

## **RELATIONSHIP BETWEEN INTELLIGENCE AREAS AND INTERPERSONAL PROBLEM SOLVING SKILLS ACCORDING TO MULTIPLE INTELLIGENCES THEORY**

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### **ABSTRACT**

The aim of this research is to analyse relationship between intelligence areas and problem solving skills of the students of Faculty of Education according to multiple intelligences theory of Gardner. Research sample is composed of 311 (64.3% female, 35.7% male) students who attended the Faculty of Education. Research data has been collected through "Multiple Intelligences Scale" developed by Yeşildere (2003) and "Problem Solving Inventory" developed by Heppner and Peterson (1982). It was determined that problem solving skill perception of the teacher candidates according to the gender differentiated meaningfully according to scores of mathematical, visual, kinesthetic intelligence areas. It was found that problem solving skills of the male teacher candidates are higher than the female teacher candidates. There is a negative meaningful relation among all intelligence areas and problem solving skill perception of the candidate teachers. There is a meaningful relationship in a positive aspect between problem solving skill and emotional intelligence.

**Keywords:** Problem solving skills, intelligence area, Faculty of Education, candidate teacher, multiple intelligence.

### **INTRODUCTION**

What intelligent is and how to define intelligence has been an important question for many trainer. Gardner (1983) defined intelligence as "the ability to solve problems or to create products that are valued within one or more cultural settings". In arriving at his theory, Gardner combined the empirical findings of hundreds of studies from a variety of disciplines. He included psychometric and experimental psychology, and also encompasses cognitive and

developmental psychology, differential psychology, neuroscience, anthropology, and cultural studies (Gardner & Moran, 2006).

In his theory of Multiple Intelligences (MI), Gardner (1983), claims that intelligence is comprised of multiple modules or types, which are largely independent and functionally separate from each other. According to Brualdi (1998), using biological as well as cultural research, he formulated a list of seven intelligences. This new outlook on intelligence differs greatly from the traditional view which usually recognizes only two intelligences, verbal and computational. The seven intelligences Gardner defines are: linguistic intelligence; logical-mathematical intelligence; musical intelligence; bodily-kinesthetic intelligence; spatial intelligence; interpersonal intelligence; and intrapersonal intelligence. Gardner (1999, p.33-34) later defined intelligence as a "biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture". He introduced three new intelligences, although he noted that the strength of evidence for each one varies. He confirmed only one new intelligence, naturalistic intelligence, ability to recognize and classify species in the environment (Netto & Furnham, 2006). MI theory also stresses that the interaction among these intelligences is important for understanding how people's minds work (Gardner & Moran, 2006). Gardner claims that the seven intelligences very rarely operate independently. Rather, the intelligences are used concurrently and typically complement each other as individuals develop skills or solve problems (Brualdi, 1998).

Problem solving process is a complex process that requires cognitive, kinesthetic skills. By problem solving, functions such as reaching an exact aim, developing tools for reaching that aim, and while doing that overcoming obstacles have been done by individual (Ellis & Siegler, 1994). Problem solving is about individual's aims, needs, values, beliefs, skills, habits and attitudes. Problem solving is a process in which encountered problems are defeated while reaching an aim and this can be explained process of reaching solution by adding originality, creativity or imagination to this (Çam & Tümkaya, 2006). Problem solving has been learned from childhood, and problem solving skills are developed in school years (Miller & Nunn, 2003).

According to Heppner (1982) problem solving is synonymous with the concept of overcoming. Individuals who solve problem efficiently are stated that they are people who think independent and creative, who has social capability, who have self confidence and they can tolerate ambiguities (Dow & Mayer, 2004). It has been determined that people who perceive themselves capable in problem solving have more sociable, more positive self perception in interpersonal relations, and they present more suitable working methods and attitudes in academic aspects (Şahin, Şahin & Heppner, 1993). And it has been determined that those who evaluate themselves as ineffective in problem solving have more inner conflicts, extreme sensitive, depressive, and obsessive in interpersonal relations, and they presents unkind and negative behavior (Dixon, Heppner & Anderson, 1991).

The aim of this research is to analyze relationship between intelligence areas and problem solving skills of the students of Pre-school Teacher Education, Turkish Language Teaching, Guidance and Psychological Counseling, English Language Teaching departments at Education Faculty at Cyprus International University according to multiple intelligences theory of Gardner. In addition to this, whether a significant difference between intelligence areas and problem solving skills according to gender wants to determine as well.

**Research Problem**

What is the relationship (if so) between problem solving skill perception and intelligence areas of candidate teachers?

**Sub Problems**

Answers to subquestions below are looked for through research problem.

- ✓ Is there a meaningful relationship between problem solving skill perception and intelligence areas of candidate teachers?
- ✓ Do problem solving skill perception and intelligence areas of the candidate teachers differentiate meaningfully according to gender variable?

**METHOD**

The research is a descriptive research towards to determine relationship between problem solving skills perception and intelligence areas of the students. Dependant variables of the research are problem solving skill perception and intelligence areas. Independent variable is gender.

**Research Model**

The present research used descriptive kind of general survey model with a quantitative method. Widely used descriptive approach aims to identify the condition of interest. Survey models refer to research approaches that aim to describe past or existing situation. The situation, event, individual or object related to the study is used to determine in their own terms (Karasar, 2009).

**Population of the Research**

Students of Education Faculty who are receiving training in the Academic Year of 2008-2009 constitute the sampling of this research. In the research, 311 students who receive training in the Faculty of Education are taken in to the research. 64.3% of the students in the sampling are female and 35.7% of them is male.

**Data Collecting Instruments**

“Multiple Intelligences Scale”, developed by Yeşildere (2003), whose Cronbach alpha coefficient is .93 was used in the research. In the inventory of multiple intelligence areas for academicians, between 0-7 refers to “not developed”, 8-15 refers to in the inventory of; "slightly developed", between 16-23 refers to "mid-level developed", 24-31 of the "developed" and between 32-40 "advanced" level. Also, “Problem Solving Inventory” (PSI) developed by Heppner and Peterson (1982) and adapted by Şahin, Şahin and Heppner (1993) was used. Cronbach alpha coefficient of the scale is .88. This scale is a Likert type of scale that consists of 35 items and it is scored between 1-6. Problem Solving Inventory is a self evaluation scale that measures individual’s self perception in problem solving skills. The highness of the scores, taken from the scale, shows that individuals perceive themselves inadequate.

**Table : KMO and Bartlett's test of problem solving skill perception and intelligence areas**

Scales	Item Number	Cronbach's Alpha	Kaiser-Meyer-Olkin KMO	Bartlett's Test of Sphericity		
				Approx. Chi-Square	df	Sig.
Multiple Intelligences Scale	80	.93	.684	10737.059	3160	.000**
Problem Solving Inventory	35	.88	.840	3659.119	496	.000**

### Analysis of Data

In the research, test “t” is used in order to find if there is a difference according to sex variable on intelligence areas and problem solving skills of the students of the Faculty of Education. Relationship between intelligence areas and problem solving skills of the students are analyzed with Pearson Moment Correlation Coefficient. Importance level was taken as .05 in the research.

### FINDINGS

Findings and comments about research problem and sub-problems take place in this part. The first sub-problem of the research was stated like this: “Do problem solving skill perception and intelligence areas of the candidate teachers differentiate meaningfully according to gender variable?”

**Table 2: Descriptive statistics of problem solving skill perception and intelligence areas of the candidate teachers**

DEPENDENT VARIABLES	GENDER	n	$\bar{x}$	SD
Problem Solving Skill	Female	200	94.590	18.059
	Male	111	90.099	18.165
Linguistic	Female	200	34.925	5.957
	Male	111	36.036	6.572
Mathematical	Female	200	34.385	5.637
	Male	111	36.009	5.786
Visual	Female	200	34.460	6.179
	Male	111	36.171	6.441
Musical	Female	200	32.560	6.510
	Male	111	33.603	5.142
Kinesthetic	Female	200	33.425	6.427
	Male	111	35.018	5.892
Interpersonal	Female	200	33.555	6.922
	Male	111	32.648	6.371
Intrapersonal	Female	200	32.875	5.835
	Male	111	32.756	6.291
Naturalistic	Female	200	34.510	5.782
	Male	111	34.774	5.311

**Table 3: t value and p value of problem solving skill perception and intelligence areas of the candidate teachers**

DEPENDANT VARIABLE	Levene's Test for Equality of Variance		t	SIG. (2-TAILED)
	F	SIG.		
Problem Solving Skill	.710	.400	2.097	.037*
Linguistic	.213	.645	1.518	.130
Mathematical	.188	.665	2.411	.016*
Visual	1.577	.210	2.304	.022*
Musical	2.160	.136	1.455	.147
Kinesthetic	1.895	.170	2.156	.032*
Interpersonal	2.159	.143	1.138	.256
Intrapersonal	.041	.841	.166	.868
Naturalistic	.445	.505	.398	.691

Findings about problem solving skill perception and intelligence areas scores of the candidate teachers according to gender were determined by t-test. These findings are in Table 3. It was determined that Problem solving skill perception of the candidate teachers according to the gender differentiated meaningfully as statistical according to scores of mathematical, visual, kinesthetic intelligence areas. ( $t_{\text{Problem Solving skills}}=2.097$   $p<.037$ ;  $t_{\text{Mathematical intelligence}}=2.411$   $p<.016$ ;  $t_{\text{visual intelligence}}=2.304$   $p<.022$ ;  $t_{\text{kinesthetic intelligence}}=2.156$   $p<.032$ ).

As it is understood from the Table 3 statistical meaningful differentiation was determined among problem solving skill perception, scores of mathematical, visual, and kinesthetic intelligence areas according to the gender. It is determined that this differentiation in favor of male teacher candidates.

The second sub-problem of the research was stated like this: "Is there a meaningful relationship between problem solving skill perception and intelligence areas of candidate teachers?"

Findings about this sub-problem were determined by Pearson Moment Correlation Coefficient. As it is seen from Table 4, there is a negative meaningful relation among all intelligence areas and problem solving skill perception of the candidate teachers because higher problem solving skill perception shows negative perception, lower problem solving skill perception shows positive perception.

**Table 4. Pearson correlation test results between problem solving skill perception and multiple intelligences areas of the candidate teachers**

Dependent Variables			
Problem Solving Skill	Linguistic	Pearson Correlation	-.304(**)
		Sig. (2-tailed)	.000
		N	311
Problem Solving Skill	Mathematical	Pearson Correlation	-.287(**)
		Sig. (2-tailed)	.000
		N	311
Problem Solving Skill	Visual	Pearson Correlation	-.264(**)
		Sig. (2-tailed)	.000
		N	311
Problem Solving Skill	Musical	Pearson Correlation	-.179(**)
		Sig. (2-tailed)	.002
		N	311
Problem Solving Skill	Kinesthetic	Pearson Correlation	-.239(**)
		Sig. (2-tailed)	.000
		N	311
Problem Solving Skill	Interpersonal	Pearson Correlation	-.134(*)
		Sig. (2-tailed)	.018
		N	311
Problem Solving Skill	Intrapersonal	Pearson Correlation	-.229(**)
		Sig. (2-tailed)	.000
		N	311
Problem Solving Skill	Naturalistic	Pearson Correlation	-.307(**)
		Sig. (2-tailed)	.000
		N	311

\*\* Correlation is significant at the .01 level (2-tailed).

\* Correlation is significant at the .05 level (2-tailed).

In this situation, how much the problem solving skill perception of candidate teachers is higher, parallel to this their intelligence areas' scores increase. Generally, if it is summarized, it can be said that candidate teachers who perceive their problem solving positive can develop their all intelligence areas.

## DISCUSSION AND CONCLUSION

As a result of the research, it was found that score difference in mathematical, visual, kinesthetic intelligence areas are in favor of male teacher candidates. Finding of the research in hand can be said that it is parallel to the research results that are conducted by Baran (2000), Oklan Elibol (2000), Durmaz and Özyıldırım (2005), Öztürkmen (2006), Özdemir (2006), Abacı and Baran (2007), Hoşgörür and Katrancı (2007), Taş (2007), Doğan and Alkış (2007), Serin (2008), Koray and Azar (2008), on university students, Güllü and Tekin (2009) lise öğrencilerinin and towards multiple intelligence areas are influenced by gender variable. However, it was determined that research result in hand is contradictory with the study conducted by Tümkaya and İflazoğlu (2000), Bilge and Arslan (2000) and Berkant and Ekici (2007) on teachers. Kuru (2001) noted that while accelerator effects that play a major role in the development of the intelligence have a positive contributions to the development of intelligence of individuals, blunt experiences effect intelligence development of the individuals in a negative way. Therefore, intelligence areas of students who graduated from different school types can develop differently according to education that they got. In this situation analyzing highschool types can give more clues about the reasons of this differentiation. The result that male students' mathematical and kinesthetic intelligence areas are higher than female students can derive since they graduate from science department and they do sports more than females.

Meaningful differentiation was found among score means of the problem solving skill perception according to the gender of candidate teachers ( $t=2.097, p<.05$ ). According to this, it was found that problem solving skills of the male teacher candidates are higher than the female teacher candidates. Parallel to the research results, in his research conducted on university students Akbağ (2000) stated that males tend to problem-focused dealing much more. Meaningfull differences were found between problem solving skill perception and gender in the studies of Serin (2006). Similarly, Bozkurt, Serin and Erman (2004) found a meaningful difference among problem solving skill perception according to the gender in their research that was conducted on primary education teachers. The finding of this study is different from the study result of Heppner and Peterson (1982); Çam (1997); Saracaloğlu, Serin and Bozkurt (2005). Positive perception of problem solving skills of male students can derive since they have more chance of experience than female students in our society; frequency of facing negative and positive events; parents contribute their problem solving skills development. This can be interpreted as a result of developing more effective attitudes toward problems in the life process.

Similar to research result in hand, İşmen (2001) also stated in his study, called “Emotional Intelligence and Problem Solving”, conducted with university students that there is a meaningful relationship in a positive aspect between problem solving skill and emotional intelligence.

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