differences were found between 1-7 ($\overline{X}$=19.84 and $\overline{X}$=17.79), 3-7 ($\overline{X}$=19.78), 5-7 ($\overline{X}$=20.03), 4-7 ($\overline{X}$=19.72) and 6-7 ($\overline{X}$=20.30) in TA. Among the AA 5-7 ($\overline{X}$=13.77 and $\overline{X}$=12.17) and among the SCA 1-7 ($\overline{X}$=31.42 and $\overline{X}$=28.55) was found a significant difference. In Aksan's (2006) work, it was said in accent work that there are differences in sub dimensions in problem solving skills of university students according to their departments, with Turkish teaching and mathematic teaching students apply on thinking approach the least and classroom teaching students using planned approach the most, mathematic students use it the least. Arslan (2001), in his research, said that department and university variances of teacher candidates cause differences in terms of determining and planned approaches. There are also works showing that department variance is not effective on university students' problem solving skills (Yurttaş, 2001; Çam, 1997).

Table 2.c. Descriptive statistics results of problem-solving skills sub dimensions according to the departments
(Tablo 2.c. Problem çözme becerisi alt boyutlarının bölümlere göre betimsel istatistik sonuçları)

Departments	N	PA	TA	AVA	AA	SCA	PLA
		$\overline{X}$ (s)	$\overline{X}$ (s)	$\overline{X}$ (s)	$\overline{X}$ (s)	$\overline{X}$ (s)	$\overline{X}$ (s)
1- Sciences teaching	161	35.44 (6.06)	19.84 (3.51)	18.45 (3.90)	13.44 (2.74)	31.42 (5.83)	18.44 (3.38)
2- Mathematic teaching	149	34.19 (6.53)	19.19 (4.33)	18.15 (4.11)	13.04 (3.18)	29.72 (6.11)	17.43 (4.31)
3- Classroom teaching	205	34.91 (6.31)	19.78 (3.82)	18.14 (3.71)	13.22 (3.28)	30.59 (5.48)	17.98 (3.82)
4- Turkish teaching	135	34.39 (6.58)	19.72 (3.70)	18.08 (4.28)	13.26 (3.34)	30.18 (6.20)	17.56 (3.89)
5- Social sciences teaching	92	33.43 (6.75)	20.03 (3.06)	18.30 (4.21)	13.77 (3.21)	30.33 (4.90)	18.28 (3.34)
6- Pre school teaching	70	35.16 (6.67)	20.30 (3.46)	18.26 (3.84)	13.69 (2.82)	31.41 (4.82)	18.67 (3.65)
7- Physical education teaching	71	33.66 (5.90)	17.79 (6.12)	17.77 (5.06)	12.17 (3.85)	28.55 (7.10)	17.20 (9.48)
Total	883	34.57 (6.40)	19.59 (4.01)	18.19 (4.07)	13.25 (3.20)	30.41 (5.84)	17.93 (4.52)

The variance of problem solving skills according to class level was examined with independent sample t-test and results given in Table 3.

Table 3. T-test results of variance of problem solving skill according to grade level
(Tablo 3. Problem çözme becerisinin sınıf düzeyine göre değişimi t-testi sonuçları)

Grade	N	$\overline{X}$	s	t	df	p
1	462	132.40	19.64	-2.496	881	.013
4	421	135.61	18.54			

The average of 1st year students is 132.40 and the 4th year average is 135.61 and the difference between the two grades was meaningful (t_{881}=-2.496; p=0.013). When the sub-dimensions of the scale are examined in SCA, meaningful differences were found (880,72=-3.243; p=0.001) between the 1st ($\overline{X}$=29.80) and 4th year ($\overline{X}$=31.07). The final year students believe in their problem-solving skills. Katkat and Mızrak (2003) claim that except for 1st and 2nd year students, other class students' problem-solving skills increase as the their grades increase. Tumkaya and İflazoğlu (2000) said that 1st year students feel themselves inadequate in problem-solving skills according to 4th year students. Arslan (2001) has stated grade variables differentiate in terms of precipitant, thinking, self-confident and planned approach score. Also works have been done in which there is no difference according to the class variable (Ferah, 2000; Taylan, 1990).

The variance of teacher candidates' problem solving skills according to teaching type were examined and results showed in Table 4.

Table 4. T-test results of variance of problem solving skills according to the type of teaching
(Tablo 4. Öğretim türüne göre problem çözme becerilerinin değişimi t-testi sonuçları)

Teaching type	N	$\overline{X}$	s	t	df	p
Daytime	552	134.20	18.51	.532	881	.595
Evening	331	133.49	20.28			

The daytime teaching students' average is 134.20 and the evening time teaching students' average is 133.49 and the difference wasn't determined statistically significant between daytime and evening time averages (t_{881}=0.532; p=0.595). Similar, the type of teaching in all sub-dimensions was not found a significant difference (p> 0.05).

To examine variance of problem-solving skills according to class in department, t-test was made. When teacher candidates' problem-solving skills were examined according to year and department, there were meaningful differences in science teaching and classroom teacher candidates in studying 1st and 4th year. This difference was statistically significant between the grades of either department in favor of 4th year students. For science teaching the 1st year average is 133.81 and the 4th year average is 141.82 (t_{159}=-2.940; p=0.004). For classroom teacher candidates the averages are 132.08 and 139.09 respectively ($t_{185.63}$=-2.861, p=0.005). No statistically significant difference was found in other departments (p> 0.05).

When comparing in the same grade but inter-departments it was seen that in the first year there are not meaningful differences (F_{6-455}=1.221; p=0.294), in the fourth year there are meaningful differences (F_{6-414}=3.999; p=0.001). The differences were found between science 1-4 ($\overline{X}$=141.82 and $\overline{X}$=132.35), 1-7 ($\overline{X}$=126.51) and 3-7 ($\overline{X}$=139.09). No significant differences were found in sub dimensions.

In his work, Taylan (1990) can not find meaningful differences according to class variables, but when program variables are taken together, he can find meaningful differences.

Problem-solving skills of teacher candidates according to gender were examined with the independent sample t-test and results are given in Table 5.

Table 5. T-test results of variance of problem solving skills according to gender
(Tablo 5. Cinsiyete göre problem çözme becerisinin değişimi t-testi sonuçları)

Gender	N	$\overline{X}$	s	t	df	p
Female	500	135.11	18.17	2.086	881	.037
Male	383	132.39	20.35			

There is a meaningful difference between total score of male and female students in problem-solving skills. The average of females is higher (t_{881}=2.086; p=0.037). In the sub dimensions of scales' male and female students averages there were meaningful differences between the PA, AVA and AA. The averages in PA $\overline{X}$=35.07 for females' and $\overline{X}$=33.92 for males' (t_{881}=2.668; p=0.008), in AVA $\overline{X}$=18.43 for females' and $\overline{X}$=17.87 for males' ($t_{767.548}$=2.013; p=0.041) were found. The AA averages were found as $\overline{X}$=13.54 for females and $\overline{X}$=12.86 for males (t_{881}=3.135; p=0.002). Females were seen to be more precipitant and getting away from problems. Moreover they were seen to be biased in comparing the results used in problem solving with the results which should be.

When problem-solving skills total score was considered according to gender in all departments, there was no meaningful difference between female and male students' averages (p>0.05). In sub-dimensions meaningful differences were found as SCA in science teaching (N=94 female $\overline{X}$=30.47; N=67 males $\overline{X}$=32.76 and t_{159}=-2.499; p=0.013), AVA in classroom teaching (N=113 female $\overline{X}$=18.65; N=92 males $\overline{X}$=17.51 and t_{203}=2.194; p=0.029), the AVA in Turkish teaching (N=71 female $\overline{X}$=18.89; N=64 males $\overline{X}$=17.19 and t_{133}=2.067; p=0.021) and PA in social science teaching (N=44 female $\overline{X}$=35,02; N=48 male $\overline{X}$=31.98 and t_{90}=2.204; p=0.030). It was seen that females use in avoidant and precipitant approach. While Aksan (2006) states that females present an assessor approach, Ferah (2000), Düzakın (2004), D'Zurilla and others (1998) state that there are meaningful differences in problem solving skills according to gender. There are some works stating that gender does not have a role on problem-solving skills (Taylan, 1990; Çam, 1997).

The change of problem solving skills of teacher candidates according to the high school type they graduated from also was examined. The school types were divided into three groups. First group formed as foreign language high schools (N=164) which is included Anatolian high school (N=182), teacher schools (N=68), science high schools (N=8). Second group formed as vocational school which is included the technical high school (N=8), girls vocational high schools (N=19), vocational religious high school (N=2), engineering college (N=3), other (N=14). And last group was formed as general high school which is included the public high schools (N=415) ANOVA results are given in Table 6.

Table 6.a. Descriptive statistics results of problem solving skills according to graduating high school type
(Tablo 6.a. Problem çözme becerisinin mezun olunan lise türüne göre betimsel istatistik sonuçları)

High school type	N	$\overline{X}$	s
1-Foreign language h.s.	422	134.50	18.10
2-General high school	415	133.56	20.13
3-Vocational school	46	132.09	20.19
Total	883	133.93	19.18

Table 6.b. ANOVA results of variance of problem solving skills according to graduated high school type
(Tablo 6.b. Mezun olunan lise türüne göre problem çözme becerisinin değişimi ANOVA sonuçları)

Source of variance	Sum of squares	df	Mean of square	F	p
Between Groups	348.20	2	174.100	.473	.624
Within Groups	324197.44	880	368.406		
Total	324545.65	882			

The average of general high school graduates was 133.56. The vocational high schools' average was 132.09 and foreign language school groups average was 134.50. The average of the foreign language school group is higher than the others. Among teacher candidates' problem-solving skills by high school type, there is no meaningful difference found (F_{2-880}=0.473; p=0.624). When examined in sub-dimensions of the scale, it was stated that there is no meaningful difference (p>0.05).

The examined results of problem-solving skills by why teacher candidates preferred their department are given in Table 7.

Table 7.a. Descriptive statistics results of problem solving skills according to why teacher candidates prefered their department.
(Tablo 7.a. Okuduğu bölümü seçme nedenlerine göre problem çözme becerisi betimsel istatistik sonuçları)

The Preferring Reason	N	$\overline{X}$	s
1. It is the most suitable department to SSPE* score	298	132.68	19.20
2. To love teaching proffession	330	136.41	18.33
3. Family request	48	130.77	20.33
4. It is work guaranteed	98	132.19	18.82
5. To love children	30	139.13	17.28
6. Effect of teachers	16	132.06	19.68
7. Other	63	129.98	22.38
Total	883	133.93	19.18

*SSPE: Student selecting and placement exam score

Table 7.b. ANOVA results of variance of problem solving skills according to preffering reasons to department
(Tablo 7.b. Bölümü seçme nedenlerine göre problem çözme becerilerinin değişimi ANOVA sonuçları)

Source of Varience	Sum of squares	df	Mean of square	F	p
Between Groups	5113.80	6	852.300	2.337	.030
Within Groups	319431.84	876	364.648		
Total	324545.64	882			

There are meaningful differences between the total scores of teacher candidates' problem-solving skills according to why teacher

candidates chose their department (F_{6-876}=2.337; p=0.030). When the source of the difference is examined with post hoc test it is stated between 2-1 ($\overline{X}$=136.41 and $\overline{X}$=132.68), 2-7 ($\overline{X}$=129.98) and 5-7 ($\overline{X}$=139.13). When sub-dimensions of the scale is examined, meaningful differences in TA, SCA and PLA are found by why the students chose their departments. The differences in TA between 2-3 ($\overline{X}$=20.07 and $\overline{X}$=18.63), 2-4 ($\overline{X}$=18.81) and 2-7 ($\overline{X}$=18.70) between 5-3 ($\overline{X}$=20.87), 5-4, 5-7 (F_{6-876}=3.011; p=0.006), in SCA between 2-3 ($\overline{X}$=31.01 and $\overline{X}$=28.96) and 2-7 ($\overline{X}$=29.33) among 5-1 ($\overline{X}$=32.50 and $\overline{X}$=30.12), 5-3, 5-4 ($\overline{X}$=30.09) and 5-7 (F_{6-876}=2.335; p=0.030), in PLA between 2-3 ($\overline{X}$=18.39 and $\overline{X}$=16.94), 2-4 ($\overline{X}$=17.20) 5-1 ($\overline{X}$=19.87 and $\overline{X}$=17.78), 5-5,5-4, 5-6 ($\overline{X}$=17.13) and 5-7 ($\overline{X}$=17.37) were found (F_{6-876}=2.641; p=0.015).

Teacher candidates were asked how they spend leisure and they were able to choose several alternatives. The results are given in Table 8.

Table 8. Descriptive statistics results of problem solving skills by passing leisure.
(Tablo 8. Boş vakitlerini değerlendirme etkinliklerine göre problem çözme becerisi betimsel istatistik sonuçları)

Activity	N	$\overline{X}$	s
Sport	463	133.54	19.37
Internet/computer use	514	134.02	17.78
Reading	570	135.25	17.62
Watching T.V.	498	132.44	18.71
Solving Puzzle	288	135.91	17.42
Playing Chess	93	135.34	19.79
Attending cultural activities	422	136.82	17.17
Playing Mind Games	228	135.82	18.92
Other	165	133.92	22.11

When Table 8 is examined, it is seen that the average score of reading, puzzle, chess, mind game and cultural activities is lower than that of sportive activities, internet and TV. When sub-dimensions are considered, chess players in PA ($\overline{X}$=35,28); in TA ($\overline{X}$=20.04), in SCA ($\overline{X}$=31.14) and in PLA ($\overline{X}$=18.40) who participated in cultural activities; in AVA ($\overline{X}$=18.78) who enjoy puzzle solving, the AA ($\overline{X}$=13.79) who marked other was found high. There is no difference in problem-solving skills by the number of the activities students prefer and in sub dimensions (total F_{11-871}=1.245; p=0.252, others p>0.05).

5. CONCLISION AND RECOMMENDATIONS (SONUÇ VE ÖNERILER)

It was seen that there is a meaningful difference between the problem solving skills of the 462 first year and 421 fourth year students that formed the sample. When Table 2 is examined, it is seen that among the departments' total scores, science teaching is higher, and there is a meaningful difference between the physical education and science departments. It is seen in Table 2.c, that science teaching students use precipitant and avoidant approaches which are negative problem-solving skills; pre-school teaching students use thinking, self-confident and planned approaches, which are positive skills and in assessor approach social science students have higher averages. It can be said that the pre school teacher candidates try to

find out what the problem really is before applying problem solving plan and present behavior thinking on how problem solving to result in. moreover, they can be said to get healthy decisions by getting info about the solving and thinking on all of the alternatives for a problem-solving with a planned approach. Physical education teacher candidates are the ones showing the least thinking behavior. Science teacher candidates can be said to be avoidant, so cannot rely on their skills to solve problems and show behaviors to get away from problems.

Social sciences teacher candidates can be said to present comparing behavior from the results taken and the results which should be with determining approach. During licensing education of teacher candidates, they were seen to get higher levels on problem solving skills. In Table 3, the average of the 1st year is seen as 132.40 and 4th year students' 135.61. The difference between the two year is found to be a meaningful. When the sub-dimensions of the scale in self-confident approach it is found to be a meaningful difference between 1st and 4th year. That 4th year students' average is high shows that the students who are about to graduate believe in their problem-solving abilities. While there is no difference found in problem-solving skills by teaching type (Table 4), there is difference found between 1st years and 4th years in classroom teaching and science teaching students when grade and department are examined together. For the two departments' students, 4th years' problem-solving average is found to be higher. In science, in sub dimensions, in avoidant, precipitant and self confident approaches and in classroom teaching students, in self confident and planned approaches are found meaningful differences. Moreover, when comparing all of the 4th year students, science-classroom and preschool teaching students' problem solving skills are highest. Between science-Turkish and science-physical education, classroom-physical education, there are meaningful difference.

It is seen that problem solving skills show meaningful differences by gender and females' average is higher (Table 5). It is seen that females are more impatient, more avoidant and have more determining behavior than males.

While there is no meaningful difference in problem solving skills by high school type, science/Anatolian/teaching high school graduates' average is found to be higher (Table 6).

When problem solving averages are compared by why they chose their department, it is seen that the average scores of those who chose a department because they love children and teaching is high (Table 7). Problem-solving skills of those who chose the departments by family wishes and other reasons are the lowest. When lower dimensions are examined in thinking, self-confident and planned approaches, a meaningful difference is found. These approaches are negative problem-solving behavior. Teacher candidates who prefer the job because they love children and teaching can be said to be self-confident in problem solving, making necessary planning for solutions, and showing individual thinking for producing different solutions.

It is seen that the problem-solving skills of those who enjoy mind games, puzzles, chess and cultural activities among the teacher candidates are high (Table 8). We reached the results that those who attend cultural activities show thinking behavior in problem solving, looking for solutions, believing in self qualifications and making planns for solving problems.

University education is an education targeted at gaining knowledge in both basic reasoning and skills. Moreover, it is important for which individuals solve job finding problem and adapting society. When we think that human life is set up on problems and

solutions, the necessity of problem-solving skills is seen. Teacher candidates are expected to be self confident in problem solving skills, able to produce different alternatives for solutions, to make planns and to apply them while comparing the results with expectations. Problem-solving skills can be developed with systematic work from primary school. In university, with education especially given in a faculty of education, this skill should be supported. With work done with the students whose problem-solving skills are low, it should be learned why the students feel inadequate in their problem solving skills and try to find solutions.

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