The Affect Of 4 Mat Teaching Technique And Learning Styles On Learning Some Geometrical Concepts

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Abstract

In this research, the affect of 4 MAT teaching model in mathematic course about geometric concepts over sixth grade students academic success and the affect of learning styles on students successes are aimed to search. By this aim the some geometrical concepts has been taught to the students by using 4 MAT teaching model and constructive learning model. The sample of study consist of total 39 sixth year secondary school students who are at the state school which is found in middle Anatolia region. These two classes were randomly separated into experimental and control groups. Nonequivalent control group design, one of the a quasi-experimental model and survey model were used in this study which has been carried out for 5 weeks in the second semester of 2009-2010 academic year. The data of this study was obtained from geometrical success test, structured interview and Kolb Learning Style Inventory. In order to test research quantitative data ANCOVA, T-test, Kruskall Wallis, Mann Whitney U test were used. On the other hand, qualitative data is analyzed by describing. According to analyzing result of qualitative data most of the students expressed positive thoughts on applying 4 MAT teaching technique on learning some geometrical concepts. But in analyzing result of quantitative data it is found out that this technique has no meaningful affect on students' success .We reached the conclusion of students' dominant learning styles have affect learning these geometrical concepts.

Key Words: 4 MAT Teaching Model, Learning Styles, Geometry, Constructivist Learning Model

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Extended Summary

Purpose

The data from the standardized achievement tests administrated by the Ministry of National Education in Turkey for secondary students suggest that the constructivist curriculum seems to fall short of expectations concerning improved student achievement in Math. Therefore, the use of different methods will hopefully make a contribution to Math education. Accordingly, the present paper is a study on the effects of 4MAT, a teaching method and learning style, on academic achievement. The purpose of the present study is to identify the effects of 4MATon the extent to which sixth grade students can learn certain concepts of geometry point, line, line segment, ray, plane, angles and polygons. Accordingly, an attempt is made to seek an answer to the following problems:

1- Does 4MAT have an influence on the extent to which certain concepts of geometry (point, line, line segment, ray, plane, angles and polygons) can be learned?
2- How do students view the use of 4MAT in teaching certain concepts of geometry (point, line, line segment, ray, plane, angles and polygons) ?
3- Do students' learning styles have an influence on the extent to which certain concepts of geometry (point, line, line segment, ray, plane, angles and polygons) can be learned?

Method

The study is based on the nonequivalent control group design, a quasi-experimental one and survey model. The subjects were measured in reference to the dependent variable both before and after the experiment. They were randomly divided into two groups, namely experimental group and control group, in accordance with the study design (Karasar, 2007). The study was conducted on 39 sixth grade students from a secondary school located in a district in the Central Anatolia Region. It lasted for five weeks during the Spring Term of the Academic Year 2009-2010. The data were collected through the Geometry Knowledge Test, Structured Interviews and Kolb Learning Style Inventory. The quantitative data were analyzed via ANCOVA, the t-test, the Kruskal Wallis Test and the Mann Whitney-U test whereas the qualitative data were studied descriptively.

Results and Discussion

There was no significant difference between 4MAT and constructivism in academic achievement, which seems to be contradicted by several other studies on the efficiency of 4MAT. For instance, Peker (2003), Demirkaya (2003), Tatar (2006), Dikkartın (2006) and Ozturk (2007) reported that 4MAT had significant influences on student achievement. The main reason for this discrepancy might be the fact that these previous studies had compared 4MAT with the teacher-centered traditional teaching model whereas the present study made a comparison between the former and the learner-centered constructivist learning model. Another reason is likely to be concerned with the duration and scope. In fact, previous studies used 4MAT in some subjects of geometry in the first year and in all subjects of geometry

in the second year. These studies reported that 65% of the participants in the experimental group and 70% of those in the control group had experienced a significant improvement in the first year while 85% of the former group and 73% of the latter group had significantly better levels in the second year (About Learning, 2008). The finding suggests that 4MAT is likely to have a positive influence on student achievement when the duration is longer and scope is wider. Therefore, conducting longer studies and using the method in different subjects may yield more generalizable conclusions as to the efficiency of 4MAT. Some students had entirely positive opinions of 4MAT while others had party positive- negative ideas about it, which might have resulted from their learning styles. The questionnaire carried out to determine learning styles has the following principle: if an individual's scores in different sections that aim to reveal different learning styles are equal or very close to each other, that individual can be said to have characteristics of all learning styles. Some individuals, though rarely, get very low scores in a section. In that case, they can be argued to have few or no characteristics of that learning style. It is another possibility that an individual will have very high scores in one particular section but very low ones in all the other sections. This suggests that he/she has many characteristics of one particular learning style but few or no characteristics of others (Boydak, 2008). Out of the participants (n=19) in the experimental group, 79% reported entirely positive opinions of 4MAT whereas the remaining 21% had partly positive-negative ideas about it. Considering these differences between students, it should not be surprising that they had conflicting views about 4MAT, for it is a combination of four different learning styles. Seeing that the participants had generally positive opinions of the method, 4MAT should be taken into account by teachers. The students' dominant learning styles had an influence on their academic achievement in certain concepts of geometry (point, straight line, line segment, half-line, plane, angles and polygons). This finding is supported by those of Peker (2003), Hasirci (2005), and Okur and Bahar (2010). It was reported that students' learning styles had a significant effect on their academic achievement in math for high-school students (Peker, 2003), social studies for third grades (Hasirci, 2005) and all courses for prospective primary school math teachers (Okur and Bahar, 2010). Bahar et al. (2009) noted that different achievement levels of students with different learning styles could be a result of teaching activities that would enable students with one particular learning style to be successful. However, this was not the case for the present study, which included teaching activities with a consideration into various learning styles. Therefore, the difference observed in this study might be the effect of the students' competences in mathematical reasoning and three-dimensional thinking on their achievement in math. In fact, Gardner (1999) and Bumen (2002) maintained that competence in mathematical reasoning and three-dimensional thinking, which are components of logical/mathematical intelligence and spatial intelligence, is among the significant variables in achievement in math. On the other hand, some studies do not support the finding that students' dominant learning styles affect their academic achievement (Ozturk, 2007; Bahar et al., 2009). This might have been caused by the age-groups of the participants and inclusion of different subjects.

References

About Learning, (2008). 4 MAT 4 Geometry Materials Resources, About Learning Inc., Wauconda. http://www.geometry-teaching.com/index.php/research-results (Erişim Tarihi: 05.02.2010).

Altun, M. (2004). Matematik Öğretimi. (6-8. Sınıflar), Alfa Yayıncılık, Bursa. Altun, M. (2005). Matematik Öğretimi (1-5.Sınıflar) , Aktüel Yayıncılık, İstanbul. Altun, S. ve Büyükduman, İ. (2007). Yapılandırmacı Öğretim Tasarımı Uygula- masına ilişkin Öğretmen ve Öğrenci Görüşleri Bir Örnek Olay İncelemesi, *Kuram ve Uygulamada Eğitim Bilimleri*, 7(1), 7-39.

Arlien, M. and Hodenfield, C. (2007). 4 MAT 4 Algebra The System Of Mathematics , Editör Dr. Bernice McCarthy, About Learning Inc., Wauconda.

Arlien, M. and Hodenfield, C. (2010). 4 MAT 4 Geometry Activity Book , Editör Dr. Bernice McCarthy, About Learning Inc., Wauconda.

Aşkar, P. ve Akkoyunlu, B. (1993). Kolb Öğrenme Stili Envanteri, Eğitim ve Bilim Dergisi, 17(87) , 37-47.

Bahar, H.H., Özen, Y., ve Gülaçtı, F. (2009). Eğitim Fakültesi Öğrencilerinin Cinsiyet ve Branşa Göre Akademik Başarı Durumları İle Öğrenme Stillerinin İncelenmesi, Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi, 42(1) , 69-86.

Boydak, H.A. (2008). Öğrenme Stilleri, Beyaz Yayınları, İstanbul, 95-104.

Bümen, N.T. (2002). Okulda Çoklu Zeka Kuramı, Pegem A Yayıncılık, Ankara, s.1-38.

Büyüköztürk, Ş. (2004). Sosyal Bilimler için Veri Analizi El Kitabı, 4. Baskı, Pegem A Yayıncılık, Ankara, 94-100.

Brannigan, G.G. (1985). The Research Interview. A.Tolor (Ed.) Effective Interviewing, Springfield, IL: Charles C. Thomas Pub.

Demirkaya,H. (2003). Coğrafya Öğretiminde 4MAT Öğretim Sisteminin Lise Coğrafya Derslerindeki Başarı ve Tutumlar Üzerine Etkisi, Doktora Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Dikkartın, F.T. (2006). Geometri Öğretiminde 4 MAT Öğretim Modelinin Öğrenci Başarısı ve Tutumları Üzerine Etkisi, Yüksek Lisans Tezi, Balıkesir Üniversitesi Fen Bilimleri Enstitüsü, Balıkesir.

Gardner, H. (1999). The Disciplined Mind-What All Students Should Understand, Simon&Schuster Inc., New York, 114-248.

Göğün, Y. (2009). İlköğretim Matematik 6. Sınıf Öğretmen Kitabı, Özgün Matbaacılık, Ankara.

Hasırcı, Ö. (2005). Görsel Öğrenme Stillerine Göre Düzenlenen Öğretimin Akademik Başarı ve Kalıcılığa Etkisi, Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi, 14(2), 299-314.

Hayran, M. ve Özdemir, O. (1995). Bilgisayar İstatistik ve Tıp, Hekimler Yayın Birliği Yayınları, Ankara, s.372.

Hermann, N. (1996). The Whole Brain Business Book, McGraw-Hill, Newyork.

Karasar, N. (2007). Bilimsel Araştırma Yöntemi, Nobel Yayın Dağıtım, 99-105, Ankara.

Kolb, D. (1984). Experiential learning: Experience as the source of learning and development, Englewood Cliffs, Prentice Hall, 25-104.

McCarthy, B. (1985). What 4MAT Training Teaches us About Staff Development, Educational Leadership. 42(7), 61-68.

Mc Carthy B. (1990). Using the 4MAT System to Bring Learning Styles to Schools, Educational Leadership, 48 (2) , 31-37.

McCarthy, B. (1997). A tale of four learners: 4MAT's learning styles, Educational Leadership, 54(6), 46–51.

McCarthy, B. (1987). The 4MAT System: Teaching to Learning Styles with Righ/Left Mode Techniques, Excel Inc., Barrington, p.220.

MEB, (2005). İlköğretim Matematik Dersi Öğretim Programı ve Kılavuzu, 6-8. Sınıflar, Talim ve Terbiye Kurulu Başkanlığı, Ankara: MEB Yayınları.

Okur, M. and Bahar, H. H. (2010). Learning style of primary education prospective mathematics teachers; states of trait-anxiety and academic success, Procedia Social and Behavioral Science, 2, 3632-3637.

Öncü, H. (1994). Eğitimde Ölçme ve Değerlendirme, Matser Basım San. Ve Tic. Ltd. Şti., Ankara.

Öztürk, Z. (2007). Öğrenme Stilleri ve 4MAT Modeline Dayalı Öğretimin Lise Tarih Derslerindeki Öğrenci Başarısına Etkisi, Yüksek Lisans Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Peker, M. (2003). Öğrenme Stilleri ve 4MAT Yönteminin Öğrencilerin Matematik Tutum ve Başarılarına Etkisi, Doktora Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Peker, M., Mirasyedioğlu Ş. ve Yalın İ. H. (2003). Öğrenme Stillerine Dayalı Öğretimde 4 MAT Öğretim Modeli, Pamukkale Üniversitesi Eğitim Fakültesi Dergisi 13(1), 1-14.

Peker, M., Mirasyedioğlu, S. ve Aydın, B. (2004). Matematik Öğretmenlerinin Dikkate Alabilecekleri Öğrenme Stilleri: McCarthy Modeli, Milli Eğitim Dergisi, 163, 72-81.

Senemoğlu, N. (2004). Gelişim, Öğrenme ve Öğretim, Gazi Kitapevi, Ankara, s. 376.

Tarhan, N. (2008). Duyguların Dili, Timaş Yayınları, İstanbul, 31-47.

Tatar, E. (2006). İkili İşlem Kavramı ile İlgili Öğrenme Güçlüklerinin Belirlenmesi ve 4MAT Yönteminin Başarıya Etkisi, Doktora Tezi, Atatürk Üniversitesi Eğitim Bilimleri Enstitüsü, Erzurum.

Tekin, H. (1977). Eğitimde Ölçme ve Değerlendirme, Mars Matbaası, Ankara.

Weber, P. and Weber, F. (1990). Using 4MAT to improve Studio Presentations, Educational Leadership, 48(2), 41-46.

Yıldırım, A. ve Şimşek, H. (2005). Sosyal Bilimlerde Nitel Araştırma Yöntemleri, Seçkin Yayıncılık, Ankara, 224-225.