# Comparison of the Level of Using Metacognitive Strategies during Study between High Achieving and Low Achieving Prospective Teachers[*]

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## Abstract

The main purpose of this study is to compare the level of using metacognitive strategies during study between high achieving and low achieving prospective classroom teachers. This study was designed as a mixed method study. Metacognitive Learning Strategies Scale developed by Namlu (2004) was used to measure the use of metacognitive strategies during study. In addition, a semi-structured interview was conducted with selected prospective classroom teachers to find out how they used metacognitive strategies in their learning. All the prospective classroom teachers studying at Caucasus University and Çukurova University, Faculty of Education were the target population of the study. The sample consisted of 690 prospective classroom teachers randomly selected from the population. A sample consisting of 30 prospective teachers was selected from the sample to interview. In analyzing quantitative data, MANOVA and two-factor ANOVA statistical techniques were used. Content analysis technique was conducted in analyzing the qualitative data. Findings of the study indicated that there was a significant difference between high achieving and low achieving prospective classroom teachers in using metacognitive strategies in their learning favoring high achieving prospective classroom teach

### Key Words

Metacognition, Prospective Classroom Teacher, Academic Achievement, Study.

Learning requires the active participation of the learners in their own learning by interacting with the environment. What enhances this active participation of learners is metacognition. Metacognition is a thinking system. It is the act of learning to learn, focusing, step by step planning what is going to be done, evaluating every phase of the learning process, and making the necessary arrangements accordingly. Besides, metacognition means learn-

ers' knowing or being aware of their own cognitive processes, and controlling and directing these processes (Meichenbaum, 1986 cited in Boyce, van Tassel-Baska, Burruss, Sher, & Johnson, 1997).

While Gallagher (1997) defines metacognition as thinking about thinking, Doğanay (1997) describes it as a thinking process that takes place in every stage of learning and that reflects students' behaviours (p. 39). Davis and Davis (2001) point out that learners' awareness of their own thinking, using this awareness in controlling the things they do, using thinking processes such as memory, attention and imagination, and using learning to learn skills indicate that metacognition is interrelated with all thinking dimensions.

Learning is a thinking process. Therefore, it becomes more permanent with the increase in thinking processes involved. In such process, studying is defined as the effective use of certain techniques for learning purposes (Yıldırım, Doğanay, & Türkoğlu, 2000). In order to be able to plan, process and eval-

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uate their own learning processes, learners need to gain the skills such as planning, effective reading, listening and writing, and active participation. Studies show that having studying skills has positive effects on the academic success and self-esteem (Gall, Gall, Jacobsen, & Bullock, 1990).

The process of studying is actually a process of problem solving. In such process, learners' planning, organizing, and evaluating the things they are going to do will inform them about the way to follow, and this will affect their performance in a positive way. Paris and Winograd (1990, p. 25) state that metacognition is a way of enhancing problem solving through cognitive tools. Problem solving involves higher order thinking processes such as understanding, analyzing, synthesizing, generalization, and learning to think for themselves, which requires an "integrated association". Costa (p. 36 cited in Doğanay, 1997) defines metacognition as the awareness of mental processes and strategies and the ability of evaluating and reflecting on the intellectual productions. He also points out that metacognition is involved in every phase of the problem solving process.

On the other hand, the related literature encompasses several studies that investigate problem solving and metacognitive skills together (Deseote, Roeyers, & Buysee, 2001; Kapa, 2001; Kramarski, Mevarech, & Arami, 2002; Marge, 2001; Schoenfeld, 1985; Schurter, 2001; Swanson, 1990; Teong, 2002). Besides, various studies on metacognition (Kapa, 2001; Kramarski et al., 2002; Marge, 2001; Schoenfeld, 1985; Schraw, 2009; Schurter, 2001; Teong, 2002; Victor, 2004) found that metacognition had a prominent role in the education of children and adults. Besides, some other studies (Case, Harris, & Graham, 1992; Cautinho, 2007; Deseote & Roeyers, 2002) detected a significant relationship between the level of metacognitive skills and the level of academic success, and success in problem solving skills is related to the knowledge of metacognition (Hollingworth & McLoughlin, 2001).

Recently, metacognition as a self-regulated learning way has been viewed as a research field that has prominent effects on the learners' academic success and performance (Ruban & Reis, 2006).

Studies also show that metacognitive skills enhance permanent learning and success (Cooper, 2008; Georghiades, 2004), improve questioning skills (Kramarski, 2008), develop social skills and success when used cooperatively (Flavell, 2000), enhance cognitive regulation (Mevarech & Amrany, 2008), help time management (Rosetta, 2000), and improve thinking and problem solving skills of learners. Similarly, (Desoete 2008; Shamir, Mevarech, & Charmit, 2009; Vrugt & Oort, 2008; Zohar & Ben David, 2008) found that metacognitive strategies had positive effects on academic success and problem solving skills of learners. Studies at national level (Akdur, 1996; Balcı, 2007; Demir, 2009; Demir & Gülşen, 2000; Gelen, 2003; Gümüş, 1997; Küçük & Özcan, 2000; Tunçman, 1994) also found that metacognitive strategies enhanced academic success and problem solving skills of learners.

Acquisition of metacognitive skills leads learners to flexible thinking, planned study, and more effective problem solving skills. It is important to note that theorists agree that the most effective learners are those who can regulate their own learning (Butler & Winne, 1995, p. 245). On the other hand, since learners have different metacognitive skills and knowledge, their learning pace and levels differ (Woolfolk, 1993). In line with this, the most effective way of self-regulation is the correct evaluation of what is known and what is not known (Schoenfeld, 1987, p. 2 cited in Louca, 2003). Metacognitive skills are of great importance in enhancing this.

Despite the existence of different studies that aim to identify the relationship between study and metacognitive skills (Alexander, Carr, & Schwanenflugel, 1995; Bouffard-Bouchard, Parent, & Lareveé, 1993; Gurb, 2000; Hannah & Shore, 1995; Hwang & Vrongistinoz, 2002; Meneghetti, DeBeni, & Cornoldi, 2007; Romainville, 1994; Schunk & Zimmerman, 1994; Swanson, 1990; Zimmerman, 1989; Zimmerman & Martinez-Pons, 1990), more studies that aims to identify the metacognitive skills involved while studying are still needed. Studies at national level (Atılgan, 1998; Bay, Tuğluk, & Gençdoğan, 2005; Çetin, 2007; Dilek, 1993; Erdamar, 2010; Erkan, 1996; Ersoy, 2003; Karapınar, 2000; Kaya, 2001; Özbey, 2007; Özcan, 2006; Şener, 2001; Uçar, 1997) found a positive, linear relationship between learners' studying habits and skills and their academic success. Kesiktaş (2006) investigated the strategies that will help teachers to instruct their students with special needs.

It is prominent for prospective teachers to have metacognitive strategies both for managing their own learning processes better and for teaching these skills to their students. Presenting how prospective teachers use metacognitive strategies during study and its relationship with the academic success will raise awareness for the instruction of these strategies in pre-service teacher training programs. Besides, although the relationship be-

tween academic success and metacognition has been investigated in other countries, studies have usually focused on the effect of metacognition on the academic success in our country. Describing high and low achieving prospective teachers' use of strategies will shed light to the understanding of the nature of learning process. Revealing the nature of learning processes will contribute to the instruction methods and processes, which will increase implicit learning. Learning is an ongoing process which is not limited only with the experiences gained at school. Learners who are aware of their own learning processes and reflect it into daily life activities will succeed in different areas of life.

## Purpose

The main purpose of this study is to compare the level of using metacognitive strategies between high achieving and low achieving learners. In line with this purpose, the following research questions guided the study:

1. According to the perceptions of prospective teachers, is there a significant difference between the level of using planning, organizing, self-monitoring, and self-evaluating strategies of metacognition in the studying process?

2. According to the perceptions of prospective teachers, does the interaction of the level of success and gender create any significant difference between the level of using planning, organizing, self-monitoring, and self-evaluating strategies of metacognition in the studying process?

3. According to the perceptions of prospective teachers, does the interaction of level of success and time allocated for daily studying create any significant difference between the level of using planning, organizing, self-monitoring, and self-evaluating strategies of metacognition in the studying process?

4. According to the perceptions of prospective teachers, does the interaction of level of success and studying habit create any significant difference between the level of using planning, organizing, self-monitoring, and self-evaluating strategies of metacognition in the studying process?

5. What are the perceptions of high achieving and low achieving prospective teachers on the level of using metacognitive strategies in the studying process?

## Method

### Research Design

This study was designed as a mixed model (Creswell, 2003) in which qualitative and quantitative methods were used together so as to compare the level of using metacognitive strategies during study between high achieving and low achieving prospective teachers. In the first phase, the researcher used a scale that aims to identify the way the participants used metacognitive skills. In the second phase, the researcher also conducted interviews with a group of prospective teachers chosen from the participants and collected detailed, in-depth data regarding the way the prospective teachers use metacognitive skills.

### Population and Sample

The target population of the study (Karasar, 2004) was all the students at Cukurova University and Caucasus University, Faculty of Education, Primary School Teaching Programme in the spring semester of 2009-2010 academic year. In order to be able to create a sample representing this population, the students were divided into natural groups based on the grade levels and day-evening classes they were attending. Then, one group representing each of the grades from the evening classes and the day classes were randomly selected as the sample of the study. In order to identify the group to be interviewed, academic success of the participants was identified and they were divided into high-achieving and low-achieving groups based on the standard deviation values. Then, 15 students from each group were recruited on voluntary basis.

### Data Collection Tools

The present study made use of three data collection tools: "Metacognitive Strategy Scale" developed by Namlu (2004) was used in order to measure metacognition- the dependent variable of the study. "Personal Information Form" developed by the researcher was used to collect data about the independent variables. "Semi-structured interview form" developed by the researcher aimed to collect qualitative data. Metacognitive Strategy Scale, developed by Namlu (2004) for the context of studying and learning process, had been developed as a result of the data obtained from 655 university students. In order to enhance the validity and the reliability of the scale, normal distribution analysis, factor analysis, coefficient of internal consistency,

item total score correlation, and distinctiveness analysis were conducted. As a result of the factor analysis, four factors explaining the 45 % of the total variance were obtained. Cronbach Alpha coefficient of the whole scale was found .81 while the reliability coefficient for the data obtained from this scale was found .77. Büyüköztürk (2005, p. 171) and Tezbaşaran (1996) state that the reliability coefficient of .70 or above is sufficient for the reliability of a psychological test.

The use of Metacognitive Skills during study interview form was prepared considering the planning, organizing, monitoring, and evaluating dimensions of metacognition. The scale consists of 12 questions: planning dimension (3), organizing and evaluating dimensions (6), and evaluating dimension (3).

### Analysis of the Data

The analysis of the quantitative data was conducted using parametric tests. Firstly, the data were evaluated in terms of the requirements of the parametric tests. Once meeting the requirements of parametric tests, multivariate analysis of variance (MANOVA) was used for the first sub-purpose while for the analysis of the sub-purposes from second to fifth, two-way ANOVA was conducted.

As to the analysis of the interview data, content analysis, one of the qualitative data analysis methods, (Yıldırım & Şimşek, 2005) was conducted. For this purpose, the data obtained from the interviews were transcribed and some codes were created on the text. Then, the interrelated codes making a meaningful unit were combined together. In order to enhance the reliability of the coding and making up themes, the data were coded by two researchers independent from each other and the coherence of the data was evaluated (.95 for the reliability of the themes in the interview form, and .93 for the codes) using the formula developed by Miles and Huberman (1994, p. 64) . As above.70 reliability percentage of between two coders and is regarded sufficient, the reliability of the data analysis was enhanced.

### Results

Quantitative findings of the study show that metacognition level of the high achieving prospective teachers were significantly higher than the level of low achieving ones in all dimensions of the metacognition in terms of the level of using planning, organizing, monitoring, and evaluating skills

(planning F1-383) = 44,799, $p<.001$; organizing $F(1-383)= 29,179$, $p <.000$; monitoring $F(1-383)= 11,848$, $p \leq.001$; evaluating $F(1-383)= 22,252$, $p<001$). In all dimensions of the metacognition, metacognition level of the high achieving prospective teachers were found to be significantly higher than the level of low achieving ones. The interaction of gender and success was found to create a significant difference (F1 – 3,888, $p<.05$) in the self-evaluating dimension of metacognition, but not in other three dimensions. All the male and female students in the high achieving group were found to have higher metacognition levels than the students in the low-achieving group. It was found that the interaction of success and time allocated for studying did not create any significant differences in any of the dimensions. This indicates that the level of metacognition of high achieving and low achieving prospective teachers does not change according to the time allocated for studying. One of the remarkable findings is that high achieving learners had higher metacognition scores in all groups in terms of the time allocated for studying. Both in high achieving and low achieving groups, those who studied regularly got the highest scores while the lowest scores belonged to those who studied only during the exam times.

Qualitative findings of the study support the quantitative findings. Especially the statement of a high achieving prospective teacher related to evaluating dimension of metacognition "….*I review the things I have studied in mind. I try to test whether I have learnt or not*" (s.29) is worth noting. In a similar vein, in the planning dimension of metacognition, S1 in the high achieving group stated that "*I make plans. I first plan the things I am going to do in mind. Then, I get the necessary materials*" (S1) while S2 expressed her opinions in the organizing "*I do not make the mistake of studying for all the lessons at the same time since being organized is very important. I organize lessons and homework before I study and I get pleased for doing.*"

### Discussion

In all dimensions of the metacognition, metacognition level of the high achieving prospective teachers were found to be significantly higher than the level of low achieving ones. Findings obtained from the quantitative data were supported with the qualitative data obtained from the interviews. Individuals who have acquired metacognitive strategies can succeed in different areas when compared to those who have not.

The findings correlate with the related literature. Balcı (2007), Demir (2009), Desoete (2008), Gelen (2003), Hwang and Vrongistinoz (2002), Kramarski (2008), Shamir et al. (2009), Mevarech and Amrany (2008), Muhtar (2006), Vrugt and Oort (2008), Zohar and Ben David (2007) point out that metacognitive strategies increase students' academic success. Since the high achieving prospective teachers consciously or unconsciously use planning, organizing, self-monitoring, and self-evaluating of metacognitive strategies during study, their level of metacognition was found to be higher than that of the low achieving students. Daniela and Cesare (1997) point that numerical and geometrical problem solving abilities are strongly related to metacognitive capabilities. One of the prospective teachers stated that "…*One should be able to use what s/he has learnt as a whole. Since all the lessons are related to each other, one thing I learn affects another one. All the things we learn are related with each other" (S1).*

There is a dual process between the habit of studying and metacognition. Vrugt and Oort (2008) found that metacognition had effects on the use of the four studying strategies. In the same vein, Ruban and Reis (2006) point out that metacognitive strategies enhance learning. Besides, metacognitive strategies positively affected resource management strategies and the use of cognition, which had positive effects on the studying habits. A prospective teacher's views on studying habit is worth noting:, "*….I review the things I have studied in mind. I try to test whether I have learnt or not" (S29).*

This statement shows that the learner uses her organization skills in the knowledge of the process and at the level of the control of that process. Unlike the low achieving group, self-monitoring scores of the males were higher than the females. This finding is also correlated with that of Sheorey and Mokhtari's (2001) (cited in Yavuz, 2009, p. 93). One of the prospective teachers in low achieving group indicated using self-monitoring in his learning by expressing that "…*I always review myself and the things I read and listen (S27)".* According to Eggen and Kauchak (2001) successful students are those who are aware of the times they are acting in a strategic way or not. Thus, as individuals who are aware of their own learning processes, high achieving students' having higher metacognitive levels than the low achieving learners is somewhat expected. A process like this will create a learning environment which is based on cooperation and in this environment students see the other students as a resource rather than rival (Karakaya, 2001, p. 110) .

This finding is correlated with a study conducted in Bergen University. The study investigated the reasons for failure in the first year of the university education. When the relationship between success and the time allocated for studying was analyzed, it was found that learners spending longer time for studying got higher scores than those who did not (Eikeland & Manger, 1992 cited in Yörük, 2007, p. 4). A high achieving prospective teacher interviewed stated "*It depends on the circumstances and priorities. I try to give importance to all the lessons because it's a must (S6)".*

High achieving prospective teachers have more effective studying habits because the more effective studying habits the students have, the higher their metacognition level becomes. Studies show that having studying habits positively affects the variables such as academic success and self-esteem (Gall et al., 1990). Students who study only during the exam times got the lowest scores in four dimensions of metacognition. Similar to this study, Pintrich and De Groot (1990) and Schunk (1990) found that students' academic success increased with the more effective studying habits (cited in Yörük, 2007, p. 4).

In conclusion, it has been found out that there is a significant difference between the high achieving and low achieving prospective teacher's level of using metacognitive strategies during study. Both the qualitative and the quantitative data obtained from the study support this finding. Students' level of using metacognitive strategies will increase with the increase in effective study. Including organizing, self-monitoring, and self-evaluating skills of metacognition in instructional designs and using them actively will bring academic success. Effective teachers are those who employ metacognitive skills in their studying habits. In line with this, parallel to the findings high achieving learners will teach these skills implicitly to their students, which will certainly bring academic success.

This result points the importance of teaching metacognitive strategies in pre-service training. In this way, prospective teachers will have the chance of acquiring planning, organizing, self-monitoring, and self-evaluating skills for their own learning, and this will contribute to their being independent learners and good models for their students in the future.

The followings are suggested in the light of the findings of the present study:

Based on the results of the study, university curriculum can include activities based on metacognitive skills, especially effective study skills in a more comprehensible way.

- Referring to the findings obtained from the present study, prospective teachers can be instructed the effective study skills, metacognitive skills and use of metacognitive skills during study.

Qualitative findings of the study demonstrated the effect of motivation, an important factor in self-awareness, on study process. In line with this, teachers can give importance to creating learning environments that will increase students' self-confidence and belief to succeed.

## References/Kaynakça

Akdur, T. E. (1996). *Effect of collaborative computer based concept mapping on students physics achievement, attitude toward physics, attitude toward concept mapping and metacognitive skills at high school level.* Unpublished master's thesis, Middle East Technical University (METU), The Institute of Social Sciences, Ankara.

Alexander, J. M., Carr, M., & Schwanenflugel, P. J. (1995). Development of metacognition in gifted children: Directions for future research. *Developmental Review*, *15,* 1-37.

Atılgan, M. (1998). *Üniversite öğrencilerinin ders çalışma alışkanlıkları ile akademik başarılarının karşılaştırılması.* Unpublished master's thesis, Gaziantep Üniversitesi, Sosyal Bilimler Enstitüsü, Gaziantep.

Balcı, G. (2007). *İlköğretim beşinci sınıf öğrencilerinin sözel matematik problemlerini çözme düzeylerine göre bilişsel farkındalık becerilerinin incelenmesi.* Yayımlanmamış yüksek lisans tezi, Çukurova Üniversitesi, Sosyal Bilimler Enstitüsü, Adana.

Bay, E., Tuğluk, M. N. ve Gençdoğan, B. (2005). Üniversite öğrencilerinin ders çalışma becerilerinin incelenmesi. *Elektronik Sosyal Bilimler Dergisi*, *4 (*14), 94-105.

Bouffard-Bouchard. T., Parent, S., & Lareveé, S. (1993). Self-regulation on a concept-formation task among average and gifted students. *Journal of Experimental and Child Psychology*, *56,* 15-134.

Boyce, N. L., Van Tassel-Baska, B. J. D., Sher, B. T., & Johnson, D. T. (1997). A problem based curriculum: Parellel learning opportunities for students and teachers. *Journal for the Education of the Gifted, 20* (4), 363–379.

Butler, D. L., & Winne P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Rewiew of Educational Research*, *65* (3), 245–281.

Büyüköztürk, Ş. (2005). *Sosyal bilimler için veri analizi el kitabı* (5 bs). Ankara: Pegem A Yayıncılık.

Case, L. P., Harris, K. R., & Graham, S. (1992). Improving the mathematical problem solving of students with learning disabilities: Self-regulated strategy development. *The Journal of Special Education*, *26,* 1-19.

Cautinho, S. A. (2007). The relationship between goals, metacognition and academic success. *Educate*, *7* (1), 39–47.

Çetin, B. (2007). *Yeni ilköğretim programı uygulamalarının ilköğretim 4. ve 5. sınıf öğrencilerinin çalışma alışkanlıkları ile özyeterliliklerine etkisi ve öğrencilerin program hakkındaki görüşleri.* Yayımlanmamış doktora tezi, Marmara Üniversitesi, Eğitim Bilimleri Enstitüsü Enstitüsü, İstanbul.

Cooper, F. (2008). *An examination of the impact of multiple intelligences and metacognition on the achievement of mathematics students.* Unpublished doctoral dissertation, Capella University.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed method approaches* (2nd ed.). Thousand Oaks: Sage.

Daniela, L., & Cesare C. (1997). Mathematics and metacognition: What is the nature of the relationship? *Mathematıcal Cognıtıon*, *3* (2), 121–139.

Davis, J. R. ve Davis A. B. (2001). *Kendi kendine öğrenmek* (çev. A. Baykara). Ankara: Kapital Medya Hizmetleri A.Ş.

Demir, Ö. (2009*). Bilişsel koçluk yöntemiyle öğretilen bilişsel farkındalık stratejilerinin altıncı sınıf sosyal bilgiler dersinde öğrencilerin epistemolojik inançlarına, bilişsel farkındalık becerilerine, akademik başarılarına ve bunların kalıcılıklarına etkisi.* Yayımlanmamış doktora tezi, Çukurova Üniversitesi, Sosyal Bilimler Enstitüsü, Adana.

Demir-Gülşen, M. (2000). *A model to investigate probability and mathematics achievement in terms of cognitive, metacognitive and affective variables*. Unpublished master's thesis, Boğaziçi University, The Institute of Science and Engineering, İstanbul.

Desoete A. (2008). Multi-method assessment of metacognitive skills in elementary school children: How you test is what you get. *Metacognition Learning, 3* (3), 189–206.

Desoete, A., & Roeyers, H. (2002). Off-line metacognition – a domain specific retardation in young children with learning disabilities. *Learning Disability Quarterly*, *25,* 123-139.

Desoete, A., Roeyers, H., & Buysee, A. (2001). Metacognition and mathematical problem solving in grade 3. *Journal of Learning Disabilities*, *34,* 435-449.

Dilek, N. (1993). *Askeri lise öğrencilerinin ortaokul ve lisedeki ders çalışma alışkanlıkları ve akademik başarılarının karşılaştırılması,* Yayımlanmamış yüksek lisans tezi, Marmara Üniversitesi, Sosyal Bilimler Enstitüsü, İstanbul.

Doğanay, A. (1997). Ders dinleme sırasında bilişsel farkındalıkla ilgili stratejilerin kullanımı. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi*, *2* (15), 34–42.

Eggen, P., Kauchak, D. (2001). *Educational psychology. Windows on classrooms* (5th ed.). New Jersey: Merrill Prentice Hall.

Erdamar (Koç), G. (2010). Öğretmen adaylarının ders çalışma stratejilerini etkileyen bazı değişkenler. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 38,* 82-93.

Erkan, A. S. (1996). *Lise öğrencileri için bir ders çalışma alışkanlıkları envanterinin geliştirilmesi,* Yayımlanmamış yüksek lisans tezi, Ege Üniversitesi, Sosyal Bilimler Enstitüsü, İzmir.

Ersoy, S. (2003). *İlköğretim 6,7,8. sınıf öğrencilerinin İngilizce dersindeki başarılarına göre öğrenme stilleri ve çalışma alışkanlıklarının incelenmesi.* Yayımlanmamış yüksek lisans tezi, Selçuk Üniversitesi, Sosyal Bilimler Enstitüsü, Konya.

Flavell, J. H. (2000). Development of children's knowledge about the mental world. *International Journal of Behavioral Development*, *24* (1), 15–23.

Gall, M. D., Gall, J. P., Jacobsen, D. R., & Bullock, T .L. (1990). *Tools for learning: A guide to teaching study skills.* Alexandria,VI: ASCD.

Gallagher, S. A. (1997). Problem based learning: Where did it come from, what does ıt do, and where is it going. *Journal of the Educaion of the Gifted*, *20* (4), 332–362.

Gelen, İ. (2003). *Bilişsel farkındalık stratejilerinin Türkçe dersine ilişkin tutum, okuduğunu anlama ve kalıcılığa etkisi.* Yayımlanmamış doktora tezi, Çukurova Üniversitesi, Sosyal Bilimler Enstitüsü, Adana.

Georghiades, P. (2004). Making pupils' conceptions of electricity more durable by means of situated metacognition. *International Journal of Science Education*, *26* (1), 85–99.

Gurb, E. (2000). Maximizing the potential of young adults with visual impairments the matacognitive element. *Journal of Visual Impairment & Blindnesa*, *94* (9), 574-583.

Gümüş, N. (1997). *Öğrenmeyi öğretmenin öğrenci erişisi, kalıcılığı ve akademik benliğine etkisi.* Yayımlanmamış doktora tezi, Hacettepe Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.

Hannah, C. L., & Shore, B. M. (1995). Metacognition and high intellectual ability: Insights from the study of learning-disabled gilled students. *Gifted Child Quarterly*, *39,* 95-109.

Hollingworth, R., & McLoughlin, C. (2001). Developing science students' metacognitive problem solving skills online. *Australian Jounral of Educational Technology*, *17,* 50-63.

Hwang, Y. S., & Vrongistinos, K. (2002). Elementary in-service teachers' self regulated learning strategies related to their academic achievement. *Journal of Instructional Psychology*, *29* (3), 147-155.

Kapa, E. (2001). A metacognitive support during the process of problem solving in a computerized environment. *Educational Studies in Mathematics*, *47,* 317-336.

Karakaya, Ş. (2001). *Eğitimde program geliştirme çalışmaları.* Erzurum: Atatürk Üniversitesi Yayınları.

Karapınar, S. (2000). *Yabancı dil öğrenme sürecinde benlik kavramı, ders çalışma becerileri ve başarı arasındaki ilişkiler üzerine üniversite düzeyinde bir araştırma,* Yayımlanmamış yüksek lisans tezi, Ortadoğu Teknik Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.

Karasar, N. (2004). *Bilimsel araştrma yöntemi* (13. bs). Ankara: Nobel Yayın Dağıtım.

Kaya, M. (2001). *Lise 1. Sınıf öğrencilerine verimli çalışma alışkanlıkları kazandırmada grup rehberliğinin etkisi.* Yayımlanmamış yüksek lisans tezi, İnönü Üniversitesi, Sosyal Bilimler Enstitüsü, Malatya.

Kesiktaş, A. D. (2006). Ders çalışma becerileri ve özel gereksinimli çocuklar. *Ankara Üniversitesi Eğitim Fakültesi Özel Eğitim Dergisi, 7* (1), 37-48.

Kramarski, B. (2008). Promoting teachers' algebraic reasoning and self-regulation with metacognitive guidance, *Metacognition Learning, 3* (2), 83–99.

Kramarski, B., Mavarech, Z. R., & Arami, M. (2002). The effects of metacognitive instruction on solving mathematical authentic tasks. *Educational Studies in Mathematics*, *49,* 225-250.

Küçük-Özcan, Z. Ç. (2000). *Teaching metacognitive strategies to 6th grade students.* Unpublished doctoral dissertation, Boğaziçi University, The Institute of Science and Engineering, İstanbul.

Louca, E. P. (2003). The concept and ınstruction of metacognition, *Teacher Development, 7* (1), 9–30.

Marge, J. J. (2001). *The effect of metacognitive strategy scaffolding on student achievement in solving complex math word problems.* Unpublished doctoral dissertation, California University, Riverside.

Meneghetti, C., DeBeni, R., & Cornoldi, C. (2007). Strategic knowledge and consistency in students with good and poor study skills. *European Journal Of Cognitive Psychology*, *19* (4/5), 628-649.

Mevarech, Z. R., & Amrany C. (2008). Immediate and delayed effects of meta-cognitive instruction on regulation of cognition and mathematics achievement, *Metacognition Learning, 3* (2), 147–157.

Miles, M. B., & Huberman, A. M. (1994). Qualitative data analysis (2nd ed.). Thousand Oaks, CA: Sage.

Muhtar, S. (2006). *Üstbilişsel strateji eğitiminin okuma becerisinde öğrenci başarısına olan etkisi.* Yayımlanmamış yüksek lisans tezi, Ankara Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.

Namlu, A. G. (2004). Bilisötesi öğrenme stratejileri ölçme aracının geçerlilik ve güvenirlik çalısması. *Anadolu Üniversitesi Sosyal Bilimler Dergisi, 2,* 123-133.

Özbey, N. (2007). *İlköğretim öğrencilerinin ders çalışma alışkanlıklarının bazı değişkenler açısından incelenmesi.* Yayımlanmamış yüksek lisans tezi, Osmangazi Üniversitesi, Fen Bilimleri Enstitüsü, Eskişehir.

Özcan, G. (2006). *İlköğretim dördüncü ve beşinci sınıf öğrencilerinin ders çalışma alışkanlıklarının ve ortamlarının incelenmesi.* Yayımlanmamış yüksek lisans tezi, Marmara Üniversitesi, Eğitim Bilimleri Enstitüsü, İstanbul.

Paris, S. G., & Winograd, P. (1990). How metacognition can promote learning and instruction. In B. F. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp.15-52). Hillsdale, NJ: Erlbaum.

Romainville, M. (1994). Awareness of cognitive strategies: the relationship between university students'metacognition and their performance. *Studies in Higher Education*, *19* (3), 359-367.

Rosetta, Z. (2000). A metacognitive intervention in mathematics at university level. *International Journal of Mathematical Education in Science and Technology, 31* (1), 143–150.

Ruban, L., & Reis, S. M. (2006). Patterns of self-regulatory strategy use among low-achieving and high-achieving university students. *Roeper Review*, *28* (3), 148-156.

Schoenfeld, A. (1985). *Mathematical problem solving.* San Diego, CA: Academic Press.

Schraw, G. (2009). Measuring metacognitive judgments. In D. J. Hacker, J. Dunlosky, & A. C. Graesser (Eds.), *Handbook of metacognition in education* (pp. 415-429). New York: Routledge.

Schunk, D. H., & Zimmerman, B. J. (Eds.). (1994). *Self-regulation of learning and performance: Issues and educational implications.* Hillsdale, NJ: Erlbaum.

Schurter, W. A. (2001). *Comprehension monitoring and Polya's heuristics as tools for problem solving by developmental mathematics students.* Unpublished doctoral dissertation, The University of the Incarnate Word, San Antonio, TX.

Shamir, A., Mevarech, Z. R., & Gida, C. (2009). The assessment of meta-cognition in different contexts: Individualized vs. peer assisted learning. *Metacognition and Learning*, *4,* 47-61.

Swanson, H. L. (1990). Influence of metacognitive knowledge and aptitude on problem solving. *Journal of Educational Psychology, 32* (2), 306-314.

Şener, K. (2001). *İlköğretim öğrencilerinin çalışma alışkanlıklarının matematikteki başarılarına etkisi.* Yayımlanmamış yüksek lisans tezi, Fırat Üniversitesi, Sosyal Bilimler Enstitüsü, Elazığ.

Teong, S. K. (2002). The effect of matecognitve training on mathematical word problem solving. *Journal of Computer Assisted Learning, 19,* 46-55.

Tezbaşaran, A. A. (1996). *Likert tipi ölçek geliştirme kılavuzu.* Ankara: Türk Psikologlar Derneği.

Tunçman, N. (1994). *Effects of training preparatory school of EFL students at Middle East Technical University in a metacognitive strategy for reading academic texts.* Unpublished master's thesis, Bilkent University, The Institute of Humanities and Letters, Ankara.

Uçar, G. (1997). *Birleştirilmiş sınıflar fen bilgisi dersi ışık ünitesinde öğrenci başarısına öğrencilerin çalışma alışkanlıkları ve öğretmenlerin ders işleme yöntemlerinin etkisi.* Yayımlanmamış yüksek lisans tezi, Marmara Üniversitesi, Sosyal Bilimler Enstitüsü, İstanbul.

Victor, A. M. (2004). *The effects of metacognitive instruction on the planning and academic achievement of first and second grade children.* Unpublished doctoral dissertation, II Graduate College of the Illinois Institute of Technology, Chicago.

Vrugt A. & Oort F. J. (2008). Metacognition, achievement goals, study strategies and academic achievement: Pathways to achievement. *Metacognition Learning, 3* (2), 123-46.

Woolfolk, A. E. (1993), Examples of learning tactics in Educational Psychology (5th ed.). New Jersey: Prentice Hall.

Yavuz, D. (2009). *Öğretmen adaylarının öz yeterlilik algıları ve üst bilişsel farkındalıklarının çeşitli değişkenler acısından incelenmesi.* Yayımlanmamış yüksek lisans tezi, Zonguldak Karaelmas Üniversitesi, Sosyal Bilimler Enstitüsü, Zonguldak.

Yıldırım, A., Doğanay, A. ve Türkoğlu, A. (2000). *Okulda başarı için ders çalışma ve öğrenme yöntemleri.* Ankara: Seçkin Yayınları.

Yıldırım, A. ve Şimşek, H. (2005). *Sosyal bilimlerde nitel araştırma yöntemleri* (5. bs). Ankara: Seçkin.

Yörük, D. (2007). *Lise öğrencilerinin akademik başarıları, başarı korkuları ve ders çalışma alışkanlıkları arasındaki ilişkilerin incelenmesi.* Yayımlanmamış yüksek lisans tezi, Gazi Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.

Zimmerman, B. J. (1989). A social cognitive view of self regulated academic learning. *Journal of Educational Psychology, 81,* 329-339.

Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology, 82,* 51-59.

Zohar, A. & Ben David A. (2008). Explicit teaching of meta-strategic knowledge in authentic classroom situations. *Metacognition Learning, 3* (1), 59-82.