

## The Effect of Logical-Mathematical Intelligence on Financial Accounting Achievement According to Multiple Intelligence Theory

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### Abstract

*The purpose of this study is to determine the intelligence types of students taking Financial accounting course within the context of Gardner's Multiple Intelligence Inventory and to determine whether there is a correlation between the types of intelligence they have and Financial Accounting course and their academic achievement. The study was conducted by applying Gardner's Multiple Intelligence Inventory to 279 randomly selected students at Karadeniz Technical University and Giresun University who took Financial Accounting course in 2016-2017 academic year. As a result of the research, it has been determined that the students were "moderately advanced" in "Logical-Mathematical" and "Musical" intelligence types and "advanced" in other intelligence types. When the results of the study were examined in terms of gender variable, statistical differences were found in the scores of students in "Logical-Mathematical", "Spatial" and "Musical" intelligence types and no difference was found for other intelligence types. As another result of the study, a positive significant correlation between achievement in Financial Accounting course and the "Logical-Mathematical" intelligence type was found. In addition, it was determined by the regression analysis performed that "Logical-Mathematical" intelligence of the students affects Financial Accounting course achievements and that "Logical-Mathematical" intelligence is one of the predictors of Financial Accounting Grade Points.*

**Keywords:** Achievement of Accounting, Multiple Intelligence Theory, Howard Gardner

### 1. Introduction

Intelligence, which can be defined as the capability of the mind to learn, to benefit from the things learned, to adapt to new situations, and to find new solutions, have been evaluated with different approaches throughout history. It is possible to say that traditional understanding of intelligence has the qualities narrowing the boundaries of the human brain and neglecting the wide cognitive potential human beings possess. However, today's understanding of intelligence is based on the idea that it is a broad concept encompassing many features and life activities. In this context, "Theory of Multiple Intelligence", introduced by Howard Gardner and bringing a different perspective to the concept of intelligence, argues that intelligence has a meaning beyond verbal and mathematical abilities. According to this, intelligence, expressing itself through various talents that exist in various areas of life, presents a multiple structure and a feature that cannot be measured by the intelligence tests developed on the basis of traditional understanding of intelligence (Gürel & Tat, 2010: 336). The Multiple Intelligences Theory, centered on the individual, was first described in Gardner's book titled "Frames of Mind: The Theory of Multiple Intelligences". The Multiple Intelligence Theory is an approach opposing IQ-based viewpoints and emphasizing that intelligence in people is multi-parted and that individuals come to the learning environment with different learning styles (Köksal, 2006: 474).

Based on the idea that intelligence presents a plural structure beyond having a singular quality, the Multiple Intelligence Theory mentions the existence of multiple intelligences that provide our knowledge and learning (Gürel & Tat, 2010: 348). According to the theory underlining that each individual has a combination of intelligence composed of eight basic intelligences, the types of intelligence are as follows (Köksal, 2006: 474-75):

- **Verbal Linguistic Intelligence:** It is the ability to produce and to use the language effectively that includes complex events such as thinking and expressing with words, evaluating complex meanings on the language, understanding meaning and structure in words, reading poetry, humor, storytelling, grammar knowledge, metaphorical expression, analogy, abstract and symbolic thinking, concept creation and writing.
- **Logical-Mathematical Intelligence:** It is the ability to think by numbers, to make calculations, to draw conclusions, to establish logical relationships, to develop hypotheses, to solve problems, to think critically, to know abstract symbols such as numbers and geometric shapes, and to make connections between pieces of information.
- **Spatial Intelligence:** It is the ability to think by pictures, images, shapes and lines, to perceive and reason three-dimensional objects.
- **Bodily-Kinesthetic Intelligence:** It is the ability to express oneself with motion, gestures and mimics, and to use brain-body coordination effectively.
- **Musical Intelligence:** It is the ability to think by sounds, notes, and rhythms, to recognize different voices, and to produce new voices and rhythms.
- **Interpersonal Intelligence:** It is the ability to work collaboratively within the group, to communicate verbally and nonverbally, to understand, share, express, and interpret feelings, thoughts and behaviors of people, and to persuade people.
- **Intrapersonal Intelligence:** It is the ability of people to recognize their own feelings, their degree of emotional reaction, and process of thinking, to evaluate oneself, and to set goals for themselves. It covers all other types of intelligence.
- **Naturalist Intelligence:** It is the ability to recognize and research all living beings in the nature, and to think about their creation.

Traditional education considers only numerical and verbal ones. However, the one-way intelligence approach potentially limits the development of human mind. According to Gardner, intelligence can be improved and changed, and to some degree being intelligent can be learned. The characteristics of intelligence can be listed as follows according to him (Gardner, 1983):

1. Every person has the ability to improve and develop his or her intelligence.
2. Intelligence cannot only change, but can also be taught to others.
3. Intelligence is a versatile phenomenon that results from the interactions of the brain and mind systems in human beings.
4. Although showing versatility, intelligence is a whole in itself.
5. Every human being has all of the various intelligence areas.
6. Every person can improve each of the various intelligence areas to a sufficient level.
7. Various intelligence areas often work together and in a certain harmony.
8. There are many ways for a person to be able to be intelligent in every field.

According to the theory of multiple intelligences, which argues that human intelligence cannot be objectively measured by IQ tests in a traditional way, people have talents and potentials in different fields (Çırakoğlu & Saracaloğlu, 2009: 427). Multiple-intelligence is a theory aiming to uncover an individual's intelligence areas (i.e. talents) and aiming the use of these areas in interaction with other areas of intelligence by people (Alaz, 2009: 2). For example, scientists, engineers, accountants, sales professionals, statisticians, computer programmers, and economists are considered to be the occupational groups whose logical-mathematical intelligence dominates according to the theory. Individuals with high levels of logical-mathematical intelligence are good at arithmetic calculations, questioning, developing hypothesis and interpreting information (Gürel & Tat, 2010: 350). In this context, the relation of the intelligence levels of accountants with the logical-mathematical intelligence area requires the theory of multiple intelligences to be taken into account in the provision of financial accounting education. Adaptation of innovative approaches such as the theory of multiple intelligences to financial accounting education will have a positive effect on the quality of education received by potential new candidates of the accounting profession, which is important for businesses, practitioners, educators. Members and organizations of accounting profession (Kleinman, 1999: 1-2).

In fact, the Accounting Education Change Commission (AECC) also emphasizes the necessity of education methods improving the social skills of students and encouraging active learning environments, unlike traditional education methods where accounting students are passive in information transfer (Chang, 2006: 6). As can be understood from the explanations above, changes in accounting education have enabled the use of new approaches and teaching techniques such as multiple intelligence theory for raising the quality of education. In this context, the success of accounting students depends on continuing their education in the areas where they have capabilities. Indeed, accepting that individuals who prefer accounting profession have high level of logical- mathematical intelligence within the framework of the theory of multiple intelligences has led to the creation of the main framework of this study. Accordingly, in this study, the effect of the logical-mathematical intelligence of students who took financial accounting courses on the success of financial accounting courses was tried to be determined.

## 2. Literature Review

In the literature review made, a number of studies examining the correlation between multiple intelligence theory and academic achievement have been reached. Although a great majority of the mentioned studies have been conducted in different fields of education (Durmaz & Özyıldırım 2005, Alaz 2009, Uzunöz & Akbaş 2011, Baş 2010, Eyyam *et al.* 2010, Uzoğlu & Büyükkasap 2011, Abdi *et al.* 2013, Perez *et al.* 2014, Ahvan & Poor 2016), the studies of Chang (2006) and Cheong *et al.* (2007) are in the field of financial accounting education. In this context, the purposes and findings of the studies on the correlation between the theory of multiple intelligences and academic achievement are briefly mentioned below. Durmaz & Özyıldırım (2005) investigated the correlation between the achievements in Chemistry and Turkish lessons of first graders in the Department of Classroom and Science Teaching at the Faculty of Education of Trakya University. As a result of the study, it has been seen that there is a relation between chemistry course achievement and logical-mathematical intelligence. Chang (2006) found a meaningful correlation between logical-mathematical intelligence and academic achievement in the study conducted with the aim of examining the feasibility of alternative education methods in teaching financial accounting courses according to the eight different intelligences identified in the Theory of Multiple Intelligence. Cheong *et al.* (2007) conducted a research on 259 students in their study that aimed to investigate whether Intelligence Types defined in Gardner's (1983) Multiple Intelligence Theory were effective in the success of Accounting I, Economics I, and English for College Studies courses.

As a result of the research, they determined a positive correlation between verbal linguistic intelligence and intrapersonal intelligence and the academic achievement of these courses. In their studies aiming to reveal the effects of multi-intelligence theory-supported education on the academic achievements of 9th grade students in the Geography courses, Alaz (2009) and Uzunöz & Akbaş (2011) found that there is a significant difference between the academic achievements of the students upon whom methods and techniques based on the theory of multiple intelligence were applied and other students.

In his study, Baş (2010) analyzed the effects of multiple intelligence theory strategies of students who took English courses and the traditional system on academic achievement. As a result of the research, it was determined that the motivation and academic achievements of the students upon whom multiple intelligence theory was applied were higher than those of the traditional method. Eyyam *et al.* (2010) found a meaningful correlation between verbal-linguistic intelligence and academic average as a result of their study conducted to demonstrate the effect of verbal-linguistic intelligence on academic achievement. The statistical results of the study conducted by Uzoğlu & Büyükkasap (2011) in order to determine the multiple intelligence areas of the seventh-grade primary school students by self-evaluation, and to reveal how they are influenced by gender and their relevance to mathematical/scientific achievement, showed that the dominant field of intelligence of seventh-grade students is the intrapersonal intelligence in female students and the logical-mathematical intelligence in male students. The intelligence areas of students show some differences between male and female students. It was also determined that there is a positive correlation between students' intelligence areas and their scientific and mathematical achievement. Abdi *et al.* (2013) found that multiple intelligence-based instructional techniques have a more positive effect on academic achievement than the traditional system as a result of their study carried out with the aim of investigating the effect of multiple intelligence-based teaching techniques on academic achievement. Perez *et al.* (2014) examined the correlation between multiple intelligences, academic achievement and motor development on a group of secondary school students. In the study where Sportcomp was used in measuring motor development, it was determined that the level of bodily-kinesthetic intelligence was significantly related to motor development and that there was a statistical correlation between logical-mathematical intelligence and academic achievement.

Ahvan & Poor (2016) found a positive correlation between multiple intelligence and academic achievement as a result of their study about the correlation between the academic achievement and intelligence of college students within the framework of Gardner's Multiple Intelligence Theory.

### 3. Methodology

The sample of the study is composed of 279 students from Karadeniz Technical University (K.T.U) and Giresun University who took Financial Accounting course in 2016-2017 academic year. The questionnaire was administered to students who were willing to participate in the study among those who took Financial Accounting course. Multiple Intelligence Inventory developed by Gardner was used in the research. In the relevant inventory, the expressions consisting of 10 items for each intelligence area to determine the students' eight intelligence areas are scored according to the 5-point Likert scale. In the inventory, the maximum score that students can take in each intelligence area is 40, and the minimum score is 0. In addition, demographic information, academic averages and Financial Accounting course grades of the students were obtained through questionnaire method. The reliability of the data of variables can be determined by the Cronbach's alpha coefficient. This coefficient is between 0 and 1 (Bayram, 2004: 127). Alfa values between 60-80% are evaluated as "Reliable" in evaluating the alpha coefficient in terms of reliability of the scale (Nakip, 2006: 146). The Cronbach Alpha value of all variables in the study was found to be 0.796. Then, the scale is inferred to be "reliable". In this study, the SPSS (Statistical Package for Social Sciences) software was used during the process of data analysis. In order to find answers to the problems of this study, techniques such as standard deviation, mean, Independent T test, ANOVA, the Pearson product-moment correlation coefficient, and linear regression were used. The significance level of .01 and .05 were used during the statistical analysis.

### 4. Empirical Results

The demographic attributes of the students participating in the research questionnaire are shown in Table 1.

As seen in Table 1, the majority of the respondents are female students (60.9%), which is in parallel with the gender ratios of the registered students in their departments. The majority of participants (43.4%) are students at Accounting Department. More than half of the participants (60.3%) are students enrolled in the Daytime Education Programs.

**Table 1: Descriptive Profile of Respondents**

<i>Gender</i>	<i>N</i>	<i>%</i>	<i>Type of Educaiton</i>	<i>N</i>	<i>%</i>
Male	109	39,1	Daytime	168	60,3
Female	170	60,9	Evening	111	39,7
<i>Department</i>	<i>N</i>	<i>%</i>	<i>Academic Average</i>	<i>N</i>	<i>%</i>
Public Administration	21	7,5	lower than 2,00	85	30,5
Business Administration	55	19,8	between 2,01 – 2,50	100	35,8
Public Finance	82	29,4	between 2,51 – 3,00	73	26,2
Accounting	121	43,4	higher than 3,00	21	7,6

The most important consideration in evaluating the results is that the multiple intelligence inventories is not an intelligence test and is never used for this purpose (Armstrong, 1999, 2000). In fact, quantitative and numerical data of every intelligence area in this inventory does not have an effect in determining the existence or absence of an individual's intelligence in that category. The main purpose of this inventory is to help individuals relate themselves to experiences they have in eight different intelligence areas (Saban, 2005: 56). For this purpose, while the answers given by the students to the Multiple Intelligence Inventory are evaluated, interpretations can be made according to the following score intervals (Selçuk *et al.* 2004: 29):

Options	Total grades obtained from each area	
4 – Completely Appropriate	between 32 – 40	Highly advanced
3 – Highly Appropriate	between 24 – 31	Advanced
2 – Partially Appropriate	between 16 – 23	Moderately advanced
1 – Slightly Appropriate	between 8 – 15	Slightly advanced
0 – Not Appropriate	between 0 – 7	Unadvanced

In Table 2, the questions asked to the students participating in the questionnaire and the arithmetic mean and standard deviation of answers given by students to these questions according to the 5-point Likert scale are given by listing from the lowest average to the highest for each question group.

**Table2. Students' Multiple Intelligence Scores**

INTELLIGENCES	Mean	Standard Deviation	Development Level
Logical-Mathematical	22,44	7,12	Partially Appropriate (2) – Moderately Advanced
Musical	23,37	7,72	Partially Appropriate (2) – Moderately Advanced
Intrapersonal	25,76	5,42	Highly Appropriate (3) – Advanced
Verbal Linguistic	25,98	5,09	Highly Appropriate (3) – Advanced
Spatial	26,06	6,29	Highly Appropriate (3) – Advanced
Bodily-Kinesthetic	26,62	6,48	Highly Appropriate (3) – Advanced
Naturalist	26,99	7,93	Highly Appropriate (3) – Advanced
Interpersonal	29,58	5,92	Highly Appropriate (3) – Advanced

As it is understood from Table 2, the strongest intelligence area of students is “interpersonal” and the weakest area is “logical-mathematical” intelligence area. Students can be assessed as being moderately advanced in Logical-Mathematical and Musical intelligence types and advanced in other intelligence types.

Independent T test results and mean scores for determining whether the answers given by the students to the Multiple Intelligence Inventory test vary according to gender variable are given in Table 3.

**Table3. The Gender-Based Evaluation of the Multiple Intelligence Inventory Scores of the Students Participating in the Questionnaire**

INTELLIGENCES	Gender	N	Mean	Standard Deviation	p
Verbal Linguistic	Male	109	25,56	5,13	0,272
	Female	170	26,24	5,06	
Logical-Mathematical	Male	109	24,41	7,36	0,000**
	Female	170	21,18	6,67	
Spatial	Male	109	24,32	6,45	0,000**
	Female	170	27,17	5,93	
Musical	Male	109	22,05	7,94	0,023*
	Female	170	24,21	7,47	
Bodily-Kinesthetic	Male	109	26,27	7,50	0,503
	Female	170	26,84	5,74	
Naturalist	Male	109	26,50	8,01	0,418
	Female	170	27,29	7,88	
Interpersonal	Male	109	29,16	6,15	0,348
	Female	170	29,84	5,76	
Intrapersonal	Male	109	25,70	5,05	0,893
	Female	170	25,79	5,65	

**Note:** \*Significance level  $p < 0.05$ ; \*\*significance level  $p < 0.01$

As shown in Table 3, in terms of gender variation, the responses of the participating students to the Multiple Intelligence Inventory were found to be statistically different in the “Logical-Mathematical” and “Spatial” intelligence types with a significance level of 0.01; and “Musical” intelligence type with a significance level of 0.05, and it does not differ for other types of intelligence. As another result of the study, a positive correlation between the achievement grades of the students in Financial Accounting course and the “Logical-Mathematical” intelligence type sub-dimension ( $r = 0.147$ ,  $p < 0.05$ ) has been found, but no significant correlation could be found between students' academic averages (grade point averages) and multiple intelligence types.

The Pearson product-moment correlation coefficient results, which indicate the correlation between students' Multiple Intelligence Inventory scores and achievement grades in Financial Accounting course and Grade Point Average, are given in Table 4.

**Table 4: Correlation between Multiple Intelligence Inventory Scores and Financial Accounting Grade Points-Grade Point Averages**

	Financial Accounting Grade Point		Grade Point Average	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Verbal Linguistic	0,036	0,552	0,045	0,458
Logical-Mathematical	<b>0,147*</b>	0,014	0,076	0,208
Spatial	-0,021	0,722	-0,040	0,501
Musical	-0,037	0,534	0,068	0,255
Bodily-Kinesthetic	0,036	0,549	0,015	0,804
Naturalist	0,028	0,641	0,113	0,060
Interpersonal	0,052	0,384	-0,044	0,464
Intrapersonal	0,027	0,657	0,050	0,406

**Note:** \*significance level  $p < 0.05$ ; \*\*significance level  $p < 0.01$

As seen in Table 4, a positive correlation between the achievement grades of the students in Financial Accounting course and the sub-dimension of Logical - Mathematical Intelligence scores ( $r = 0.147$ ,  $p < 0.05$ ) has been determined, but no significant correlation could be found between other intelligence types and Financial accounting course achievement scores. Moreover, no significant correlation between Grade Point Average and multiple intelligence types was found. This result shows that the logical mathematical intelligence may have more advantages for students in computational questions that require skill and competence, and require classifying, interpreting, and establishing relationships.

**Table5. Linear Regression Analysis on the relation between Multiple Intelligence Inventory Score and Financial Accounting Grade Point**

Model	R	R Square	Adjusted R <sup>2</sup>	Std. Error of the Estimate
1	0,147	0,022	0,018	23,00

Independent Variables: Multiple Intelligence Types

Dependent Variable: Financial Accounting Grade Point

In Table 5, **R** is the regression coefficient for the independent variables (Multiple Intelligence Types) on Financial Accounting Course Achievement Scores (FA), and it is 0.147. **R<sup>2</sup>** is the coefficient of determination that indicates approximately what percentage of the total variance in the dependent variable is explained by the independent variables together, and is 1.8% here. The F and p values in Table 6 are the results of one-factor variance analysis showing the significance of the regression and the coefficients of determination, and are at the significance level of 0.05 as can be seen.

**Table6. ANOVA Test Results about the Validity of Regression Analysis**

Model		Sum of Squares	df	Mean Square	F	p
1	Regression	3229,281	1	3229,281	6,100	0,014
	Residual	146639,815	277	529,386		
	Total	149869,097	278			

The values of B in Table 7 give the partial regression coefficients and show the gradients of the variables in the formula. Beta, on the other hand, is the standardized regression coefficients and helps in interpreting the relative significance rankings of the independent variables for the dependent variable. When looked at the results of regression analysis, the coefficient of "Logical-Mathematical" (Log.Math.) Intelligence type is calculated as (0.173) at a significance level of 0.05. The following is the formulation of these:  $FAGP = 31.377 + 0.173\text{Log.Math.}$

Table7. Coefficients Relating to Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	p
		B	Std. Error	Beta		
1	(Constant)	31,377	9,753		3,217	,001
	Verbal Linguistic	-,107	,325	-,024	-,330	,742
	Logical-Mathematical	,563	,226	,173	2,488	<b>,013</b>
	Musical	-,156	,211	-,052	-,738	,461
	Naturalist	,083	,221	,029	,378	,706
	Interpersonal	,225	,298	,057	,753	,452
	Bodily-Kinesthetic	,019	,309	,005	,062	,950
	Intrapersonal	,021	,292	,005	,071	,943
	Spatial	-,336	,284	-,091	-1,180	,239

### 5. Discussion and Results

In this study, the correlation between the scores of Multiple Intelligence areas of the students studying at Karadeniz Technical University and Giresun University and their achievements of Financial Accounting course, and the effect of average score of each intelligence type defined in the Multiple Intelligence Inventory on Financial Accounting course achievement scores were examined. Also, the difference of Multiple Intelligence Inventory scores according to gender variables was also tried to be determined. When the general results of the research are evaluated, the intelligence type having the highest average score (29.54) among students' multiple intelligence scores is "interpersonal" and the intelligence type with the lowest average score (22.44) is "logical-mathematical". In the study conducted by Karamustafaoğlu (2010), the highest average score was calculated in musical intelligence type and the lowest average score was calculated in intrapersonal intelligence type. The highest average score in the study by Naeini & Pandian (2010) was calculated in "Spatial" and the lowest average score was calculated in "Naturalist" intelligence. In the study by Swami *et al.* (2006), the highest average score was calculated in "interpersonal" with a similar result with our study, but differently the lowest average score was calculated in "musical" intelligence. The highest average score in the study by Yuen & Furnham (2005) was calculated in spatial intelligence type, and the lowest average score was calculated in musical intelligence type.

When literature is evaluated generally, it can be interpreted that there are different factors affecting the average score in terms of intelligence types, and therefore a common result cannot be reached. When the results of the study analyzed in terms of gender variation, although there was a statistically significant difference in the scores of students in "Logical-Mathematical", "Spatial" and "Musical" intelligence types, no difference was found for other intelligence types. Male students were found to have higher mean scores than female students in terms of "Logical-Mathematical" intelligence type; and female students were found to have higher mean scores than males in the "Spatial" and "Musical" intelligence types. Similarly, in the study conducted by Uzoglu & Büyükkasap (2011) it was determined that female students had higher mean scores than males in the "Spatial" and "Musical" intelligence types ( $p < 0.01$ ); but male students were found to have higher mean scores in the Verbal-Linguistic and Intrapersonal intelligence types, unlike the results of our study. That male students have higher mean scores than females in the "Logical-Mathematical" type of intelligence is in parallel with other studies in the literature (Hamurcu *et al.* 2002, Furnham & Budhani 2002, Rammsayer & Rammstedt 2000, Swami *et al.* 2006). These results emphasize that it is important for instructors to be able to be aware of that students can be good at different intelligence areas depending on the gender (Uzoğlu & Büyükkasap 2011).

As another result of the study, a positive correlation between the achievement grades of the students in Financial Accounting course and the "Logical-Mathematical" intelligence type sub-dimension ( $r = 0.147$ ,  $p < 0.05$ ) was found, but no significant correlation could be found between academic averages (grade point averages) of the students and multiple intelligence types. On the basis of this data, it can be stated that students having high "Logical-Mathematical" intelligence scores can be successful in financial accounting course. The study also included a linear regression analysis to determine the effect of multiple intelligence scores of the students on their Financial Accounting course achievement. Multiple Intelligence Scores explains 1.8 percent of total variance in Financial Accounting Grade Point. Therefore, it can be said that the students' Multiple Intelligence Scores affect their Financial Accounting Grade Point and Multiple Intelligence Scores are one of the predictors of Financial Accounting Grade Points for sample of students from K.T.U. and Giresun University.

As a result, it can be said that the Multiple Intelligence Inventory can be an alternative approach to teach accounting knowledge. It can be stated that for a field of science, which requires recording, classifying, analyzing and interpreting skills, such as accounting, “Logical-Mathematical” intelligence is more important than other intelligence types, and that people need to be familiar with their abilities before they choose the field they will study so that they can be more successful.

### References

- Abdi, A., Laei, S. & Ahmadyan H. (2013). The effect of teaching strategy based on multiple intelligences on students' academic achievement in science course. *Universal Journal of Educational Research*, 1(4), 281-284.
- Ahvan, Y. R. & Pour, H. Z. (2016). The correlation of multiple intelligences for the achievements of secondary students. *Educational Research and Reviews*, 11(4): 141-145.
- Alaz, A. (2009). The effect of multiple intelligence theory on academic achievement of ninth grade students in geography lesson. *Türk Eğitim Bilimleri Dergisi*, 7(1): 1-22.
- Armstrong, T. (1999). *7 kinds of smart: discovering and identifying your multiple intelligences, revised and updated with information on 2 new kinds of smart*. New York, NY: Plume.
- Armstrong, T. (2000). *Multiple intelligences in the classroom*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Baş, G. (2010). Effects of multiple intelligences instruction strategy on students' achievement levels and attitudes towards English lesson. *Cypriot Journal of Educational Sciences*, 5, 167-180.
- Bayram, N. (2004). *Sosyal bilimlerde SPSS ile veri analizi*. Bursa: Ezgi Kitabevi.
- Chang, C.F. (2006). Teaching accounting to learners with diverse intelligence. [Online] Available: <http://ssrn.com/abstract=1327578> (August 8, 2017)
- Cheong, A.H., Loong, A.W., Cheng, T.B., & Rajangam, N. (2007). The relationship between multiple intelligences and academic results of Taylor's business foundation students. [Online] Available: <http://www.herdsa.org.au/wp-content/uploads/conference/2007/PDF/R/p14.pdf> (August 8, 2017)
- Durmaz, H. & Özyıldırım, H. (2005). Investigation of attitudes of students in the programs of class teaching, and science teaching towards chemistry lesson, and the relation between their multiple intelligence fields and their success in chemistry and language lessons. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 6 (1): 67-76.
- Eyyam R., Meneviş, İ. & Doğruer, N. (2010). Çoklu zeka ve akademik başarı arasındaki ilişki. *International Conference on New Trends in Education and Their Implications*, 916-919.
- Furnham, A. & Budhani, S. (2002). Sex differences in the estimated intelligence of school children. *European Journal of Personality*, 16, 201-219.
- Gardner, H. (1983). *Frames of mind: the theory of multiple intelligences*. New York, NY: Basic Books.
- Gürel, E. & Tat, M. (2010). Multiple intelligence theory: from unitary intelligence conception to multiple intelligence approach. *The Journal of International Social Research*, 3(11): 336-356.
- Hamurcu, H., Günay, Y. & Özyılmaz, G., (2002). Buca eğitim fakültesi fen bilgisi ve sınıf öğretmenliği bölümü öğrencilerinin çoklu zeka kuramına dayalı profilleri. *V. Ulusal Fen ve Matematik Eğitimi Sempozyumu Bildiriler Kitabı*, Cilt I, 415-421.
- Kleinman, G. (1999). The accounting education change assessment process: a research report. *Accounting Educators' Journal*, 11: 1-46.
- Nakip, M. (2006). *Pazarlama araştırmaları: teknikler ve SPSS destekli uygulamalar*. Ankara: Seçkin Yayıncılık.
- Pérez, L.M.R., Nieto, M.P., Otero, I.R., Amengual, A.R. & Manzano, J.A.N. (2014). Relationships among multiple intelligences, motor performance and academic achievement in secondary school children. *International Journal of Academic Research*, 6(6): 69-76.
- Rammsayer, T. & Rammstedt, B. (2000). Sex differences in self of different aspects of intelligence. *Personality and Individual Differences*, 29, 869-880.
- Saban, A. (2005). *Öğrenme öğretme süreci yeni teori ve yaklaşımlar*. (4th ed.). Ankara: Nobel Yayın Dağıtım.
- Selçuk Z., Kaylı H. & Okut L. (2004). Çoklu zeka uygulamaları. Ankara: Nobel Yayın Dağıtım.
- Swami, V., Furnham, A., Kannan, K. (2006). Estimating self, parental, and partner multiple intelligences: a replication in Malaysia. *The Journal of Social Psychology*, 146(6): 645-655.
- Uzoğlu, M. & Büyükkasap, E. (2011). İlköğretim yedinci sınıf öğrencilerinin zekâ alanlarının tesbiti ve bu alanlar ile fen ve matematik başarıları arasındaki ilişki. *Journal of Turkish Science Education*, 8(3): 124-137.
- Uzunöz, A. & Akbaş, Y. (2011). Coğrafya dersinde çoklu zekâ destekli öğretimin öğrenci başarısı ve kalıcılığa etkisi. *Türk Eğitim Bilimleri Dergisi*, 9(3): 467-496.