**Conceptualizing Teacher Metacognition (+/- 1,500 words)**

 There is growing consensus in the field of education that it is critical for teachers to be aware of their own teaching actions (Tekummru-Kisa & Stein, 2015), because the more aware teachers are of themselves and their practices, the more they may be able to enhance their students’ development (Hattie, 2009). Thus, metacognition, which is broadly defined as “cognition about cognition” or “thinking about thinking” (Anderson, 2002; Flavell, 1999; Metcalfe, 2000), is now recognized as an important aspect of teaching and teacher development. However, despite this widespread recognition, research into teacher metacognition is still a work in progress (Zohar & Barzilai, 2013). This is largely due the vast majority of studies into metacognition up until this point focusing on metacognition in learners, and research that has been done in regards to metacognition in teachers has been mostly limited to mathematics and science teachers (see, for instance, Georghiades, 2004; Hartman, 2001b; Tekummru-Kisa & Stein, 2015; Zohar & Barzilai, 2013). This has left additional teaching contexts that vary in: subjects taught (i.e. language teaching, music teaching), students age (elementary, middle, high-school, university), and geographic location (within individual countries, and across countries) relatively unexplored. There is now a need to expand the study of teacher metacognition into additional teaching contexts to establish a multifaceted perspective from which it can studied. This will contribute not only to furthering the understanding of teacher metacognition and all that it entails, but also and how it can enhance both the teaching and learning process in various, differing situations.

While the general concept of metacognition itself is relatively straightforward, the various aspects and elements that are included in “thinking about thinking” add numerous layers of complexity. Thus, when considering the development, utilization, and maintenance of metacognition in teachers, various other terms are included under the umbrella of metacognition, i.e. “metacognitive actions” (see, for instance, Duffy, Miller, Parsons, & Meloth, 2009), “metacognitive awareness” (see, for instance, McCormick, Dimmitt, & Sullivan, 2013), “reflection” (see, for instance, Risko, Roskos, & Vukelich; 2005), and some terms are even used synonymously i.e. “self-regulation” (see, for instance, Perry, Phillips, & Dowler, 2004). Thus, as Duffy et al. (2009) state, “it is sometimes difficult to synthesize the literature on teachers as metacognitive professionals because so many different terms are used to describe the thoughtful and intentional mental activity in which teachers presumably engage.” (pp. 242-243).

**Components of Teacher Metacognition**

Throughout the teacher metacognition literature, it has been widely proposed that various interconnected components complement each other and work together towards the same goal of enhancing the teaching and learning process. These components include: metacognitive knowledge (Flavell, 1979; Schraw, 2001; Schraw & Moshman, 1995), metacognitive skills (aka., metacognitive regulation, metacognitive strategies) (Kluwe, 1987; Jacobs & Paris,1987, Wenden, 1986), and metacognitive experiences (Efklides, 2009; Flavell, 1979, Zohar & Brazilai, 2013). As outlined by Flavell (1979), “…metacognitive knowledge consists primarily of knowledge or beliefs about what factors or variables act and interact in what ways to affect the course and outcome of cognitive enterprises.” (p. 907), and includes three subcategories: knowledge about person, tasks and strategies. Others have referred to components of metacognitive knowledge in terms of declarative knowledge, procedural knowledge, and conditional knowledge (see, for instance, Kluwe, 1987; Jacobs & Paris, 1987). Declarative knowledge refers to knowledge of what the skills are, procedural knowledge refers to knowing when to use them, and contextual/conditional knowledge refers to knowing when/why to use them. Metacognitive knowledge is a crucial element of teachers’ metacognition because it “can help teachers compare various methods that might be used to achieve the same academic objectives and evaluate the advantages and disadvantages of each.” (Hartman, 2001b, p.162).

Metacognitive skills, refer to skills and processes used to guide, monitor, control and regulate cognition and learning (Veenman, 2011; Wenden, 1986). It involves monitoring and self-regulation, as well as planning and evaluating (Kluwe, 1987; Jacobs & Paris, 1987). Monitoring and self-regulation refers to the awareness of one’s performance, planning refers to the appropriate selection of strategies that can positively affect performance, and evaluating refers to the appraisal of the final outcome of the task and the reevaluation of strategies that were use. As Efklides (2009) explains, “The deliberate character of MS (metacognitive skills) entails that the person consciously and purposively applies strategies, which ensure that his/her thinking will be in the desired direction and will bring about the outcome defined by the goal set. “(p.79). Thus, metacognitive skills allow teachers to 1) reflect upon their lessons and teaching strategies, 2) monitor their teaching in real time, and 3) make conscious decisions about what they can do to improve.

Metacognitive experiences refer to any conscious cognitive or affective experiences which relate to an on-going cognitive endeavor. In other words, metacognitive experiences consist of feelings, estimates, or judgments related to 1) the features of a task, 2) the cognitive processing taking place during the task, and 3) the outcome of the task (Efklides, 2009). An example of a metacognitive experiences that teachers may encounter include the feeling of satisfaction or dissatisfaction with the way an activity is progressing, the feeling that the they are not ready to teach the content for the next day’s class, an estimation of time required for lesson activities, and judging that a certain activity in a textbook may not be beneficial to a lesson. Metacognitive experiences are an important aspect of teacher metacognition because they form an active awareness of the teacher as he/she is performing a task thus, informing them in real time of their progress on the task and on the outcomes.

**Teaching “with” and Teaching “for” Metacognition**

With a combination of metacognitive knowledge, skills, and experiences, teachers are able to use metacognition in different ways in different situations, for example, to improve their overall teaching, to improve their lessons, to improve their own learning, and/or to foster metacognition in learners. Thus, metacognition in teachers includes both acting with and for metacognition (Hartman, 2001b; McCormick et al., 2013).

Teaching for metacognition means teachers reflect on how their actions will activate or develop their students’ metacognition, and involves actions such as planning, reflective questioning, modeling, scaffolding, and explicit strategy explanation (Bransford et al., 2000; Hartman, 200la). Teaching with metacognition means teachers “think about their own thinking regarding their teaching.” (Hartman, 2001b, p. 149). This happens pre, during, and post lesson and includes reflecting on “…instructional goals, students' characteristics and needs, content level and sequence, teaching strategies, materials, and other issues related to curriculum, instruction and assessment.” (Hartman, 2001b, p.149) in order to maximize instructional effectiveness. As Duffy et al. (2009) point out, recent insights into effective teachers tell us that the majority “…frequently and deliberatively engage in conscious, mindful action (or, as we argue, in metacognitive thought) as well as technical or procedural routines.” (p.241), or in other words, teach with metacognition. Additionally, teachers acting with metacognition may also approach their own learning and development metacognitively. This can aid in both the ways they approach their own teaching of content (teaching with metacognition) and the ways in which they foster or support their learners’ metacognitive development (teaching for metacognition.

Despite recognition that acting with metacognition is an important contributing factor to effective teaching, most studies into teacher metacognition thus far have focused on teaching for the development of metacognition in learners (see, for example, Bransford et al., 2000; Hartman, 200lb; Veenman et al. 2006; Zhang & Zhang, 2013), leaving research and understanding of teachers acting with metacognition relatively underdeveloped.

**Teacher Metacognition Stimuli**

When considering metacognition in teachers, it is also important to think about the factors that may stimulate or discourage metacognition; however, the focus on why individuals engage in metacognition is rarely given attention. Veenman, Van Hout-Wolters, & Afflerback (2006) state that it is now imperative to know more about how different components of metacognition develop, and the conditions under which they do so because “Without considering the reasons for being metacognitive, it is impossible to examine the consequences of metacognition, and without examining the consequences, we cannot determine if the thoughts are functional, useful, adaptive, or valuable for the individual.” (Paris, 2002, p.114). It is now essential to address questions like, What stimulates teachers’ metacognition? Why do teachers think about their thinking? What are the conditions that initiate or support teacher metacognition? What are the conditions that hinder or obstruct it?

Paris (2002) presents two classes of stimuli for general metacognition (not specific to teachers); metacognition that is self-stimulated, and metacognition that is stimulated by others. He goes on further to break down self-initiated metacognition into two primary sources: 1) examining our own thinking when we are uncertain or confused, 2) considering our self-representation to others.

An example of the first primary source of self-initiated metacognition that may occur in a language teaching context would be a situation where the teacher may be uncertain, or confused about a grammar point, or vocabulary definition they are teaching. In order to check or repair understanding, a teacher rely on examining their current knowledge for clarification, or revising their thinking processes in order to take actions such as referring to the teacher’s book or notes, looking up the point in question via. technological resources, or having a student explain. In regards to the second primary source of self-stimulated metacognition, language teachers may consider or wonder what students think about them and their teaching abilities, “Do they think I am a good teacher?”, “Do they like me?”, “Do they think my English abilities are poor?”. The analysis of questions like these is a metacognition about students’ thinking that can influence the teacher’s thought and behavior to obtain their desired impression.

Metacognition that is stimulated by others causes an individual to think about cognitive states and abilities (Paris, 2002). This could be in the form of direct questioning for example, a supervisor may ask a teacher “Why did you use the picture of a cow eating fava beans to teach students about global warming?”, in which case the teacher would need to examine their thinking and explain the rationale behind their actions. Another example common to English language classrooms would be a student asking “What do you mean?” when they couldn’t understand what the teacher said. In this case, the teacher would need to consider the language they used and state things in a different way that would be comprehensible for the student.

Metacognitive stimulation from others may not always be in the form of direct questioning like the above situations. It could also result from instances or situations in which a person (or persons) says something or does something that confuses you. For example, students in class always look bored and disengages in class and some even fall asleep. The teacher may ponder, “What am I doing in class to contribute to this?”, “How do I feel when I am teaching my classes?”, “What can I do to resolve this ongoing issue?” The students provide a stimulus for the teacher to examine what they are thinking as well as their actions. The metacognitive thinking stimulated in situations like these can result in revising what an individual is doing or how they are thinking in order to achieve desired outcomes.

There are certainly other possible stimuli for metacognition including such things as: cultural beliefs, social pressures, and personal values therefore, it is important to recognize that metacognition is “…valued, expressed, taught, and supported to different degrees by different communities and the origins and practices that imbue metacognition with value should be studied.” (Paris, 2002, p.115).

**Situating Teacher Metacognition**

The research of metacognition has traditionally been approached from cognitive paradigms which has resulted in a misrepresentation of metacognition as a cognitive enterprise independent of sociocultural elements. As Veenman et al. (2006) outline, most conceptualizations of metacognition interpret it as higher-order cognition about cognition or as a higher order agent looking over and controlling the cognitive system. These sorts of perspectives have led to metacognition being interpreted as a monolithic construct, rather than something that is dynamic, complex and socially situated (Zhang & Zhang, 2013). Metacognition is not something that takes place in a void, therefore it is crucial to consider how “individual differences and contextual factors interact with metacognition and its various components” (Veenman et al., 2006, p.10).

Considering that teaching is now widely acknowledged as a socially embedded (Clandinin & Connelly, 1995; Johnson, 1999; Telles, 2000) complex and dynamic process (Graham & Phelps, 2003; Kiss, 2012; Kramsch & Ware, 2004; Richards, 2008), it is essential to recognize metacognition in teachers as something more than just higher-order cognition about cognition, and something that can change depending on context. Teachers are constantly challenged to deal with multiple interacting factors simultaneously which requires them to “monitor and regulate their cognitive activity as well as enhancing content learning, identifying appropriate strategies, making moment-to-moment decisions to ensure students’ learning and adjusting for individual differences.” (Ghonsooly, Khajavy, & Mahjoobi, p. 592). In order to manage the complexities of teaching, teachers must “shift their vision of teaching from a solo endeavor to an interactional event among their own teaching actions, students’ thinking, and the nature of the task that they selected.” (Tekummru-Kisa & Stein, 2015, p. 108).

The constantly changing, complex environment that teachers are situated in requires the ability for teacher metacognition to flex or adapt to the different situations that they encounter. This is why Zhang & Zhang (2013) argue that metacognition must be treated as a dynamic system and should be regarded as something that is embedded in individuals, and intertwined with many modifiable cognitive and sociocultural variables. The cognitive and sociocultural variables that teachers are subjected to can greatly influence their metacognition and metacognitive actions. As Duffy et al. (2009) contend, the amount of “…thought and control a teacher exerts depends on what the teacher is required to do; how frequently the teacher has to do it; students’ developmental level, needs, and interests; and the teacher’s instructional goals.” Additionally, various studies suggest that teachers’ decisions are regulated by external conditions such as imposed directives, rather than teachers thought (see, for instance, Maloch et al., 2003; Valli & Buese, 2007) meaning that teacher metacognition (and all that it entails) is variable from context to context and person to person. If a teacher is in a situation where things are heavily controlled by external stakeholders and classroom practices have become routinized and habitual, teachers may not utilize metacognition as much (Duffy et al., 2009). However, teachers who are in a less constrained, non-routinized situation must make more decisions and therefore may require a higher degree of metacognition.

The varying components and varying degrees of metacognitive thought that have been discussed, illustrate its complex nature. Thus metacognition should not be viewed as a monolithic construct. There are various components in a constant state of flow which come together to contribute to the successful development, utilization and maintenance of teachers’ metacognition. As Fairbanks, Duffy, Faircloth, He, Levin, Rohr, & Stein (2010) state, “successful teachers must recognize that virtually every situation is different, must see multiple perspectives and imagine multiple possibilities, and must apply professional knowledge differentially.” (p.162). Meloth & Deering (2009) also argue that to be an effective teacher, one must be disposed to being thoughtfully adaptive in response to complex and unanticipated problems that arise. Therefore, it has been proposed that teachers need “adaptive metacognition” which is defined as “both the adaptation of one’s self and one’s environment in response to a wide range of classroom variability.” (Lin, Schwartz, & Hatano, p.245).

**Outstanding issues in Teacher Metacognition**

Within the research into teacher metacognition thus far, some outstanding issues have been noted. As mentioned above, many have argued that the ontological and epistemological viewpoints from which metacognition is studied need to be expanded from the currently dominant cognitive, positivistic perspectives to complexity paradigms which can help to make sense, and unify currently overlapping definitions and constructs of metacognition.

An additional issue pointed out by Duffy et al. (2009) is, “While researchers and educators claim frequently that teachers are metacognitive, detailed characterizations based on empirical qualitative or quantitative evidence are scarce.” (p.240). Haukås (in this volume), has also similarly noted that there are many studies demonstrating the benefits of metacognition to enhance learning, and the teacher’s role in doing so; however, there is still little known in regards to teachers’ knowledge and beliefs about metacognition and its implementation into instructional practices. Moreover, Zohar and Barzilai (2013) present the following questions that still remain unanswered in teacher metacognition literature, “What do teachers need to know and to be able to do in order to apply metacognition successfully in the classroom? Do teachers usually possess the pertinent knowledge? What sort of professional development processes can help teachers develop the necessary knowledge?” (p. 127). It is apparent that there needs to be more empirical evidence of teacher metacognition, what it entails, how it develops, what stimulates or discourages it, how it is maintained, and how it is implemented into teaching practices.

As there still limited research into language teacher metacognition at this time, this study aims to further knowledge and understanding of the topic within this specific context as well as contribute to the advancement of teacher metacognition research as a whole by addressing the following research questions from a complexity paradigm: