THE EFFECTS OF MULTIPLE INTELLIGENCE THEORY BASED TEACHING ON STUDENTS' ACHIEVEMENT AND RETENTION OF KNOWLEDGE (EXAMPLE OF THE ENZYMES SUBJECT)

Assist. Prof. Dr.Sibel GÜRBÜZOĞLU YALMANCI
Kafkas University, Faculty of Education
Department of Secondary Science Education
Kars,TURKEY

Ph. D. Candidate Ali İbrahim Can GÖZÜM
Kafkas University, Faculty of Education
Department of Primary Preschool Education
Kars,TURKEY

ABSTRACT

The purpose of this study is to compare theory of multiple intelligences with the traditional education method by looking at the science teachers' success, permanence of their information about enzyme subject. The research is experimental and it was carried out during 2010-2011 education year of Faculty of Education of Kafkas University, on Science Department's third grade students. In this research two impartial groups were formed and these two groups were used as control and experiment group. There were 30 students in control group and 30 students in experiment group. During the application, the lessons were given traditionally in control group, and in the experiment group; lessons were given according to multiple intelligence method. In the research, before application, the information level of students about enzyme was measured. After application the increase of their information was measured and four weeks later a success test was formed to determine the permanence of information. In the research a SPSS 16.0 package program was used to analyze the datum. To compare the students' points from pretest and difference of arithmetic average of an unrelated t test and experiment were used. For comparing control group's last test and performance test ; Anova test statistics was applied. To determine the meaningful distinction after Anova test, Benforroni test was applied. In the research; the significance level was .05 In the pre-test results before the beginning of application no-meaningful distinction was found between experiment and control group according to t test. After the application ; in the last test and permanence test, multiple intelligence method which was applied on experiment group has a meaningful distinction compared to traditional education method applied on control group.

Key Words: Multiple Intelligence Theory, Enzymes, Knowledge Retention, Biology Training.

INRODUCTION

Today, what can an individual do is more widely thought than what he does with the advances in the field of education and psychology. Multiple intelligence theory has been proposed to consider new training methods for his purpose. (Kirk, 2003).After reviewing traditional intelligence approach, Neuropsychology and development expert Gardner proposed for the first time seven different universal capacity in his book '' Frames Of Mind'' which was published in 1983 (Lash, 2004).In 1983, Gardner set forth that any individual has a variety of intelligence degree (mathematical-logical, verbal-linguistic, musical-rhythmic, bodily-kinesthetic, intrapersonal, social, visual-spatial and nature); and this revealed multiple intelligence theory which describes the learning styles, interests, capabilities and tendencies of individuals. (Işık, 2007).Howard Gardner initially prepared a list of seven types of intelligence. The first two of these are verbal- mathematical intelligence which are very precious at school, the next three (musical-rhythmic, bodily-kinesthetic, visual-spatial) are

related to the artistic skills and the last two (internal, social) have been called as personal intelligence by Gardner (Gardner, 1999). Finally, he added the naturalist intelligence.

Verbal-Linguistic intelligence is a kind of language capacity to achieve an aim and capability to use language learning ability in terms of writing and speaking effectively (Gündeşli, 2006*). Logical mathematical intelligence* is a capability type for making mathematical calculation, deductive and inductive reasoning, building logical relationships, generating hypothesis, solving problem, making critical thinking and understanding numbers, geometric shapes and abstract symbols. (Vural, 2004). *Visual spatial intelligence* is an ability type for spatial representation of individual mind or shaping dreams , thinking with pictures, images, shapes and lines, perceiving and comprehending three dimensional objects (Büyüksalan, 2003; Gardner, 2006). *Musical-rhythmic* **intelligence** is instrument playing, singing and song writing ability with the basic components of music (melody, rhythm, tempo, freedom, harmony and music forms etc.) Recognition and use of rhythmic and tonal concepts include sensivity capabilities toward sounds from the environment and music instrument (Büyükalan 2003; Çuhadar,2006). *Bodily kinesthetic intelligence* is the capacity of expressing oneself with movements, gestures and facial expressions, using the effective coordination of brain and body , creating a product using the whole body or a part of the whole body (Büyükalan, 2003; Gardner, 2006). *Interpersonal (social) intelligence* is the capacity of understanding, distinguishing and welcoming the emotions, aspirations and needs of surrounding people (Tan, 2008). *Intrapersonal intelligence*, according to Gardner, is the most important intelligence type of daily life, which enables oneself to have knowledge and take responsibility of his own life (Demirel, 2000). *Naturalistic intelligence* is the ability of recognizing and researching all living things in nature and thinking on their creation (MEB, 2009).

Gardner mentioned two important advantages of multiple intelligence in education. They are:
➢ It gives the opportunity to plan our education program so as to make the students desired. (For example, musician and scientific training)
➢ It enables us to reach more students trying to learn different disciplines and theories. Learning would be realized much easily on condition that students are trained by using these intelligence fields (Bümen, 2004).

The two learning disciplines which multiple intelligence theory has put over the top are learning by doing and experiencing and the discipline of organizing teaching status according to students' capabilities (Tan, 2006). While Gardner was submitting the features related to multiple intelligence theory and scientific evidences, he largely relied on brain research and neuropsychology. Thus, the theory has been accepted unquestionably great. Brain research has shown that each intelligence type takes place only in a specific part of the brain (Selçuk, Kayılı, Okut, 2003). Multiple intelligence theory puts forward that every human being has one or more mental space unique to himself and he learns more easily in accordance with this mental space. This theory is considered to enable different learning environments to access information, to have an impact on endearing the subject and to arouse interest. Multiple intelligence theory based teaching in science courses have a great role in creating active learning environment for students. The main principle of multiple intelligence theory is to cater to different intelligence area of each student. To ensure that students are able to create links among the information adopted, it is required to use teaching methods and techniques toward multiple intelligence theory.

It is required to organize learning environment in an encouraging style as students' participation, success, and knowledge internalizing are expected. Depending on this fact, it is quite important to apply multiple intelligence theory in science and technology teaching (Evrekli, Aydın, Balım, 2006).

The greatest impact of the theory in the process of teaching is to increase the creativity of teachers in developing teaching strategies. Because, when teachers and planners think activities for each intelligence type, they inevitably enlarge their method and technique repertoire, reveal different and original techniques. As different intelligence types are used in classroom activities during that process, cooperation is possible between the teachers whose expertise areas are completely different from each other. For example, one needs to communicate and get advice of music teacher while planning an activity related to musical intelligence (Demirel, 2000).

Every child has strong and weak sides no matter what his intelligence area is. On condition that only one or two of these intelligence areas are used, the students whose intelligence types don't take place among the ones used at school cannot be able to improve their brilliant sides, complete learning in a long period without enjoying or never manage to learn.

Consulting the relevant literature, it is possible to come across with several research which emphasize determining intelligence types and the impact of a subject discussed according to multiple intelligence theory on student success, knowledge permanence and attitude (Dilek Sezer, 2008; Etli, 2007; Furnham, Sahahidi and Baluch 2002, Güney, 2007; Gök Altun, 2006; Hoerr 1994; Ribot, 2004; Shore, 2004).

In this study, the subject of enzymes of biology course was submitted to students with teaching techniques planned according to multiple intelligence theory, and determining the impact of this study on student success was aimed. Depending on the purpose, answers to the following sub-problems were tried to be found.

1. Is there a meaningful difference between pretest points of experiment group to whom the subject of enzymes was taught according to multiple intelligence theory and control group to whom the same subject was discussed according to traditional methods?

2. Is there a meaningful difference between pretest-posttest points and permanence test points of experiment group to whom subject of enzymes was taught according to multiple intelligence theory?

3. Is there a meaningful difference between pretest- posttest points and permanence test points of control group to whom the subject enzymes was taught according to traditional methods?

METHOD

Research Model

In this study, nonequivalent groups pretest posttest model was used in the scope of quasi experimental method based on neutral determination of groups so as to research the effect of multiple intelligence theory based activities. (McMillan and Schumacher, 2006).

In nonequivalent groups pretest posttest model, there are two groups formed by neutral assigning. One of them is referred as experimental group an the other is called as control group. In each group, pretest and posttest measurements are performed. (Karasar, 2008).

Universe and Sample

The study was carried with 60 teacher candidates of third grade students of Science Teaching department, at which enzymes were studied in the scope of Science Teaching as a part of curriculum. In the study, two classes were used as control and experimental group formed by neutral assigning.

Data Collection Tool

Success Test

Success test was developed in the research to measure to what extent the students gained behaviors as long as in the issue of enzymes is concerned. In the success test, 35 questions were prepared for each unit covering any behavior aimed to be taught. The questions were examined by biology and education sciences experts. The test was applied to 86 people who studied the subject of enzymes at university level. At the end of pilot application, selectivity indexes of test articles, article severity degree and Croncbah Alpha reliability coefficient were found and on this basis, the articles whose assessment were weak were taken out of the test. There are 30 questions in the end of the test. General reliability coefficient assessed for success test is $\alpha=.80$. The statement that depending on Alpha coefficient, the scale is highly reliable is used. According to Kalaycı (2008), on condition that Alpha record is between 0.80-1.00, the scale is highly reliable. Besides, there are questions related to five of Bloom's cognitive scale (knowledge, understanding, application, analysis and assessment).

Application

The application was practiced during 2010-2011 education year at the department of Science Teaching of Kafkas University on 60 students attending third grade. During application period, the courses were discussed with traditional method on control group while it was studied according to multiple intelligence theory on experimental group by the researcher. Activities were organized for each intelligence area. The activities are shown below.

Table 1: The table of activities in the issue of enzymes based on multiple intelligence theory.

Intelligence Area	Activity
Verbal Linguistic Intelligence	Writing and reading studies, enabling students to make comments.
Logical Mathematical Intelligence	Problem solving, conducting an experiment, puzzle solving.
Visiual Intelligence Area	Visual Presentations , Materials, Power Point
Musical Intelligence Area	Making Power Point Presentation in company with Enzymes Music.
Bodily- Kinesthetic Intelligence Area	Making animations with body.
Social Intelligence	Knowledge exchange, Cooperated workshops, Group Discussing
Nature Intelligence	Answering the question of what would happen if there were no enzymes? Explaining where the enzymes are used.
Intrapersonal Intelligence Area	Realizing the importance of enzymes for all living creatures and searching for answers to the question of 'why' in the experiments.

For both control and experimental group, pretest at the beginning of the unit, posttest at the end of the unit and retention test after 4 weeks were applied. For the purpose of comparing student success points, these tests consist of same questions.

Data Analysis

In this research, an unrelated t-test in order to compare the students' scores obtained from pre-test and retention tests, and one-way Anova statistics in order to compare the groups within themselves and with one another for repetitive measurements have been applied. The Tukey test has been performed so as to determine among which groups the significant differences have been observed as a result of the Anova test.

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FINDINGS AND INTERPRETATION

Evidence of the First Sub-Problem

The first sub-problem of the study is in the form of, "Is there any significant difference between the pre-test score averages of experimental group in which the issue of enzymes is discussed based on the multiple intelligence theory and of the control group in which the same issue is discussed through traditional methods?" In order to assess this sub-problem, a t-test has been performed between the pre-test scores of the students belong to control and experimental groups which have been applied at the beginning of the unit. Results are shown in Table 2.

Table 2: The t-test chart of the scores obtained from achievement pre-test.

Test	Groups	N	Average	S	sd	t	p
Pre-test	Control	30	10.86	1.19	58	.56	.57
	Experimental	30	11.10	1.93			

As a result of the t-test, there is no significant difference between the achievement pre-test scores of the experimental group receiving Multiple Intelligences Theory-based education and of the students of the control group receiving a traditional education, which have been performed before the unit begins [$t_{(58)}$=56, p>.05; Levene Statistics=2.06, p=.15]. The levels of the two groups are consentaneous. This situation has facilitated the implementation of the achievement test to both of the groups in terms of the perception of differences as a result of the practices. It can be said that there is no disparity of success between the students of control and experimental groups in the sense of the issue of enzymes before the implementation.

Evidence of the Second Sub-Problem

The second sub-problem of the research is, "Is there any significant difference between the mean scores of pre-test, pro-test and retention test of the experimental group that discuss the issue of enzymes using the theory of Multiple Intelligences?" The table concerning the ANOVA statistics so as to determine whether there is significant difference between these tests is given below.

Table 3: One-way ANOVA test table for repetitive measures concerning the experimental group students' pre-test, post-test and retention test scores

Source of Variance	Total of squares	sd	Average of squares	F	P*	Significant Difference**
Among subjects	449,789	29	15,510	16,802	.000	2-1,3-1
Measurement	622,156	2	311,078			
Error	1073,844	58	18,515			
Total	**2145,789**	**89**				

* Important at p <.05 level.
** Measurements in which differences have been observed as a result of Tukey test.

According to Table 3, there is a significant difference between the scores of the experimental group in pre-test (1), pro-test (2) and retention test (3) [$F_{(2,58)}$= 16.802, p<0.05]. As a result of the Tukey test, a statistically significant difference has been observed between the pre-test - pro-test and pre-test - retention test of the experimental group (p <0.05).

Table 4: The arithmetic mean and standard deviations of the experimental group students' pre-test, post-test and retention test

Tests	N	Average	SS
Pre-test	30	11.10	1.93
Pro-test	30	16.86	4.96
Retention Test	30	16.46	4.91

In Table 4, it can be seen that the experimental group students' mean score of post-test (x = 16.86) and the mean score of retention test (x = 16:46), are higher than the mean score of pre-test (x = 10.11). In addition, no difference has been observed between the post-test and retention test according to the Tukey test. In this case, when the averages are taken into consideration, the post-test scores of students have increased compared to the pre-test scores; therefore, it can be said that the students have learned the subject of enzymes being discussed according to the Multiple Intelligence Theory. It has been observed that the success levels after the implementation have not changed in accordance with the scores obtained from the retention test, so it can be said that the effect of the implementations based on Multiple Intelligence Theory continues.

Evidence of the Third Sub-Problem and Interpretation

The third sub-problem of the research is: "Is there any significant difference between the pre-test and pro-test - retention test mean scores of the control group that discuss the issue of enzymes using the theory of Multiple Intelligences?" The table concerning The ANOVA statistics so as to determine whether there is significant difference between these tests is given below.

Table 5: ANOVA test chart concerning the control group students' pre-test, post-test and retention test scores

Source of Variance	Total of squares	sd	Average of squares	F	P*	Significant Difference**
Among subjects	254,233	29	8,767	5,658	.000	2-1
Measurement	56,267	2	28,133			
Error	288,400	58	4,972			
Total	**598,900**	**89**				

* Important at P <.05 level.
** Measurements in which differences have been observed as a result of Tukey test.

According to Table 5, there is a significant difference between the scores of the groups in pre-test (1), pro-test (2) and retention test (3) [$F_{(2,58)}$= 5,658, p<0.05]. As a result of the Tukey test, it has been observed that this difference takes part between the control group students' pre-test scores and post-test scores (p <0.05).

Table 6: The arithmetic mean and standard deviations of the control group students' pre-test, post-test and retention test

Tests	N	Average	SS
Pre-test	30	10.76	1.04
Pro-test	30	12.70	3.60
Retention Test	30	11.63	2.15

In Table 6, it can be seen that the control group students' mean score of post-test (x = 12.70) is higher than the mean score of retention test (x = 11.63), and the mean score of pre-test (x = 10.76). In addition, no difference has been observed between the pre-test and retention test according to the Tukey test (p>0.05). In this case, considering the mean scores, it is observed that this difference is in favor of the pro-test. So, it can be said that

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the students have learned the unit with a traditional method with which they are familiar. There is a significant difference between pro-test and retention test. Considering the averages, it is again observed that this difference is in favor of the pro-test. In this case, it can be said that the students do not remember any information regarding the protein synthesis unit. In the face of the averages, the pro-test scores of the students have increased compared to the pre-test; therefore, students can be said to have learned the subject of the enzymes discussed according to the traditional approach. However, there is not any difference between the scores of the retention test performed after the traditional approach and the scores of the pre-test performed at the beginning; for this reason, there has been detected no retention of information about the subject of enzymes which has been discussed according to the traditional approach.

CONCLUSION AND DISCUSSION

The purpose of this study is to determine the effect of the enzymes issue discussed through the theory of Multiple Intelligences to the success of students. For this purpose, considering the final achievement test scores performed immediately after the subject of enzymes discussed with activities based on the traditional approach and on the theory of Multiple Intelligences; it can be observed that the mean success scores of both of the student groups have increased compared to the pre-test. However, it is seen that this increase has been higher in the experimental group in which activities based on the theory of multiple intelligences have been held. In this respect, the theory of Multiple Intelligences can be said to be effective in learning Bayrak, 2005; Demiral, 2006; Deveci, 2008; Gökçek, 2007; Şengül, 2007; Yağcı, 2006 obtained similar results in their studies.

In the retention test conducted after 3 weeks from the date of the research, it has been determined that there is a significant difference between the experimental group that taught according to the multiple intelligences theory and the control group which taught according to the traditional method; and this difference has been found to be in favor of the experimental group. The research findings demonstrate that the education based on the theory of multiple intelligences affect the permanence of information more positively than traditional methods of teaching. This result obtained from the retention test is in line with the studies of Altuntaş, 2007; Etli, 2007; Öner 2005; Uçak, 2006.

In order for the multiple intelligence-based education to be more effective, education implementations based on multiple intelligence are performed in field education courses in universities' faculties of education, and prospective teachers can implement the multiple intelligence theory more effectively if the studies on this theory are examined.

Teachers should have knowledge about the education based on Multiple Intelligences theory in order for them to identify the intelligence profile of the students having difficulty in comprehending the subject and to prepare appropriate activities for these profiles. If teachers have insufficient knowledge about the subject, they can be informed about multiple intelligences-based instruction through in-service training.

It is thought that students can be academically more successful through education based on Multiple Intelligences Theory in which they can be more effective, use the materials by themselves, speak and discuss freely, learn by seeing and acting, and use their undiscovered intelligence fields. For this reason, in our era where individual differences come into prominence, more importance should be attached to the theory of Multiple Intelligences that can support the students' individuality, and by doing so that can make learning more pleasant (Hasenekoğlu and Gürbüzoğlu 2009).

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BIODATA AND CONTACT ADDRESSES OF AUTHORS

Assist. Prof. Dr. Sibel GÜRBÜZOĞLU YALMANCI currently employed as an Assistant Proffesor at Kafkas University of Education Faculty, Graduate School of Natural and Applied Sciences Department of Biology Teaching. She received Phd degree in Graduate School of Natural and Applied Sciences Department of Biology Teaching at Atatürk University. She is specially interested in socio-scientific issues, Biology education, education of university students.

Assist. Prof. Dr. Sibel GÜRBÜZOĞLU YALMANCI
Kafkas University, Faculty of Education
Graduate School of Natural and
Applied Sciences Department of Biology Teaching.
Kars,TURKEY
E-Mail: s.gurbuzoglu@hotmail.com

Ph. D. Candidate Ali İbrahim Can GÖZÜM is currently employed as an Research Assistant at Kafkas University, Faculty of Education, Primary Department of Preschool Education. He is currently a Ph D student at Gazi University, Institute of Educational Sciences, Primary Department of Preschool Education. He is specifically interested in socio-scientific issues, concept teaching, conceptual change, scicence education for preschool children.

Ph. D. Candidate Ali İbrahim Can GÖZÜM
Kafkas University, Faculty of Education
Primary Department of Preschool Education
Kars,TURKEY
E-Mail: a_ibrahimcan@hotmail.com

REFERENCES

Altun, D. G. (2006). "Çoklu Zekâ Kuramına Göre Hazırlanmış Ses Ve Işık Ünitesinin Öğrenci Başarısına, Hatırlama Düzeylerine, Fen Bilgisine Karsı Tutumlarına Ve Öğretmen Ve Öğrenci Görüşlerine Etkisi" Muğla Üniversitesi Fen Bilimleri Enstitüsü İlköğretim Eğitimi Anabilim Dalı (Fen Bilgisi Öğretmenliği), Muğla.

Altuntaş, N. (2007). "Çoklu Zeka Kuramı İle Öğrenmenin 7. Sınıf Öğrencilerinin Matematik Başarılarına Etkisi" Marmara Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Ana Bilim Dalı İlköğretim Matematik Öğretmenliği Bilim Dalı, İstanbul.

Bayrak,H. (2005)."İlköğretim 8. Sınıf Öğrencilerinin Kimyasal Bağlar Konusundaki Başarılarına,Öğrendikleri Bilgilerin Kalıcılığına, Tutum Ve Algılamalarına Çoklu Zeka Kuramına Dayalı Öğretimin Etkisi", Yüksek Lisans Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Anabilim Dalı Fen Bilgisi Eğitimi Bilim Dalı, Ankara.

Bümen, N. T. (2004), Okulda Çoklu Zekâ Kuramı, İkinci Baskı, Ankara: PegemA Yayıncılık. Syf 21.

Büyükalan, S.F. (2003). Çoklu Zekâ Kuramı", Eğitim ve Denetim Dergisi, Sayı:1, Ankara.

Çuhadar, C.H. (2006). " Müziksel Zekâ" , Ulusal Müzik Eğitimi Sempozyumu Bildirisi, Pamukkale Ünv. Eğt. Fak. Denizli, 26-28 Nisan.

Demirel, Ö. (2000) ,Planlamadan Uygulamaya Öğretme Sanatı, Pegem A Yayıncılık, Ankara.

Demiral,Ü. (2006). " Fen Bilgisi Öğretiminde Genetik Ünitesinin Kavranmasında Çoklu Zeka Kuramının Öğrenci Başarısına Etkisi" , Yüksek Lisans Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Anabilim Dalı Fen Bilgisi Eğitimi Bilim Dalı, Ankara.

Deveci. E.(2008). "Öğretim Stillerinin Farklı Zeka Türlerine Sahip 6. Sınıf Öğrencilerinin Fen Ve Teknoloji Ders Başarısı İle İlişkisi", Yüksek Lisans, Abant İzzet Baysal Üniversitesi Sosyal Bilimler Enstitüsü, Bolu.

Dilek, S. (2008). "Yeni Programdaki "Madde Ve Isı" Ünitesine Yönelik Laboratuar Etkinliklerinin Çoklu Zeka Kuramına Göre Yürütülmesi, Yüzüncü Yıl Üniversitesi Fen Bilimleri EnstitüsüOrtaöğretim Fen Ve Matematik Alanları Eğitimi Anabilim Dalı, Yüksek Lisans Tezi, Van.

Etli, C. (2007)."Çoklu Zekâ Kuramına Göre Hazırlanan Öğretim Etkinliklerinin 9. Sınıf Öğrencilerinin Biyoloji Başarılarına Ve Öğrenilen Bilgilerin Kalıcılığına Etkisi", Gazi Üniversitesi Eğitim Bilimleri Enstitüsü Orta Öğretim Fen Ve Matematik Alanları Eğitimi AnabilimDalı Biyoloji Öğretmenliği Bilim Dalı, Yüksek Lisans Tezi, Ankara.

Evrekli, E., Aydın, G. ve Balım, A. G.(2006). " Yapılandırmacı kuram ve çoklu zeka kuramı uygulamalarına ilişkin bir teknik: zihin haritalama." Özel Tevfik Fikret Okulları, İzmir: Eğitimde Çağdaş Yönelimler III "Yapılandırmacılık ve Eğitime Yansımaları Sempozyumu".

Furnham, A., Shahidi, S., Baluch, B., 2002. Sex and Culture Differinces in Perceptions of Estimated Multiple Intelligence for Self adn Family: A British – Iranian Comparison. Journal of Cross Cultural Psychology, 33 (3), 270–285

Gardner, H. (1999). " Intelligence Reframed. Multiple intelligences for the 21st century", New York: Basic Books. 41-43 pages. Useful review of Gardner's theory and discussion of issues and additions.

Gardner, H., 2006. Changing Minds. Harvard Business Scholl Press, 244p, Boston,USA.

Gündeşli F. (206). Çoklu zeka kuramı ve ilköğretim kurumlarının yönetim yapısına potansiyel etkileri. Yayınlanmamış Yüksek Lisans Projesi. Kahramanmaraş Sütçü İmam Üniversitesi, Sosyal Bilimler Enstitüsü, Kamu Yönetimi Anabilim Dalı, Kahramanmaraş.

Hasenekoğlu İ. Ve Gürbüzoğlu G. (2009). Çoklu zeka kuramına dayalı işlenen protein sentezi konusunun öğrencilerin bilgilerindeki kalıcılığına etkisi. Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi, 10(3), 49-59.

Hoerr, T.R., 1994. The Multiple Intelligence Approach to Giftedness. Contemporary Education, 66(1), 32–35.

Lash, M.D. (2004). Multiple Intelligences and the Search for Creative Teaching, *Paths of Learning*, 22, 13 – 15

Işık,D. (2007). Çoklu Zeka Kuramı Destekli Kubaşık Öğrenme Yönteminin İlköğretim 3. Sınıf Öğrencilerinin Matematik Dersindeki Akademik Başarılarına Etkisi Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi (Kefad) Cilt 8, Sayı 1.

Kalaycı, Ş. (2008). SPSS Uygulamalı Çok Değişkenli İstatistik Teknik. Ankara: Asil Yayın Dağıtım Ltd. Şti.

Karasar, N. (2008). "Bilimsel Araştırma Yöntemi" Nobel Yayın Dağıtım, Ankara.

Kirk A. Becker. (2003). History of the Stanford-Binet Intelligence Scales: Content and Psychometrics, Stanford-Binet Intelligence Scales, Fifth Edition Assessment Service Bulletin Number 1.

McMillan, J.H. and Schumacher, S. (2006). Evidence-Based Inquiry. Research in Education. United States of America: Pearson Education

MEB. (2009). Meslekî Eğitim Ve Öğretim Sisteminin Güçlendirilmesi Projesi. Bilişsel Gelişim. Ankara.

Öner, M. (2005). "Tam Öğrenme Destekli Çoklu Zeka Kuramı Uygulamalarının Fen Bilgisi Dersindeki Erişi, Tutum Ve Kalıcılığa Etkisi", T.C. Dicle Üniversitesi Sosyal Bilimler Enstitüsü Eğitim Bilimleri Eğitimi Anabilim Dalı Eğitim Programları Ve Öğretim Bilim Dalı Yüksek Lisans Tezi, Diyarbakır.

Ribot, N.(2007). My Experience Using the Multiple Intelligences. New Horizons For Learning, http://www.newhorizons.org/trans/international/ribot.htm.

Selçuk, Z., Kayılı, H., Okut, L. (2003). "Çoklu Zeka Uygulamaları", Nobel Yayın Dağıtım, II.Baskı, Ankara.

Shore, JR., 2004. Teacher Education an Multiple Intelligences: A Case Study of Multiple Intelligences and Teacher Efficacy in Two Teacher Preparation Courses. Teachers College Record, 106 (1), 112–139.

Şengül, S. H. (2007). "Çoklu Zeka Kuramı Temelli Öğretimin İlköğretim Altıncı Sınıf Öğrencilerinin Dolaşım Sistemi Başarıları Üzerine Etkisi" ,Yüksek Lisans Tezi, Balıkesir, T.C. Balıkesir Üniversitesi Fen Bilimler Enstitüsü Ortaöğretim Fen Ve Matematik Alanlar Eğitimi Anabilim Dalı.

Tan, U. (2008). "Çoklu Zeka Kuramına Göre 3-6 Yaş Arasındaki Çocukların Yöneldikleri Oyuncakların Mesleki Eğilimleri Belirlemedeki Rolü Ve Bir Model Önerisi" ,Yüksek Lisans Tezi, İstanbul.

Tan, Ş (2006), Öğretimi Planlama ve Değerlendirme,Onuncu Baskı, Ankara: PegemA Syf 82.

Uçak, E. (2006) "Maddenin Sınıflandırılması Ve Dönüsümleri Konusunda Çoklu Zeka Kuramı Destekli Öğretim Yöntemi'nin Öğrenci Başarısı, Tutumu Ve Hatırda Tutma Düzeyine Etkisi", Pamukkale Üniversitesi Fen Bilimleri Enstitüsü, İlköğretim Anabilim Dalı, Yüksek Lisans Tezi, Denizli.

Vural , B.,2004,Öğrenci Merkezli Eğitim ve Çoklu Zekâ, Hayat yayıncılık, İstanbul.

Yağcı, Z., "Çoklu Zeka Kuramının İlköğretim Altıncı Sınıf Fen Bilgisi Öğretiminde Öğrenci Başarısına Etkisi", Yüksek Lisans Tezi, T.C. Balıkesir Üniversitesi Fen Bilimleri Enstitüsü İlköğretim Anabilim Dalı, Balıkesir, 2006.