TEACHER CANDIDATES’ METACOGNITIVE AWARENESS ACCORDING TO THEIR DOMAINS AND SEX

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The aim of this research is to determine the metacognitive awareness of the teacher candidates according to their domains and sex. The participants of the study is composed of 233 teacher candidates studying in Pedagogical Formation Certificate Program at Yildiz Technical University, and from the domains of social (121), numeric (51), fine arts and design (61). To determine the metacognitive awareness of the participants of the study “Metacognitive Awareness Scale”, originally developed by Schraw, G., and Sperling-Dennison, R. (1994) and Turkish bilingual equivalence of which carried out by Akın, A., Abacı, R., and Çetin, B. (2007), was used. Analyses of one-way ANOVA, conducted to determine the teacher candidates’ metacognitive awareness according to their domains, reveal that although the metacognitive awareness of numeric group was higher than the other two groups, statistically significant difference was not found. Correlatively, in view of the results of t-test for independent groups conducted according to sex, though metacognitive awareness of female teacher candidates was found higher than that of males, statistically significant difference was not found.

**Keywords:** Metacognitive awareness, Teacher candidates, Domains and Sex

**INTRODUCTION**

Several researchers have proposed theoretical frameworks for the study of teachers’ knowledge (e.g. Elbaz, 1983; Clark & Peterson 1986; Schon, 1983, 1987). Shulman (Shulman, 1986, 1987; Wilson, Shulman & Richert, 1987) suggested that the professional knowledge base for teaching consists of several components. Consideration of means for teachers’ learning focuses attention on learning theories which are usually derived from studies on children’s learning. When children’s learning is addressed within the context of conceptual change theories, it is generally agreed that understanding children’s prior knowledge is essential for designing instruction. In this sense, adults’ learning is similar to children’s learning. Therefore, in order to find out which learning experiences can be meaningful for teachers’ professional development, it is necessary to mention the concept of metacognition of thinking skills.

Since Flavell (1979) introduced the concept ‘metacognition’, many studies have addressed the issue of the influence of metacognition on learning performance. The concept of “metacognition” was suggested, for the first time, by Flavell in 1976. Flavell (1976: 232),
describes metacognition as “knowledge and cognitive about cognitive phenomenon”, and “individual’s knowledge about his/her own cognitive process, and employing this knowledge to inspect cognitive processes”. According to Flavell (1979), metacognition is the individual’s awareness of how he learns and what he does, employment of proper knowledge to gain his ends; the ability to employ cognitive skills that are required in an ordinary test, the knowledge of which strategies be employed with which goals, and the assessment of individual processes before and after performance. Furthermore, it is a cognitive activity or knowledge that arranges any items of cognitive functions (Flavell, 1993). Knowledge of cognition refers how much learners learn with their own memories and learning methods (Sperling, Howard, Staley 2004), and their cognitions or what they know about cognition as a general (Akın, Abacı and Çetin, 2007). It is the knowledge that is stockpiled by the individual which has different cognitive goals and skills and attempted different cognitive experiences, and which is composed of interaction among variants of individual, task and strategy (Flavell, 1979; Flavell, 1993; Livingston, 1997).

Regulation of cognition implies a row of metacognitive activities which help individual control his/her learning and thinking, and associate with both mutually, (Thomas and McRobbie, 2001) in other words, it implies strategies or skills that stimulate comprehension, and enable to accomplish the objective (Flavell, 1979). Based on a review of studies, Wang, Haertel, and Walberg (1990) concluded that metacognition is the most important predictor of learning performance. Several studies (Bowen, Shore, & Cartwright, 1992; Brown, 1980; Christoph, 2006; Markman, 1977, 1979; Mevarech & Fridkin, 2006; Pressley & Afflerbach, 1995; Schoenfeld, 1992; Shore & Lazar, 1996) have focused on the use of metacognitive skills while performing different tasks.

Metacognition has been one of the most challenging concepts among researchers due to many factors. It is one of the most important factors that affects problem solving behaviors of individuals (Swanson, 1990; Artzt and Armour-Thomas, 1992; Fitzpatrick, 1994; Kuiper, 2002). It is also an extremely important structure, affecting individual learning process (Akın, Abacı and Çetin, 2007). Furthermore, metacognition has a main role in the self-regulation, required to succeed in learning (Lucangeli and Cornoldi, 1997). Besides, it enables learners to plan and allocate learning resources, monitor their current knowledge and skill levels, and evaluate their current learning level at various points during the acquisition process. Metacognitive support aims to increase learning competence by means of systematic explicit guidance to learners as they think and reflect on their tasks (Bannert, 2008; Lin, Schwartz, & Hatano, 2005; Quintana, Zhang, & Krajcik, 2005; Schraw et al., 2006; Veenman, Van Hout-Wolters, & Afflerbach, 2006; White & Frederiksen, 1998; Winters et al., 2008). Kuiper (2002) states that learners with a certain level of self-regulation and strategy of metacognition get a better academic achievement. He also emphasizes that metacognition, as only learned once, encourage reflective thinking, provide responsibility, and build self-confidence to make decisions quickly. Moreover, it facilitates critical and creative thinking. Schraw and Graham (1997) see metacognition as an important factor in effective learning, for it provides individuals with following and arranging their own cognitive performances. According to them, performance of metacognition increases the awareness level in learning, enabling to employ the existing strategies effectively and getting the processes of caution better.

Recently, individuals should carry out their studies schemingly and regularly, and also have knowledge of their own cognitive processes in order to be successful, concurrently with their busy learning activities (Akin, Abaci and Cetin, 2007). Therefore, all of these are elements related to metacognitive awareness. Moreover, metacognitive awareness of individuals is regarded as an important factor in increasing of their success, their learning throughout their life
span, their creative and critical thinking, and building self-confidence. Consequently, it has very critical importance to determine the level of metacognitive awareness of teacher candidates, and develop their metacognitive awareness. In this study, in addition to define metacognitive awareness of teacher candidates, it is also analyzed whether gender and domains have an important role on the metacognitive awareness of teacher candidates. Consequently, the aim of this study is to determine the levels of metacognitive awareness of teacher candidates, and examine whether these levels change according to some variables such as gender or domains. For this purpose, we seek to find answers to the following study questions:

1) Is there a significant difference among scores of metacognitive awareness of teacher candidates according to gender?

2) Is there a significant difference among scores of metacognitive awareness of teacher candidates according to their domains?

METHOD

Participants

A sample of 233 teacher candidates studying in Pedagogical Formation Certificate Program at Yıldız Technical University participated in the study. The teacher candidates, all of whom were graduates, were from the domains of social (121), numeric (51), fine arts and design (61). They were 175 female and 56 male teacher candidates.

Instrument

The data of the study were acquired by means of the application of the Inventory of Metacognitive Awareness (IMA), developed by Schraw and Dennison (1994), and adopted into Turkish by Akın, Abacı and Çetin (2007) on students. The Inventory of Metacognitive Awareness is a total 52-item of inventory, and each item rated on 5-Point Likert type scale which ranges from “1-always true” to “5-always false” to report respondents’ level of agreement with 52 items. The original form of MTI consists of two main (knowledge of cognition and regulation of cognition) dimensions (Schraw and Dennison, 1994). For the entire inventory, coefficients of internal consistency reliability were calculated to be .95 (Akın, Abacı ve Çetin, 2007). In this study, the total reliability score of the scale was .91.

The highest point to be obtained in IMA prepared as 5 graded Likert type was 260 and the lowest point was 52. High points obtained from the inventories not including negative item showed high degree of awareness. By dividing total point obtained from the inventory into the number of items the level of metacognitive awareness of the related individual can be found. It is possible to say that an individual gaining under 2.5 point from IMA has low metacognitive awareness and the one who gains over 2.5 point has high metacognitive awareness (Akın, Abacı and Çetin, 2007).

Analysis of Data

The teacher candidates were given 15 minutes to answer the Inventory of Metacognitive Awareness. The data, gathered, was analyzed by means of a packaged program. At this stage,
Descriptive Statistics Methods were applied, while determining the levels of metacognitive awareness of teacher candidates. To determine whether there is a significant difference among scores of metacognitive awareness of teacher trainees according to gender, an independent t-test was applied. Besides, to determine whether there is a significant difference among the scores of metacognitive awareness of teacher trainees according to their domains, one-way ANOVA test was conducted.

RESULTS

In this chapter, we allow for the analyses, carried out with the aim of determining the levels of metacognitive awareness of teacher candidates. Table 1 indicates the group statistics of the levels of metacognitive awareness of teacher candidates according to gender and domains.

Table 1. Group Statistics According to Gender and Domains.

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>175</td>
<td>198.26</td>
<td>22.63</td>
<td>1.71</td>
</tr>
<tr>
<td>Male</td>
<td>56</td>
<td>196.78</td>
<td>22.31</td>
<td>2.98</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domains</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td>121</td>
<td>199.70</td>
<td>20.11</td>
<td>2.57</td>
</tr>
<tr>
<td>Numeric</td>
<td>51</td>
<td>202.47</td>
<td>24.20</td>
<td>3.38</td>
</tr>
<tr>
<td>Fine Arts</td>
<td>61</td>
<td>195.14</td>
<td>23.17</td>
<td>2.10</td>
</tr>
</tbody>
</table>

Table 1 shows that the mean of the levels of metacognitive awareness of female teacher candidates are 198.26, while the means of the levels of metacognitive awareness of male teacher candidates are 196.78. Moreover, it is seen that the mean of the levels of metacognitive awareness of teacher candidates whose domain is Social is 199.70, that of teacher candidates whose domain is Numeric is 202.47 and that of those whose domain is Fine Arts is 195.14.

Relating to the first question of the study, the independent t-test was conducted in order to observe whether there is a significant difference among the levels of metacognitive awareness of teacher candidates according to gender. Table 2 indicates the results of the independent t-test.

Table 2. The t-test results regarding the scores of metacognitive awareness according to gender.

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metacognitive Awareness</td>
<td>Female</td>
<td>175</td>
<td>198.26</td>
<td>22.63</td>
<td>.61</td>
</tr>
<tr>
<td>Male</td>
<td>56</td>
<td>196.78</td>
<td>22.31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As is seen from the figures of Table 2, it was seen that there was not a significant difference among the scores of metacognitive awareness of male and female teacher candidates (p=.26>0.05). It can be reported that the scores of metacognitive awareness of female teacher candidates (198.26) and the scores of male teacher candidates (196.78) were nearly similar, and the scores of both groups indicated a homogenous range according to the standard deviation.
figures. In view of the results of t-test for independent groups conducted according to sex, though metacognitive awareness of female teacher candidates was found higher than that of males, statistically significant difference was not found.

One-way ANOVA test was applied to observe whether there is a significant difference among the levels of metacognitive awareness of teacher candidates, according to their domains. Table 3 indicates the results of ANOVA test according to domains.

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>sd</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Groups</strong></td>
<td>2179.55</td>
<td>2</td>
<td>1089.77</td>
<td>2.12</td>
</tr>
<tr>
<td><strong>Within Groups</strong></td>
<td>118010.71</td>
<td>230</td>
<td>513.09</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>120190.27</td>
<td>232</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to the results of the analysis, there was not a significant difference among the scores of metacognitive awareness of teacher candidates (F=2.12; p=.12>0.05) according to domains. Analyses of one-way ANOVA, conducted to determine the teacher candidates’ metacognitive awareness according to their domains, reveal that although the metacognitive awareness of numeric group was higher than the other two groups, statistically significant difference was not found. In other words, the scores of metacognitive awareness of teacher candidates do not change according to domains of teacher candidates significantly.

**DISCUSSION**

Metacognition has been one of the most challenging concepts among researchers due to many factors. It is one of the most important factors that affects problem solving behaviors of individuals (Swanson, 1990; Artzt and Armour-Thomas, 1992; Fitzpatrick, 1994; Kuiper, 2002). It is also an extremely important structure, affecting individual learning process (Akın, Abacı and Çetin, 2007). Furthermore, metacognition has a main role in the self-regulation, required to succeed in learning (Lucangeli and Cornoldi, 1997). Based on a review of studies, Wang, Haertel, and Walberg (1990) concluded that metacognition is the most important predictor of learning performance. Several studies (Bowen, Shore, & Cartwright, 1992; Brown, 1980; Christoph, 2006; Markman, 1977, 1979; Mevarech & Fridkin, 2006; Pressley & Afflerbach, 1995; Schoenfeld, 1992; Shore & Lazar, 1996) have focused on the use of metacognitive skills while performing different tasks.

Moreover, metacognitive awareness of individuals is regarded as an important factor in increasing of their success, their learning throughout their life span, their creative and critical thinking, and building self-confidence. Consequently, it has very critical importance to determine the level of metacognitive awareness of teacher candidates, and develop their metacognitive awareness. In this study, in addition to define metacognitive awareness of teacher candidates, it is also analyzed whether gender and domains have an important role on the metacognitive awareness of teacher candidates. Consequently, the aim of this study is to determine the levels of metacognitive awareness of teacher candidates, and examine whether these levels change according to some variables such as gender or domains.
The findings of the research revealed that there was not a significant difference among the scores of metacognitive awareness of male and female teacher candidates. It can be reported that the scores of metacognitive awareness of female teacher candidates and the scores of male teacher candidates were nearly similar, and the scores of both groups indicated a homogenous range according to the standard deviation figures. In view of the results of t-test for independent groups conducted according to gender, though metacognitive awareness of female teacher candidates was found higher than that of males, statistically significant difference was not found. This finding of the research is parallel to the findings of Fitzpatrick (1994), Sheorey & Mokhtari (2001), Memnun & Akkaya (2009), Ozsoy & Gunindi (2011), but it does not correspond to the findings of the researches carried out by Kazu and Ersözlü (2007) and Monktari and Sheroy (2001). It can be inferred from this finding that more comprehensive researches are needed in this subject.

Another objective of this study was to establish whether there is a significant difference among the scores of metacognitive awareness of teacher candidates according to their domains. According to the results of the analysis, there was not a significant difference among the scores of metacognitive awareness of teacher candidates according to domains such as social, numeric and fine arts. In other words, the scores of metacognitive awareness of teacher candidates do not change according to the domains of teacher candidates significantly. Therefore, from a developmental and an instructional perspective it is relevant to know how metacognitive skills develop: whether they develop from being general into becoming domain-specific or the other way around? Earlier studies yielded contradictory results (Schraw, Dunkle, Bendixen, & Roedel, 1995; Schraw& Nietfeld, 1998; Veenman & Beishuizen, 2004; Veenman & Verheij, 2003; Veenman et al., 1997, 2004; De Jong, 1992; Glaser, Schauble, Raghavan, & Zeitz, 1992).

If teacher candidates comprehend the significance of metacognitive awareness and have education on metacognitive awareness, they can use metacognition effectively in their experiences as a teacher. Therefore, classes which will help teacher candidates have metacognitive awareness can be designed and applied. Considering this fact, including the activities regarding the development and support of metacognitive awareness will be beneficial for teacher candidates in teacher education programs in terms of professional and personal development. It is recommended that in future researches the factors that affect metacognitive awareness of teacher candidates should be examined elaboratively.

REFERENCES


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