Educational Research Association
The International Journal of Research in Teacher Education
2018, 9(2): 26-35
ISSN: 1308-951X

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The Relation between Teachers` Self-Reported Metacognitive Awareness and Teaching with Metacognition

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Abstract

Teachers' competency with or delivery of metacognition instruction may show variations. Although limited research offered pessimistic findings of classroom metacognition instruction, the factors have not been examined adequately. Therefore, this study examined a) the relation between teachers' metacognitive awareness and teaching with metacognition and b) whether a professional development module of teaching metacognition might impact teaching with metacognition. Findings confirmed that metacognitive awareness and teaching with metacognition were correlated. However, a day-long module might not be sufficient to change practices of teaching with metacognition. It is, therefore, suggested teachers study metacognition explicitly and for prolonged periods.

Keywords: metacognitive awareness, teaching with metacognition, teaching for metacognition, teaching metacognitively, survey research.

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Introduction

Cognitions can be monitored and controlled through the actions and interactions of metacognitive knowledge, metacognitive strategies, and metacognitive experiences (Flavell, 1979). Numerous research investigated Flavell's (1979) question; "how much good does cognitive monitoring actually do us in various types of cognitive enterprise?" (p.910) and it was found that metacognition is an important tool for learning effectively (Ros Fisher, 2002; Kerndl & Aberšek, 2012). Metacognitive individuals benefit from declarative (i.e. what), procedural (i.e. how), and conditional (i.e. when and why) knowledge about cognition and they can manage their cognitions successfully. That is, metacognition adequate individuals can plan, monitor and regulate, and evaluate the cognitive processes and products (Veenman, Van Hout-Wolters, & Afflerbach, 2006). Such informed and regulatory actions have beneficiary impacts on language acquisition, reading comprehension, writing, attention, memory, and problem solving (Flavell, 1979). Individuals' awareness, responsibility for learning, and performances increase by metacognitive adequacy (e.g. Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007; Çer & Şahin, 2016; Cross & Paris, 1988; Cubukcu, 2008; Curwen, Miller, White-Smith, & Calfee, 2010; Desoete, Roeyers, & Buysse, 2001; Klingner, Vaughn, & Schumm, 1998; Michalsky, Mevarech, & Haibi, 2009; Muñiz-Swicegood, 1994; Van Keer & Vanderlinde, 2010).

It is known that children of 6 to 8 can show evidence for metacognitive knowledge and engage in monitoring when prompted (Baker, 2005 as cited in Veenman, 2016). When individuals are required to use metacognitive strategies, these skills become sophisticated and academically oriented. Young children around the age of 8 can show evidence for planning, monitoring, regulating, and evaluating cognitions (Veenman, 2016). These strategies are substantially domain specific until around 14 (Veenman, 2016). With practice (Fisher, 1998), individuals start to use these strategies more flexibly (Schraw, 1998) and then, they can transfer such knowledge and skills across different tasks, areas, or disciplines (Veenman, 2016; Wilson, 2009).

As Fisher (1998), Van Keer and Vanderlinde (2010), and Veenman and colleagues (2006) stated, individuals can show variations in metacognitive adequacy. There may be some individuals who develop metacognitive competency by for example, socio-educational opportunities and show sufficient competency with metacognitive acts. Some others may have metacognitive knowledge but suffer from production deficiency. Such individuals experience difficulty in using metacognitive knowledge at their disposal and regulating their cognitions for several reasons (Veenman, Kerseboom, & Imthorn, 2000; Veenman et al., 2006). On the other hand, another group of individuals who cannot spontaneously acquire a metacognitive repertoire might suffer from availability deficiency (Veenman et al., 2006). Such individuals do not have sufficient metacognitive knowledge and strategies at their disposal. However, metacognition instruction, fortunately, can help ameliorate limited or no metacognition adequacy (Anastasiou & Griva, 2009; Author, 2015, 2016; Van Keer & Vanderlinde, 2010; Veenman, 2016).

Problem and Purpose of the Study

Numerous research studies examined the impacts of metacognition training for its beneficiary impacts on learning and achievement. By such research, optimal or effective instructional practices have been highlighted since 1980s. However, as Duffy (1993, 2002) and Hartman (2001) previously emphasized, effectiveness of instruction might not always pertain to instructional practices. Rather, it pertains to teachers' expertise in orchestrating instruction for students' best learning outcomes (Duffy, 1993) and teachers' making their own metacognition explicit to students (Schraw,1998; Tanner, 2012). However, as previously stated (Author 2016, 2017a), limited research on teachers' adequacy with teaching metacognition does not offer optimistic findings. That is, classroom teachers were usually reported as insufficient to develop students' metacognition.

Regarding developmental characteristics of metacognition and pessimistic findings on teaching metacognition, it is important to examine teachers' transferring metacognition to *teaching* and potential impacts of professional development initiatives for the best educational experiences. As Balcikanli (2011) emphasized, teachers' awareness about their own teaching can initiate a change in teachers' development. Such a change can initiate teachers' delivery of metacognition instruction in classrooms. For these reasons, this study aims to investigate whether;

a) there is a relation between teachers' metacognition and teaching metacognitively, and

b) a single professional development module of teaching metacognition might impact teaching metacognitively.

To confirm these hypotheses, a quasi-experimental study was conducted regarding the following conceptual definitions.

Conceptual definitions

Metacognition. Metacognition pertains to one's awareness about and regulation of his cognitions. Metacognition is composed of metacognitive knowledge and metacognitive strategies (Baker & Brown, 1984; Flavell, 1979; Nelson, 1996; Veenman et al., 2006). With the help of one`s knowledge about self, task, and strategies, metacognitive individuals can plan, monitor, regulate, and evaluate their cognitions strategically. By so, they involve in metacognitive experiences (Flavell, 1979). In this study, individuals` metacognitive awareness was assessed by Schraw and Dennison's (1994) inventory.

Teaching metacognition. Teaching metacognition pertains to instructional practices that aim to activate and develop students' metacognition (Author, 2017a; Hartman 2001; Veenman et al., 2006). By "implementing metacognition as an integral part of … lessons" (Veenman et al., 2006, p.10), teachers can foster students' metacognitive knowledge, collaborate with students and scaffold their strategic learning experiences, encourage students` independence with strategic learning, assess their metacognition, and help them do self-assessment. For these, teachers can adopt goal-directedness, integrate language of thinking, provide constructive feedback and appropriate guidance, and prolong metacognition instruction (Author, 2017b). The data sources of teaching for metacognition, collection, analysis procedures, and findings were described in detail in a previously released work (i.e. Author, 2017a).

Teaching metacognitively. It pertains to teaching for and with metacognition. "Teaching with metacognition means teachers think about … instructional goals, teaching strategies, sequence, materials, students' characteristics and needs, and other issues related to curriculum, instruction and assessment before, during and after lessons in order to maximize their instructional effectiveness" (Hartman, 2001, p.149). This construct was assessed by an inventory developed by Balcikanli (2011). However, it should be noted that Metacognitive Awareness Inventory for Teachers (MAIT) does not explicitly include teaching for metacognition although some implicit indicators can be collected. For this reason, the author examined best-situated practices of teaching metacognition via interview protocols during which teachers developed a reading lesson plan. In the following, the methods that triangulate these constructs will be described.

Method

In this section, various entities that made this study possible will be presented as in the following. Initially, participants and data collection methods will be described. Then, the author will describe how she collected and analyzed the data to answer the research questions.

Participants. This study was conducted in Turkey. The volunteer participants taught a foreign language at a Western university. In total, there were 30 participants; 26 were female and 4 were male. Their age ranged from 23 to 55 > years. They majored mostly in English or American Language and Literature. Three participants graduated from the department of English Language Teaching. Two participants held a diploma from either at the department of

Translation Studies or Linguistics. Eight participants did not specify their majors. Besides, 21 of the participants had a bachelor's degree. Seven held a master of arts degree either in English or American Language and Literature and 2 had a master of science degree from College of Education.

Data collection materials. Following an institutional review board approval for the protection of participants, the participants were informed about their rights and procedures. They gave informed consent. Then, to examine the hypotheses in this study, the data were collected by two inventories and interview protocols were adopted. These instruments were Metacognitive Awareness Inventory (MAI) and Metacognitive Awareness Inventory for Teachers (MAIT). In the following, they will be introduced shortly.

Metacognitive awareness inventory. Metacognitive Awareness Inventory (MAI) was developed by Schraw and Dennison (1994). MAI is a 52-item measurement instrument factored by knowledge about cognition (17 items) and regulation of cognition (35 items). The internal consistency (α) for these scales were ≥.88 and two factors accounted for 58% of the variance.

In this study, a five-point scale was used to assess language instructors' metacognitive awareness. Knowledge about cognition (KC) scores ranged between a minimum of 3.47 and a maximum of 4.82 (*M*=4.18, *SD*=.36). Regulation of cognition (RC) scores ranged between a minimum of 3.63 and a maximum of 4.80 (*M*=4.31, *SD*=.33).

Metacognitive awareness inventory for teachers. Metacognitive Awareness Inventory for Teachers (MAIT) was developed by Balcikanli (2011). This inventory assesses teachers' awareness and regulation of teaching (teaching with metacognition). MAIT is a 24-item instrument that has 6 factors loading as declarative knowledge (DK; 4 items), procedural knowledge (PC; 4 items), conditional knowledge (CK; 4 items), planning (P; 4 items), monitoring (M; 4 items), and evaluating (E; 4 items). The construct validity and internal consistency reliability was confirmed through a 3-stage scale development procedure. The α for all subscales ≥ .79. A total of 60% of the variance in teaching metacognitively was explained by the six-factor solution.

A 5-point Likert-type MAIT was used in this study as recommended by Balcikanli (2011). The ranges changed as can be seen in the following table (Table 1).

Table 1.

Frequencies for MAIT subscales

	Minimum	Maximum	Mean	SD
Declarative knowledge (DK)	3.25	5	4.35	.40
Procedural knowledge (PK)	3.5	5	4.18	.41
Conditional knowledge (CK)	3.5	5	4.41	.37
Planning (P)	3.25	5	4.20	.56
Monitoring (M)	3	5	4.33	.48
Evaluating (E)	3.25	5	4.23	.47

Data collection procedures. The data were collected in two steps. Since the findings of this study came from a more comprehensive study (i.e. Author, 2017a), the following figure (Figure 1) displays the procedures of the main study. In this manuscript, only quantitative data collection and analysis procedures will be presented. It is highly suggested that this study's findings are complemented with the corresponding part (i.e. Author, 2017a) for a comprehensive understanding of the phenomenon.

Before delivering the professional development module, the author asked participants to complete MAI and MAIT at their convenience and to their best knowledge. Then, a professional development module was delivered after it was adjusted to the participants needs' and recent self-reported knowledge and practices of teaching metacognition. Following these steps,

participants were asked to complete MAIT, again. In the following the professional development module will be described to help interpret the findings.

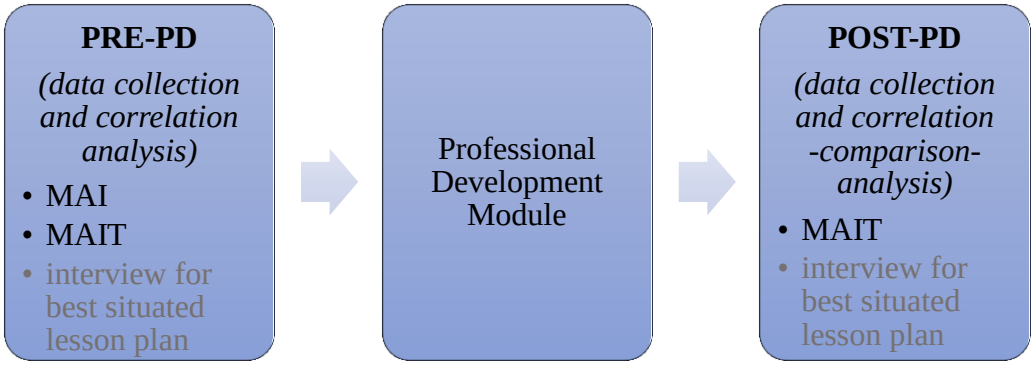

Figure 1. Stages of the research

Professional development module. In this study, the author delivered a day-long professional development (PD) module for volunteer participants. For this purpose, the author initially identified the core characteristics of effective PDs by reviewing pioneering work in the field (e.g. Desimone, 2009; Hawley & Valli, 2007; Van den Bergh, Ros, & Beijaard, 2014; Webster-Wright, 2009). These characteristics included content, active learning, coherence, collective participation, clear goals, and reflection (see Author, 2017a). Following the initial analysis of MAI, MAIT, and best-situated lesson plans, the module was contextualized regarding teacher's needs, current knowledge about metacognition and teaching metacognition, assumptions, biases, beliefs, and practices.

By these identified principles, the PD aimed to polish teachers' knowledge about metacognition and teaching metacognition and improve their competencies with and practices for teaching metacognition in classrooms. For this purpose, the author delivered the PD module into two steps. In the first section, the author initially stated the purpose of the PD explicitly and reviewed expected teacher competencies and behaviors at the beginning of the first section. Then, she reviewed theory of metacognition, characteristics and competencies of metacognitive readers, metacognition assessment, and instructional practices that help improve students' metacognition. The participants were also presented short video clips where classroom teachers mediate their lessons to develop students' metacognitive strategies. Following author's presentation, participants were given some time to discuss the content and ask questions both to the author and to other participants.

In the second session, the participants were given opportunities to practice teaching metacognition. For this purpose, the participants were distributed a reading text and asked to study it with a partner or in groups to develop a best-situated lesson plans of teaching metacognition. Then, the participants were invited to share their lesson plans with the whole group. The generic lesson plans consisted of pre-reading, during reading, and post-reading sections. For this reason, the whole group discussed how a teacher can initiate or develop students' metacognition in each stage of the lesson. They talked about various instructional practices, reading strategies, standards, lesson objectives, importance of background knowledge, interest, motivation, teacher's knowledge, competencies, assumptions, and expertise, potential problems, and instructional concerns. Meanwhile, the author took some notes to be used during her modeling of teaching metacognition.

Following the initial brain-storming, the author invited some of the participants to *act out* teaching metacognition for their colleagues. Two participants volunteered for this task and they modeled how they would teach metacognition in their classrooms. After one participant acted out, the whole group discussed opportunities for students' metacognition, potential problems during the lesson, and concerns with the curriculum and pacing. Then finally, the author also

acted out teaching metacognition by utilizing the same scenario. For this purpose, she made some instructional changes and explained the rationale for her decisions. She also highlighted some tips to handle some of the generic concerns that participants announced.

Finally, the participants were given some time and space to reflect on their usual teaching routines for metacognition. They were invited to think weather the author's instructional tips would help them to embrace metacognition during their classes. Moreover, they were invited to think about their assumptions regarding students' adequacy with metacognition or how their predispositions might impact students' learning metacognition. Following these, participants were welcomed to share their concluding thoughts that ended the module.

Data analysis procedures. The data were analyzed by Pearson correlation analysis to examine the relation between MAI and MAIT and paired samples t-test analysis was used to compare the mean differences between pre-PD MAIT and post-PD MAIT. For this purpose, initially the assumptions (normality, linearity, and homogeneity of variances) were tested and confirmed.

Results

In this section, the main findings will be presented. By the statistical analysis, it was found that MAI and MAIT scores correlated positively and self-reported teaching with metacognition practices did not change significantly following a single-day professional development module of teaching for metacognition. In the following, these findings will be elaborated separately.

The relation between metacognitive awareness and teaching with metacognition: Metacognition can transfer across domains. In the following table (Table 2), the correlations between the subscales of MAI and MAIT were presented. 23 out of 28 correlations were statistically significant. 5 statistically insignificant correlations were as in the following. DK (declarative knowledge) and E (evaluating) on MAIT did not correlate with RC (regulation of cognition) on MAI, $r(30)= .36$ and $r(30)=.31$, p=(n.s) respectively. Also, P (planning) and E (evaluating) on MAIT did not correlate with KC (knowledge about cognition) on MAI, $r(30)= .24$ and $r(30)=.20$, p=(n.s) respectively. Finally, M (monitoring) and P (planning) did not correlate $r(30)= .34$ as can be seen on Table 2. All statistically significant correlations were positive and were greater or equal to$r(30)= + .39$, $p <.01$, two-tailed.

Table 2

Correlations between MAI's and MAIT's subscales

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
$RC_{(MAI)}$	1							
$KC_{(MAI)}$	.81**	1						
$DK_{(MAIT)}$	.36	.45*	1					
$PK_{(MAIT)}$	.50**	.50**	.79**	1				
$CK_{(MAIT)}$	.69**	.64**	.69**	.75**	1			
$P_{(MAIT)}$	.44*	.24	.41*	.52**	.55**	1		
$M_{(MAIT)}$	.60**	.47**	.62**	.40*	.53**	.34	1	
$E_{(MAIT)}$	.31	.20	.66**	.57**	.53**	.39*	.56**	1

*Note. **p <.01 (two-tailed), *p <.05 (two-tailed)*

Statistically insignificant mean difference between Pre-PD and Post-PD MAIT: A single professional development module may not impact teaching with metacognition. A paired-samples t-test provided evidence that there were no statistically significant mean differences between the pre-PD and post-PD MAIT subscales. That is, the pre-PD mean scores of DK, CK, PK, P, M, and E did not significantly differ from the corresponding post-PD subscales, $t(23)$, $p_{DK}=.56$, $p_{PK}=1$, $p_{CK}=.38$, $p_{P}=.83$, $p_{M}=.51$, and $p_{E}=.57$. In the following, current findings will be interpreted and possible educational and research implications will be offered accordingly.

Discussions and Conclusions

This study was conducted to illuminate the complex phenomenon of metacognition, teaching metacognition, and teaching with metacognition. Although metacognition has been frequently studied and although the importance of teaching metacognition has been announced almost after each empirical study, few researchers such as Baker (2017) and Van Keer and Vanderlinde (2010) recognized that the realities in research and mainstream classrooms are different. That is, students in mainstream classrooms are not competent of metacognition. Similarly, few researchers who examined teachers' competencies with teaching metacognition revealed pessimistic findings possibly explaining the discrepancy between mainstream and research classroom realities from an instructional perspective (Author, 2017b). However, factors that might impact metacognition instruction practices still needs examination to spread beneficiary effects of metacognition to mainstream classrooms.

This study has potentials to expand our understanding of metacognition and teaching metacognitively. First of all, by this research it is confirmed that metacognition can be transferred across domains or tasks as previously noted by Fisher (1998), Schraw (1998), Veenman (2016), and Wilson (2009). Metacognitively adequate teachers can plan, monitor, and evaluate their teaching practices. Just like strategic learners, metacognitive teachers plan their instructional practices considering their goals, materials, and students' needs. They also continuously monitor and assess instruction's effectiveness in meeting goals and helping students to learn the content. Monitoring instructional flow and students' reactions is the indispensable prerequisite for regulating teaching. By the interactions with students, teachers can make informed instructional adaptations or changes within the course of classes. Considering the dynamic and authentic nature of classroom instruction, monitoring and regulating teaching might not always be separated from each other. Lastly, metacognitive teachers evaluate their teaching performances that help meet goals and support students' learning. They also do self-assessment regarding setting instructional goals, choosing instructional practices (e.g. approaches, methods, and techniques) and materials, and delivering instruction regarding curriculum, educational standards, and students' needs.

For these promising benefits, it is highly suggested that especially pre-service teachers should study metacognition explicitly during their degrees. Considering the variations with metacognition adequacy, teacher education programs should implant metacognition theory in various classes (Author, 2017a) and have future teachers practice it. Therefore, pre-service teachers can develop an expertise with metacognition and master metacognitive acts that possibly transfer to teaching. Therefore, such teachers can be capable of both teaching strategically and helping students learn strategically.

In addition, the metacognition instruction period should also be prolonged. Cubukcu (2008), Dole, Duffy, Roehler, and Pearson (1991), Duffy (1993), Duke and Pearson (2008), Gourgey (1998), and Veenman et al., (2006) emphasized students need instruction and practice of metacognition for prolonged periods; therefore, they can develop and engage in metacognitive acts adequately. The same notion applies to teaching metacognitively. By the pre-PD and post-PD MAIT mean difference analysis, it was found that teachers' self-reported practices of teaching with metacognition were not different from each other. Since metacognition competency and teaching with metacognition correlate, an insignificant finding in teaching with metacognition was an organic outcome of a day-long PD. That is, a day-long PD module may not be sufficient to develop an understanding of thinking about teaching. Therefore, this study strongly recommends extended professional development initiatives. So that, teachers can develop and understanding of the phenomenon, practice it sufficiently, and get necessary scaffolding and feedback both from the facilitators and colleagues.

This finding can be discussed considering the nature of the PD and previous findings. On the one hand, the PD did not specifically focus on how to plan, monitor, regulate, and evaluate

teaching, rather how to initiate and develop students' metacognition. This can be considered as a possible explanation for teachers' not changing practices of teaching with metacognition. At the same time, this detail can be considered as a limitation of this study. On the other hand, previously published findings (Author, 2017a) reported that half of the teachers (*N*=15) emphasized the importance of doing self-assessment of teaching. Since metacognition pertains to self-awareness, teaching with metacognition organically emerged for some teachers. While these teachers talked about their best-situated lesson plans during the post-PD interview, they emphasized that in addition to teaching for metacognition, they should also teach with metacognition. That is, they appreciated *teaching metacognitively*. Therefore, the analysis in this study confirmed our earlier arguments; a day-long professional development module may not produce intended impacts for all participants (Author, 2017a).

For its potential implications, this study calls for future research. It is important to replicate this study and investigate the relation between metacognition and teaching metacognitively in different contexts and with different teachers. Although this set might sound wordy, in fact by the nature of the phenomenon, I hypothesize that metacognition competent teachers can teach students metacognition while they plan, monitor, regulate, and evaluate such instruction. Teaching metacognitively can help classroom communication and facilitate academic performance (Hartman, 2001); therefore, future research should take account of improving both teachers' knowledge, competence, practices of metacognition and students' adequacy with metacognition simultaneously.

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