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 teachers.

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 learners’ 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-
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 & Amran, 2008), help time management (Rosetta, 2000), and improve thinking and problem solving skills of learners. Similarly, (Deseote et al., 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; Balci, 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 (Atdigan, 1998; Bay, Tügül, & Gençdoğan, 2005; Çetin, 2007; Dilek, 1993; Erdamar, 2010; Erkan, 1996; Ersoy, 2003; Karapınar, 2000; Kaya, 2001; Özçay, 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-
between 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 ≤.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 skills 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


