2023

An Exploration of ELL Teachers' Conception of Metacognition and Its Use in Elementary School Classrooms

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An Exploration of ELL Teachers' Conception of Metacognition and Its Use in Elementary School Classrooms

by

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A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Education

Presented to
The Faculty of the College of Education, Information, and Technology
March 24, 2023

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ACKNOWLEDGEMENTS

I would like to thank my committee for the guidance you provided me throughout this process. Dr. Kane as my professor, you pushed me to do more than just learn new information, but to expand my mind and my thinking skills. Most of all, thank you for your unwavering support as my committee chair during the dissertation process. You always responded promptly and helped me to examine the importance of my dissertation decisions.

Dr. Piro thank you for your thorough and well-rounded overview of psychology and my favorite, history of education. You made lectures interesting by accentuating the theoretical and the historical aspects of education with culture and art. You embody and model a doctoral persona for your students, and your feedback during the dissertation process was helpful.

Dr. Maltempi thank you for your support during the dissertation process. You helped with everything from understanding the value of *Q* methodology to improving my writing and statistical skills. Thank you! You are simply the best!

Thank you to my cohort for endless laughs and support. Jenine, I am grateful as you helped me so much with data collection.

To my parents, I could not have done this without your teachings and advocacy for education. Despite having an elementary school education, and being immigrants who did not speak English, you leveraged your values of Hellenism, patriotism for the United States, family, religion, and education to prepare me for this process. To my brother, you helped mold me to think and learn through our endless global political debates.

Last, but not least, thank you to my husband. Your emotional support, help with our business, and most importantly raising our three beautiful children was pivotal to my success. You are truly my best friend.

DEDICATION

I dedicate this dissertation to my three children, Konstantinos, Stavros, and Agnes. I have sacrificed a great deal of time with you to complete this program and I am forever grateful for your understanding, love, and support. The three of you have such great spirit, sense of humor, and I am so proud of you. Every day I thank God for all three of you. I hope that my journey in this program, serves as an example for all of you, that with grit, determination, hard work, and sacrifice, you can accomplish your dreams.

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Abstract

Metacognitive instruction and pedagogy have been linked to self-aware, independent, and successful learning. A particular student population that may benefit from a focus on metacognitive instruction are English Language Learners (ELL). This *Q* methodology study uses a mixed methods approach to examine the dominant viewpoints, beliefs, and opinions of ELL teachers on metacognition, metacognitive instruction, and pedagogy. Data were analyzed from 25 suburban New York public school ELL teachers located in Nassau and Suffolk counties concerning their beliefs regarding the metacognition, metacognitive instruction, and pedagogy. In addition, demographics, and exposure to metacognition as a topic were assessed using a baseline survey. This study identified and examined three *Q* models of shared viewpoints held by ELL teachers. Background characteristics were utilized to describe the clusters of ELL teachers. These characteristics consisted of: grades taught, education levels, certifications held, years of experience, and educational and professional exposure to metacognition as a topic. The three *Q* models revealed consensus in many areas of metacognition and metacognitive instruction, with some variation between the *Q* models. The three *Q* models that emerged were: Critical strategic thinking and reflection lead to ELL student self-awareness and independent learning; Explicit and deliberate planning model coupled with visual organizers; and Explicit monitoring and self-reflection coupled with visual organizers.

Keywords: metacognition, self-regulation, English Language Learners, *Q* methodology

Chapter I Introduction

This dissertation will use *Q* methodology to explore English Language Learners (ELL) teacher dominant viewpoints about metacognition, beliefs about their use of metacognitive instruction practices inside their classrooms, and exposure to metacognitive resources and supports in their educational and professional trainings.

For over forty years, theorists and their research have highlighted the importance of students acquiring metacognitive knowledge and skills to become successful lifelong learners (Wilson & Conyers, 2016). The use of metacognitive strategies for learning in ELL students may lead to deeper learning and improved performance, especially for struggling ELL learners (Hernberg, 2020). However, there has been a dearth of research on ELL teacher understanding about metacognition and research on the use of metacognitive practices with students remain sparse. This study not only seeks to explore personal ELL teacher metacognitive dispositions, but also which metacognitive practices ELL teachers believe they adopt most often to support their personal metacognition, and the instructional practices they incorporate in their instruction to help ELL students increase their own repertoire of metacognitive knowledge and strategies. This study is critical as ELL students rely on ELL teachers to understand their own metacognition, and to teach them how to metacognitively monitor and regulate their cognitive strategies while listening and reading, as they are processing their native language and the English language simultaneously to comprehend (U.S. Department of Education [USDOE], 2015)). Due to the dual processing required of ELL students, as opposed to single language processing with monolingual students needed to comprehend oral instructions and written text, metacognitive knowledge and strategies become an indispensable tool allowing ELL's to become conscious, confident, successful students through the enhancement of their strategy repertoire (Zhang &

Goh, 2006). If ELL teachers do not understand metacognition and fail to incorporate it into instruction, the concept and the practice remain abstract, lost in the gap between research and practice. Moreover, the teachers will not have the capacity to serve as the mediator between their metacognitive knowledge and skills and a metacognitively rich educational setting.

The concern is that ELL teachers may lack metacognitive practice at the core of their respective personal teacher metacognitive epistemology, or that aspects of metacognition are adopted by ELL teachers in and incoherent and fragmented fashion stems from little evidence existing that teachers are explicitly or consistently metacognitive in general (Duffy et al., 1987). Additionally, there is little to suggest that schools are using metacognitive strategies in a widespread manner (Perry, Lundie & Golder, 2018). Furthermore, it is also unclear if the development of personal metacognition and metacognitive instructional practices are being developed in teacher preparation programs at the university level, during teacher induction and through lifelong professional development. According to a study in Europe, teachers reported that limited training on the topic of metacognitive deficits and lack of teaching time prevented the use of specialized teaching methods to support student metacognition (Mavropalias & Andronidi, 2017). To the student researcher's knowledge, a study about ELL teacher understanding and use of metacognition in the United States does not exist, and it is unfair to assume the extent to which metacognition is adopted by ELL teachers and taught to their students, therefore this study sets out to explore this topic. The next paragraph briefly describes how ELL teachers are trained and certified in New York State (NYS), to assist the reader in familiarizing themselves with the level of training required by teachers who work with ELL students, and who will be sampled in this study.

In New York State (NYS) all school districts are held responsible for hiring ELL teachers to address the needs of students with English as a new language and ELL teachers receive advanced training, to do so. A NYS certification requirement is that ELL teachers receive core education courses along with a special track master's degree in TESOL (teaching English as second language or foreign language), or bilingual education. The intended outcome of ELL teacher education is to meet NYS standards and initiatives for ELL students, which include: 1) Addressing the needs of ELLs in early childhood education; 2) Providing resources and technical assistance to school districts to prepare bilingual and English as a New Language teachers to raise standards and achievement levels for ELLs; 3) Identifying instructional strategies for ELLs; 4) Developing resource documents to support literacy development for ELLs. It is within the third initiative, identifying instructional strategies, where this dissertation will explore if ELL teachers are providing instruction enhanced with metacognitive skill training and knowledge (NYSED, 2019). The remainder of the introduction will familiarize the reader to the interdisciplinary definition of metacognition, global importance, the significance if metacognition as a pedagogic question, the significance of a metacognitive teacher, the importance of metacognitive instruction for ELL students, and a statement of the problem.

1.1 Interdisciplinary Introduction to the Definition of Metacognition

To analyze if English Language Learner (ELL) teachers understand metacognition, and incorporate it into practice, one must understand the interdisciplinary definitions of the term. Before defining metacognition, it is important to point out that after forty years of bonafide research and theory on the pivotal role of metacognition in knowledge acquisition and application, a consensus on a definition continues to elude the interdisciplinary community. Metacognition has been researched and defined by many disciplines such as psychology,

philosophy, and education, yet arriving at a unified definition has been difficult (Azevedo, 2020). Joelle Proust (2013) a prominent philosopher in metacognition, calls the variation in definition "astonishing" and writes about the interdisciplinary nature as the primary reason for metacognition's various definitions that have failed to converge. Despite its importance, its "fuzzy concept" makes it difficult to formalize its applications in higher, secondary, and primary education communities (Brown, 1987; Kuhn and Dean, 2004; Tarricone, 2011). Additionally, metacognition has been described and defined in many ways. Therefore, operationalizing the construct for study remains a challenge (Azevedo, 2020; Tarricone, 2011).

Besides its interdisciplinary nature standing in the way of a universal definition, psychologists, educators, and philosophers have grappled with understanding where cognition ends, and metacognition begins. Clearly, both involve thinking, however not all our thinking is metacognitive in nature. Furthermore, experts in the field have used terms such as metacognitive knowledge (MCK), metacognitive skills (MCS), self-regulation (SR), and executive functioning (EF), interchangeably, making it difficult to conceptualize the various components and processes of metacognition, and how they interact with each other in the classroom.

Despite metacognition's controversial nature, there are some notable and acceptable definitions in the interdisciplinary community. Most educational philosophers and educational psychologists define metacognition (MC) as the knowledge, assessment, and monitoring of our own cognition in service of executive function and regulation, learner agency, problem-solving, judgment, decision making, awareness, knowing ourselves emotionally and cognitively, accomplishing our goals, and learning. A student ignites his or her metacognition when one reflects on what one knows, what one needs or wants to know, during problem-solving, and when regulating and planning. Within the word metacognition, "meta" a Greek word, means

after, above, behind, or beyond. The word "meta" helps us understand that when we look at metacognition, we look at "knowledge about one's own cognition rather than the cognitions themselves" (Brown, 1978, p. 79; Tarricone, 2011). An overused and simple definition is "thinking about thinking" (Flavell, 1979). A more elaborate definition from psychologist John Flavell's writing referred to metacognition as one's knowledge concerning one's cognitive processes and the active monitoring, regulation, and orchestration of these processes in the service of a cognitive enterprise (Flavell, 1979; Tarricone, 2011).

Knowing cognitive strategies and planning on how, when, and where to use them are factors that affect intellectual performance. One can conceptualize metacognition in the classroom as awareness and management of one's thought to regulate and further learning and apply heuristics in everyday problem solving (Kuhn and Dean, 2004). Awareness is central to knowledge, and control distinguishes metacognition from cognition (Pintrich, 2002, Worley, 2018). Kuhn (2000) further posited that cognitive processes are involved in the cognitive action, while metacognitive processes are involved in choosing, planning, and monitoring the cognitive action (Alzahrani, 2017).

According to Schraw and Dennison (1994), metacognition consists of two components, knowledge of cognition and regulation of cognition. One can think of metacognition as the quintessential ingredient in teaching and learning. A metacognitive learner does not passively receive information. Metacognition is what separates us from machines, what makes us sentient beings. Brown describes metacognitive learners as, "active constructors of knowledge, rather than passive recipients of knowledge" (Brown, 1994, p. 9). Schraw and Moshman (1995) describe metacognitive learners as conscious and deliberate who can self-educate by using regulation as the mediator between reflection and learning (Rahman & Yunus, 2020). Even

Aristotle had pondered the difference between perception as passive intellect and understanding as active intellect or what he called Noesis (McKeon, 2001).

Metacognition is the very essence of a "twenty-first century" learner, and "learning to learn" is the cornerstone of the "twenty-first century" workforce. A widely used term, the goal to produce "twenty-first century" learners is what has brought metacognition to the world stage. Eriyani (2020) reported that metacognitive abilities are the key to learning. Cetin (2015) and Gogh and Kovari (2018) indicated that metacognitive abilities are essential for lifelong learning.

In philosophy, one definition is the epistemic belief about one's ability to recall information, solve a problem, and in hindsight, evaluate their performance (Proust, 2013). One area of concern to educational philosophers is known as personal epistemology. Personal epistemology is one's belief about what knowledge is, where it resides within the individual, and how the individual constructs such knowledge within the self (Fagnant & Crahay, 2012). Another similar construct is folk epistemology, an area of study concerned with the average person's beliefs concerning the nature of knowledge and how it occurs (Kitchener, 2002). Educational philosophers are very much concerned with the declarative part of metacognition, which comprises one's beliefs and how they affect performance and problem-solving. The literature review will analyze the various interdisciplinary definitions and theories of metacognition in depth.

1.2 Global Importance

Multiple corporations, governments, and not-for-profits have created a global demand for metacognitive, self-led, independent learners and effective problem solvers. Our English Language Learner (ELL) students know two languages at a minimum and should be prepared as twenty-first-century learners to confidently compete on the world stage. The International

Bureau of Education (UNESCO) defines twenty-first-century curriculum and pedagogy as one that prepares students for soft skills and specialized skills (2021). Soft skills are defined as creativity, communication, collaboration, critical thinking, problem-solving, ethics, positive attitudes, and technology savvy, etc. (UNESCO,2021). As the reader will see in the literature review, critical thinking and problem solving require cognitive and metacognitive capabilities. The global focus is on the advancement of teachers and student competencies as opposed to curriculum content (Marope, 2014). The Organization for Economic Co-operation and Development (OECD, orchestrator of the Programme for International Student Assessment (PISA in their "Skills for 2030" publication, describes metacognition as vital to education (OECD, 2018). The International Association for the Evaluation of Educational Achievement's (IEA) executive Director, Dr. Dirk Hastedt, stated, "Everyone wants to ensure young people are equipped to think critically and creatively, to solve problems in an increasingly changing and globalized world" (IEA, 2021, p. 1).

In the United Kingdom, England established the Personal Learning Thinking Skills (PLTS) framework comprising six skills that, together with the functional skills of English, mathematics, and Information and Communication Technologies (ICT), are essential to success in learning, life, and work. These skills will enable young people to enter work and adult life as confident and capable individuals. The six personal learning and thinking skills are 1) Independent Inquiry; 2) Creative Thinking; 3) Reflective Learning; 4) Teamwork; 5) Effective Participation; 6) Self-Management (Gateway qualifications, 2021). All these skills that require a deeper set of metacognitive skills such as planning, monitoring, reflection, and self-regulation, or they are thinking competencies that require in depth metacognitive knowledge, such as declarative, procedural, and conditional knowledge and memory. For example, for a student to think

creatively one must reflect, evaluate, assess, and plan to create and innovate. He or she must think about their own thinking and learning to assure that they are on the right track (Jia et al., 2019). The international and European education communities have established steps to formalize the role of metacognition in education through policies, standards, and a vision.

In the United States, metacognition is not explicitly formalized in state learning standards. The National Education Association discusses various components of self-regulation and metacognition in their publication P21, preparing 21st Century Students for a Global Society: An Educator's Guide to the Four C's (n.d.), which outlines the essential 21st century skills–critical thinking, communication, collaboration, and creativity (Porter 2021). In response to P21, many states revised their educational standards; however, the Common Core State Standards (CCSS) mention metacognition once in the document without any specified framework of how to teach and assess metacognitive knowledge or skill (Kurzer, 2015). The CCSS and other standards frequently mention metacognitive-related components such as higher-order thinking (HOT), critical thinking skills (CTS), and the standards themselves are by their nature metacognitive however, are not identified as such by the state standards. The Next Generation Learning Standards (NGLS) does not mention metacognition, even though metacognitive teaching strategies enhance NGLS standards in the classroom. In an action research qualitative study, a science teacher taught explicit metacognitive strategies to 76 students in a middle school science class. Once the skills were taught, the students used concept maps to monitor and record the skills that they were using during science instruction and while performing science labs and projects. Most students showed increased retention, understanding, and transfer of the science content within NGSS compared to those who did not receive metacognitive training (Monroe, 2018). Although metacognition enhances student ability to achieve proficiency in NGSS to the

standards, the very metacognitive skills that help become proficient in the standards are not explicitly mentioned.

Another area of education in the US and globally that acknowledges metacognition as an important ingredient to learning for underserved and English Language Learner (ELL) student populations is liberatory education. Hamond (2021) defines liberatory education as the combining of the science of learning with culturally responsive practice. Culturally responsive practice is a term that is frequently lumped together with multicultural education and social justice education. However, culturally responsive education has a different focus, to create independent learning and to advance student agency. Under her "master moves for liberatory instruction," Hammond describes the goal is for students to become self-aware, and self-directed as learners, the two hallmarks of metacognition" (Hammond, 2021, p. 7). Liberatory education focuses on structures, processes, and routines that give students the ability to become leaders in charge of their learning. The focus on metacognition for students of color and ELL students is taking center stage, especially since the goal is to support historically marginalized students to be independent learners and not just compliant learners.

1.3 Metacognition and Student Outcomes

A wealth of research correlates metacognition and high student achievement. A meta-analysis of 137 research studies correlates metacognition with intelligence and academic achievement (Ohtani & Hisasaka, 2018). Effective metacognitive skills teaching can make a significant difference in pupil outcomes (Perry, Lunder & Golder, 2018) and students who apply metacognitive strategies outperform peers who do not (Owens & Vista, 2017). This is important, pointing to evidence that metacognitive pedagogy should focus not only on developing metacognitive skills but also on metacognitive knowledge. They are both important because

metacognitive knowledge is the awareness of knowledge and metacognitive skills are needed for the regulation of that knowledge. Developing metacognition in the classroom, especially learner agency and autonomy, is efficient in time and money and has a high impact on achievement. (Worley, 2018).

The highest performing school systems in PISA teach metacognitive skills in their schools, such as Shanghai, Hong Kong, and Finland (Perry, Lunder, & Golder, 2018). High-performing students utilize metacognitive strategies and self-regulation more often than low achieving students and students with disabilities. Research by Veenman et al. shows that metacognition accounts for approximately 16.3% of a child's ability to succeed in school, while intelligence only accounts for 13% (Perry, Lundie, & Golder, 2008; Veenman & Beishuizen, 2004). In a qualitative cross-sectional study, researchers evaluated 100 secondary school students for the use of metacognitive skills and strategies on the effectiveness of their cognitive ability. The data obtained concluded that the development of metacognitive skills increases the effectiveness of a student's cognitive ability (Rahman & Yunus, 2020).

Metacognition's usefulness in classroom environments is limitless. Teaching metacognition is fundamental to other skills such as critical thinking, problem-solving, and making judgments and decisions (Owens & Vista, 2017). It is through the development of these skills that metacognitive pedagogy also entails developing a student's self-efficacy by understanding their academic strengths and weaknesses to build self-confidence and agency in the classroom (Hulbig, 2021). Metacognitive abilities produce in-depth knowledge, increase retention and memory, and enhance social learning (Stanton et al., 2021). Metacognition works best when taught within student collaboration, making it ideal for school and social settings. Metacognitive skill teaching also enhances assessment and feedback and works well with a growth mindset

(Perry, Lunder, & Golder, 2018). Teaching metacognitive strategies and skills provides cross-curricular enhancement. There is evidence that metacognitive knowledge combined with metacognitive skills predicts successful learning across age ranges and school subjects (Perry, Lundie, & Golder, 2008).

Although there is ample research linking metacognitive knowledge and metacognitive skills to increased school performance, there is some prominent research linking only metacognitive skills to student achievement. There is a positive correlation between metacognitive skills and learning performance, whereas metacognitive knowledge and learning performance are not related in some studies (Veenman & Elshout, 1999). This may be because it is difficult for subjects to verbalize their metacognitive knowledge before or after a task or give an account about the involvement of metacognitive knowledge during post-task interviews and questionnaires. Conversely, metacognitive skills are measured during the task making this aspect of metacognition easier to operationalize and examine. Putting aside the metacognitive skills versus metacognitive knowledge debate, Veenman and colleagues have established strong evidence about the benefits of metacognition and its correlation to strong academic performance when metacognition is taught over a long period and embedded in the lessons (Perry, Lunder & Golder, 2018, Veenman & Beishuizen, 2004).

1.4 Significance of Metacognition as a Pedagogic Question

A thorough review of metacognitive literature and studies leads a reader to conclude that efficacious metacognitive pedagogy in the classroom is vital to learning. Eriyani (2020) reported that developing metacognitive abilities in students through metacognitive pedagogy is key to teaching and learning. Ample studies confirm the correlation between teaching metacognition and high student achievement albeit research and writing on what metacognitive pedagogy is in

the classroom is unfocused and diffuse. There have been some efforts to establish evidenced-based metacognitive instruction, but overall metacognitive practice and theory is unclear. The literature review will take a deep dive as what a metacognitive approach to instruction looks like, the role a teacher with good metacognitive understanding plays in instruction, and how the teacher mediates the two, however a short introduction to the topic will be provided in the next few paragraphs.

In "Promoting Student Metacognition" Kimberly Tanner (2012), writes about explicit metacognitive activities that can be incorporated into any grade and subject to increase metacognitive skill and metacognitive knowledge learning. Tanner suggests opening lessons by exploring with students what they already know about a topic that can guide their learning. Throughout the lesson she recommends giving students opportunities to identify misconceptions, and an opportunity to change course in their independent practice. She also recommends closing lessons and exams with post assessments such as exam wrappers and reflective journals to assess how their thinking has changed, what strategies worked and did not work, and future goals they can implement for more successful learning in the future (Chick, 2015). Teachers can also introduce tools which help students identify study strategies. Tanner also recommends developing a "classroom culture grounded in metacognition" by regularly checking for understanding, modeling, and facilitating metacognition pre, post and during lessons, and integrating metacognition into collaborative classroom discussions (Tanner, 2012, p. 116-118). The literature makes it abundantly clear that in the classroom the goal of metacognitive activities in lessons is to understand oneself as a learner and to solve problems related to learning on order to facilitate learner agency, control, independence, and a growth mindset.

In their book "Teaching Students to Drive Their Brains," Wilson and Conyers (2016) share practical teaching strategies and practices by setting goals with students, monitoring student progress, and engaging in practices that enhance cognitive flexibility. The authors also started unique teaching programs at Nova Southeastern University that they call "brain-based". The teaching programs focuses on training teachers to use metacognitive strategies in the classroom.

Scharff et al., (2017) writes about Bloom's Taxonomy as a necessary tool in a metacognitive classroom. Bloom's taxonomy provides lists of verbs and questions that teachers can ask to enlist various metacognitive learning processes in the classroom. The verbs and questions provide teachers and students with a range of lower to higher order thinking questions in six categories: 1) Knowledge; 2) Comprehension; 3) Application; 4) Analysis; 5) Synthesis; and 6) Evaluation. In addition, knowledge surveys can be constructed using Bloom's Taxonomy that can help students enhance their judgment-of-learning by supporting student self-assessment on their actual performance versus their perceived performance on exams and assignments (Scharff, 2017).

John Hattie world-renowned educator and researcher listed several variables that positively impact learning, (Hedlund, 2021). Variables like teacher and student efficacy, verbalization and questioning, collaborative learning, problem-based learning and inquiry, and feedback were found to be the most effective. Hattie has also studied and written about encouraging students to make their learning visible to scaffold metacognitive abilities. Since then, many curricula have been developed for making learning visible, and one of them is Thinking Maps.

Thinking Maps (2021) and other mind mapping companies have researched and developed eight systematic mind maps that represent various human cognitive endeavors for various types of information processing. Students can learn to use specific maps for gathering, recording,

analyzing, and overall making learning visible. Examples include tree maps for taxonomy, bridge maps for analogies, cause, and effect maps, and more. The student thinking maps make learning visible by allowing learners to capture the moment of thinking for in the moment analysis, post-assessment (Sweet et al., 2016). The thinking map also preserves students thinking allowing the opportunity for teacher feedback making the student's thinking and learning visible. The brain maps also scaffold and support working memory, as the student can record the information on the map for analyses and manipulation. This is especially important for students with learning disabilities and ELL learners, as they struggle to hold information in working memory while engaging in metacognitive activities. In a study with 239 students, grades three through eleven, concept maps proved the most powerful instruments for uncovering and supporting student metacognition (Ritchart et al., 2009).

Another aspect of making learning visible is Carol Dweck's research on Growth Mindset (2017). A growth mindset is a student/teacher that believes in developing various metacognitive ingredients that cultivate successful teaching and learning, such as self-efficacy, motivation, self-regulation, reflection, and feedback. In more general terms it is a disposition that a student holds that learning and intelligence are not fixed. Helping a student making their implicit beliefs on learning visible aids in improving metacognitive knowledge and skills. In a study at a German University with 254 students, implicit theories of self-regulation were strongly related to students' achievement goals, learning strategies, and metacognitive knowledge as opposed to implicit theories of intelligence (Hertel & Karlen, 2020). This study shows the strong connection between a student's declarative metacognitive knowledge and its strong relationship to student achievement.

In summary, in a metacognitive classroom, a metacognitive teacher not only model's metacognition but facilitates student metacognition through explicitly teaching metacognitive skills and knowledge within a collaborative learning community that emanates from pedagogy that focuses on metacognition. If one is to walk into a metacognitive classroom, he or she should observe the teacher to model and facilitate pre-assessment and planning activities, active questioning, and monitoring through inquiry on how a lesson is progressing especially during problem solving, and post analysis and reflection on how a lesson, assignment or exam helped a student learn. Furthermore, self-regulation is evidenced when students and teacher are engaged in the lesson and setting goals for future learning.

1.5 Significance of a Metacognitive Teacher

There exists a challenge in developing metacognitive teachers. Teachers need to develop their metacognitive knowledge and skills and figure out how to advance metacognition in their classrooms and their students (Wilson & Bai, 2010). Metacognitive teachers do not solely focus on teaching metacognition but adopt a metacognitive practice about thinking and learning (Schofield, 2012). One cannot assume that students will develop strategies for effective thinking on their own and that includes strategies for the systematic and accurate processing of information. A self-aware teacher promotes that same self-awareness in students and teaches them how to implement metacognitive strategies as agents of their thinking (Kluwe, 1982). Teachers must not only be metacognitive, but they must model metacognition to their students. Teachers need to acknowledge the connections between learning and affect for themselves and their students, as the learner's emotions impact their metacognitive state.

To produce metacognitive students, teachers need to have a clear understanding of the concept of metacognition and believe in its value. Teaching students how to learn is just as

important as teaching students' cognitive skills and content. In fact, teachers need to have a metacognitive disposition themselves. Understanding and personal epistemology regarding metacognition are not enough without a pedagogical understanding of metacognition. Metacognitive pedagogy entails that educator understand what instructional techniques and strategies are necessary to teach metacognition. A study by Wilson and Bai (2010) examined pedagogical understandings of metacognition of teachers working towards a master's degree in education revealed that their own personal understandings of metacognition were related to their perceptions of what instructional strategies they used to be effective in helping their own students develop their metacognition. Another finding in this same study is that teachers with good metacognitive knowledge (declarative, procedural, conditional) have a better understanding of metacognitive pedagogy.

1.6 ELL Students and the Need for Metacognitive Pedagogy

English Language Learner students represent an increasing student body population in the United States. Common native languages spoken by ELLs ranges from Spanish as the most common (71%) followed by Chinese (4%), Vietnamese (3%), French (2%), and Arabic (2%). As of 2018 ELL's make up 10% of the student population totaling five million students (NCES, 2021). ELL students are struggling to meet proficiency in reading and math. In 2017, just 14% scored proficient or above proficient on math state test exams, and 9% scored proficient or above proficient in reading state exams (USDOE, 2022). The underachievement is pervasive and leads to several negative outcomes to high school and higher education. ELLs graduated at a rate of 59% compared to the national average of 80% in 2012 (Stetser & Stillwell, 2014).

There are some reasons as to why the gap exists. Some are related to metacognition, and some are not, yet the need to address these reasons is important. According to McGuire (2021),

this gap exists because low-income minority students and ELL students may not be exposed to metacognitive strategies from caregivers; therefore, they not only enter school behind affluent white students, but they are also not provided with metacognitive knowledge and strategies in the classroom. Metacognitive skill teaching often fails to emerge in underprivileged classrooms for many reasons. Fixed student intelligence is a common misconception amongst educators, and in addition, schools are under-resourced and as a result do not provide opportunities for high-level learning. Furthermore, ELL teachers have limited time available for direct and effective instruction (August et al., 2005). Massive achievement gaps for these students are also due to a lack of academic English proficiency which is rooted in lack of sufficient vocabulary leading to poor comprehension (Wallace, 2008). Moreover, ELLs lack the necessary fluency skills caused by poor phonemic awareness and word recognition (Jennings et al., 2013) contributing to cognitive overload when reading while trying to decode words, leaving very little energy dedicated to comprehension.

In response the challenges that ELLs face Every Student Succeeds Act (ESSA) addressed the need to provide responsive and challenging instruction that is aligned with state standards and prepares ELLs for college and career readiness (USDOE, 2015). Students may be instructed within the confines of bilingual programs or English-only immersion programs along with pullout or push-in instruction from a TESOL certified teacher. Several evidence-based intervention programs have been developed yet the academic achievement gap between ELLs and their peers continues to grow.

Developing metacognitive skills can help the academically underserved ELL students overcome previous educational disadvantages (Horell et al., 2019). Metacognition can make a difference. “Over the last 20 years, I have seen countless students transform their academic

performance by using simple metacognitive learning strategies that show them how to learn" (McGuire, 2021, p. 70). Metacognitive teachers and metacognitive pedagogy introduce effective strategies that consist of bolstering the metacognitive knowledge and skills of ELLs to enhance vocabulary acquisition, and word fluency. Metacognitive skills are crucial to word learning (Nagy & Scott, 2000), by teaching ELLs to purposefully monitor and reflect their word learning processes, use appropriate task strategies and transfer those newly acquired strategies to future tasks that will aid in learning English (Deng, 2016). Effective instruction is necessary to support effective word learning strategies, improve vocabulary acquisition thereby increasing comprehension. The bottom line is that ELL learners need abundant knowledge of metacognitive reading strategies to improve their reading comprehension (Fani et al., 2021).

Metacognition can also help in receptive language skills. In second language learners, listening skills are positively impacted by utilizing cognitive and metacognitive skills, and it is the development of listening skills that positively impact speaking, comprehension, and writing (Zhang & Goh, 2018). Another study with 100 participants by Looichin et al. (2017), revealed that metacognitive strategy awareness has a positive effect on students' post test scores on listening performance. Listening comprehension and overall comprehension is an important skill for ELL students, and although these studies are helpful, further research is needed in this area to specify what type of metacognitive skills impact listening comprehension, and how to effectively instruct students in this area.

English Language Learners should be afforded instruction that increases declarative, procedural, and conditional knowledge to "consciously and purposefully monitor and reflect their word learning processes, flexibly use task appropriate strategies and transfer the strategies to new tasks" (Deng, 2016, p. 8). Furthermore, if teachers promote metacognitive awareness, it

can enable ELLs to manage their cognitive abilities effectively and efficiently by locating weaknesses that can be rectified through employing more effective cognitive strategies that can lead to successful learning of English as a second language (Sekar, n.d.).

1.7 Statement of the Problem and Research Questions

In a time where the focus of underserved students ELL students has become the center of a global and national public education system, the notion of using metacognition to produce life-long self-efficacious, independent, and competent thinkers, learners and teachers are deserving of the utmost urgency and importance from educators worldwide. Research with K-12 ELLs is lacking and deserves a more intense focus, especially since language acquisition research is positively correlated to metacognitive learners (Hernberg, 2020).

In summary, the dissertation will answer the following research questions (RQ):

RQ1: What are the dominant viewpoints shared by ELL teachers regarding metacognition?

RQ2: To what extent if any do ELL teachers believe they are implementing metacognition into their pedagogical and instructional methods?

RQ3: Are there institutional resources available to ELL teachers relative to metacognitive instructional practices?

1.8 Definition of Terms

This section provides a definition of terms used in Chapter I.

1. Conditional metacognition: Knowing when to apply skills and strategies to facilitate learning.
2. Declarative metacognition: Awareness or analysis of own's own thinking process.
3. ELL: English Language Learners.

4. Epistemic: Of, relating to, or involving knowledge.
5. Epistemology (Philosophical): Knowledge and understanding.
6. ESSA: Every Students Succeeds Act.
7. Folk Epistemology (Philosophy): Our personal self-knowledge.
8. Growth Mindset: Having a growth mindset means understanding that intelligence improves through studying and practice.
9. Heuristics: mental shortcuts we use to solve problems and make decisions.
10. Metacognition: The awareness or consciousness about what we know and, how we will utilize what we know to achieve a cognitive enterprise.
11. Noesis (Philosophy): The activity of our intellect, and the exercise of reason.
12. Pedagogy: The art of science of teaching, especially instruction in teaching methods.
13. Procedural metacognition: Knowing how to apply skills and strategies to facilitate learning.
14. TESOL: Teaching English to Speakers of Other Languages.

1.9 Chapter Summary

The acquisition of metacognitive knowledge and skills has been linked to students becoming successful life-long learners (Wilson & Conyers, 2016). Students who apply metacognitive strategies while learning outperform peers who do not (Owens & Vista, 2017). This is especially the case for English Language Learner (ELL) students. The use of metacognitive knowledge and strategies in ELL students has been correlated to deeper learning and improved learning performance (Hernberg, 2020). For students to incorporate and benefit from metacognition, teachers must understand, personify, model, and explicitly incorporate metacognitive knowledge and skills for ELL students during instruction. There has been a good amount of research

documenting the positive outcomes for students linked to the teacher use of metacognitive pedagogy and instruction. This has not been the case for ELL teacher understanding and use of metacognition in the classroom. This study will explore teacher understanding and use of metacognitive instructional practices in the classroom. Using *Q* methodology, this study will examine ELL teacher viewpoints and beliefs regarding metacognitive knowledge and metacognitive skills during instruction. Additionally, the study will investigate ELL teacher prior exposure to metacognition as a topic during their previous education and professional development.

In the next chapter, the literature review will survey and organize the theories and research on metacognition, by first, providing a history of metacognition and the various conceptions derived from the writings of some of the most prominent philosophers' and educational psychologists. The literature review will explore the research and theories on the various components and processes of metacognition, first looking at metacognition as a two-factor model (metacognitive knowledge and skills), with a possible third factor of metacognitive experience through affect motivation social metacognitive theories. Then metamemory and monitoring, will be explored, followed by the importance of critical reflection and critical thinking. The developmental trajectory of metacognition and self-regulation will also be reviewed. Finally, the literature review will examine how teacher understanding influences metacognitive instruction, pedagogy and how students benefit from receiving instruction with metacognitive pedagogy. The goal is to fully understand metacognition from an educational, psychological, and philosophical standpoint.

Chapter II Literature Review

The purpose of this dissertation is to explore ELL teachers' viewpoints and how it relates to their understanding of metacognition, how their beliefs impact their pedagogical and instructional methods, and understand the level of instructional support they have received involving metacognition. As stated in Chapter 1, there exists confusion in the literature among the constructs of metacognition and self-regulation with many unanswered questions about the similarities and differences between them (Dinsmore et al., 2008). The literature review will present the various definitions and writings from some of the most prominent philosophers and educational psychologists to lay the groundwork using various conceptions about the topic.

Additionally, the literature review will explore the research and theories on the various components and processes of metacognition, first looking at metacognition as a two-factor model (metacognitive knowledge and skills), with a possible third factor of metacognitive experience through affect motivation social metacognitive theories. Then the chapter will explore metamemory, monitoring, and the importance of critical reflection and critical thinking. The developmental trajectory of metacognition and self-regulation will be reviewed. Finally, the literature review will examine how teacher understanding influences metacognitive instruction, pedagogy and how students benefit from receiving instruction with metacognitive pedagogy. The goal is to for the student researcher to give the reader a deep understanding of metacognition, its processes, to understand the importance of formally adopting a system in which educators have a good grasp on what metacognition is and how to teach it, especially in classrooms with ELL students and historically underserved student populations.

2.1 History of Metacognition in Philosophy, Psychology, and Education

Many metacognitive researchers and writers begin their literature reviews about metacognition from when John Flavell coined the term during the heart of the cognitive revolution in the 1960s and portrayed metacognition as a conceptual framework first discussed in psychology. Contrary to this belief, components of metacognition have been contemplated since ancient times. Most philosophers and educational psychologists mentioned below did not use the term metacognition or discuss the models of metacognition as we have come to know them today. They do; however, touch upon various components and processes of metacognition in their writing.

In ancient Greece, philosophers were percipient on the importance of reflection, the presence of self-talk, and questioning, all leading to increased self-awareness and learning. Socrates said that man learns nothing new, but he only becomes aware of what he already knows, and when someone asked Heraclitus what he knew, he replied, "I search myself" (Drigas & Mitsea, 2020). In Plato's work *Theaetetus* 189e-190a, Socrates describes thinking in terms of an internal dialogue, a type of critical thinking, or what Lev Vygotsky would later call a private speech. This private speech occurs when the soul considers or ponders life's questions (Worley, 2018). In another example, Plato's dialogical work *Meno*, Socrates part (82b–85b), Socrates asserts that Meno's slave boy can solve a geometrical problem through Socrates' questioning. The boy solves the problem, thus demonstrating Socrates' point that the knowledge was already within him. All Socrates had to do was his famous Socratic method to assist him in arriving at the answer. Plato's writings discuss self-reflection and internal discourse and use questioning and critical thinking to construct knowledge. Plato's work represents a three-in-one technique that Socrates uses, which encompasses a teacher, a learner, and a facilitator (Worley, 2018). At his

trial in 399 BC,-Socrates emphasized the importance of reflection in life by saying, “Life without inquiry is not worth living” (McKeon, 2001; Tarricone, 2011). Another famous dictum by Socrates “Know thyself”, encapsulates the importance of self-awareness and metacognitive assessments we make about ourselves (Nelson et al., 2014). The notion that these ancient philosophers understood that leveraging what we already know through our experiences, activating our prior learning, accessing our schemas, and reflecting on them to construct new knowledge is well documented.

Moving forward to 354-430 AD, De Trinitate, otherwise known as The Trinity, primarily focused on matters of religion: however, St. Augustine devoted a good portion of this masterpiece to writing about the role of reflection and memory (Tarricone, 2011). Fast forward to the 17th century, philosopher, René Descartes declared, "I think, therefore I am" or "Cogito, ergo sum." For Descartes the capacity for self-reflection uniquely belongs to humans, as does the soul and language (Metcalfe, 2008).

In an “An Essay in Human Understanding” (1689), English philosopher and physician John Locke discussed various components of metacognition and their role in understanding and acquiring knowledge. He discusses at great length the concept of children reflecting on their thinking. More importantly, he focused on the importance of surveying our strengths and weaknesses when attempting to accomplish a goal, problem solve and learn in the process. He wrote,

> “When we know our strength, we shall the better know what to undertake with hopes of success; and when we have well surveyed the powers of our minds and made some estimate what we may expect from them, we shall not be inclined either to sit still and not set our thoughts on work at all, in despair of knowing anything”; (Locke, 2018, p.35).

About a century later, Immanuel Kant discussed that reasoning is born out of making inferences during problem-solving (Tarricone, 2011). In 1890 Williams James wrote in his *Principles of Psychology* about metacognitive experiential learning which is the process by which individuals understand the ways they learn from experience and themselves as learners and use that understanding to improve their learning effectiveness (Kolb & Kolb, 2012).

John Dewey (1933) focused on phases of reflective thinking that describe what would later be termed metacognitive reflection, critical thinking, and problem-solving. Dewey described the initial phase of problem-solving as a challenge, in which one can experience uncertainty, doubt, perplexity, and hesitation (Tarricone, 2011). The second phase is where the student activates prior knowledge to search effective strategies on how to solve the problem. Dewey did not go into great depth about feelings and the epistemic beliefs that may or may not arise during the process of reflection; however, he did describe some form of self-regulation that one must impose on oneself during inquiry and critical reflection. In the second phase, the learner must suspend judgment and cope with feelings of doubt while gathering data and further inquiring about a solution.

Developmental psychologist, Jean Piaget's cognitive development theory outlined metacognition's development at various stages. Through spontaneous speech, private speech, and actions, Piaget evidenced reflection, reasoning, and knowledge to inform competing courses of action to solve problems. For Piaget, children develop the capability of reflecting on their thoughts during the formal operations stage (12 years old – adulthood), along with abstract and critical thinking. In Piaget's work, three senses of reflectivity were discovered, knowledge of the self, self-control or regulation, and self-correction (Tarricone, 2011).

John H. Flavell, an American cognitive developmental psychologist, coined and defined metacognition. Metacognition was briefly described in the introduction; however, to reiterate, it is the awareness or consciousness about what we know and how we will utilize what we know to achieve a cognitive enterprise (Ediger et al., 2015). Furthermore, he linked self-regulation to metacognition with a term he called "cognitive monitoring" (Israel et al., 2015). Self-regulation will be explored in more detail later in this literature review.

Cognitive monitoring under Flavell's model incorporates metacognitive knowledge and metacognitive experiences and is characterized by four areas in which metacognition interacts with our understanding and our cognition: 1) metacognitive knowledge (MK); 2) metacognitive experiences; 3) goals or tasks; and 4) actions or strategies. Through cognitive monitoring and regulation, metacognition plays a role in memory, comprehension, attention, problem-solving, self-control, self-instruction, and all cognitive enterprises such as social cognition (Flavell, 1979). These related processes will be described in further detail below.

Lev Vygotsky emphasized the importance of reflection and thinking in the development of knowledge. For Vygotsky, there were two factors in acquiring knowledge: an automatic, unconscious process, and second, the development of awareness and control over that knowledge (Guo, 2020). Vygotsky also spoke about learning through mediation. Psychological tools in our social environment such as adults, peers, language, signs, and symbols are facilitators that mediate learning. The student then internalizes these psychological tools and uses them in independent and effective problem solving (Vygotsky, 1978). For Vygotsky, awareness and control go hand in hand with self-regulation. According to Vygotsky, one of the most prominent self-regulating mechanisms is our private speech, which children develop very young (Fox & Riconscente, 2008). Jurgen Habermas, like Vygotsky, believed that historical and social

contexts influence reflective processes. According to Habermas, communication, a rigorous process mediated by language and practical discourse, allows for critical thinking. Robert Hugh Ennis, a pioneer in critical thinking, wrote at great length about dialogical and suppositional thinking, being open to others' worldviews, and how this leads to reflection, reasoning and eventually produces problem-solving competencies (Tarricone, 2011).

In the 1980's Howard Gardner made an important contribution by reframing teaching, learning and assessment through pluralism by outlining various competencies students can use as a mediator to construct knowledge otherwise known as multiple intelligences. Initially there were seven and one of them was intrapersonal intelligence, which is the ability to understand oneself and to use such information effectively in regulating one's own life (Ansarin & Khatibi, 2018).

Finally, one theoretical framework infrequently linked to metacognition and its history is the Mediated Learning Experience (MLE) by Dr. Reuven Feuerstein. MLE's link to metacognition is of particular importance to this study because the statement of the problem asserts that the teacher is the mediator between their metacognition and a metacognitive educational setting that enhances learning. Feuerstein's MLE is based on Vygotsky's theories that underscore the importance of the interactions between the person, the environment, and the experiences that modify one's learning and eventually induce organic change in one's brain (Feuerstein et al., 2010). According to MLE, a parent or teacher can serve as the liaison between the environment and the student through modeling, questioning, and scaffolding provides an engaging and effective interaction, thus producing a superior learning experience (Kozulin & Presseisen). Furthermore, the mediator must incorporate teaching and advocate for metacognitive knowledge and skill in the student. The student eventually internalizes the mediated experience and

becomes an independent, cognitively competent learner and worker. Jerome Bruner wrote and spoke about MLE's unique ability to engage students metacognitively, which he felt was not incorporated in other learning models and was pivotal in rehabilitating inefficient learners (Jain, 2006).

Most philosophers, psychologists, and educators have different vantage points and emphasize various processes of metacognition that are necessary ingredients to effective teaching and learning. Regardless of the differences in their theoretical framework, one can see a common thread spanning centuries of contemplation, writing, and research. Almost all agree that for learning to take place, it is essential to 1) activate prior schema and experience; 2) situate the learner in a problem-solving situation; 3) elevate the learner to reflect, think critically, and self-regulate using modeling, questioning, and scaffolding; and 4) teacher assumes the role of a facilitator, not a lecturer. It is not a coincidence that in today's classroom, most of these commonalities compose the bulk of what we know today as evidence-based practice (EBP) and pedagogy. However, it remains unclear if teachers, and in particular ELL teachers understand how metacognition is an essential part of EBP and believe they must assume the role of purposeful mediators of metacognition in the classroom.

2.2 Factor 1: Metacognitive Knowledge (MK)

One of the most common models of metacognition is the two-factor model. The two-factor model focuses on knowledge of cognition (metacognitive knowledge) and regulation of cognition (metacognitive skills) (Magno, 2010). Beginning with metacognitive knowledge, research shows that students with awareness and control about their cognitions are successful and high achieving students, especially in reading (Hartman, 2001). Since metacognitive knowledge is important to student success, it is therefore equally important to properly define it.

According to Flavell (1979), the first factor is metacognitive knowledge (MK), which is the information we recall from memory and experiences. Metacognitive Knowledge can be divided into three classifications: 1) personal/self-knowledge is the knowledge that one has of themselves and universal variables that influence cognitive activity; 2) task knowledge is the nature of information and task demands at hand; and 3) strategy knowledge is the knowledge of how, using what methods, to acquire a specific goal during learning and problem-solving strategies (Pintrich et al., 2000; Schraw & Moshman, 1995; Tarricone, 2011, Annevirta & Vauras, 2001) (Figure 1). Metacognitive knowledge is the interchange between personal characteristics, the characteristics of the task at hand, and the accessible strategies one can apply to complete the task (Flavell, 1979, Veenman & Elshout, 1999). Paris and Winograd (1990) defined metacognitive knowledge as cognitive self-appraisal and described it as the inner self-reflections one has about their knowledge and abilities. Brown (1987) claimed that a learner does not have metacognitive knowledge until s/he can adequately explain why a particular strategy is helping in learning or in understanding something. (Annevirta & Vauras, 2001).

The first classification of MK is self/personal knowledge, also known as declarative knowledge, and is influenced by culture, childhood experiences, and development. It consists of beliefs about our 1) intra-individual differences; 2) inter-individual differences; 3) universals of cognition (Flavell, 1979, 1987; Tarricone, 2011). Our self-knowledge is our belief about how the mind works in general, but it also considers our abilities and the abilities of others. Our inter and intraindividual knowledge works to compare what we know within ourselves compared to what others know. Our universals about cognition are the general societal and environmental standards and beliefs we hold about cognition, such as our intuitions, misunderstandings, and the process of learning in general (Alhefnawy, 2020; Tarricone, 2011).

Our self-knowledge is shaped by our social environment and can be tacit or explicit, but either way, it is a type of knowledge that is resistant to change, which can profoundly impact learning (Pintrich, 2002; Veenman et al., 2006). Pintrich et al. (2000) consider all aspects of declarative knowledge motivational, except for the universals of cognition. Self-knowledge is instrumental in our self-esteem, self-efficacy, perception, and cognitive flexibility.

In philosophy, our self/personal knowledge is known as our epistemology, epistemic beliefs, and folk epistemology. In philosophical circles, these terms share the same burden with metacognition in arriving at a clear and unified definition (Hofer and Sinatra, 2009); however, the descriptions of self/personal knowledge and personal epistemology are very much aligned. "Personal epistemology is a field that examines what individuals believe about how knowing occurs, what counts as knowledge and where it resides, and how knowledge is constructed and evaluated" (Hofer 2004, p.1). King and Kitchener (2002, 2004) consider personal epistemology as something that we as humans advance through in a developmental sequence on how well we integrate our objective and subjective beliefs about the nature of knowing.

The second classification of MK is strategic or procedural knowledge. This subcategory of MC includes all the metacognitive strategies (MS) used to achieve their goals. These include learning, thinking, and problem-solving (Flavell, 1979; Pintrich, 2002). This area of metacognition is responsible for determining what strategy is best and applying it to one's cognitive enterprise. This area determines if a student knows how to complete tasks.

The third and final classification of MK is task knowledge, otherwise known as conditional knowledge. Conditional knowledge refers to when, where, and why a specific skill or strategy is helpful. This subcategory of metacognition is concerned with when and why one uses the metacognitive approach. One considers the contextual, cultural, and situational factors involved

when attending to task. Awareness, knowledge, and understanding enable learners to manage, monitor, and assess their progress in a task to prevent failure (Tarricone, 2011). Lack of awareness, content knowledge, and insufficient monitoring lead to the breakdown of one's problem-solving and task completion activities.

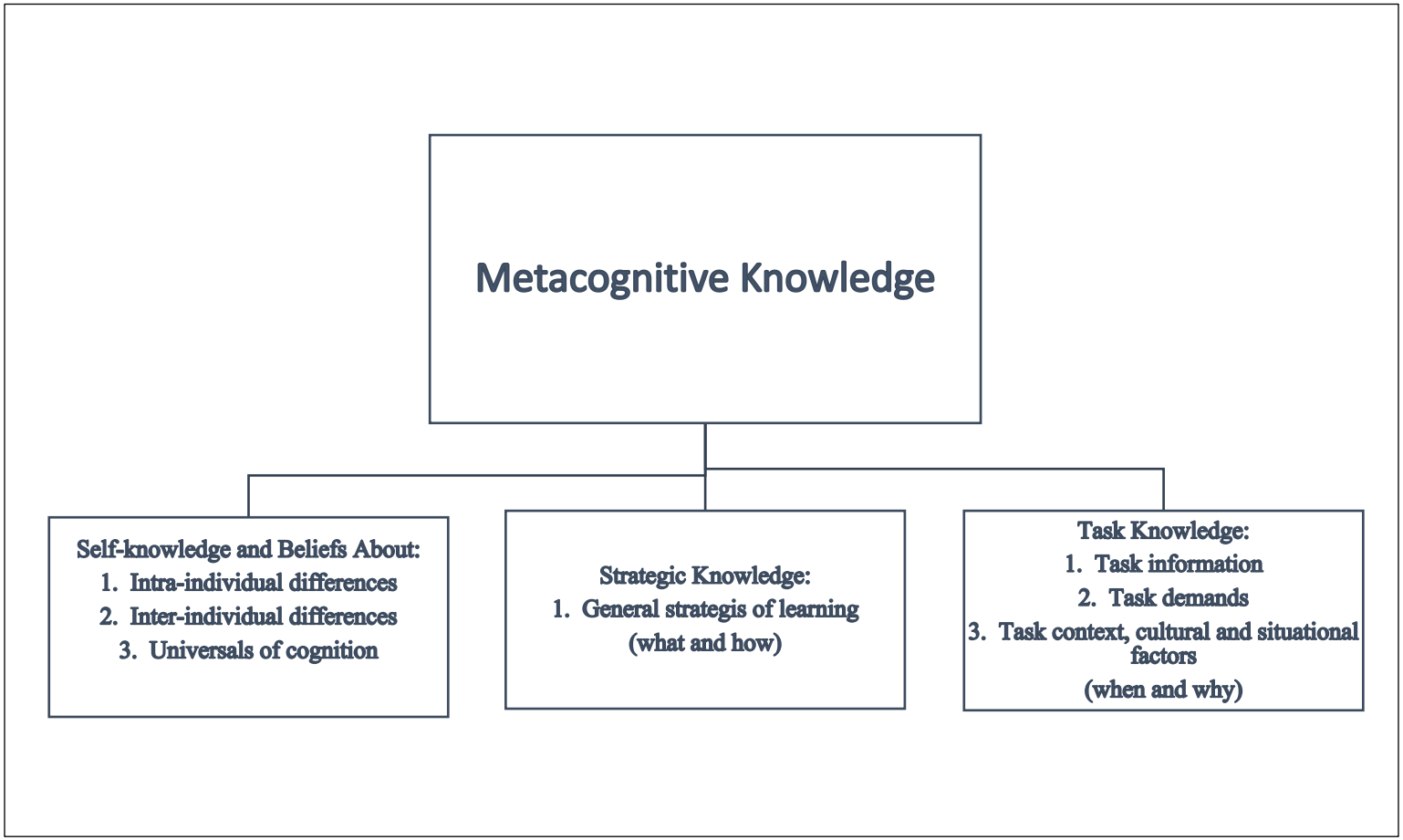
Metacognitive knowledge plays an important role in student teaching and learning particularly in the way that students are taught and assessed (Pintrich, 2002). It is linked to student performance because increased student awareness of skills and strategies will increase the likelihood that these skills will be accessed and utilized in the learning (Bransford et al., 1999). Furthermore, the frequent access and use of strategies during problem solving enhance the transfer of strategies across subjects and across situations, therefore there is a need to teach metacognitive knowledge explicitly (Pintrich, 2002). In summary, metacognitive knowledge is what we know, experience about ourselves and others as learners, the strategies we have internalized that help us problem-solve and navigate more effectively, and most importantly, knowing when and where to utilize these strategies. Our metacognitive knowledge supports and scaffolds our judgments in our learning enterprises; however, metacognitive knowledge coupled with Factor 2, sound metacognitive skills and self-regulation, is the key to a productive learning environment. When encountering tasks in school it is important for ELL students to be aware of their cognitive strengths and weaknesses, so they can adjust their cognition and thinking to gauge what is required of them to learn. The next section will define Factor 2, metacognitive skills.

2.3 Factor 2: Metacognitive Skills and Self-Regulation

Metacognitive skills otherwise known as self-regulation are divided into three parts and determine how well one acquires metacognitive skills and controls their learning mechanism. The three parts are 1) planning, which typically takes place pre-task and involves selecting

Figure 1

Factor 1 of the Two-Factor Model of Metacognition: Metacognitive Knowledge

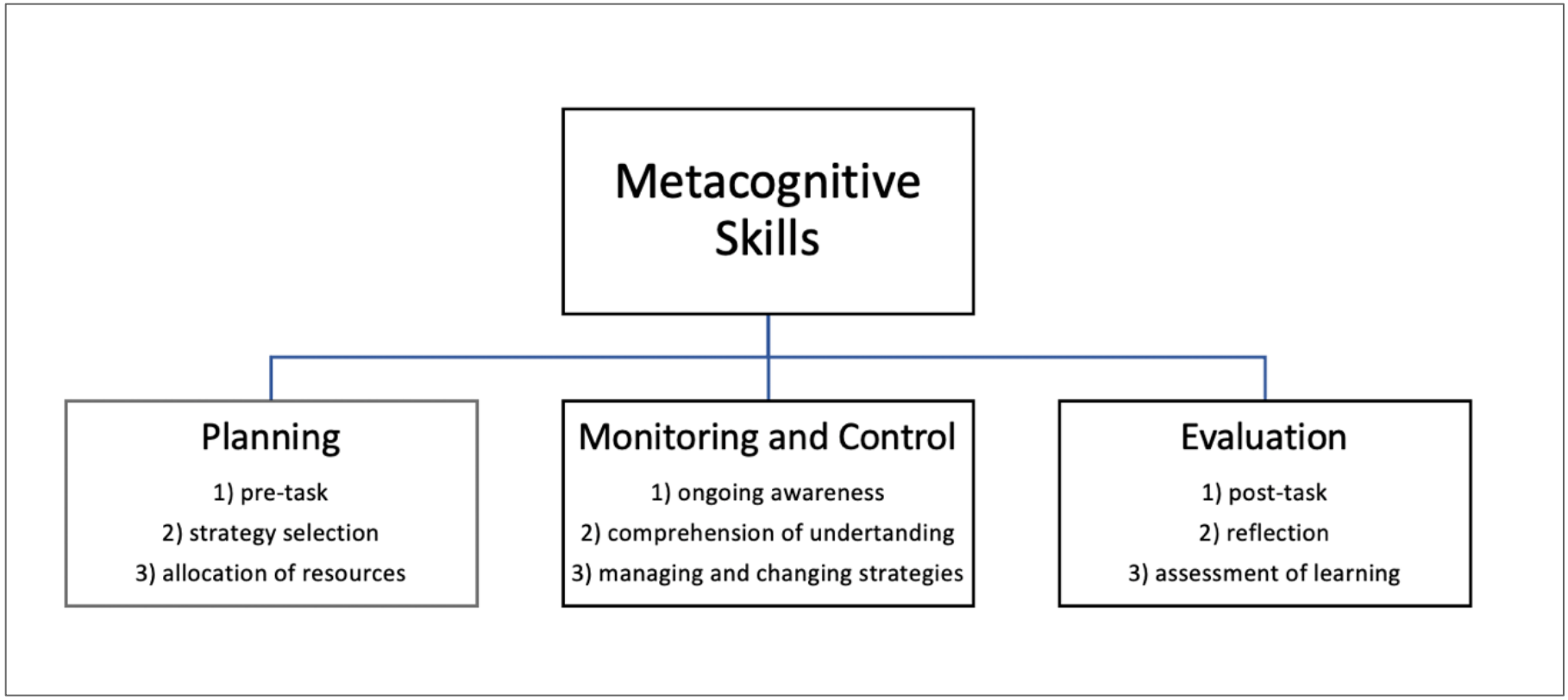


strategies, allocating resources; 2) monitoring and control, which takes place during the task and is the ongoing awareness and assessment of comprehension, performance, and progress along with managing and changing strategies because of monitoring; and 3) evaluating which usually takes place post-task and involves reflection, reviewing and assessing learning (Chatzipenteli et al., 2013). (Figure 2). All three are interrelated and not isolated skills as metacognitive monitoring grants students access to metacognitive regulation through metacognitive evaluation of the learning process (Winne & Perry, 2005). Research shows that students who use metacognitive planning, monitoring, and evaluating skills boost their confidence and their language skills, and this information can be particularly useful for ELL teachers and students (Huang, 2013).

Executive functioning, born out of information processing theory, is valuable in understanding metacognitive skills. Research shows that a lack of executive functioning skills and self-regulation skills accounts for achievement gaps in ELL students even as early as pre-kindergarten (Finders et al., 2021). Self-regulation and metacognitive skills are closely related to executive functioning skills (EF). The definition of EF is a set of skills that include the optimal utilization of our working memory, flexible thinking, and self-control. The first domain in which EF and metacognition work is memory monitoring, otherwise known as metamemory (Brown, 1978; Tarricone, 2011). One study with 209 first graders' cross-sectionally and longitudinally, established a correlational relationship between executive functioning and metacognitive control. Furthermore, strengths in executive functioning and metacognitive control were significantly associated with positive academic outcomes (Roebers et al., 2012). In yet another study, EF showed a stronger relationship to metacognition in five-year-old children compared to

Figure 2

Factor 2 of the Two-Factor Model of Metacognition: Metacognitive Skills



seven-year-old children (Bryce et al., 2014). This is an exciting finding in that it highlights a stronger connection between EF and metacognition in younger students, possibly due to a strong focus on mnemonic memorial processes such as rhymes and songs compared to older students. Besides control, EF and metacognitive skills also team up to coordinate planning, goal setting, and the selection of necessary strategies for problem-solving. Most of this coordination takes place in the frontal lobe, also known as the pre-frontal cortex. Wheeler et al., (1997) shows the relationship between EF and metacognition in the frontal lobe by outlining the three levels of frontal lobe functioning as follows 1) meaningful mental representations and organization and integration of such representations; 2) monitoring, conscious control, goal setting, and planning; 3) the ability to self-reflect and achieve self-awareness and introspection (Tarricone, 2011). Metacognition specifically resides in the anterior prefrontal cortex of the brain, responsible for pre-existing knowledge, strategies, and rules (Clark & Dumas, 2016). Neuro-imaging studies suggest that brain activation is especially pronounced in the prefrontal cortex while performing either typical EF or specific metacognitive tasks (e.g., Kao et al. 2005). In students with neurological disorders and frontal lobe lesions, both EF and metacognition may be impaired resulting in poor initiation, planning, monitoring, and evaluation of academic tasks (Roebers et al., 2012).

Finally, executive functioning is an essential coordinator of self-regulation. Executive functioning oversees, directs, manages, evaluates, and regulates cognitive strategies and processes during problem-solving (Brown, 1978). The construct of self-regulation is perceived in the literature as a behavioral manifestation of both metacognitive abilities and executive functioning. Self-regulation, the level of executive functioning, and the quality of metacognitive skills is an influential factor in the ability to learn (Kovalcikova & Runcakova, 2020).

Metacognitive skills also enhance our procedural and conditional knowledge and include the voluntary regulation and control of one's cognitive activities (Desoete et al., 2001; Veenman & Elshout, 1999). The effectiveness of student cognition is related to the development and the ability of a student's metacognitive skills, which aid students in reflection and management in service of cognitive activities (Rahman and Yunus, 2020). Metacognitive skills are measured through think-aloud activities, also known as online measurement.

2.4 Self-Regulation Theories

Self-regulation is an important component of metacognition as it is composed and defined by the metacognitive skills outlined in Factor 2 of the two-factor model of metacognition. Our metacognitive skills involve planning, monitoring, and evaluation of our learning. Prominent models in self-regulation include Pintrich's model which outlines his General Framework for SRL in four stages: 1) forethought and planning; 2) monitoring; 3) control; and 4) reaction and reflection (Pintrich, 2000). Another metacognition model by Schraw and Dennison (1994) outlines eight major components comprising metacognitive knowledge and metacognitive skills. These are (1) declarative knowledge, (2) procedural knowledge, (3) conditional knowledge, (4) planning, (5) information management strategies, (6) monitoring, (7) debugging strategies, and (8) evaluation of learning.

Self-regulation and metacognition have been used by some interchangeably, but it is important to note the difference. Metacognition includes metacognitive knowledge and metacognitive skills, while self-regulation focuses on the metacognitive skills component of metacognition. Some self-regulation theories also explore metacognitive emotions and motivation; however, they are beyond the scope and the research questions of this study. Next,

the chapter will provide a short overview of metamemory and its relationship to monitoring, a main component of metacognition.

2.5 Metamemory and Monitoring

Metamemorial processes are linked to our metacognitive perceptions and experiences stored in our long-term memory. Moreover, the capacity and speed of our working memory affect our ability to plan, monitor our cognitive processes to self-regulate. The foundation of metamemory is thinking about and making use of our memories through monitoring and regulation. Flavell (1971) defined metamemory as the knowledge, monitoring, and regulation of our memory processes. He pointed out that it is not a "unitary process towards a single ontogenic destination" and can be categorized into four broad overlapping categories (Flavell, 1975, p. 2). The first type of metamemory seems to exist on all developmental levels, and it is the implicit recognition of an object using our stored internal representations. The second category is storing, retaining, and retrieving larger chunks of information, mostly unconsciously and automatically, as we cannot use our deliberate and self-conscious activity for everything we need to remember. The third is the conscious behavior and use of mnemonic strategies for the taxonomy of memory phenomena. The fourth is metamemory which, as defined above, is the knowledge of our memory, how it works and how we can regulate it and control it.

Strategic memory behavior related to metamemory is a developmental process that increases as we get older. Another ability that comes with developing metamemory is planning for situations that recall more exertion to remember and some that call for less. Our metamemory helps us understand how we can retrieve something in the future by taking into consideration three memory relevant variables related to metacognitive knowledge: 1) what do I know about myself and my memory (declarative); 2) What do I know about the task at hand (conditional);

and 3) what strategies do I know or I need to learn this information, recall it and retrieve it later on (procedural) (Flavell, 1975).

Brown (1974, 1975) discussed the importance of the relationship between memory awareness and one's mnemonic processes, especially for successful problem solving (Tarricone, 2011). Both Flavell (1970) and Brown (1975) echoed the importance of deliberate memorization in learning. Flavell (1970) added from his research that older children use more complex internal and external memory strategies. The nature of the development of knowledge and awareness of one's memory system is interrelated.

Memory and metamemory play an important role in a student's metacognitive skills. Metamemorial processes allow students to effectively plan, monitor, and evaluate during problem solving and learning processes. Moving on to the next section, the role of critical thinking and critical reflection and the relationship to metacognitive knowledge and skills will be discussed.

2.6 Critical Thinking, Reflection, Judgment, and the Regulation of Metacognition

Reflection is one of the primary mechanisms of metacognition and serves to regulate and control cognition (Rahman & Yunus, 2020). Conscious access to our metacognitive knowledge facilitates our thinking and self-regulation skills (Annevirta et al., 2007). Critical reflection is a process of looking inward at our conjectures, beliefs, and experiences and evaluating our understandings, knowledge, and assumptions which becomes the basis of new beliefs (Tarricone, 2011). The quality of our critical reflection is influenced by and depends on our prior knowledge, internal private speech, beliefs, and level of self-awareness. Critical reflection leads to necessary knowing or critical knowledge, which comprises our metacognitive knowledge (declarative, procedural, and conditional). Stated another way, the interplay between our

declarative knowledge and reflection facilitates and is essential for critical reflection and critical expertise to occur with all necessary ingredients for activating our metacognition.

Critical reflection is triggered in problem-solving situations either internally or by the teacher posing discipline-specific reflective questioning. This process in which one challenges their thinking is initiated through individual or collaborative problem solving where beliefs, values, prior knowledge, and biases are challenged through higher order thinking and reflective interpretation. The stimulation of our metacognition through critical reflection also ignites our mind to review, monitor, and apply control of our strategies and processes necessary for problem-solving.

Critical reflection and critical thinking or reflective thinking are both related to reflective judgment, also triggered during a problem-solving situation. Before defining reflective judgment, it is crucial to focus on the terms. Dewey used the terms interchangeably; thinking is not reflective unless focused and critically thinking about a problem-solving situation (Tarricone, 2011). Therefore, critical thinking is not only reflective but focused thinking. It is the ability to apply skills, rules, and methods to problem-solving (King & Kitchener, 1994). Reflective judgments are taking a "step back" and considering multiple courses of action towards solving a problem, with the ability to incorporate uncertainty into the process (Dwyer, 2017). To apply critical thinking skills to a problem, one needs to have a reflective judgment (King & Kitchener, 1994). Epistemic assumptions and epistemological judgments influence reflective thinking and judgments that affect our problem-solving, especially in older children and adults (King & Kitchener, 2004; Tarricone, 2011). In one study by King and Kitchener (2004), participants assisted by reflection prompts learned to plan better faster. Moreover, the study found that reflection led to immediate improvements in the participants' planning strategies. Preliminary

results suggest that deliberate metacognitive reflection can help people discover clever cognitive processes from minimal amounts of experience. Understanding the role of reflection in human learning is a promising approach for making reinforcement learning more sample-efficient in humans and machines (Becker & Lieder, 2021).

Critical thinking skills are the enhancement of knowledge, and the process of organizing these enhanced skills is a factor of metacognition (Magno, 2010). The relationship between critical thinking skills and metacognition is well documented by research. Without metacognition, it is impossible to engage in critical thinking (Magno, 2010). In a qualitative study. Magno (2010) found that factors of metacognition and factors of critical thinking skills are significantly related. Kuhn and Dean (2004) found that critical thinking skills are necessary for debate situations, and to achieve those skills; students need to use metacognition explicitly. Results showed that good critical thinkers engaged in more metacognitive activities, especially high-level planning, and high-level evaluation strategies (Ku & Ho, 2010).

Thus far, metacognition has been defined and analyzed as a two-factor model. The components models and metacognition previously discussed are vital to all academic and non-academic learning environments and span across all domains. This is called domain generality, and it means that metacognitive knowledge and skills can effortlessly be transferred across all tasks and domains (Veenman et al., 2006). Next, the importance of acquiring generalized metacognitive knowledge in domain-specific areas such as mathematical problem solving and comprehension will be discussed.

2.7 Metacognition and its Relationship to Domain-Specific Learning

After children participate in metacognitive instructional programs, researchers have found that their mathematics achievement scores significantly increase (Victor, 2004). Students who

access and utilize their metacognitive knowledge, skills, and strategies yield positive mathematical performance, particularly problem-solving (Alzahrani, 2017). Furthermore, students who struggle to control and monitor their learning process are associated with poor mathematics performance. There exists a correlation between successful problem solving and metacognitive skills such as monitoring, and regulation, especially when facilitated by teachers who understand and teach metacognition through student discourse pre- and post-problem solving (Schoenfeld, 2007). Metacognition is also correlated to prediction skills. Prediction skills allow children to anticipate task difficulty, retrieve and activate their prior knowledge, and associate past problem-solving experiences with the task at hand, facilitating pre-and post-self-evaluation and strategy selection during the problem-solving process (Desoete, 2006). Evaluation and prediction are equally important metacognitive processes. Predictions help students select the conditional and procedural strategies necessary to solve the problem, and they help with error detection during post evaluative thinking. In a qualitative study looking at the relationship between intelligence, metacognitive skills, and mathematical problem-solving in third-grade pupils, a significant association was found between prediction, evaluation, intelligence, procedural, and mathematical fact retrieval skills in children without mathematical learning disabilities; however, peers with learning disabilities had less metacognitive skills, and problems with prediction and evaluation skills (Desoete et al., 2006).

Comprehension skills are necessary for mathematical problem solving; however, they play a critical role in English Language Arts. According to Israel et al. (2013), fluency is necessary for reading, but to understand, know, and learn; students need to employ metacognitive strategies to monitor their thinking while reading. Typically, students begin to focus less on fluency strategies by mid-first grade and more comprehension strategies. This prepares students for their

first metacognitive endeavor, which is to read for understanding. The metacognitive aspect is for a student to develop explicit awareness (a sort of declarative knowledge). To learn or read for pleasure, one must apply conditional and declarative, in other words, self-regulatory strategies, to monitor their understanding. Children with learning disabilities showed deficits in the use of metacognitive reading strategies compared to children without learning disabilities. The better the performance in reading strategies, the better textual comprehension was and vice versa, suggesting that metacognitive reading skills contribute to reading comprehension (Nicolielo-Carriho, 2016).

The domain-specific importance of metacognition is essential and should be understood by our teachers, especially by our ELL teachers. To understand metacognition, teachers must also know how it develops in students.

2.8 Developmental Stages of Metacognition and Self-Regulation

There is no exact age that one automatically develops cognitive or metacognitive capabilities. Metacognition does not develop in stages but instead works in dynamic shifts as we grow (Kuhn, 2000). Our ability to acquire, monitor, and control our knowledge becomes more sophisticated as we age. The development of our verbal capabilities is also important. They can enhance or obstruct our ability to report on our implicit metacognition, so the development of verbalization has been linked to our metacognitive trajectory (Clark & Dumas, 2016). Biological, social, and cultural determinants contribute to developing the necessary metacognitive and metacognitive skills to navigate academic, social, professional problems and successfully achieve our goals. In addition, both our metacognitive knowledge and skills are enhanced by formal education as we get older (Veenman et al., 2006). Metamemory is also enhanced by natural developmental

determinants and by the instruction we receive overtime. Overall, research has shown that metacognitive knowledge precedes metacognitive skills (Flavell, 1979; Desoete et al., 2001).

Moreover, planning develops before monitoring and monitoring precedes control, and they both have been found to change qualitatively, not quantitatively. In a study with 66 children ages 5 through 7 years old, the older children chose more optimal and sophisticated strategies during a problem-solving task instead of more strategies (Bryce & Whitebread, 2016). Another general developmental finding is that metacognition develops in separate domains and ultimately becomes generalized across domains (Veenman & Spaans, 2005). Despite our developmental differences, metacognitive research has identified age ranges where one acquires metacognitive abilities.

2.9 Metacognition in Infants and Toddlers (0-36 months)

Initially, the presence of metacognition in infants was not documented. Flavell (2000) most recently asserted that one could observe theory of the mind (ToM), a precursor to metacognition, in infants before the age of one year old, as evidenced by the infant's reaction to their caretakers' mental states and intentions (Kuhn, 2000; Flavell, 2000; Marulis et al., 2016). Theory of the mind is when children develop the ability to recognize that various mental states exist in themselves and others (Marulis et al., 2016). As children grow through the stages of early childhood, their ability to recognize the mental states of others becomes more sophisticated. It continues to be scaffolded by co-thinking, which is shared self-regulation with a more knowledgeable adult. Theory of the mind in these early years is a precursor of reading comprehension, decoding, and linguistic competence during the kindergarten years (Atkinson et al., 2017). Theory of the mind continues to develop into the preschool years.

2.10 Metacognition in Pre-school (3 to 5 years old)

At around three years of age, children begin to develop their metacognitive knowledge and skills. Children can monitor their cognition during preschool, provide a feeling of knowing, and show awareness of comprehension failure (Marulis & Nelson, 2020). Preschoolers begin to understand what is necessary for acquiring knowledge (Chatzipenteli et al., 2013). During the preschool years, research has documented the emergence of rudimentary self-regulatory (SR) skills and executive functioning (EF), along with conditional knowledge. Self-regulation conditional expertise and knowledge transfer are enhanced by interest and motivation. This is coupled with the improvement of meta-memory and memory monitoring and the explosion of vocabulary. Whitebread et al. (2008) documented verbal, non-verbal metacognitive behaviors, and self-regulatory behaviors in preschoolers during tasks.

Metamemory begins to develop at around three years of age (Flavell, 1979). However, understanding how memory works and how to monitor is not as sophisticated. Over time the monitoring of metamemory is enhanced through instruction. The difficulty children experience when monitoring stems from the inability to use their knowledge about memory and learning to regulate their cognition. Preschoolers have not integrated their metacognitive knowledge and regulatory skills within a unified conceptual framework, such as the constructivist theory of the mind (Annevirta & Vauras, 2001).

2.11 Metacognition in the Primary School Years

Metacognitive knowledge continues to improve in the first three years of primary schooling. A longitudinal study by Annevirta and Vauras (2001) with students 6-9 years of age revealed that metacognitive knowledge develops significantly during this developmental stage. Around

the age of 6-7, students acquire a more stable concept of cognitive processes and themselves as actors in cognitive activity.

Once metacognitive knowledge begins to solidify, metacognitive skill and strategy development follow between 8 to 10 years old (Veenman et al., 2004; 2006). In another longitudinal study, Annevirta et al. (2007) students continuously developed strategic skills from 4-13 years of age. In their research, Schraw and Moshman (1995) found a positive relationship between knowledge of the relative effectiveness of strategies and appropriateness of strategy use. As students' progress in primary school, they also begin to integrate their metacognitive knowledge and regulatory skills and understand that they affect each other.

Although there is a steady progression of metacognitive knowledge and skills, Annevirta and Vauras (2001) found considerable variability within the development of different individuals. Some children may not develop metacognitive knowledge at all during the first three years of primary school. The suspicion is that Learning Disabilities and other developmental disorders may impede the development of metacognitive skills. Annevirta et al., (2007) also found that the development of the children's metacognition did not follow a cumulative pattern indicating that the children's metacognition increased more from the spring term of the 1st grade to the spring term of the 2nd grade than from preschool to the 1st grade. One explanation of this result might be that it is not until after the first school year, after mastering basic "school skills" and becoming "a pupil," that children can better concentrate and think about their cognition.

Studies with primary school students indicate that planning precedes monitoring and evaluation, and monitoring precedes self-regulatory control. One study found that children had developed good monitoring skills and management and self-regulation by nine years old, followed by between eleven to twelve years old (Roebers et al., 2009).

2.12 Secondary School

The transition from primary to secondary school can hurt the development of metacognitive knowledge and skills. Uka and Uka (2020) conducted a study and found that student perceptions of their abilities to learn, motivation, and parental support are significantly correlated to self-regulation in secondary school. Another study found a downward trend in students using metacognitive strategies immediately after transitioning from primary school into secondary school (Leutwyler & Merki, 2009). Some researchers say this is due to a decline in self-efficacy; intellectual and self-regulatory demands may be more intense in secondary school, but student self-regulatory capacities may not have caught up to the demands (Mok et al., 2007). Yet others say that this is due to a teacher's lack of knowledge or training to incorporate metacognition into everyday classroom practice (Annevirta & Vauras, 2001; Perry et al., 2018).

Regardless of the setback that may occur in student metacognition during this stage, students become capable of more sophisticated metacognition during the secondary school years and into adulthood. As students develop increasingly sophisticated metacognitive skills, how researchers measure these skills also changes. The following section will discuss the various ways teachers can facilitate metacognition in the classroom.

2.13 Metacognitive Teachers Promulgate Metacognition in Education

As mentioned in Chapter I, teacher understanding of metacognition plays a crucial role in preparing students for 21st century learning. The educational benefits of applying metacognitive strategies such as self-awareness and self-monitoring include the development of independent learners who control their learning and learn how to learn for life (Papaleontiou-Louca, 2003).

A qualitative study revealed that teacher mediation is essential in developing a student's metacognitive and problem-solving skills (Guo, 2020). For teachers to mediate metacognition,

they need to have a personal metacognitive disposition, a good understanding of metacognition, and the knowhow to help develop it in their students. Metacognitively aware teachers are more self-reflective, and teachers who practice self-reflection examine their actions, leading to evolving classroom practices and teacher growth by seeking and welcoming professional development (Nian, 2020). Professional development combined with a metacognitive personal epistemology makes it more likely that teachers will plan, monitor, and evaluate their teaching practices and pass these self-regulatory skills along to their students. A study in 2018 found that metacognitively aware teachers also taught metacognitive knowledge and strategies to their students (Ozturk, 2018). Furthermore, metacognitive teachers typically have positive metacognitive experiences and declarative knowledge through their successful academic performance. In one study, results confirmed that the pre-service teachers' who expressed beliefs consistent with metacognition, were positive predictors of their self-reported use of cognitive and metacognitive strategies. The use of cognitive and metacognitive strategies was a significant positive predictor of their student's academic performance" (Vosniadou et al., 2019, p. 23).

Personal metacognitive knowledge in teachers is correlated to the use of metacognitive instructional strategies and metacognitive pedagogical practices in the classroom. In a related study, metacognitive teachers recognized the value in providing assignments that assisted students' metacognitive thinking and took the time to help students become self-aware of their cognitive processes (Wilson & Bai, 2010). Metacognitive instructors are intentional about how they facilitate student learning (Scharff & Draeger, 2015). They ask questions about when, why, and how students need to acquire knowledge and skills. They monitor student progress before,

during, and after class to make adjustments that better facilitate student learning (Winckelmann & Draeger, 2020).

2.14 ELL Student Outcomes and Metacognition

Metacognitive pedagogical practices have many benefits in the classroom with general education students, but especially with English Language Learner (ELL) students. Metacognition has the potential to reduce achievement gaps and allow students to access equity through effective metacognitive interventions that develop academic skills (McGuire, 2021). Metacognition is critical for learning, and there are three main areas in which ELL teachers can foster students' metacognition: supporting student learning strategies (i.e., study skills), encouraging monitoring and control of learning, and promoting social metacognition during group work (Stanton et al., 2021). Overall, there is a consensus surrounding the importance of ELLs becoming self-regulated learners (Echevarria, Vogt, & Short, 2012; Snow, Griffin, & Burns, 2005).

There is strong evidence that metacognitive instruction can improve language learning performance (Hernberg, 2020). Furthermore, the use of metacognitive strategies for language learning "can lead to more profound learning and improved performance, especially among learners who are struggling" (Anderson, 2002, p. 3). Research shows that language learners who successfully acquire their primary and secondary languages tend to be more metacognitive (Kurzer, 2015). More specifically, teaching metacognitive knowledge and skills to ELL students has helped them in reading, listening, speaking, problem-solving, and most importantly, finding their role in the target culture and reconciling their backgrounds in the new context. In a research project with students in the Middle East, metacognition reported in student journals correlated positively with second language acquisition (Kurzer, Dewey, & Belnap, 2011).

Overall, there is evidence that metacognitive instruction can enhance performance in language learning (Hernberg, 2020). Incorporating metacognitive teaching into reading and writing with English as a Foreign Language (EFL) students creates independent and creative learners who develop their reading and writing skills through increased knowledge and confidence (Supeno, 2021).

Additional findings indicated that self-assessment helped EFL students to increase test scores and to develop their reading strategies. It enabled them to plan, monitor, and evaluate their reading process by implementing different strategies and techniques. Drawing on these findings, the research suggests that English teachers who use self-assessment of reading strategies as part of reading courses improve students' reading comprehension skills and strategy use (Kenza, 2021).

Christina Goh and Larry Vandergrift (2021) dedicated an entire textbook on training second language teachers on bringing metacognition to the forefront of L2 (second language) listening instruction by increasing the ability of learners to control and regulate their thoughts and learning. Results showed that the experimental group showed a statistically significant increase in listening performance on the final test following an eight-week process-based metacognitive instruction with pedagogical procedures on listening comprehension performance and metacognitive awareness of 37 EFL listeners in Turkey (Yetis, 2021). Meltzer et al. (2021) discussed a theoretical framework for understanding and promoting metacognition and executive function as part of assessment and treatment plans for L2 learners to improve students' effort, academic performance, and resilience (Meltzer et al., 2021).

Another study by Kim and Linan-Thompson (2013), revealed that vocabulary instruction combined with self-regulatory enhancement of the instruction increased ELL's acquisition of

vocabulary and increased their self-interest in adopting self-regulation strategies in their repertoire. In another study, Lubliner and Smetana (2005) examined the effects of a metacognitive vocabulary intervention on the vocabulary learning and reading comprehension of fifth-grade students from one of California's lowest performing Title I schools. This study focused on the development of students' metacognitive skills, self-appraisal of cognition and management of thinking to help students, monitor their word-learning processes and word-learning strategy use. The study revealed that the achievement gap narrowed between Title I students and those from an above-average school because of this metacognitive intervention. However, the question remained whether the students acquired and retained motivation for learning language. The most effective interventions incorporate not only cognitive and metacognitive, but also motivational aspects of self-regulated learning, in line with suggestions by previous work (Boekaerts & Corno, 2005). A meta-analysis of 30 articles on enhancing self-regulated learning for elementary level students (Dignath, et al., 2008) suggested self-regulated learning training programs have a positive effect on academic learning outcomes, cognitive and metacognitive strategy use, as well as motivation with a weighted average effect size of .69. The current study included the three components of self-regulated learning: cognitive strategies, metacognitive strategies, and motivational control (Boekaerts, Maes, & Karoly, 2005; Bruning, et al., 2010; Zimmerman & Schunk, 2011).

In another study involving vocabulary acquisition and ELL students, results suggest that vocabulary instruction coupled with the incorporation of metacognitive strategies led to improvement in word knowledge for ELL children with no learning difficulties and with learning difficulties (Kim & Linan-Thompson, 2013). The findings were also consistent with the results from Lubliner and Smetana's (2005) metacognitive vocabulary intervention for fifth-grade

general classroom children, regarding significant gains in vocabulary knowledge, reading comprehension, and metacognitive skills. Additional research has shown the importance of combining cognitive strategies and metacognitive strategies over cognitive strategies and regular instruction alone. (Jitendra, Hoppes, & Xin, 2000; Mason 2004; Schunk & Rice, 1989; Souvignier & Mokhlesgerami, 2006).

2.14 Metacognitive Teachers and ELL's

Teachers who understand metacognition have metacognitive proclivity that promotes metacognitive knowledge and skills in students, especially in the ELL student population. Yet what does that look like in practice? Despite metacognitions' critical importance, students rarely receive explicit instruction on metacognition across all levels of education even though research tells us that 1) metacognitive strategies are among the most influential factors in student learning; 2) interventions that improve metacognitive knowledge and skills are effective; 3) metacognitive knowledge increases with age, but all learners, especially primary-aged students, need explicit instruction to build metacognitive knowledge and skills; 4) parents and families play an integral role in providing metacognitive experiences and developing students' metacognitive knowledge and skills, 5) students' motivation, growth mindset, self-efficacy, and emotions all influence their use of metacognitive learning strategies, which supports students' academic resilience; 6) beliefs about knowledge and learning influence how teachers and students use metacognition and approach self-regulated learning (Beach at al., 2020). This is an essential piece because researchers need to know how to assess a metacognitive teacher and how to identify metacognitive practice in the classroom.

It is vital to support students in generalizing metacognitive skills and meta-level thinking, which develops the ability to self-regulate and use skills across environments (Kuhn & Dean,

2004). Moreover, Kuhn and Dean (2004) assert that to help students become metacognitive across domains, we must nurture their metacognitive knowledge by elevating their levels of epistemological understanding to an evaluative level. An evaluative student believes that judgments and knowledge can be compared according to criteria of argument and evidence, and critical thinking is the vehicle that promotes sound assertions and promotes understanding.

First, teachers must model and explicitly show students how to access their declarative knowledge and plan. Students can plan by asking themselves what they already know and need to know (Chatzipenteli et al., 2013). Furthermore, Butler and Winnie (1995) encourage teachers to assist students in thinking about their knowledge and how it is influenced by their beliefs, motivation, and cognitive processing. This planning can be done at the beginning of a lesson or while conferencing with students. Questioning and facilitating critical thinking and critical reflection is also vital to mediating metacognition. Teachers should encourage critical reflection and thinking to provide students with a deeper understanding and enhanced engagement through metacognitive questions. Cooperative and peer learning can also be leveraged to assess declarative knowledge and planning, which taps into social metacognition and motivates, engages, and allows students to scaffold each other with group metacognitive knowledge and skills.

Teachers must model and explicitly teach monitoring skills during whole group and independent group practice. This can be accomplished through think-aloud, mind mapping, checklists, group work, scaffolding, questioning, prompting, and reciprocal teaching activities. Self-questioning and think-aloud protocols (Vygotsky 1978) promote self-regulated learning and encourage students to internalize information.

Teachers must help students evaluate and reflect on what they have learned and give feedback on the next steps through whole group, small group, individual conferencing, and reflective journaling. Post evaluative practices must be followed up within school or homework assignments that build memory and metamemory skills through retrieval practice, and elaborative rehearsal of what they have learned (Chatzipenteli et al., 2013).

For very young students, boosting executive functioning skills (i.e., working memory, cognitive flexibility, inhibitory control) is a prerequisite for effectively using metacognition to enhance learning (Howard & Vasseleu, 2020). Younger students also need feedback on the accuracy of their reflections as they tend to overestimate their performance. This can be accomplished through 1) Drawing and telling (self-reflection and verbalization); 2) Assisting children in becoming conscious about their thoughts and feelings; 3) Modeling for students how to make their thinking visible; 4) Increasing motivation and engagement through multi-sensory teaching and learning, and 5) Exploration and discovery.

In conclusion, metacognition is the main driver for self-regulation as learners reach into their prior experiences to develop a plan, achieve a goal, select strategies, monitor progress, and reflect on what and how they learned (Beach et al., 2020). Curricula should contain, as an objective, the development of student self-awareness as a learner. Instruction should support this goal by allotting sufficient time for these or similar activities: goal setting, explicit strategy instruction, and self-reflective writing and conversation. Consistent and adequate instructional time should also be allotted for activities that permit open-ended inquiry and emphasize the process of discovery, rather than product completion.

Desautel (2009; p. 2016) writes that to increase student metacognition 1) Classroom instruction and assessment should include activities in which students are included as partners in

creating rubrics and evaluating work. Student self-assessment should be a standard component of learning experiences; 2) Professional development resources should be allotted to familiarize teachers with the importance of self-reflection and 3) Provide teachers with training in techniques that support that development.

2.15 Chapter Synthesis

Thus far the literature review has summarized the various philosophers, psychologists and educators who have written about metacognition, the various definitions, representations, and models of metacognition within the classroom. The developmental trajectory of metacognition was outlined, as well as how metacognition develops in various stages. A survey of the literature confirms the value of a teacher who espouses a metacognitive disposition and is the facilitator of metacognitive pedagogy to nurture it in his/her classroom and students. This is especially true for English Language Learner classroom environments, where teaching thinking skills will change the landscape of how effectively a student learns a second language. The importance of teaching all students to think about their own thinking and learning how to learn is not in question in this study. The information that is scarce in the field of metacognition remains, are teachers, especially ELL teachers taught to understand metacognition and its prominence in teaching and learning. If ELL teachers indeed value metacognition, are they integrating it into their classrooms, and if not why? To my knowledge, teacher understanding of metacognition was measured once in the United States by Wilson & Bai (2010). However, ELL teacher metacognition has not been assessed, and even the Wilson and Bai study did not look on how teachers incorporate metacognition in their instructional methods. Existence of systemic constraints in incorporating metacognition have been suggested by some writers, however not one study to the researcher's knowledge, has systematically documented such obstacles. If

educators are to bring metacognition to the forefront of teaching and learning, we need to as a community measure our understanding of it, how we are leveraging it in the classroom, and if anything is standing in our way from doing so. The research questions (RQ) framing this study are:

RQ1: What are the dominant viewpoints shared by ELL teachers regarding metacognition?

RQ2: To what extent if any do ELL teachers believe they are implementing metacognition into their pedagogical and instructional methods?

RQ3: Are there institutional resources available to ELL teachers relative to metacognitive instructional practices.

Chapter III Methodology

This chapter explains the methodology used in this study to explore ELL teacher understanding of metacognition and use of metacognitive pedagogy inside their classrooms. First, the purpose of this study will be reviewed and supplemented by the specific research questions introduced in the previous chapters. A detailed analysis of *Q* methodology will be provided as it pertains to this study. This includes the *Q* statements used, data collection methods, data analysis methods, followed by analysis of the results.

3.1 Purpose of the Research Study and Research Questions

Metacognitive teachers who teach metacognitive knowledge and strategies to their students produce lifelong, independent, and successful learners. English Language Learner (ELL) students who are more at risk for becoming struggling learners can benefit from teachers developing their metacognitive capabilities, as they are faced with not only learning content, but simultaneously processing information in their native and English language. Whether processing information orally or through reading, metacognitive strategies and skills can support student learning by developing their declarative, procedural, and conditional knowledge, and skills. However, for a teacher to develop self-led learners, the teacher needs to have a personal metacognitive disposition. This means teachers need to understand, value, and incorporate metacognition in their lesson plans.

The purpose of this exploratory study is to identify shared understandings, viewpoints, and beliefs regarding ELL teacher personal metacognition, metacognitive understanding, use of metacognition in the classroom and exposure to metacognition in their education and professional development.

The specific research questions (RQ) investigated in this study are as follows:

RQ1: What are the dominant viewpoints shared by ELL teachers regarding metacognition?

RQ2: To what extent if any do ELL teachers believe they are implementing metacognition into their pedagogical and instructional methods?

RQ3: Are there institutional resources available to ELL teachers relative to metacognitive instructional practices?

Question number one will help reveal how ELL teachers perceive and understand metacognition. It is important as researchers to understand if ELL teachers are aware of metacognition and value its importance for themselves and for their students. The second question explores teacher use of metacognitive pedagogy inside their classrooms. Within the second question, the researcher will explore the existence of actionable metacognitive attitudes and behaviors expressed through instruction inside the classrooms that serve ELL and dual language students. The third question aims to shed light on the educational and professional institutional support that ELL teachers have received regarding metacognition. This last question will be answered by a baseline survey, whereas questions one and two will be explored through the *Q* sort.

This study will build on the sparce research that exists regarding teachers' beliefs and shared understandings about metacognition. To this student researcher's knowledge, this will be the first study exploring ELL teacher personal metacognition, and how they leverage metacognitive strategies in their instruction. Furthermore, due to the already established relationship between metacognition and improved academic achievement of ELL students, the findings may inform school administrators and graduate professors of ELL education on how much support and exposure ELL teachers may need on metacognition due to its importance in the classroom.

Before a detailed description of how *Q* methodology was applied to this study, an overview will follow about the origins of *Q* methodology, and the terminology commonly used to describe its methodological design.

3.2 An Overview of *Q* Methodology

This study used *Q* methodology to explore ELL teacher understanding, subjective viewpoints regarding the use of metacognition with ELL students. Out of normal factor analysis (*R* methodology), arose another form, *Q* methodology. *R* methodology correlates and standardizes manifest variables across people to reveal and tie them together to a latent variable and is a process that sufficiently yields on the surface information about a population, yet the method cannot define individuals in a comprehensive and in-depth manner (Watts & Stenner, 2012). *Q* methodology looks for correlations between subjects, across a sample of variables and looks at the subjects' viewpoints in depth.

Therefore, the limitations of *R* methodology provoked the birth of *Q* methodology which was created in 1935 by William Stephenson, Doctor of Physics and Psychology, and Charles Spearman, who initially termed it *Q* technique. Stephenson proposed to *The Journal of Nature* through a letter that an inverted data matrix of R methodology could essentially turn the participants into variables, and the statements into cases. Prior to the *1930's*, the study of subjectivity was beyond the scope of social scientists. The purpose was to challenge conventional approaches and develop a methodology that emphasized the significance of studying human subjectivity (Maltempi, 2018). *Q* methodology is a mixed-method exploratory technique that uses abductive reasoning to provide qualitative results by measuring the subjective perceptions and perspectives on any given topic through objective measures (Fraschini & Park, 2021). *Q* methodology serves as a bridge between quantitative and qualitative statistics. *Q*'s

emic epistemology is extremely valuable within educational research as it enables the use of a mixed-methods approach (Ramlo, 2015). Further, *Q* methodology increases the likelihood that participants' will voice their perceptions, beliefs, and perspectives through an emergent approach. This approach allows respondents' thinking to naturally emerge while reducing the researchers' subjective constructs often modeled in questionnaires and surveys (Lundberg et al., 2020).

Stephenson wrote that inner experience and behavior are inextricably linked, producing self-referential expressions that *Q* methodology can objectively study (McKeown & Thomas, 2013). These expressions are held under the microscope for inspection and comparison. Participants also known as the P set rank a set of statements or images through a *Q* sort, revealing the meaning and significance that they hold on to the topic under consideration (Herrington & Coogan, 2011). The statements, also known as the *Q* set, make up what is called a concourse. The statements are factorially analyzed, not by subsets, but by the configurations produced in shared characteristics and consensus. The statements, informed by extant literature, and experts on the topic, present varying viewpoints to the participants. Statements may convey positive and negative viewpoints in context and allow participants to share their beliefs about the topic by sorting the statements as they deem fit. As mentioned previously, developed statements are informed by current literature, and experts on the topic, and are categorized based on common threads revealed within the literature review.

In London, *Q* methodology was not widely accepted, and psychologists were skeptical of a technique that challenged traditional norms of quantitative research, however the adoption of the method increased in the United States. It is no coincidence that the widely accepted use of *Q* methodology runs parallel to the greater acceptance of mixed-methodology research (Newman &

Ramlo, 2015). More disciplines are finding mixed method research and *Q* methodology in particular, a useful and pragmatic approach to derive in depth information about a particular population.

Q methodology is conducted in three separate phases. Prior to the commencement of the first phase, and like other methodologies, the researcher must identify an area of interest, research questions, conduct a thorough literature review for themes on the topic, and identify the population who will be sampled and whose subjective viewpoints will answer the questions. Once the researcher has identified all the fundamental ingredients, one may also consult with experts on the topic to confirm themes initially found in the literature, or to add new themes. Next, the researcher derives and constructs between 36 – 80 statements from the themes that are representative of all possible viewpoints on the topic. Once the statements represent saturation of all opinions on the topic, the statements can then be refined, and if necessary reduced.

In phase two, purposely sampled participants who have proficiency within the area of study are presented with the statements to sort on a forced-choice, fixed distribution, quasi-normal template. The participant decisions on where to place the statements are guided by a condition of instruction (COI). This gestalt approach reveals participant subjectivities, perceptions, beliefs, and attitudes on the targeted topic under investigation. The template or grid the statements are placed on a *Q* sort or *Q* grid that ranges from +6 to -6 or +4 to -4 with 0 in the middle. Participants may also engage in a baseline or exit questionnaire to provide the researcher with demographic information, level of expertise on the topic, and provide feedback on the sorting process.

In phase three, the researcher uses multi-variate statistical analysis or *Q* mode factor analysis. *Q* mode factor analysis allows for the shared subjectivities of clusters of persons within the

participant set (P-set) to be revealed (*Q* factors). The analysis, however, does not group and compare variables; instead, it groups people's viewpoints into factors. The researcher with the help of statistical methods then decides what factors to retain based on a several criteria that will be discussed in depth below. One standard method of practice is to consider factors with eigenvalues more significant than one (Cox, 2017). This is known as the Kaiser-Guttman criterion which sets the cutoff at 1.0, to prevent the analysis of variables that may account for less study variance than a single *Q* sort (Watts & Stenner, 2012). One may also analyze factors based on theoretical principles, to prevent the underestimation of viewpoints that have low eigenvalue scores, but nevertheless provide valuable insight to the research questions. Furthermore, Humphrey's rule may also be applied, which states that a factor is significant if the cross-product of its two highest loadings exceeds twice the standard error' (Brown, 1980: 223, Watts & Stenner, 2012). In the following section, a summary of *Q* methodology will be detailed as it relates to implementation within the proposed research.

3.3 Why *Q* Methodology?

Implementing a methodological approach of *Q* methodology is uncommon within the field of education (Walker et al., 2018). Although eighty years of use in psychology, sociology, communication, public health, and policy, *Q* methodology is considered "new" in educational research (Walker et al., 2018). Running parallel with educational research, the study of metacognition has been researched and analyzed through various methodologies and approaches, yet scant research exists on metacognition utilizing *Q* methodology. A few *Q* studies explored related components of metacognition, such as self-regulated learning; however, to measure the concept of metacognition, most studies reviewed utilized surveys, interviews, think-aloud exercises, and observations. In examining theoretical, conceptual, instructional, and

methodological issues on metacognitive research, Azevedo (2008) writes about the necessity of using novel methodological approaches, statistical analysis, and software tools to measure metacognition and to enhance the many self-report measure studies that exist. Using a powerful and informative approach in metacognitive research like *Q* methodology would add value to the extant body of research in the field by expanding methodological tools and, therefore, can augment existing research by gaining a more detailed and balanced perspective on teachers' conception of metacognition.

Another purpose of *Q* methodology is to identify the personal constructs and values of a specific set of participants on a subjective issue, topic, or problem (Walker et al., 2018). Metacognitive teachers do not solely focus on teaching metacognition but adopt a personal metacognitive epistemology as their own set of values about thinking and learning (Schofield, 2012). The goal of this study was to see if ELL teachers espouse personal metacognition and if gaps in shared understanding about the construct of metacognition exist. Damio (2016) further posits that *Q* methodology can identify and isolate gaps in shared understanding about a topic and criteria about a topic important to a cluster of individuals. In summation, *Q* methodology provides opportunities for further investigation in areas that have never been tested before (Stephenson, 1953), like the metacognitive understanding of ELL teachers.

3.4 Developing a Concourse for the Study

Within the initial phase of *Q* methodology, the researcher develops the concourse, a set of statements or items typically categorized and derived from primary and secondary sources (McKeown & Thomas, 2013). Primary sources include interviews or a peer review and consultation about the statements. Secondary sources are derived from the literature, newspapers, and discussion boards. This set of statements identified as the *Q* set naturally

encapsulates what people would say, think, or a way that they would behave regarding the issue being investigated. Stephenson (1953) described the concourse of self-referent statements and notions that represent a person's ecological universe (p. 221). He went on to say that these statements refer to the self in action, reflection, retrospection, and the self in their behavioral milieu. Stephenson believed that "all behavior is of a self-referent kind" (p. 48) and studied by social sciences to reveal a person's inner experiences and attitudes about a topic (Stephenson, 1953). The statements should represent a well-balanced, broad range of "heterogeneous items" (p. 74) all possible discourse on the topic, allowing the participants (p-set), to sort statements within the forced-choice template, free of frustration or restriction, and avoiding the possibility of bias in the results (Watts and Stenner, 2005). Researchers don't have to collect all statements possible, which is an impossible task. Stephenson (1953) was satisfied with "a rough-and-ready universe of statements" (p. 78). Lee (2017) wrote: "A concourse of statements is processed and integrated into organized, classified, and refined ideas." Its use was well described by Brown (1993):

> "From concourse, new meanings arise, bright ideas are hatched, and discoveries are made it is the wellspring of creativity and identity formation in individuals, groups, organizations, and nations, and it is *Q* methodology's task to reveal the inherent structure of a concourse - the vectors of thought that sustain it and which, in turn, are sustained by it" (p. 95).

The process by which the participants organize the statements on a template, known as the *Q*-sort Template is called the *Q* sorting process. Most *Q* methodology studies utilize a quasi-normal, fixed distribution template that is considered a forced-choice design. For example, the participants assign each item a ranking position, with values ranging from +6 (most agreeable) to

– 6 (least agreeable) and place the statements they deem as neutral, or with the least salience on 0, (Figure3). Other distributions in *Q* studies may employ either an 11-point (-5 to +5) scale, or a 9-point (-4 to +4) scale depending on the number of statements in the concourse (Maltempi, 2018; McKeown & Thomas, 2013; Watts & Stenner, 2005). It is known as a forced distribution because of the number of items that can be assigned to each ranking position as pre-determined by the number of items that can be assigned to each ranking position. Forced, does not mean restrictive as *Q* methodology allows for individuality to be express, while the rankings provide data "obtained for factoring" (Watts & Stenner, p. 77). Next the sorting instructions, otherwise known as the condition of instruction (COI), will be discussed.

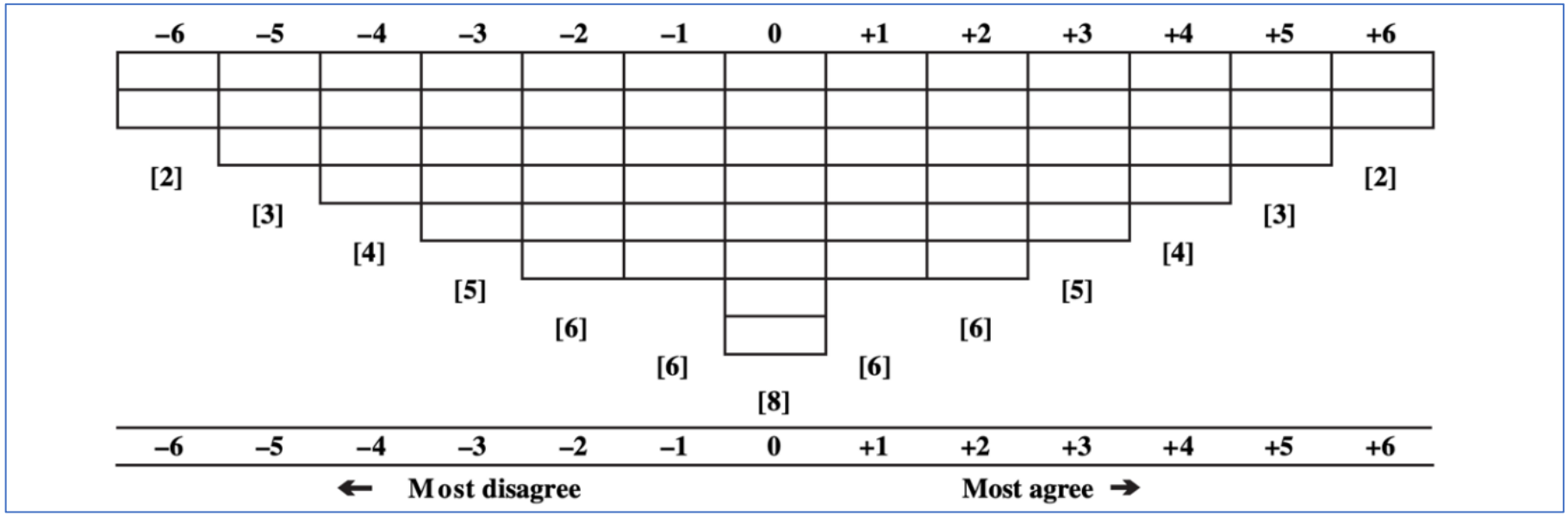
3.5 Condition of Instruction

The condition of instruction (COI) is most often the directive that guides participants on how to sort the *Q* set on the template. The sorting guidelines are usually explicit and must leave no doubt for the participant on how to sort the statements. The COI undergirds the way by which the participants sort and therefore models self-reference by arranging the statements along the continuum (McKeown & Thomas, 2013). What makes *Q* methodology different from surveys is that participants are not instructed to evaluate items in isolation but rank them in order of importance through the lens of the self, while interpreting contextual factors. Here are two straight forward examples of COI's:

1) Sort the items according to those which you *most agree* (+6) to those which you *most disagree* (-6).

Figure 3

Example of a Fixed, Quasi-Normal Distribution Q-Sort Template



2) Sort the pictures according to ones that make you smile the *most* (+4) to those that make you smile the *least* (-4).

Studies can employ more than one COI, as answering the research questions can require variations of the same basic condition (McKeown & Thomas, 2013; Watts & Stenner, 2005). One participant may be required to sort statements under various conditions or multiple participants can sort statements under a single condition (Stephenson, 1953). As noted earlier, most *Q* studies use one condition and a forced choice distribution matrix, however, there are some studies that use a free distribution where participants place statements in piles such as positive, negative, neutral, in any order without restraint. There are pros and cons, that may accompany using single vs multiple COI's, combined with forced vs free choice distributions, however those matters are beyond the scope of this dissertation.

3.6 P-set

Q methodology utilizes two kinds of sample classes: the P set and the *Q* set. The P set is comprised of the participants who sort the statements. The *Q* set is the actual statements given to the P set to sort. According to Brown (1980), McKeown and Thomas (2013), and Watts and Stenner (2012) a *Q* set containing between 40 to 80 statements is sufficient in conducting a *Q* study. Brown (1980), recommends less, 30 to 60 items. The *Q* set was discussed in great length in previous a previous paragraph, see "developing the concourse."

The P set in *Q* methodology is selected from the population the researcher is interested in. *Q* methodology does not require a large *P* set. In fact, *Q* studies have been performed with as little as one participant. *Q* researchers are not interested in a generalization resulting from a population, instead they seek a pattern of subjective thoughts. *Q* does not believe that this

pattern is derived from a population of a certain size, but this pattern exists within the population, and may be explored with one participant (Lee, 2017). The participants only need to have knowledge and experience with the subject at hand, hence purposive sampling is required. The assurance of a population providing complete representativeness across respondent characteristics (age, party identification, religion, etc.), is not required, since *Q* methodology explores attitudes in the target population (McKeown & Thomas, 2013).

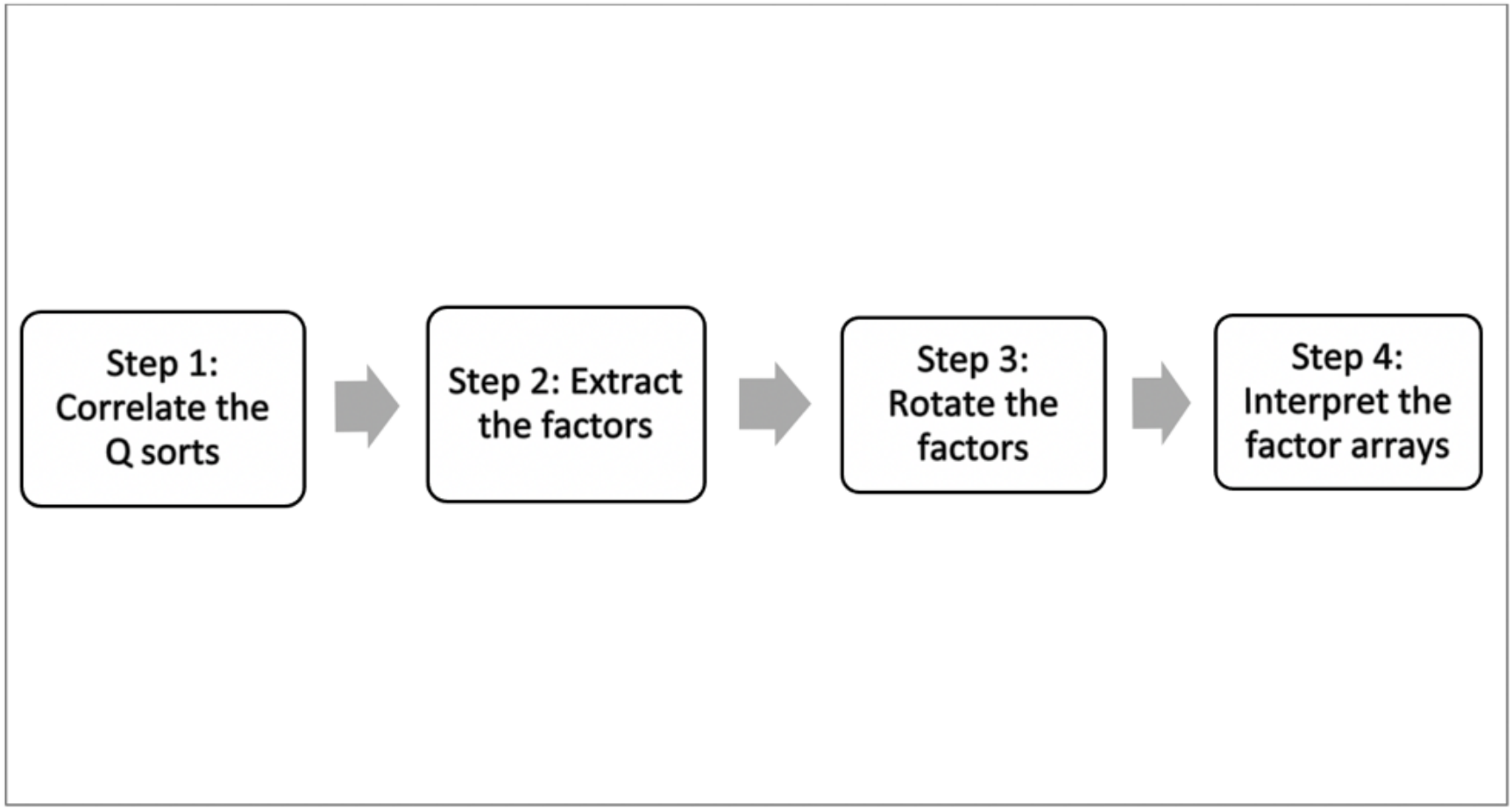
3.7 Analysis and Interpretation in *Q* methodology

Once the concourse has been constructed, and the person sample is determined, the *Q* set is entered into the software that the participants will interface with to sort the statements and complete the *Q* sort. Typically, most *Q* methodology software will provide statistical analysis as well. The collection, analysis, and interpretation of data in *Q* methodology requires a researcher who is deft both in qualitative and quantitative statistics (Newman and Ramlo, 2015). This is because *Q* methodology and *Q* factor analysis represent a marriage between quantitative and qualitative methods, to allow for using what works best to obtain useful results that answer the research questions (Tashakkori & Teddlie, 2009).

Regardless of the mixed method procedure choices one makes throughout this process, it is important to understand the order in which *Q* methodologists receive, analyze, and interpret data. To aid the reader in understanding this process the steps are outlined in Figure 4. The first step in the statistical analysis of *Q* methodology involves the correlation of the *Q* sorts. The second and third step is to extract the factors, followed by factor rotation. After factor rotation the final step is to prepare the factor arrays for interpretation to achieve a salience and consensus of viewpoint.

Figure 4

Q methodology Steps in Analyzing and Interpreting Data



3.8 Correlation as a first step to factor analysis

As previously outlined, *Q* methodology facilitates the grouping of similar views into factors, thus grouping people, not items (Newman & Ramlo, 2015). This requires enough items in the *Q* set to determine participant viewpoints, however the number of participants are not vital as in *R* factor analysis. In *R* methodology correlations between tests or variables undergo factor analysis by columns (by-variable) (Watts & Stenner, 2012). In *Q* methodology the data matrix is transposed or "turned on its side" (Watts & Stenner, 2012, p.13). This by-person factor analysis is conducted through correlation and factorization of rows where participants are considered the variables (Maltempi, 2018; Watts & Stenner, 2012). Instead of multiple tests and conditions as in *R*, in *Q* a single measuring unit is employed throughout the matrix (Brown, 1980; Watts & Stenner 2012). Factor analysis is crucial to *Q* methodology as it is the statistical vehicle by which shared viewpoints within clusters of respondents are treated as variables after they group themselves (McKeown & Thomas, 2013).

Once all the *Q* sorts have collected, the first statistical task is to run the data through a statistical program and inspect the correlation matrix. This has two purposes, the first is data reduction, and the second is for the computer to analyze the interrelationships, patterns, and common themes among our participants and their views. These are our factors expressed through a table in the form correlation coefficients, known as factor scores or factor loadings. The production of correlation coefficients is achieved through one of these three statistical tests: Spearman correlation, Pearson correlation, or Kendall correlation. The correlation tests will determine the significance of the participants' statements on each factor. The significance required must be at the $p < .05$ to $p < .01$ level. A factor score table illustrates for the researcher factor scores or typologies, grouping people into similar views. In rows one can determine the

sorters identification and the loadings (correlations) with the retained factors. Sorters represented by one factor receive an *X*, next to their factor score, a process known as flagging. Flagging highlights the various views determined from multiple sorts, also known as a representative sort (Brown, 1980). Furthermore, this marking up of factors delineates consensus statements and distinguishing factor statements, which are later quantitatively analyzed to calculate statistical significance.

Overall, the factors will make up the meaning and the variability amongst our *Q* sorts. *Q* researchers are looking for three types of variability or variance. The first is common variance which tells us the variability the groups have in common. The second is specific variance which is particular to specific participants or *Q* sorts, and the final is error variance which pinpoints random errors in the study (Watts & Stenner, 2012). In the next section factor extraction will be explained.

3.9 Factor Extraction

The next step in *Q* mode factor analysis following inspection of the correlation matrix is to determine the factor extraction method. In this statistical exercise, the point is to extract distinct portions of common variance. Most software programs offer two choices for factor extraction: principal components and Centroid (Newman & Ramlo, 2015). Some researchers argue that in *Q*, Centroid is the extraction method of choice because it is not likely that a participant would sort items in a *Q* study in the same way (Stephenson, 1953). It also allows a permissiveness in relation to data exploration (Watts & Stenner, 2012). However, Principal Component Analysis (PCA) combined with Varimax rotation is also commonly used in *Q* methodology, known for yielding “the best mathematical solution” (Hensel & Toronto, 2022, p.11).

The first factor extracted, namely Factor 1, is the first shared pattern or sorting configuration in the data. In the form of a correlation coefficient a measure is provided exemplifying the extent to individual *Q* sort is typical of the Factor 1 pattern, known as a factor loading or factor saturation (Watts & Stenner, 2012). This first factor accounts for the largest amount of study variance, with the succeeding factors regularly decreasing in size. Some post factor extraction tables also provide scores that indicate communality.

Communality marked by h^2 is calculated by summing the squared factor loadings in relation to each *Q* sort. It is a useful indicator of how much a particular *Q* sort holds in common with all the other *Q* sorts in the study group (Watts & Stenner, 2012). High communality tells us that the *Q* sort is typical and highly represents the group, and low communality tells us the reverse. The latter can signify that the factors in a study lack sufficient common variance. A caveat is that the common variance they possess is solely tied to a single factor. Another post factor extraction calculation offered are Eigenvalues.

Eigenvalues, also known as the Kaiser-Guttman criterion, are the most used criteria in figuring out which and how many factors to extract for rotation (Watts & Stenner, 2012). The factor statistical strength and offer explanatory power. Factor loadings that are regarded as substantial are those with an Eigenvalue of ≥ 1.00 ($\lambda >= |+20|$) and should be retained. It is important to warn however that the sole use of Eigenvalue criterion can exclude important theoretical factors and additional criteria are needed if too many values have high Eigenvalues (McKeown & Thomas, 2013).

If depending on Eigenvalues of 1.00 or more is leading to too many factors being extracted, some say that seven is a good default maximum number of factors to extract, while others say one factor should be extracted for a group of six to eight participants (Watts & Stenner, 2012).

Researchers must make decisions that are defendable about which criteria make sense and these decisions must be guided by objective criteria. Overall, the final set of factors should account for as much variability in the original correlation matrix as possible and should explain a decent proportion of the study variance (Watts & Stenner, 2012). There are a few more criteria, depending on the factor extraction method of choice that one can use.

Watts and Stenner (2012), recommend the following criteria. Humphrey's rule, a criterion that determines a factor's significance by calculating the cross product of its two highest loadings exceeds twice the standard error. For example, 1÷ (no. of items in a *Q* set). The Scree Test originally designed following Principal Component Analysis (PCA), is taking note of the Eigenvalues, and plotting them on a line graph. The factors which are at the point in which the line changes slope, are the ones to extract. Finally, Horn's Parallel Analysis, also recommended for PCA extraction, shows how big Eigenvalues would be when there are no factors present in the data. It extracts Eigenvalues from random data set that parallel the actual data set regarding the number of cases (items in the *Q* sort) and variables (number of participants).

3.10 Factor Rotation

Factor rotation offers the researcher the ability to view the same data from various vantage points by rotating them on and *x* and *y* axis. Orthogonal rotation maintains a 90-degree relationship between the factor and the axis, while oblique rotation permits the 90-degree relationship to be broken (Watts & Stenner, 2012). William Stephenson (1953) supported orthogonal rotation for *Q* methodology. Overall, the aim of factor extraction is to exhaust viewing all factors from the most meaningful vantage points on the axis.

Factors can be rotated by hand or by Varimax Rotation. Varimax is the preferred method, as it allows the researcher to maximize an Eigenvalue for each structure (Newman & Ramlo, 2015).

The researcher is involved in this research process, pursuing a subjective rotation of the factors, not objective (Brown, 1980; Stephenson, 1953). In addition to Eigenvalue, the varimax rotation will be used to maximize high and low factor loadings and minimize mid-value factor loadings (Zeller, 2005). Loadings mean correlations exist between variables and factors. The process highlights a small number of variables, making interpreting the results easier (Allen, 2017). The researcher should review factor loadings and their contextual significance pertaining to the topic being investigated. Varimax is an automated method deemed more objective than hand rotation and better for a larger P set and *Q* set (Watts and Stenner, 2012).

Following the calculation of factor scores and Varimax Rotation, the researcher takes a deep dive into the data by looking at statements that the participants arranged most often in a single grid position, and in addition look at the z-scores associated with the statement's placement on the grid. A *z* score illustrates how many standard deviations an observed value lies from the mean. Positive *z* scores exceed the mean, and negative *z* scores are less than the mean. *Q* factors are transformed into *Q* models by multiplying the converted *z* score by that standard deviation, revealing specific content or the underlying meaning of viewpoints (Maltempi, 2018). *Q* models represent the shared viewpoints within the person sample and are provide yet another opportunity for analysis that aids the researcher in answering the questions related to the study.

3.11 Reliability and External Validity

Reliability, a psychometric property of a test, is the extent to which one expect consistent results when using repeated measurement while examining the same concept with the same population. Validity is the extent to which an instrument measures what it is supposed to measure. Assessing reliability and validity is the only way that the measurements devised in social science research can be useful.

Validity in *Q* methodology is not evaluated as internal and subjective self-referential viewpoints are explored. The validity of a *Q* study is derived from the interpretation of data, as inductive qualitative studies (Lee, 2017). Brown (1980) wrote that because external criteria for a participant's point of view are non-existent, validity is not applicable in *Q* methodology. Regarding reliability, replicability also known as test-retest reliability has shown to range from .80 and above (Brown, 1980). The next section will discuss the application of *Q* methodology research design within this study.

3.12 Research Design and Implementation of *Q* Methodology in This Study

In the preceding section an overview was provided about the purpose and process of *Q* methodology. The remaining methodology section will lay out the application of *Q* methodology to this study. In this exploratory study, the student researcher will analyze English Language Learner (ELL) teacher understanding and utilization of metacognitive instructional practices.

3.13 Person Sample (P set)

The student researcher utilized a purposeful, also known as purposive, multi-case sampling by choosing a P set based on criteria and one that through their experiences and viewpoints, provided the necessary information to understand the phenomenon. A voluntary, anonymous, non-probability sample of 25 New York State English Language Learner (ELL) teachers employed in Nassau and Suffolk public schools comprise the sample used for this study. The teachers were contacted via email and posts on Teaching English to Speakers of Other Languages (TESOL) international association, in which the link to informed consent, baseline survey, video and written instructions on how to complete the *Q* sort, and the actual *Q* sort will be provided. In table 1, the P-set demographics are presented.

Table 1

P set Demographics

Instance ID #	Title	Grades Taught	Highest Degree In Education	Certifications in education	Years of experience
1	MLL/ELL coordinator	K-5	Masters Degree	Childhood Education 1-6 TESOL K-12	5-10 years
2	ENL Teacher	5&6	Masters Degree	TESOL K-12	20+ years
3	ENL Teacher	6-8	Masters Degree	Bilingual education 6-8 Speech and language	10-15 years
4	ENL Teacher	1	Masters Degree +	Elementary Education TESOL K-12	1-5 years
5	TESOL Instructor	K-5	Masters Degree	General Education N-6 TESOL K-12	1-5 years
6	ENL Teacher	K-5	Masters Degree	TESOL K-12	20+ years
7	ENL Teacher	K&1	Masters Degree +	TESOL K-12	15-20 years
8	ENL Teacher	K-5	Masters Degree	Childhood Education 1-6 TESOL PreK-12	15-20 years
9	ENL Teacher	K-2	Masters Degree	Childhood Education 1-6 Literacy B-6	10-15 years
10	ENL Teacher	K-6	Masters Degree +	Childhood Education 1-6 Literacy Birth -12	10-15 years
11	ENL Teacher	K-5	Docorate	General Education 1-6 TESOL K-12	5-10 years
12	ENL Teacher	6-8	Masters Degree +	TESOL K-12	15-20 years
13	ENL Teacher	K-12	Master's Degree	TESOL K-12	1-5 years
14	ENL Teacher	2, 3	Masters Degree	TESOL K-12	15-20 years
15	ENL Teacher	6-8	Masters Degree	TESOL K-12 Special Education 1-6	5-10 years
16	ENL Teacher	1-6	Masters Degree	TESOL K-12 Special Education 1-6	5-10 years
17	ENL Teacher	K&4	Masters Degree	TESOL K-12	10-15 years
18	ENL teacher	K-5	Masters Degree +	TESOL K-12	10-15 years
19	ENL Teacher	1-5	Master's Degree	B-2 Students with Disabilities 1-6 Students with Disabilities	1-5 years
20	ENL Teacher	4&5	Masters Degree +	Elementary 1-6 TESOL K-12	10-15 years
21	ENL Teacher	2&3	Masters Degree +	Childhood Education Birth-6 TESOL PreK-12	10-15 years
22	ENL Teacher	K-2	Dual Masters Degree	Early Childhood Education K-2 TESOL PreK-12	20+ years
23	ENL Teacher	1-6	Masters Degree	B-6 Students with Disabilities B-6 Elementary Education	1-5 years
24	ENL Teacher	4-6	Masters Degree	Elementary Education PK-6th TESOL K-12	15-20 years
25	ENL teacher	K-6	Doctorate	Elementary education 1-6 TESOL SBL	5-10 years

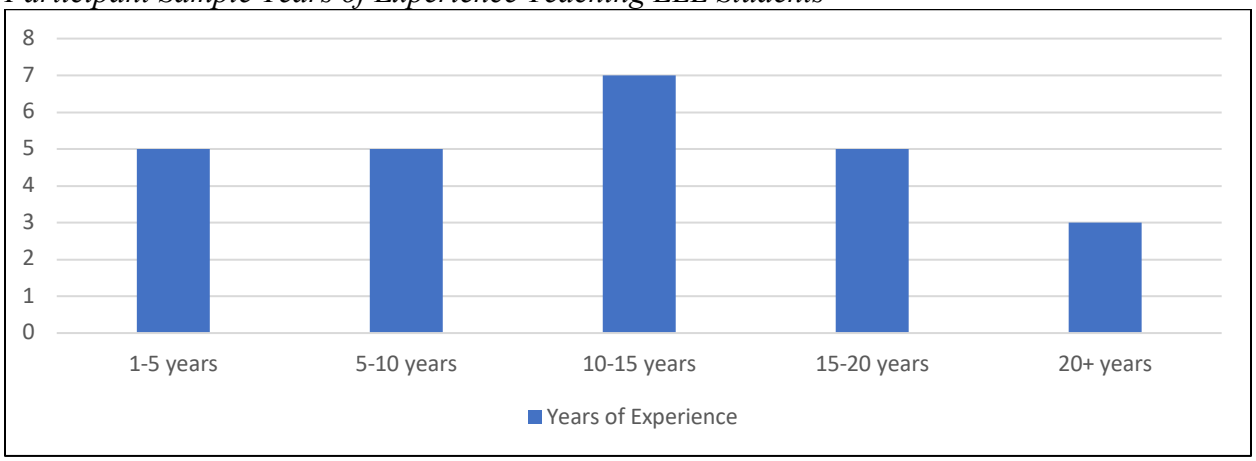
One can define purposeful sampling as selecting an experienced P set and meeting the criteria to give information about the central phenomenon of the study (Creswell & Plano Clark, 2018). An experienced P set in this study was defined as teachers that hold an advanced such as a master's degree in teaching English to Speakers of Other Languages (TESOL), dual language, or other equivalent degrees. The researcher assumed that ELL teachers with advanced degrees are more likely to understand the concept of metacognition and incorporate it into their pedagogy.

Although the person sample was solicited through non-probability techniques, the results derived from this sample will not be statistically generalizable. *Q* is not interested in generalization of a research result but to select research participants from stratified sampling to glean as many viewpoints as possible (Lee, 2017). In this study, the sample is stratified by 1) years of experience as ELL teachers; 2) grade they teach in; 3) degree in education; and 4) the varied exposure to the topic of metacognition the teachers have had prior to this research study. This information was obtained by the baseline survey teacher completed prior to the *Q* sort. The remainder of this section will highlight the diverse backgrounds of the participants.

English Language Learner teacher experience of the participant sample varied by the years of experience which ranged from one to five years to as many as twenty years and above. 20% of teachers fell in the 1-5 years of experience range, 20% of teachers fell in the 5-10 years of experience range, 28% of teachers fell in the 10-15 years of experience range, 20% of teachers fell in the 15-20 years of experience range, and finally, 12% of teachers fell in the 20 plus years of experience range. (Figure 5).

Figure 5

Participant Sample Years of Experience Teaching ELL Students



Note. Left column represents number of teachers.

The ELL teacher participant sample also varied by the grades they teach. Most of teachers in the sample have elementary school experience, with a few teaching middle school. If one is to consider sixth grade elementary school, then all the teachers in this sample teach at an elementary school level. 28% of teachers teach in lower elementary grades K through 2. 12% of teachers teach in upper elementary grades 3 through 5, 44% of teachers teach in lower and upper elementary grades K-5, 12% of teachers have elementary and middle school experience, and 4% have elementary, middle school, and high school years of teaching experience. (Figure 6).

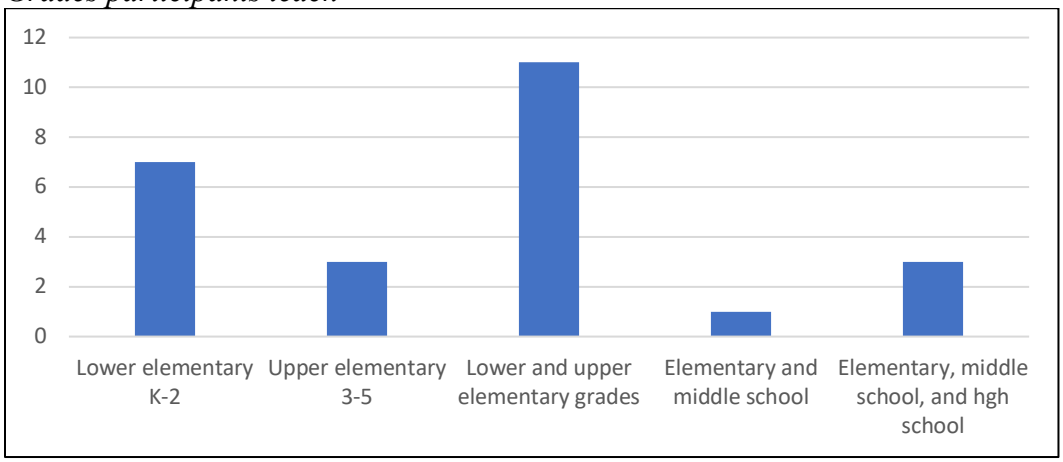
As part of the study's criteria all participants in the study were required to hold a master's degree in TESOL (teaching English as second language or foreign language), bilingual education or equivalent certifications. 92% of the teachers hold a TESOL plus degree additional credits, and 8% of the teachers hold a doctoral TESOL degree.

On the issue of teacher exposure to education in metacognition and metacognitive practices, 48% reported that they have had metacognition education only in graduate school, 28% reported that they have had metacognition education only in undergraduate school, and 24% reported that

they have had metacognition education only in both undergraduate and graduate school. The teachers reported 80% of this training came through education courses, and 20% through psychology courses exclusively. Furthermore, 100% of the teachers reported having exposure to metacognition through either continuing education conferences, seminars, observations and supervisory feedback, research articles, books, district in-house trainings, and state regulations.

Figure 6

Grades participants teach



Note. Left column represents number of teachers.

The survey was accessible to participants on June 3, 2022, and the survey was closed on the last response was received on September 26, 2022, following several days of no responses. At the culmination of the survey, all participants granted permission through informed consent for their data to be included in the study. The final viable sample for this study was N = 25.

3.14 *Q* Statements Sample

The 36 statements developed for the *Q* set in this study were derived from primary sources (ELL teachers, professors who are experts on the study of metacognition) and secondary sources through emerging themes in the literature reviewed. Following the interviews and discussions with ELL teachers and a review of hundreds of articles for the literature review, 36 statements

emerged. The *Q* sample statements, and the condition of instruction can be found in Appendix C.

Overall, the *Q* set or *Q* sample in this study was constructed using coverage and balance. Coverage means that the statements are broadly representative and relevant of all possible opinions to the P set and balance allows for the full gamut of statements included in the *Q* sample in relation to the research topic and research questions on hand (Watts & Stenner, 2012). This does not mean that the researchers view of the topic take precedence, but instead the identification of all key themes and issues are represented, without repetition and a high number of statements making the sorting process demanding and frustrating for the participants.

A table in Appendix D outlines some the research articles and books reviewed on the topic of metacognition that support the use of the *Q* sample statements. Most statements were derived from themes highlighted in more than one article or book; however, one article was named in the table to highlight for the reader that the statements are represented in the literature. Some statements are a negative or inverse of a statement derived from themes in the literature to provide balance to the *Q* set.

3.15 *Q* Sort Template and Sorting Scale

The *Q* sort template shown in Figure 7 represents a 11-point sorting scale (-5 to +5) in the form of a forced-choice, quasi-normal distribution containing slots for 36 statements to accommodate the *Q* sample. Brown (1980) recommended a 9-point scale for forty items or less, however, adjusting the distribution of the sorting scale is acceptable when a complex topic is involved (Watts & Stenner, 2012). In this case metacognition is a complex topic therefore the distribution had many neutral or close to neutral options on the scale for participants to place statements that they may have felt neutral about. The template developed was designed to

approximate a normal distribution representing data sets with M = 0.00, SD = 2.05 Skewness = 0.00, and Kurtosis = 2.36, which approximates a normal distribution. Regardless as to whether a sorting template adheres to a normal distribution, or deviates, Brown (1980) noted that similar results will typically be produced. However, when possible, it is recommended to utilize a quasi-normative distribution template (Brown, 1980; Watts & Stenner, 2012, 2005; Stephenson, 1953).

3.16 Instrumentation for *Q* method study

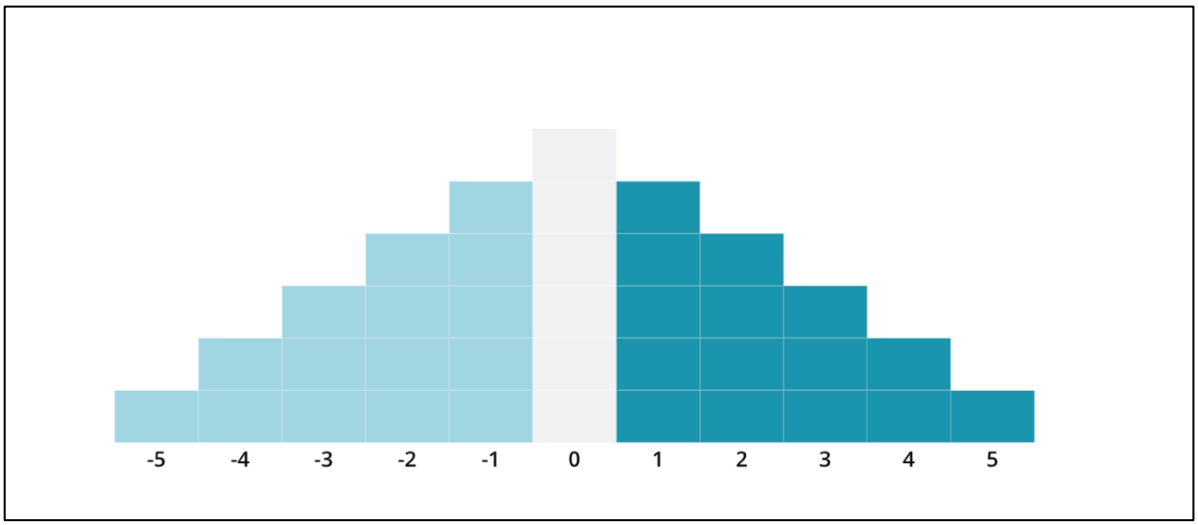
The 36 statements were inputted to *Q* Method Software (*Q* Method Software, 2022), an online *Q* sort program. *Q* Method Software (*Q* Method Software, 2022) allows participants to provide informed consent, perform baseline questionnaire, view written instructions on how to perform the *Q* sort, and perform the *Q* sort by dragging and dropping virtual cards containing individual statements into the online template. The participants cannot move from one part to another without completing in order first the informed consent, then the baseline survey, then the *Q* sort. The software also supports analysis of the data, which is stored on their online database and can easily be exported for use in other *Q* methodology software or SPSS. Access to Q method software can be provided by the link in the reference section of this dissertation.

3.17 Condition of Instruction

The format of this *Q* study takes on a single COI utilizing multiple subjects' input. The COI employed in this study states, "Please sort these statements into the template in order of importance and in a way that best describes your views about metacognition and how metacognition is incorporated in your instruction with only your English Language learners (ELL) students." Participants were instructed to individually read, rank-order, and sort provided *Q* sort statements ranging from *least agree* - 5 to *most agree* + 5 by dragging and dropping virtual cards onto a pre-set template.

Figure 7

Q sort Distribution



Note. A quasi-normal, fixed-distribution *Q* sort template with 11-point scale and 36 statements slots accessible online. Distributional statistics for the template are M = 0.00, SD = 2.05 Skewness = 0.00, and Kurtosis = 2.36.

3.18 Data Collection

Data collection for this study was facilitated by *Q* Method Software (*Q* Method Software, 2022). Participants were sent a study link and participation code through email. Through this link participants anonymously and independently accessed the informed consent, short baseline survey and *Q* sort through their own private computer.

Q Method Software (*Q* Method Software, 2022) allowed the student researcher to design the study in such a way where participants cannot move on to the baseline survey without completing and signing the informed consent and cannot move on to the *Q* sort without completing the baseline survey. Instructions and prompts are provided at the beginning and the completion of all three sections of the study. Participants were also provided with the student researcher email address with any questions regarding the completion of the study.

The baseline survey asked demographic questions that included name, email address, grades they teach, teacher title, teacher certifications, and prior knowledge regarding metacognition,

either through education, or post certificate continuing education. Names were coded for privacy and are only accessible to the student researcher via password protected access. The information was collected to ensure stratified sampling enriching the study with various and diverse viewpoints. Additionally, the baseline survey was used to answer research question.

RQ3: Are there institutional resources available to ELL teachers relative to metacognitive instructional practices?

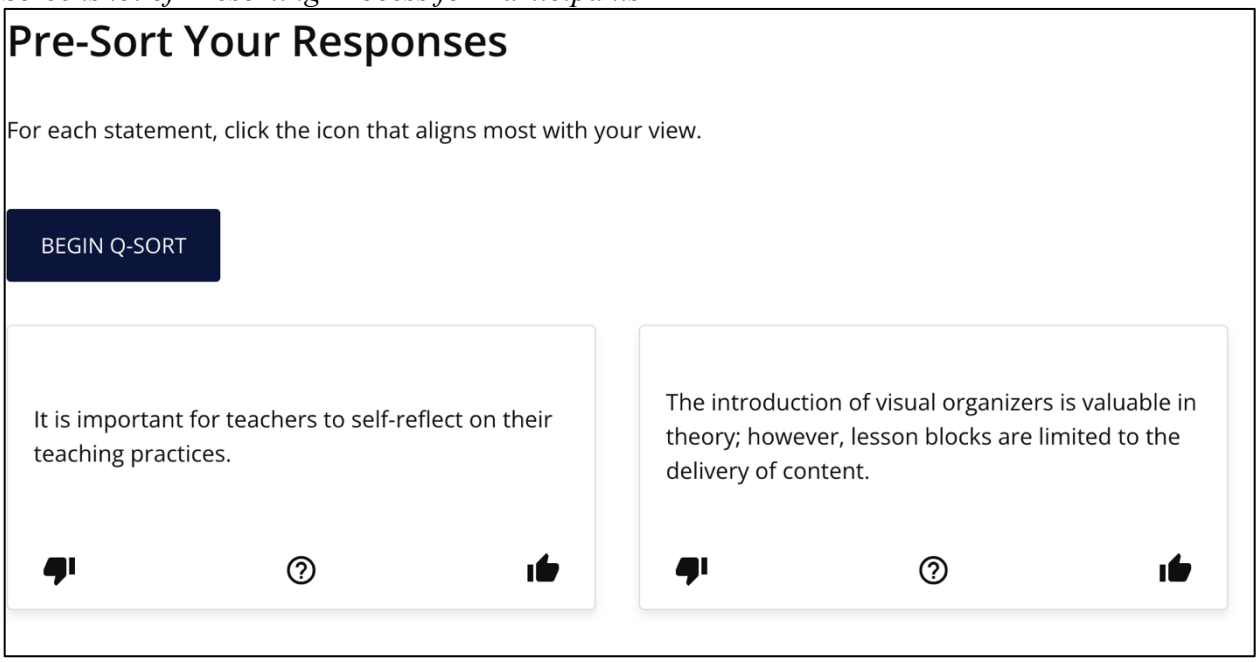
Following the baseline survey, the participants were initially presented the opportunity to pre-sort the 36 statements by reading them first and giving them a thumbs up (positive), thumbs down (negative) or a neutral designation, (Figure 8). This is not to be confused with the pre-sorting of information collected by the student researcher, which involves collecting demographic data through a baseline survey or an interview. This process allows the participant to look at the statements and divide them into three categories or piles, making it easier to then arrange the statements on the grid in the second part of the sorting process. The participants then worked with each pile, placing it on the grid by dragging and dropping the positive statements on the positive side of the scale, the negative statements on the negative side of the scale, and the neutral statements on the neutral part of the scale. The participants had ample time to review the placement of the statements and re-organize them as many times as they wish. The average time spent on data collection in this study was twenty-three minutes and thirty-three seconds.

3.19 Data Analysis

Data from the Q sort were factor analyzed with Varimax rotation and Kaiser normalization using Q method software (Q Method Software, 2022), Based on visual inspection of produced the scree plot and an analysis of produced latent root (i.e., eigenvalue) criterion, Q factors were

Figure 8

Screenshot of Presorting Process for Participants



extracted. Factors with eigenvalues > 1 were extracted. The extracted *Q* factors were utilized to identify clusters of respondents sharing common viewpoints.

Based on the content of the models, they were each interpreted, labeled, and reported. Furthermore, the *Q* scores of statements with the highest and lowers scores revealed the viewpoints of subjects loaded on specific factors.

3.20 Ethical Considerations

Participants in this study were primarily from the New York State counties and schools of Nassau and Suffolk, as well as of private school elementary ELL teachers, with a few from middle school. All participants volunteered for the study and were informed through an informed consent form about the study's purpose and benefit. Moreover, the informed consent form was used to grant the student researcher permission to use all data collection from the baseline survey and *Q* sort as part of the data gathering process. Participants anonymity and personal information such as name and email address were protected by using codes to identify

the participants instead of personal information. Participants were not in any way coerced or obligated to complete the survey and *Q* sort. They could stop participation at any time. Furthermore, the contents for the survey questions and *Q* sort statements, and the voluntary nature of the study did not cause stress or harm to the participants. All participants received a $25 Amazon gift card after completing the study as a token of appreciation.

3.21 Disclosure and Control of Potential Researcher Bias

All the *Q* statements in this dissertation were developed through a thorough literature review and review from all dissertation committee members to ensure that the *Q* set is a broad representation of viewpoints on the topic of metacognition. The quantitative and qualitative statistical model in *Q* methodology along with the student researchers deep understanding of the complex decisions that go into lesson planning, development and delivery have guided the analysis and interpretation of the results in this study. As suggested by Watts and Stenner (2012), a holistic viewpoint of the data has been the primary concern of the student researcher in this study.

3.22 Methodological Limitations

Despite the advantages that *Q* methodology provides the researcher such as the ability to measure specific viewpoints and perceptions of subjects, it is limited in the ability to provide results that are generalizable to a particular population. Although *Q* methodology is guided by quantitative statistical processes, the qualitative aspect of the researcher's interpretations may introduce methodological limitations as well as strengths.

3.23 Chapter Synthesis

Chapter III provided an overview on *Q* methodology along with its specific application to the research topic. Three research questions guide this study, along with a detailed explanation of

how *Q* methodology coupled with a short baseline survey are a good fit for answering the research questions when looking at teachers' viewpoints and understanding and utilization of metacognitive instructional practices.

In Chapter IV the results of the study will be highlighted, analyzed, and discussed. This will be done by focusing on *Q* factors and corresponding *Q* models that emerged during the methodological process that represent the shared viewpoints of the participants. Furthermore, that baseline survey will add to the analysis of, and discussion of the *Q* models shedding light on demographic data of the participants and will exclusively be used to answer RQ3 of the study.

Chapter IV Results

The purpose of this study was to explore the shared dominant viewpoints of ELL teachers regarding metacognition, their utilization of metacognitive practices in the classroom, and their exposure to institutional resources available to ELL teachers. Specifically, the following research questions were answered by the data:

RQ1: What are the dominant viewpoints shared by ELL teachers regarding metacognition?

RQ2: To what extent if any do ELL teachers believe they are implementing metacognition into their pedagogical and instructional methods?

RQ3: Are there institutional resources available to ELL teachers relative to metacognitive instructional practices?

The study's data and findings were obtained from a baseline survey, twenty-five *Q* sorts and subsequent quantitative and qualitative analysis. This section will discuss the *Q* models that surfaced from shared viewpoints of the participants in this study. The models were analyzed and compared in detail as they relate to topic at hand, specifically answering the research questions by revealing key viewpoints, shared understandings, interrelationships of the participants culminating a holistic picture of the data.

4.1 *Q* methodology Data Analysis

As mentioned previously there are four steps that were used in analyzing data within the *Q* methodology framework. First the *Q* sorts were correlated, then the factors were extracted, followed by factor rotation, and interpretation and development of *Q* models. Principal component analysis was then conducted to identify groups of persons within the sample set who

held shared viewpoints and perspectives regarding ELL teacher understanding and utilization of metacognitive instructional practices in the classroom.

4.2 Results of *Q* Factor Analysis

As a first step, using *Q* method software (Q Method Software, 2023), a correlation matrix was produced, followed by principal component analysis (PCA). Initially eight factors were extracted, with Q method software (Q Method Software, 2023), selecting the 8 factors by identifying and removing distinct portions of common variance from the correlation matrix (Watts & Stenner, 2012). Brown (1980) posits that 7 factors is the default number for extraction sufficient for further analysis and interpretation and *Q* Method software (Q Method Software, 2023), exceeds the default by one. The first factor extracted accounted for the largest amount of eigenvalue and study variance, followed by factors with smaller amounts of eigenvalue study variance. (Figure 9).

A visual inspection of the unrotated factors on a scree plot, along with Horn's parallel analyses was conducted by *Q* method software (Q Method Software, 2023), which provided additional information about the number of initial factors to be extracted. (Figure 10). Horn's parallel analysis calculated eigenvalues from random study data sets, and showed how the study data would have resulted, even if the participants had configured their *Q* sorts in an arbitrary fashion (Watts & Stenner, 2012). Actual or observed factors that exceeded the mean eigenvalue, and the 95th percentile eigenvalue were extracted. The 95th percentile (or the 950th highest eigenvalue) is typically derived from one-thousand random data sets and assures the researcher that there is a five percent chance of the factors being spurious (Watts & Stenner, 2012). Factor 1 far exceeded the mean and 95th percentile eigenvalue, and

Figure 9

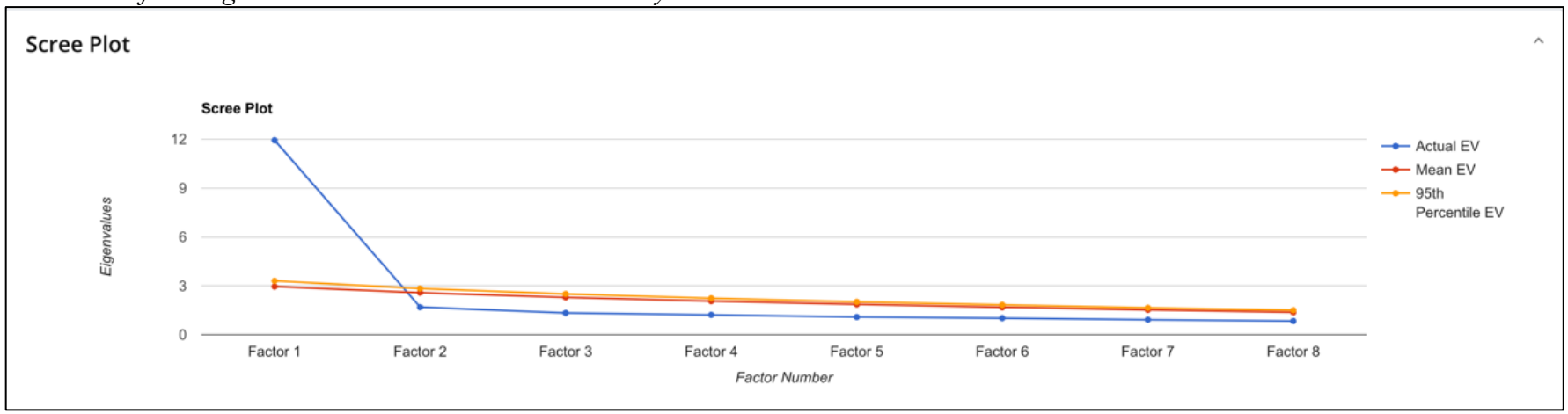
Extracted Factors

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Eigenvalue	11.94142	1.68645	1.33407	1.21383	1.08203	1.01426	0.91615	0.83537
% Explained Variance	47.76568	6.74579	5.3363	4.85533	4.32813	4.05702	3.6646	3.34148
Cumulative Variance	47.76568	54.51147	59.84777	64.7031	69.03123	73.08825	76.75285	80.09433
Humphrey's Rule	0.67158	0.29418	0.31724	0.21264	0.22774	0.21387	0.18741	0.13729
Standard Error	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

Note. Eight factors that represent the largest amounts of study variance and eigenvalues.

Figure 10

Scree Plot of the Eight Factors with Horn's Parallel Analysis



Note. Scree plot of actual eigenvalues of study unrotated factors and mean and ninety-fifth percentile eigenvalues of one-thousand random data factors. Actual or observed factors that exceed the mean and ninety-fifth percentile eigenvalues, were certainly extracted.

should be extracted, however Watts and Stenner (2012), posit that factors that are slightly below or parallel the 95th percentile eigenvalue can still be meaningful, as they still hold a high percent chance of discerning essential information.

Next, the 8 factors were further analyzed for rotation. Using the Kaiser-Guttman criterion (Eigenvalues of (EV > 1), 6 composite factors were identified (Factors 1-6). The 6 factors were analyzed and out of those 6 factors, 3 factors with the highest Eigenvalues that meet Kaiser Guttman (Factors 1-3) were then extracted and rotated orthogonally applying a Varimax rotation with Kaiser normalization to develop a set of common factors that were represented shared viewpoints of ELL teachers who participated in the study. Figure 11 illustrates an example of a composite *Q* sort that represents Factor 1.

A composite *Q* sort represented in Figure 11 is a factor that represents a theoretically "pure" shared viewpoint, no longer displaying the viewpoint of one participant (Maltempi, 2018). "Pure" models amass each participant's proportion of variance which is calculated and based on their squared factor loading (λ^2). The factor loadings with corresponding eigenvalues and percentages of variance explained, is shown in Table 3. The cut-off criterion for factor loadings of $\lambda > |+/-.43|$ was adhered to in analyzing and interpreting factors at the ($p < .01$) level. The cut off criterion is determined by ($SE=1/F\sqrt{statements}\ x\ 2.58$) factor loadings that satisfied this criterion are illustrated in Table 2 and are highlighted for each of the three factors (Brown, 1980). All participants loaded onto at least one factor, with 13 cases loading on Factor 1, 6 cases on Factor 2, and 6 on Factor 3.

Together, three *Q* factors explained more than half (i.e., 60%) of the variance in the Q statements and sorting patterns. As noted earlier, the *Q* models derived are a "pure"

Figure 11

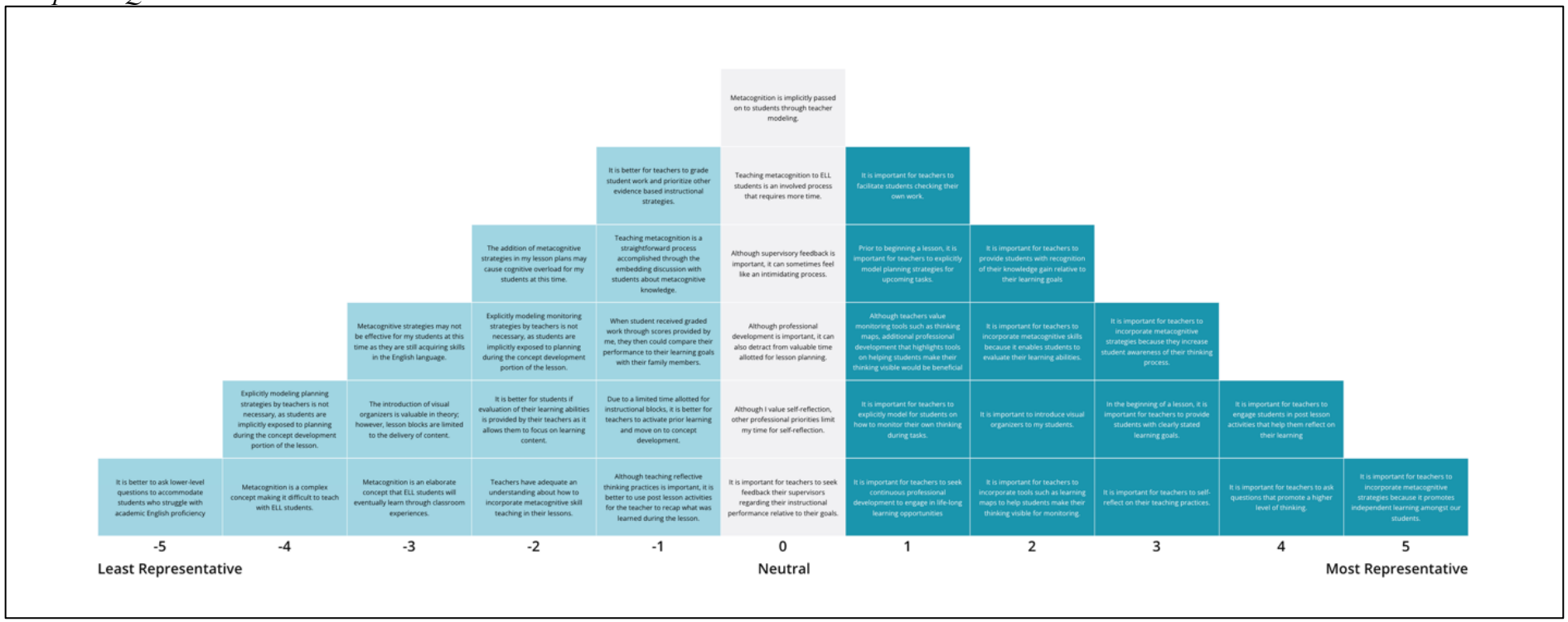
Kaiser-Guttman Criterion Factors

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Eigenvalue	11.94142	1.68645	1.33407	1.21383	1.08203	1.01426	0.91615	0.83537
% Explained Variance	47.76568	6.74579	5.3363	4.85533	4.32813	4.05702	3.6646	3.34148
Cumulative Variance	47.76568	54.51147	59.84777	64.7031	69.03123	73.08825	76.75285	80.09433
Humphrey's Rule	0.67158	0.29418	0.31724	0.21264	0.22774	0.21387	0.18741	0.13729
Standard Error	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

Note. Factors shaded in gray meet the Kaiser-Guttman criterion. The Kaiser-Guttman criterion selects factor that have an Eigenvalues of (EV > 1).

Figure 12

Composite Q Sort



Note. An example of a composite *Q* sort (Factor 1).

Table 2

Q Factor Loadings After Applied Varimax Rotation with Kaiser Normalization

Factor Matrix with Defining Sorts Flagged				
Part.No	Participant	Factor 1	Factor 2	Factor 3
1	0YFQC0	0.84747	0.1945	0.18294
2	1C9C	0.26857	0.4961	0.31533
3	2V0PE	0.26338	0.31815	0.7604
4	336FD2	0.14536	0.86919	-0.03584
5	44LI6J	0.52908	0.39967	0.30012
6	44M8T07	0.09071	0.11325	0.79545
7	4LJJ2U6X	0.68401	0.15902	0.25887
8	5TAR7AP1	0.54795	0.0625	0.5917
9	6ON8H7IV	0.22479	0.72893	0.23993
10	8AHBWUS	0.44089	0.30828	0.47172
11	92JZ	0.22197	0.16826	0.48575
12	DZHN9	0.2996	0.5425	0.36935
13	EK6J	0.48378	0.39017	0.4636
14	ESALI	0.15996	0.60662	0.27262
15	HVPB0	0.61918	0.54753	0.11991
16	HY4OVM	0.82976	0.2415	0.2005
17	KYLBRS	0.57053	0.34319	0.44298
18	LEPF8	0.75322	0.26419	0.30225
19	MI4B	0.594	0.38866	0.24587
20	Pilot 1	0.18742	0.61251	0.13723
21	RCYCSJJ8	0.78444	0.22586	0.05068
22	SWVWB	0.55738	0.37727	0.12263
23	U32SWYW	0.65024	0.29142	0.3295
24	V42T	0.69755	0.05243	0.31616
25	V5XUPEQ	0.52137	0.42922	0.36184
	No.of Defining Variables	13	6	6
	Avg. Rel. Coef.	0.8	0.8	0.8
	Composite Reliability	0.98113	0.96	0.96
	S.E of Factor Z-Scores	0.13736	0.2	0.2
	% Explained Variance	48	7	5
	Total % of explained variance	60		

Note. Total variance explained = 60. Factor loadings $\lambda > |.43|$ are highlighted are significant ($p < .01$).

representation of clusters of shared subjectivities and therefore, the partial model viewpoints provide evidence that these subjects have beliefs that often overlap or intertwine with more than one identified *Q* model. Therefore, the 3 model viewpoints derived from the *Q* factors represent the best representation of those individuals' shared viewpoints regarding ELL teachers understanding and utilization of metacognitive instructional practices. Individual factor characteristics are summarized in Table 3.

Within Factor 1, thirteen (52%) of the participants demonstrated a unique positive loading above the priori cutoff criterion. Therefore, Factor 1 illustrated the single-best model to reflect the viewpoints of the participants surveyed in this study. In addition, based on its eigenvalue from the statement sorting patterns across the *Q* sorts, the first factor explained more than 48% of the variance.

Within Factor 2, six (24%) of the participants demonstrated a unique positive loading above the priori cutoff criterion. Therefore, Factor 2 illustrated the second single-best model to reflect the viewpoints of the participants surveyed in this study. In addition, based on its eigenvalue from the statement sorting patterns across the *Q* sorts, the first factor explained more than 7% of the variance.

Within Factor 3, six (24%) of the participants demonstrated a unique positive loading above the priori cutoff criterion. Therefore, Factor 3 illustrated the third single-best model to reflect the viewpoints of the participants surveyed in this study. In addition, based on its eigenvalue from the statement sorting patterns across the *Q* sorts, the first factor explained more than 5% of the variance.

As previously noted, the study revealed three factors (Factors 1-3) regarding the shared viewpoints of ELL teacher's understanding and utilization of metacognitive instructional

Table 3

Factor Comparison

Factor Characteristics

	Factor 1	Factor 2	Factor 3
No.of Defining Variables	13.00	6.00	6.00
Avg. Rel. Coef.	0.80	0.80	0.80
Composite Reliability	0.98113	0.96	0.96
S.E of Factor Z-Scores	0.13736	0.20	0.20

Note. Individual factor statistics.

practices. To give meaning to these factors they were converted into *Q* models. *Q* models are a group of composite statements that are characteristic of the model and are organized based on the rank and *z* scores that the statements received due to a cluster of participants who load highly on that factor. *Z* scores standardized the *Q* scores mathematically by measuring the distance between a particular score and the mean average score of the measured sample, divided by the standard deviation (Watts & Stenner, 2012). The *Q* scored statements were then analyzed and interpreted based on their distinguishing statements and named the *Q* model as part of the qualitative analysis of this study.

4.3 Q Model 1: Teachers Concerned with Instructional Practices Supporting Student Independence and Self-awareness in Learning.

Q model 1 had the highest Eigenvalue of 11.94% and explained 48% of the variance amongst the statements within the *Q* sorts. 13 out of 25 participants loaded on to this *Q* model 1 and all satisfied the interpretive cut off criterion of $\lambda > |.43|$, significant at ($p < .01$). None of the participants that loaded onto *Q* Model 1, loaded onto any other *Q* model, representing a "pure" shared viewpoint. *Z* scores corresponded on the same continuum with sort values as seen in Table 3. Negative salient statements corresponded with larger negative *z* scores and positive salient statements corresponded with larger positive *z* scores. In Table 4 the negative salient statements are highlighted in green, and the positive salient statements are highlighted in yellow. Statements at the extreme of the distribution are typically the most salient (Brown, 1980). In addition, the statements were supported by factor loadings that that have a *z* score of 0.500 and above.

In *Q* Model 1, the dominant viewpoints are represented by these most salient statements. The six highest ranked positive salient statements were statements: 8 *(It is important for teachers*

to incorporate metacognitive strategies because it promotes independent learning amongst students), 20 *(It is important for teachers to ask questions that promote a higher level of thinking*), 25 *(It is important for teachers to engage in post lesson activities that help them reflect on their learning),* 31 *(It is important for teachers to self-reflect on theory teaching practices)*, 21 *(It is important for teachers to incorporate tools such as learning maps to help students make their thinking visible for monitoring)*, 13 *(In the beginning of a lesson, it is important for teachers to provide students with clearly stated learning goals*), and 7 (*It is important for teachers to incorporate metacognitive strategies because they increase student awareness of their thinking processes)*.

The six highest ranked negative salient statements were statements 23 (*It is better to ask lower-level questions to accommodate students who struggle with academic English proficiency)*, 17 *(explicitly modeling planning strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson)*, 6 *(Metacognition is a complex concept making it difficult to teach to ELL students)*, 10 *(Metacognitive strategies may not be effective for my students at this time as they are still acquiring skills in the English language)*, 18 *(The introduction of visual organizers is valuable in theory; however, lesson blocks are limited to their delivery of context)*, and 4 *(Metacognition is an elaborate concept that ELL students will eventually learn through classroom experiences)*. (Table 5).

Q model 1 provided insight to the interpretation of the dominant viewpoints of ELL teachers in the classroom. *Q* model 1, identified several dominant viewpoints regarding metacognition. These dominant viewpoints included: 1) Metacognition is important and leads to

Table 4

Q Model 1: Teachers Concerned with Instructional Practices Supporting Student Independence and Self-Awareness in Learning

	Factor Scores for Factor 1		
Statement Number	Statement	Z-score	Sort Values
23	It is better to ask lower-level questions to accommodate students who struggle with academic English proficiency	-1.72036	-5
17	Explicitly modeling planning strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson.	-1.61545	-4
6	Metacognition is a complex concept making it difficult to teach with ELL students.	-1.34353	-4
10	Metacognitive strategies may not be effective for my students at this time as they are still acquiring skills in the English language.	-1.2863	-3
18	The introduction of visual organizers is valuable in theory; however, lesson blocks are limited to the delivery of content.	-1.02207	-3
4	Metacognition is an elaborate concept that ELL students will eventually learn through classroom experiences.	-0.95901	-3
11	The addition of metacognitive strategies in my lesson plans may cause cognitive overload for my students at this time.	-0.92499	-2
22	Explicitly modeling monitoring strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson.	-0.91921	-2
12	It is better for students if evaluation of their learning abilities is provided by their teachers as it allows them to focus on learning content.	-0.9088	-2
1	Teachers have adequate an understanding about how to incorporate metacognitive skill teaching in their lessons.	-0.87944	-2
30	It is better for teachers to grade student work and prioritize other evidence based instructional strategies.	-0.76375	-1
2	Teaching metacognition is a straightforward process accomplished through the embedding discussion with students about metacognitive knowledge.	-0.7548	-1
29	When student received graded work through scores provided by me, they then could compare their performance to their learning goals with their family members.	-0.73454	-1
16	Due to a limited time allotted for instructional blocks, it is better for teachers to activate prior learning and move on to concept development.	-0.67422	-1
28	Although teaching reflective thinking practices is important, it is better to use post lesson activities for the teacher to recap what was learned during the lesson.	-0.51068	-1
5	Metacognition is implicitly passed on to students through teacher modeling.	-0.43953	0
3	Teaching metacognition to ELL students is an involved process that requires more time.	-0.28226	0
35	Although supervisory feedback is important, it can sometimes feel like an intimidating process.	-0.26949	0
36	Although professional development is important, it can also detract from valuable time allotted for lesson planning.	-0.09885	0
34	Although I value self-reflection, other professional priorities limit my time for self-reflection.	0.0507	0
32	It is important for teachers to seek feedback their supervisors regarding their instructional performance relative to their goals.	0.20718	0
27	It is important for teachers to facilitate students checking their own work.	0.68779	1
14	Prior to beginning a lesson, it is important for teachers to explicitly model planning strategies for upcoming tasks.	0.70045	1
24	Although teachers value monitoring tools such as thinking maps, additional professional development that highlights tools on helping students make their thinking visible would be beneficial.	0.73657	1
19	It is important for teachers to explicitly model for students on how to monitor their own thinking during tasks.	0.88418	1
33	It is important for teachers to seek continuous professional development to engage in life-long learning opportunities	0.92608	1
26	It is important for teachers to provide students with recognition of their knowledge gain relative to their learning goals	0.96366	2
9	It is important for teachers to incorporate metacognitive skills because it enables students to evaluate their learning abilities.	0.97457	2
15	It is important to introduce visual organizers to my students.	1.0297	2
21	It is important for teachers to incorporate tools such as learning maps to help students make their thinking visible for monitoring.	1.04592	2
7	It is important for teachers to incorporate metacognitive strategies because they increase student awareness of their thinking process.	1.10696	3
13	In the beginning of a lesson, it is important for teachers to provide students with clearly stated learning goals.	1.13826	3
31	It is important for teachers to self-reflect on their teaching practices.	1.25615	3
25	It is important for teachers to engage students in post lesson activities that help them reflect on their learning	1.26221	4
20	It is important for teachers to ask questions that promote a higher level of thinking.	1.33645	4
8	It is important for teachers to incorporate metacognitive strategies because it promotes independent learning amongst our students.	1.80046	5

Note. Eigenvalue = 11.94 %, % of explained variance = 48%. Statements highlighted in yellow indicate positive salience. Statements highlighted in green indicate negative salience.

independent learning; 2) Metacognition increases student-self-awareness of their thinking processes; 3) Metacognition is not too complex or elaborate for ELL students and should be taught even though ELL students are acquiring information in their native language and the English language.

Q model 1 presented several beliefs regarding teacher implementation of metacognition into the instruction. In order of importance measured by the *Z* scores and salience of the statements, beliefs included: 1) It is important to ask higher order thinking questions to ELL students; 2) It is important to include post-lesson reflection activities during instruction; 3) It is important for teachers to introduce clearly stated learning goals at the beginning of each lesson; 4) It is important to explicitly model planning strategies for students; and 5) Visual organizers and learning maps are important tools for student monitoring.

The baseline survey showed that the demographic data of the participants that loaded on this *Q* model, did not reflect any notable differences amongst them in level of education, years of teaching experience, or exposure to resources regarding metacognition.

4.4 *Q* Model 2: Visual Organizers are an Important Part of Instructional Planning

Q model 2 had the second highest Eigenvalue of 1.7 % and explained 7% of the variance amongst the statements within the *Q* sorts. Six out of 25 participants loaded on to this *Q* model 1 and all satisfied the interpretive cut off criterion of $\lambda > |.43|$, significant at ($p < .01$). None of the participants that loaded onto *Q* Model 2, loaded onto any other *Q* model, representing a "pure" shared viewpoint. *Z* scores corresponded on the same continuum with sort values as seen in Table 5. Negative salient statements corresponded with the larger negative z scores and positive salient statements corresponded with larger positive *z* scores. In Table 5 the negative salient statements are highlighted in green, and the positive salient statements are highlighted in yellow.

Statements at the extreme of the distribution are typically the most salient (Brown, 1980). In addition, the statements are supported by factor loadings that that have a *z* score of 0.500 and above.

In *Q* Model 2, the dominant viewpoints are represented by these most salient statements. The six highest ranked positive salient statements were statements: 15 *(It is important to introduce visual organizers to my students*), 13 *(In the beginning of a lesson, it is important to provide students with clearly stated learning goals),*14 *(Prior to beginning a lesson, it is important for teachers to explicitly model planning strategies for upcoming tasks)*, 31 *(It is important for teachers to self-reflect on their teaching practices*), 16 *(Due to a limited amount of time allotted for instructional blocks, it is better for teacher to activate prior knowledge and move on to concept development*), and 8 *(It is important for teachers to incorporate metacognitive strategies because it promotes independent learning amongst our students*).

The six highest ranked negative salient statements were statements 17 *(explicitly modeling planning strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson*), 22 *(Explicitly modeling monitoring strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson)*, 18 (*The introduction of visual organizers is valuable in theory; however, lesson blocks are limited to their delivery of context*), 29 (*When students receive graded work by me, they then could compare their performance to their learning goals with their family members)*, 34 *(Although I value self-reflection, other professional priorities limit my time for self-reflection)*, and 35 *(Although supervisory feedback is important, it can sometimes feel like an intimidating process).*

Table 5

Q Model 2: Visual Organizers are an Important Part of Instructional Planning

	Factor Scores for Factor 2		
Statement Number	Statement	Z-score	Sort Values
17	Explicitly modeling planning strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson.	-2.28647	-5
22	Explicitly modeling monitoring strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson.	-2.10762	-4
18	The introduction of visual organizers is valuable in theory; however, lesson blocks are limited to the delivery of content.	-1.54101	-4
29	When student received graded work through scores provided by me, they then could compare their performance to their learning goals with their family members.	-1.42659	-3
34	Although I value self-reflection, other professional priorities limit my time for self-reflection.	-0.99479	-3
10	Metacognitive strategies may not be effective for my students at this time as they are still acquiring skills in the English language.	-0.92229	-3
35	Although supervisory feedback is important, it can sometimes feel like an intimidating process.	-0.91274	-2
11	The addition of metacognitive strategies in my lesson plans may cause cognitive overload for my students at this time.	-0.72056	-2
36	Although professional development is important, it can also detract from valuable time allotted for lesson planning.	-0.69512	-2
2	Teaching metacognition is a straightforward process accomplished through the embedding discussion with students about metacognitive knowledge.	-0.66086	-2
27	It is important for teachers to facilitate students checking their own work.	-0.63228	-1
26	It is important for teachers to provide students with recognition of their knowledge gain relative to their learning goals	-0.42664	-1
1	Teachers have adequate an understanding about how to incorporate metacognitive skill teaching in their lessons.	-0.41445	-1
3	Teaching metacognition to ELL students is an involved process that requires more time.	-0.34431	-1
6	Metacognition is a complex concept making it difficult to teach with ELL students.	-0.19787	-1
33	It is important for teachers to seek continuous professional development to engage in life-long learning opportunities	-0.03962	0
4	Metacognition is an elaborate concept that ELL students will eventually learn through classroom experiences.	-0.01724	0
24	Although teachers value monitoring tools such as thinking maps, additional professional development that highlights tools on helping students make their thinking visible would be beneficial	0.06843	0
5	Metacognition is implicitly passed on to students through teacher modeling.	0.16308	0
28	Although teaching reflective thinking practices is important, it is better to use post lesson activities for the teacher to recap what was learned during the lesson.	0.16514	0
32	It is important for teachers to seek feedback their supervisors regarding their instructional performance relative to their goals.	0.25713	0
30	It is better for teachers to grade student work and prioritize other evidence based instructional strategies.	0.41967	1
9	It is important for teachers to incorporate metacognitive skills because it enables students to evaluate their learning abilities.	0.47792	1
7	It is important for teachers to incorporate metacognitive strategies because they increase student awareness of their thinking process.	0.57383	1
12	It is better for students if evaluation of their learning abilities is provided by their teachers as it allows them to focus on learning content.	0.59001	1
19	It is important for teachers to explicitly model for students on how to monitor their own thinking during tasks.	0.64187	1
20	It is important for teachers to ask questions that promote a higher level of thinking.	0.68991	2
23	It is better to ask lower-level questions to accommodate students who struggle with academic English proficiency	0.72576	2
8	It is important for teachers to incorporate metacognitive strategies because it promotes independent learning amongst our students.	0.75081	2
25	It is important for teachers to engage students in post lesson activities that help them reflect on their learning	0.78121	2
21	It is important for teachers to incorporate tools such as learning maps to help students make their thinking visible for monitoring.	0.81328	3
16	Due to a limited time allotted for instructional blocks, it is better for teachers to activate prior learning and move on to concept development.	0.92917	3
31	It is important for teachers to self-reflect on their teaching practices.	1.11746	3
14	Prior to beginning a lesson, it is important for teachers to explicitly model planning strategies for upcoming tasks.	1.23923	4
13	In the beginning of a lesson, it is important for teachers to provide students with clearly stated learning goals.	1.82347	4
15	It is important to introduce visual organizers to my students.	2.11306	5

Note. Eigenvalue = 1.7%, % of explained variance = 7 %. Statements highlighted in yellow indicate positive salience. Statements highlighted in green indicate negative salience.

Q model 2, identified several dominant viewpoints regarding metacognition. These dominant viewpoints included: 1) It is important for teachers to self-reflect on their own teaching practices; and 2) Metacognition is effective for ELL students, even though students are acquiring information in their native language and the English language.

Q model 2 presented several beliefs regarding teacher implementation of metacognition into the instruction. In order of importance measured by the *Z* scores and salience of the statements, beliefs included: 1) Visual organizers and learning maps are important; 2) It is important for teachers to introduce clearly stated learning goals at the beginning of each lesson; and 3) It is important to explicitly model planning strategies for students.

The baseline survey showed that the demographic data of the participants that loaded on this *Q* model, did not reflect any notable differences amongst them in level of education, years of teaching experience, or exposure to resources regarding metacognition.

4.5 Q Model 3: Teacher Explicit Modeling is Important to Student Monitoring

Q model 3 had the third highest Eigenvalue of 1.3% and explained 5% of the variance amongst the statements within the *Q* sorts. Six out of 25 participants loaded on to this *Q* model 3 and all satisfied the interpretive cut off criterion of $\lambda > |.43|$, significant at ($p < .01$). None of the participants that loaded onto *Q* Model 3, loaded onto any other *Q* model, representing a "pure" shared viewpoint. *Z* scores corresponded on the same continuum with sort values as seen in Table 6. Negative salient statements corresponded with the larger negative *z* scores and positive salient statements corresponded with larger positive *z* scores. In Table 6 the negative salient statements were highlighted in green, and the positive salient statements were highlighted in yellow. Statements at the extreme of the distribution are typically the most salient (Brown,

1980). In addition, the statements were supported by factor loadings that that have a *z* score of 0.500 and above.

In *Q* Model 3, the dominant viewpoints are represented by these most salient statements. The six highest ranked positive salient statements were statements: 19 *(It is important for teachers to explicitly model for students on how to monitor their own thinking during tasks)*, 15 *(It is important to introduce visual organizers to my students)*,20 *(It is important for teachers to ask questions that promote a higher level of thinking)*, 13 (*In the beginning of a lesson, it is important to provide students with clearly stated learning goals*), 31 *(It is important for teachers to self-reflect on their teaching practices)*, and 26 *(It is important for teachers to provide students with recognition of their knowledge relative to their learning goals).*

The six highest ranked negative salient statements were statements: 29 *(When students receive graded work by me, they then could compare their performance to their learning goals with their family members)*, 23 *(It is better to ask lower-level questions to accommodate students who struggle with academic English proficiency)*, 17 *(explicitly modeling planning strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson)*, 2 *(Teaching metacognition is a straightforward process accomplished through the embedding of discussion with students about metacognitive knowledge)*, 30 *(It is better for students to grade student work and prioritize other evidenced based instructional strategies)*, and 34 *(Although I value self-reflection, other professional priorities limit my time for self-reflection).*

Q model 3, identified several dominant viewpoints regarding metacognition. These dominant viewpoints included: 1) It is important for teachers to self-reflect on their own teaching practices; and 2) Metacognition is not too complex or elaborate for ELL students and should be

Table 6

Q Model 3: Teacher Explicit Modeling is Important to Student Monitoring

	Factor Scores for Factor 3		
Statement Number	Statement	Z-score	Sort Values
29	When student received graded work through scores provided by me, they then could compare their performance to their learning goals with their family members.	-2.36632	-5
23	It is better to ask lower-level questions to accommodate students who struggle with academic English proficiency	-1.93235	-4
17	Explicitly modeling planning strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson.	-1.44409	-4
2	Teaching metacognition is a straightforward process accomplished through the embedding discussion with students about metacognitive knowledge.	-1.3079	-3
30	It is better for teachers to grade student work and prioritize other evidence based instructional strategies.	-1.06513	-3
34	Although I value self-reflection, other professional priorities limit my time for self-reflection.	-0.94938	-3
5	Metacognition is implicitly passed on to students through teacher modeling.	-0.63348	-2
16	Due to a limited time allotted for instructional blocks, it is better for teachers to activate prior learning and move on to concept development.	-0.61684	-2
35	Although supervisory feedback is important, it can sometimes feel like an intimidating process.	-0.61496	-2
36	Although professional development is important, it can also detract from valuable time allotted for lesson planning.	-0.61102	-2
11	The addition of metacognitive strategies in my lesson plans may cause cognitive overload for my students at this time.	-0.43904	-1
18	The introduction of visual organizers is valuable in theory; however, lesson blocks are limited to the delivery of content.	-0.40076	-1
6	Metacognition is a complex concept making it difficult to teach with ELL students.	-0.34174	-1
8	It is important for teachers to incorporate metacognitive strategies because it promotes independent learning amongst our students.	-0.27088	-1
12	It is better for students if evaluation of their learning abilities is provided by their teachers as it allows them to focus on learning content.	-0.26744	-1
24	Although teachers value monitoring tools such as thinking maps, additional professional development that highlights tools on helping students make their thinking visible would be beneficial	-0.21693	0
28	Although teaching reflective thinking practices is important, it is better to use post lesson activities for the teacher to recap what was learned during the lesson.	-0.19433	0
9	It is important for teachers to incorporate metacognitive skills because it enables students to evaluate their learning abilities.	-0.14892	0
4	Metacognition is an elaborate concept that ELL students will eventually learn through classroom experiences.	-0.14171	0
1	Teachers have adequate an understanding about how to incorporate metacognitive skill teaching in their lessons.	0.01885	0
7	It is important for teachers to incorporate metacognitive strategies because they increase student awareness of their thinking process.	0.02531	0
3	Teaching metacognition to ELL students is an involved process that requires more time.	0.16879	1
22	Explicitly modeling monitoring strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson.	0.18023	1
25	It is important for teachers to engage students in post lesson activities that help them reflect on their learning	0.27493	1
27	It is important for teachers to facilitate students checking their own work.	0.40929	1
32	It is important for teachers to seek feedback their supervisors regarding their instructional performance relative to their goals.	0.48575	1
10	Metacognitive strategies may not be effective for my students at this time as they are still acquiring skills in the English language.	0.53565	2
14	Prior to beginning a lesson, it is important for teachers to explicitly model planning strategies for upcoming tasks.	0.6968	2
21	It is important for teachers to incorporate tools such as learning maps to help students make their thinking visible for monitoring.	0.81713	2
33	It is important for teachers to seek continuous professional development to engage in life-long learning opportunities	1.20676	2
26	It is important for teachers to provide students with recognition of their knowledge gain relative to their learning goals	1.31075	3
31	It is important for teachers to self-reflect on their teaching practices.	1.34683	3
13	In the beginning of a lesson, it is important for teachers to provide students with clearly stated learning goals.	1.47189	3
20	It is important for teachers to ask questions that promote a higher level of thinking.	1.57978	4
15	It is important to introduce visual organizers to my students.	1.59548	4
19	It is important for teachers to explicitly model for students on how to monitor their own thinking during tasks.	1.83903	5

Note. Eigenvalue = 1.3%, % of explained variance = 5%. Statements highlighted in yellow indicate positive salience. Statements highlighted in green indicate negative salience.

taught even though ELL students are acquiring information in their native language and the English language.

Q model 3 presented several beliefs regarding teacher implementation of metacognition into the instruction. In order of importance measured by the *Z* scores and salience of the statements, beliefs included: 1) It is important to explicitly model monitoring strategies for students; 2) Visual organizers are important; 3) It is important to ask higher order thinking questions to ELL students; 4) It is important for teachers to introduce clearly stated learning goals at the beginning of each lesson; and 5) It is important for teachers to provide students with the knowledge they have gained, relative to their learning goals.

The baseline survey showed that the demographic data of the participants that loaded on this *Q* model, did not reflect any notable differences amongst them in level of education, years of teaching experience, or exposure to resources regarding metacognition.

Baseline Survey Results

All the teachers in the baseline survey said they have taken undergraduate and graduate courses in education and psychology with metacognition as a topic. The breakdown is as follows, seven of them (28%) were exposed to metacognition in their undergraduate studies, twelve (48%) were exposed to metacognition in their graduate studies, and six (24%) encountered metacognition both in undergraduate and graduate school. (Figure 13).

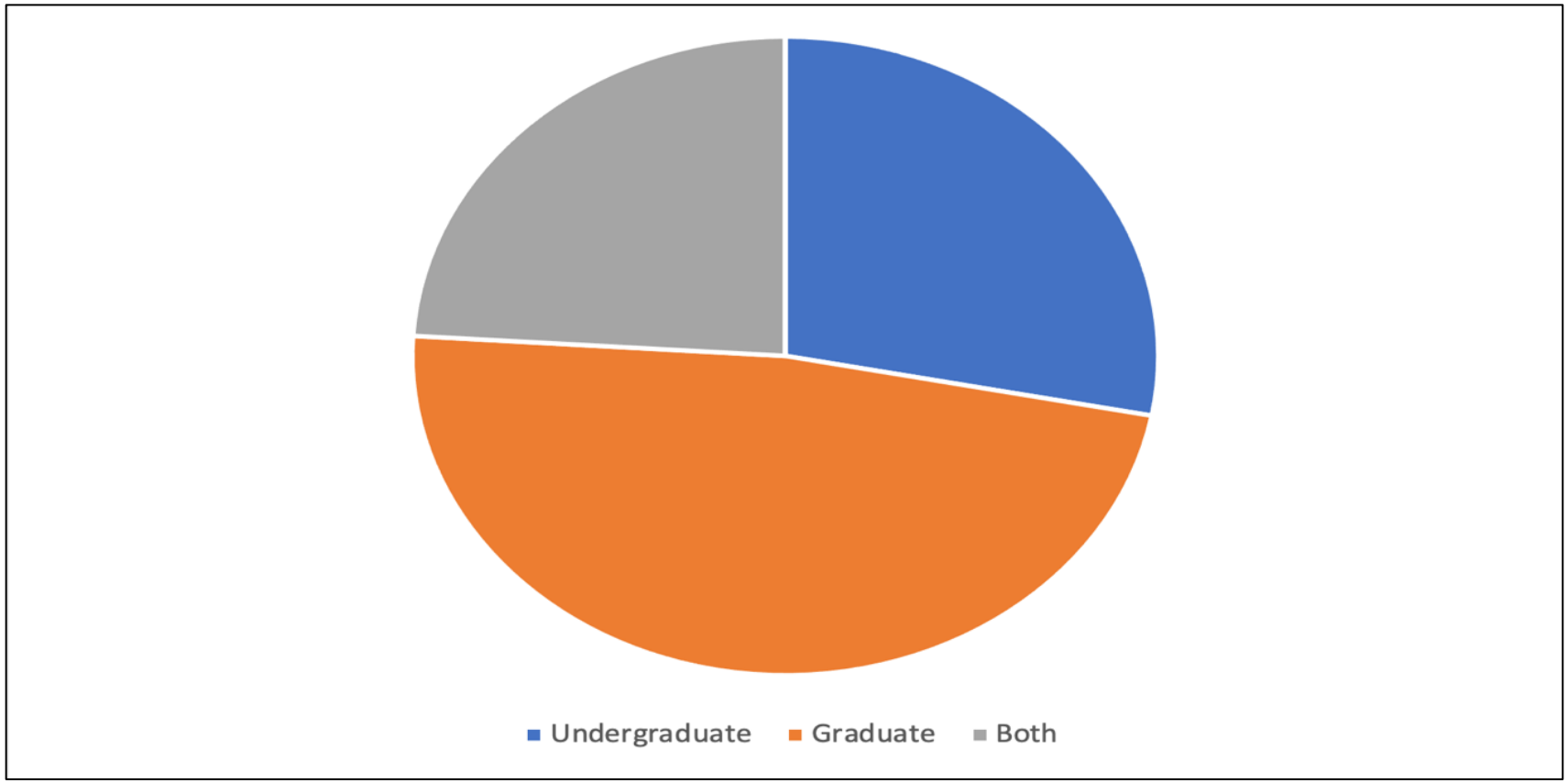
All the teachers in the sample report receiving some type of professional development on metacognition throughout their careers. Some have received one type, however most reported multiple and these include 56% reported from conferences, 40% reported from training courses, 24% reported from CTLE (continuing teacher learning and education credits) and 20% reported from seminars on metacognition. (Figure 14).

Moving on to in-house district and school training encountered by ELL teachers in their professional careers, we have 56% reported receiving in-house training by their districts or schools, 40% reported receiving metacognitive training through their formal observation and intervisitations, and 28% through supervisory feedback. (Figure 15).

In terms of literature provided by their districts and schools, 48% reported they have been given research articles 36% reported receiving books, 28% reported receiving standards that explicitly highlighted metacognition, and 12% reported receiving education magazine articles with metacognition as a topic. (Figure 16).

Figure 13

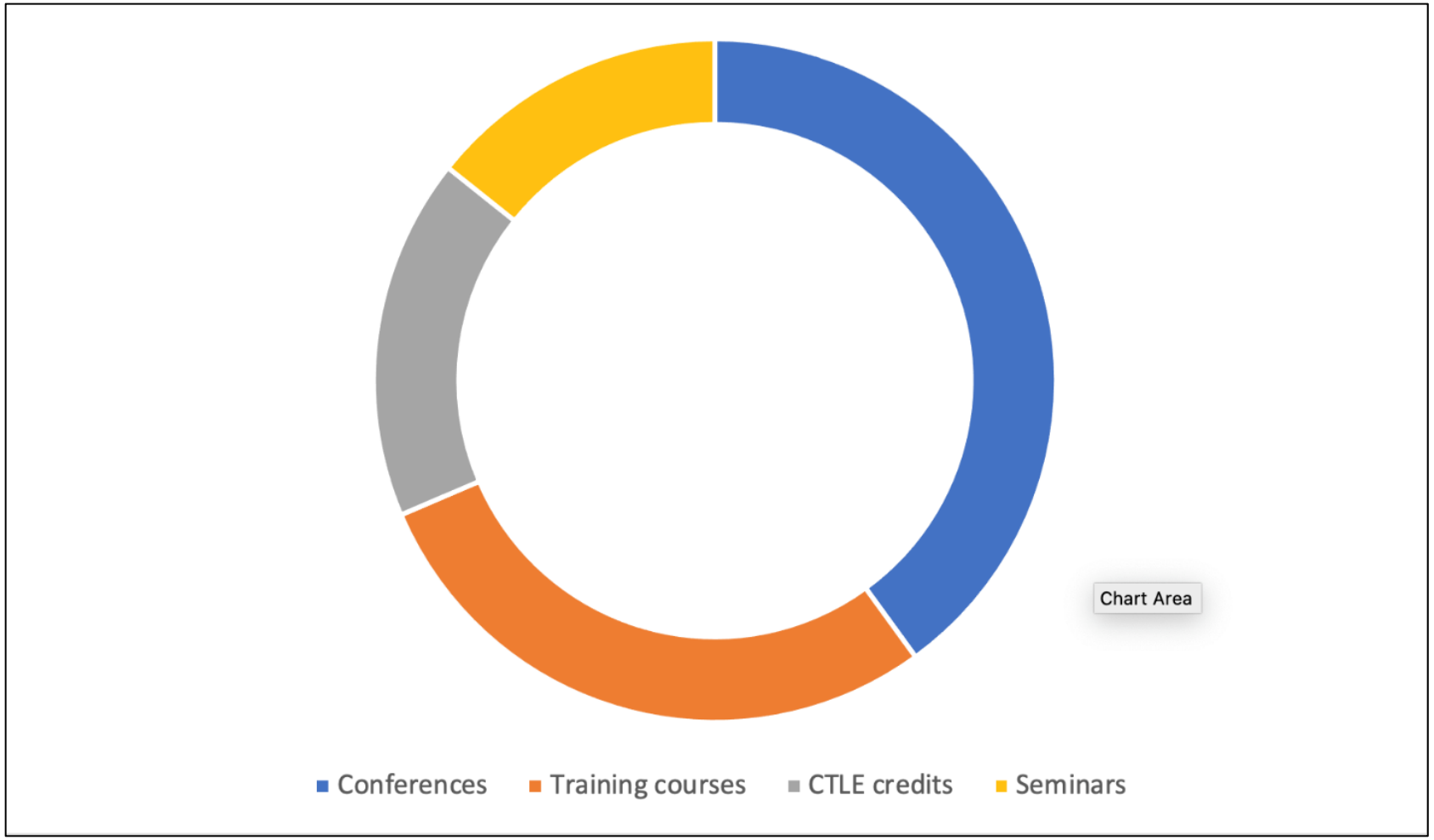
Educational Source for Metacognition as a Topic for Teachers



Note. Seven represented by blue shaded area (28%) were exposed to metacognition in their undergraduate studies, twelve (48%) represented by orange shaded area were exposed to metacognition in their graduate studies, and six (24%) represented by grey shaded area encountered metacognition both in undergraduate and graduate school.

Figure 14

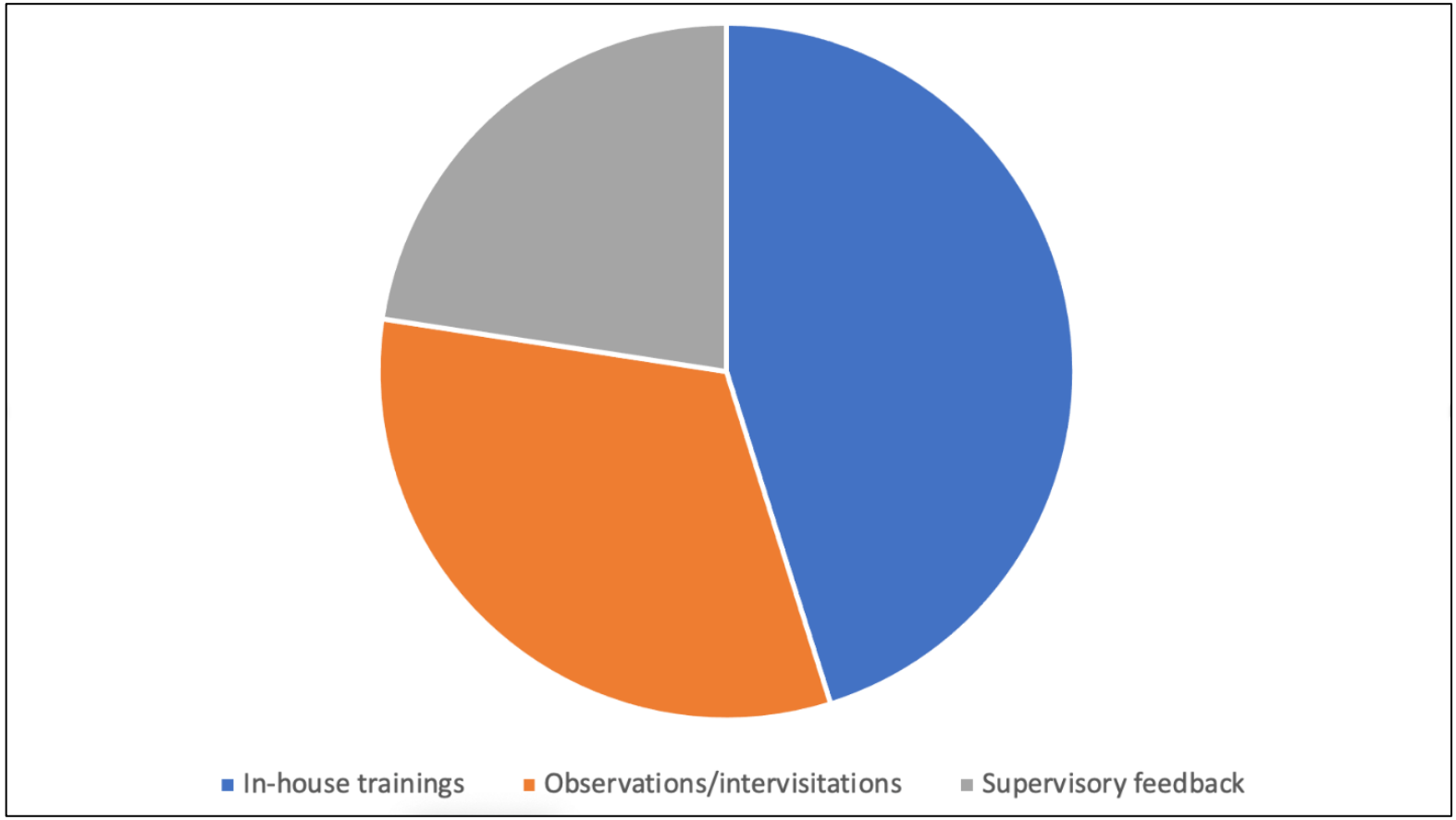
Professional Development on Metacognition



Note. 56% reported conferences represented by blue shaded area, 40% reported training courses represented by orange shaded area, 24% reported CTLE credits represented by grey shaded area, and 20% reported seminars represented by yellow shaded area. Percentages surpass 100% because some ELL teachers reported training by more than one type of professional development.

Figure 15

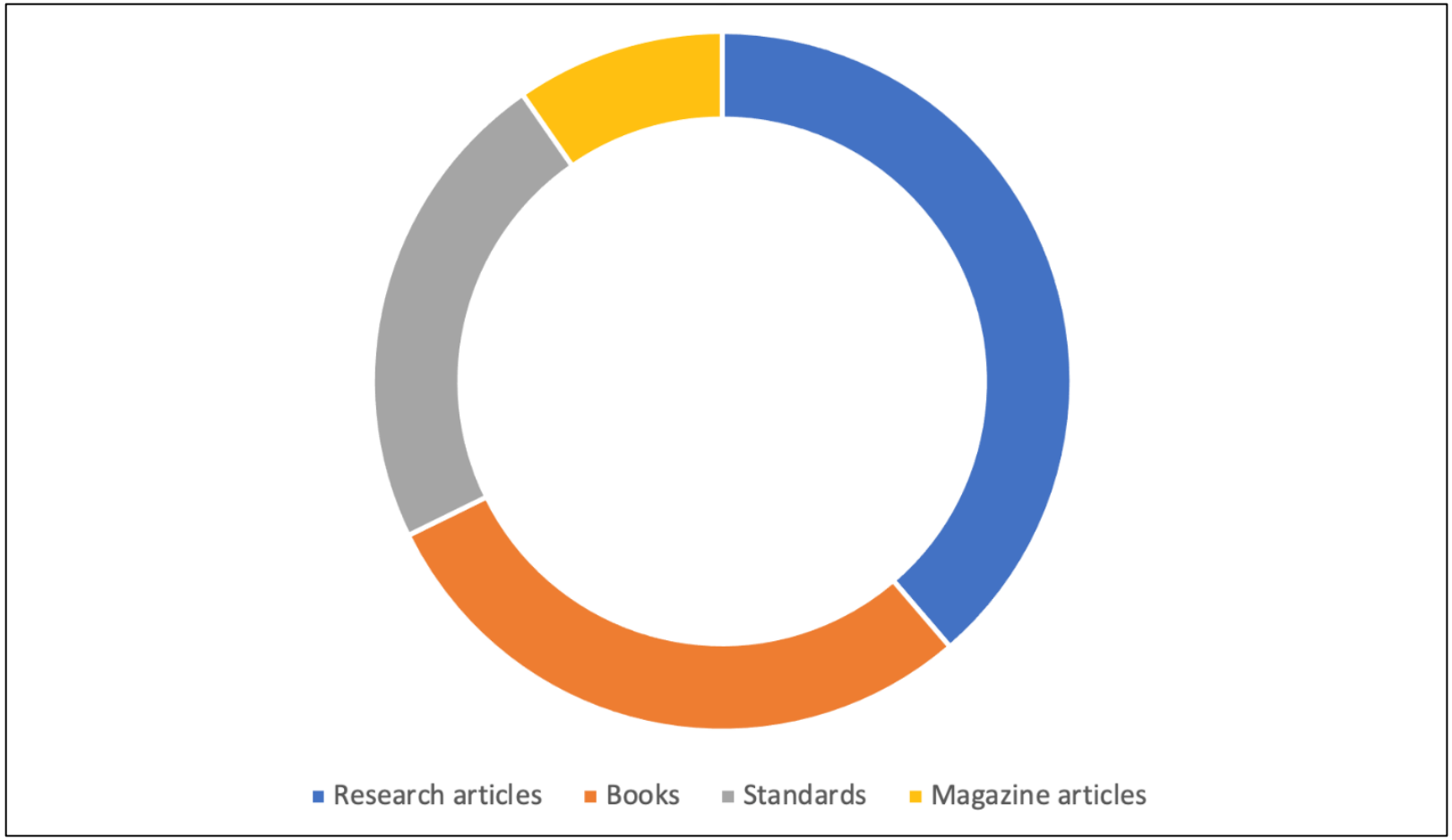
Professional Development Provided by Districts and Schools



Note. 56% reported receiving in-house training by their districts or schools represented by blue shaded area, 40% reported receiving metacognitive training through their formal observation and intervisitations represented by orange shaded area, and 28% through supervisory feedback, represented by gray shaded area. Percentages surpass 100% because some teachers received more than one type of professional development on metacognition in their careers.

Figure 16

Dissemination of Literature on Metacognition by Districts or Schools



Note. 48% reported they have been given research articles, represented by blue shaded area, 36% reported receiving books, represented by orange shaded area, 28% reported receiving standards that explicitly highlighted metacognition, represented by gray shaded area, and 12% reported receiving education magazine articles, represented by yellow shaded area. Percentages surpass 100% because some teachers received more than one type of literature by their district or school on metacognition.

Chapter V Summary, Conclusions, Implications, Limitations, and Future Directions

As outlined in the literature review of this dissertation, the effectiveness of metacognitive instruction in the classroom has been a topic of research for decades, and as per a thorough literature review in Chapter II, the research makes it abundantly clear that metacognition promotes positive academic student outcomes, especially for ELL students (Mcguire, 2021; Stanton et al., 2021)

However, very little research exists on teacher understanding and viewpoints about metacognition, their beliefs about its utilization in the classroom, and the institutional resources such as previous training and exposure to metacognition that facilitate implementing metacognitive practices in the classroom. To the student researcher's knowledge, there are no studies in the extant literature that explore ELL teacher understanding of metacognition. This study began the exploration of ELL teachers' beliefs and viewpoints regarding metacognition, metacognitive instructional practices, and their exposure to metacognition as a topic in their educational and professional training.

5.1 Summary of the Study

This study used *Q* methodology and a short baseline survey to ascertain the viewpoints of twenty-five ELL teachers from Long Island's Nassau and Suffolk Counties in New York State. In summary, the research questions were:

RQ1: What are the dominant viewpoints shared by ELL teachers regarding metacognition?

RQ2: To what extent, if any, do ELL teachers believe they are implementing metacognition into their pedagogical and instructional methods?

RQ3: Are there institutional resources available to ELL teachers relative to metacognitive instructional practices?

5.2 Results: A Summary

Three empirically grounded *Q* models emerged using *Q* methodology to answer RQ1 and RQ2. A short baseline survey was used to answer RQ3. The three *Q* models that emerged were (1) *Teachers concerned with instructional practices supporting student independence and self-awareness in learning;* (2) *Visual organizers are an important part of instructional planning;* (3) *Teacher explicit modeling is important to student monitoring.*

All three *Q* models focused on a specific component of metacognition as reflected by the statements placed in the highly salient slots of the *Q* sort; however, all the *Q* sorts were well balanced, arranging the statements so that they account for the full gamut of metacognitive and SRL model components. In other words, the teacher's dominant viewpoints and beliefs reflected by each of the three *Q* models focused on one or two components of metacognition; however, when looking at all three models together, they highlight at least one crucial component of metacognition.

5.3 Interpretation of the Findings

English Language Learner (ELL) teachers make several instructional choices daily with precious time to spare. Whether to include metacognition in their instructional milieu depends on their viewpoints, perceptions, and beliefs about metacognition. In a study with general education teachers, personal understanding and use of metacognitive pedagogy correlated with teacher perceptions regarding the effectiveness of metacognitive strategies with their students (Wilson & Bai, 2010). Therefore, if teachers believe that metacognitive pedagogy is effective, justified, and comprehensible, they will incorporate it into their instruction. Furthermore,

incorporating metacognitive instruction relies on teachers having a personal metacognitive disposition in their own lives as learners. If metacognition has delivered success in their academic journey, they are more inclined to pass it along to their students. Personal disposition, viewpoints, perceptions, and beliefs are essential but not alone. Teachers need explicit education and professional development regarding the effectiveness of metacognition and valuable, practical metacognitive instructional practices. Therefore, in this dissertation dominant viewpoints, beliefs, and exposure to metacognition as a topic were used as the vehicle to assess ELL teacher personal metacognition and their metacognitive instructional preferences. As noted in Chapter 1 and Chapter 2, this is important because metacognition leads to improved student achievement. The viewpoints and beliefs of ELL teachers are of special importance as ELL students are underachieving and in need of the benefits metacognitive teachers and metacognitive pedagogy may provide. In the remainder of this section, an interpretation of the findings will be presented, while concurrently answering the research questions.

5.4 Dominant Viewpoint 1: Teachers concerned with instructional practices supporting student independence and self-awareness in learning.

The open-ended participant responses in *Q* model 1 aligned with the literature and informed the interpretation of this model. The data in *Q* model 1 support, that ELL teachers understand the importance of students acquiring metacognitive knowledge. The sample of teachers indicate that student's attainment of metacognitive knowledge is more likely to produce independent, self-aware ELL students, as opposed to passive compliant learners.

This is an important finding, as this sample of teachers addressed the core statement of the problem in this dissertation, which is that their instruction should include creating types of thinkers and learners alongside the content they must teach. These types of thinkers and learners

are active, conscious, and free-thinking students who recognize their strengths and challenges. The samples viewpoint is also encapsulated in Factor 1 of the two-factor model of metacognition. Metacognitive knowledge, comprised of self-knowledge, strategic knowledge and task knowledge is the path to self-awareness in the classroom, and that self-awareness and independence is more likely to equip students to enter the local or global workforce as future leaders, workers, and innovators. As ELL students are increasing in size, their ability to participate in a future American or even global workforce is crucial, and instruction promoting metacognition is a pivotal contributor to student competence. Student competencies, as opposed to curriculum content, are now a global focus in education (Marope, 2014).

So how do metacognitive, independent, self-aware ELL students become competent, effective students and citizens? Independent, self-aware learners are more likely to become self-led, take-charge, lifelong learners (Hammond, 2021; Paplentoniou-Louca, 2013). They are also more likely to set goals and achieve them, as they are constantly surveying their strengths and weaknesses. Furthermore, independence and self-awareness are the main ingredients of self-regulation and control, especially in service of problem-solving (Vygotsky, 1978).
Self-aware learners are more reflective and strategic in their choice of learning strategies and can apply them to academic tasks. This increased knowledge of "learning how to learn" can increase ELL student confidence and boost second language acquisition (Hernberg, 2020; Supeno, 2021).

The teachers that loaded onto this *Q* model reflect the research that supports the development of metacognition in students. The results are not surprising when looking at their in-depth exposure to metacognition in their educational and professional lives. This viewpoint is a refreshing finding, suggesting that this group of teachers understand the core components of

metacognition, and the outcomes that are related to developing the metacognitive knowledge of ELL students.

5.5 Dominant Viewpoint 2: Metacognition is not too Complex for ELL Students

The open-ended participant responses in *Q* models 1 and 3 aligned with the literature and informed the interpretation of this model. The data in Q models 1 and 3 support a second dominant viewpoint in answering RQ1, and that is that despite its complexity, the concept of metacognition is not too complex for ELL students.

The sample of teachers in Q models 1 and 3 reject the notion that ELL students cannot understand how to adopt and utilize metacognitive strategies. The data conveys that along with teaching English language skills, metacognitive skills can concurrently be taught in the ELL classroom. This finding goes against past concerns that ELL educators have expressed such as the need to focus on teaching students' basic English language skills prior to introducing thinking skills and learning competencies. Some, ELL teachers may not have taught these skills due to a perceived lack of time; lack of knowledge regarding metacognition, and the need to teach from rigorous standards that focus on curriculum content. These are legitimate concerns, as ELL students face a heavy cognitive load by having to acquire curriculum content in an unfamiliar language. Nevertheless, the teachers in *Q* models 1and 3's viewpoint align with the literature as presented by the data. The literature suggests that the incorporation of metacognitive skill teaching with ELL's is worth the time because it results in deeper learning and improved academic performance (Hernberg, 2020). ELLs need to increase their metacognitive strategy repertoire, as it provides them with indispensable tools to become confident and successful learners (Zhang & Goh, 2006).

As in the case with first dominant viewpoint, the baseline survey results show that *Q* models 1 and 3 is a group of teachers had repeated exposure to metacognition as a topic in school and in their professional development. An ELL teacher group without this familiarity may not have expressed the same viewpoint. To follow up on this issue, the student researcher will further discuss this matter in the implications for future research section.

5.6 Dominant viewpoint 3: Teacher Self-Reflection is Important

The open-ended participant responses in *Q* models 1, 2, and 3 aligned with the literature and informed the interpretation of this model. The data in Q model 1, 2, and 3 support a third dominant viewpoint in answering RQ1, and that is that teacher self-reflection is a propensity that all ELL teachers should adopt.

Self-reflection is necessary in all aspects of teacher practice, especially in educators who model and teach metacognition. As noted in the literature review, teachers who practice self-reflection examine their actions, and are more likely to experience professional growth by seeking and welcoming professional development (Nian, 2020). Furthermore, self-aware, and self-reflective teachers are more likely to teach metacognition to their students (Ozturk, 2018). Teacher self-reflection takes a lot of emotional and physical energy, especially in today's high-paced and overwhelming educational environment. It takes great discipline to devote precious planning time to pausing and reflecting on how well one is teaching their students. Nevertheless, this group of teachers may have considered that the benefits and personal satisfaction of increasing their own metacognitive competencies.

Once more, the results from the baseline survey suggest that this sample of teachers has undergone extensive and repeated training in metacognition. Therefore, it is no surprise that one of the sample's dominant viewpoints aligns with the literature that teacher personal self-

reflection and personal metacognition produces teachers who are more likely to include metacognitive teaching and skills in their classrooms.

In looking at all three dominant viewpoints that became visible during this analysis, one can see a relationship. First, all three dominant viewpoints come from a sample of teachers who have had frequent exposure to metacognition as a topic and metacognitive resources. Second, all the dominant viewpoints are correlated with each other, as commonly found in metacognitive teachers, who believe in teaching metacognitive skills and strategies to their students. The sample from this study represents a group of teachers who are self-reflective in their practice. They believe that ELL students can acquire metacognition and can significantly benefit from its pedagogy and instruction. The goal for these teachers is to pass the baton of metacognition to their students by fostering the same self-awareness and independent learning they have in themselves. Teachers in this sample may see metacognition as a legacy their students can benefit from by developing skills and strategies that not only churn out great learners but also great thinkers. It brings the student researcher to answering and interpreting RQ2: To what extent, if any, do ELL teachers believe they are implementing metacognition into their pedagogical and instructional methods?

5.7 Teacher Belief 1: Visual Organizers are Important.

The data seems to indicate that all three *Q* models unanimously presented the belief that teachers should implement visual organizers and learning maps as part of metacognitive instructional pedagogy.

The extant literature may help explain this teacher belief. Visual organizers are a valuable tool for exercising metacognition in students. In past research, concept maps and visual organizers were powerful instruments in helping students uncover their metacognition (Ritchart

et al., 2009). Students can plan, monitor, and reflect using maps and visual organizers. Thinking maps/visual organizers are good to use during planning for the organization of material. During monitoring, students can refer to the recorded material to ensure they are on track. During post-reflection learning, one can use visual maps to evaluate learning. Visuals also align with teachers who practice multiple means of representation, engagement, and expression as part of a universally designed curriculum (UDL). ELL teachers frequently rely on UDL practices, such as multiple means of representation, to scaffold and differentiate material for dual language students.

Finally, one of most critical benefit related to visual organizers and learning maps, lies in supporting working memory, primarily during monitoring. Visual organizers allow students to organize and record information on the visual organizer or thinking map. This information would otherwise be held in working memory. Recording it on a visual or a learning map allows the frees up working memory space and reduces the cognitive load. ELL students require their working memory to be as available to them as possible. They need it to process in two languages simultaneously. Overall, it makes sense that visuals that promote metacognition are important to this sample of teacher when teaching students who are not proficient in the English language.

5.8 Teacher Belief 2: Asking Higher-Order Thinking Questions is Important

The data in *Q* model 3 support that ELLs are capable of critical and higher order thinking as part of metacognitive instruction and pedagogy. Learning to process, answer and ask higher order thinking questions enhances ELL students' critical thinking and comprehension (Paziotopulos & Kroll, 2004). Higher order thinking and critical thinking often get confounded as components of metacognition. They are not. Instead, the processing, organization, and

application of critical and higher-order thinking require metacognitive capabilities in our students. Without metacognition, it is impossible to engage in critical thinking (Magno, 2010). It is unclear if the teachers in *Q* models 1 and 3 recognize the distinction; however, they recognize that encouraging critical thinking as part of metacognitive instruction and pedagogy is essential.

Perhaps for this model, more explicit instruction with explicit modeling and visual organizers is preferable with ELL students, as opposed to complex discussions. It is also possible that the teachers in *Q* model 2 require more support and understanding of metacognitive instructional practices. This additional question remains unanswered, and discussion will continue in the implications for future study sections.

5.9 Teacher belief 3: Explicitly Modeling Thinking Strategies to Support Student Planning and Monitoring

The data in Q models 2 and 3 support that modeling thinking strategies to support student planning and monitoring is important. Teacher "think-alouds" used to model metacognitive thinking strategies and skills during instruction, especially when teaching monitoring skills, are highly effective practices. It is especially true for ELL students during English Language Arts instruction. Teachers frequently use phrases such as "good readers go back and re-read a sentence to make sure that they read the words correctly" or "good readers use context clues to understand the meaning of words they are using." According to Chatzipenteli et al. (2013), teachers must model and explicitly show students how to access their declarative knowledge and plan. Furthermore, teachers must model and explicitly teach monitoring skills during whole group and independent group practice.

Explicit modeling during planning and reading shows students ways to engage with the material and promotes awareness and control during the learning process. Instead of engaging passively, students are more likely to create a bridge between their thoughts, strategies, and the task at hand. Explicit modeling also increases the chance that a student will engage in post-lesson reflections as thought monitoring and planning for upcoming learning becomes a habitual thinking cycle that never ends for independent, self-aware, critical thinkers.

5.10 Teacher belief 4: Clearly Stating Learning Goals for Students

The data from all 3 Q models support that effective teachers set learning goals for their students during instruction. It is essential to share learning goals with students at the beginning of the lesson. Educators provide their ELL learners with a clear trajectory of what to do, which helps them learn more effectively. The assertion for teachers in this sample is that clearly stated goals are essential to metacognitive practice, which aligns with the literature. Flavell (1979) identified goal setting as necessary for cognitive monitoring in which our metacognition engages with our cognitions. Goal setting engages students through analysis of the learning task and begins the task and strategy selection process.

Goal setting is important for individual student regulation but can also provide social cohesion for students when working in small groups. Social regulation of learning (SoRL) is when collaborative groups of students engage in collective actions to achieve shared learning goals (Hadwin et al., 2018). Small group work is a very important facet of ELL teacher instruction, especially if these teachers frequently pull-out small groups of ELL students as part of their daily instructional regimen.

It is also possible that establishing goals for ELL students centered around the lesson aim makes lesson planning a metacognitive process for teachers. Setting clear goals while lesson

planning allows teachers to engage in their monitoring and self-reflection, allowing the teacher planning process to parallel the students' learning process. Teacher success around goal setting contributing to student success can be very gratifying and can offset teachers' daily frustrations. Teaching metacognition and being metacognitive is a more promising alternative by offering teachers and students conscious and mindful actions as they pertain to their shared goals.

5.11 Teacher Belief 5: Post-Lesson Activities that Promote Self-Reflection

The data from Q model 1 support that self-reflection is an important post lesson activity. The final belief expressed in this study regarding metacognitive instruction is that teachers in this sample are concerned with post-lesson activities that support student self-reflection. Post-lesson reflection, and critical reflection in general, is a significant component of metacognition. Reflection is one of the primary mechanisms of metacognition and regulates and controls cognition (Rahman & Yunus, 2020). In multiple studies, reflection improved the participants' planning strategies (King & Kitchener, 2004).

Post-lesson reflections such as journals, exam wrappers, or even simple oral reflections are time-consuming. Nevertheless, the benefits, such as creating self-aware, independent learners, are worth the investment. *Q* model 1 teachers focused heavily on their dominant viewpoint on student outcomes, such as self-led, conscious students who frequently engage in metacognitive activities. Therefore, it is no surprise that *Q* model 1 teachers' viewpoints align with teaching beliefs regarding metacognitive instruction that supports such student outcomes. Students who can reflect on their learning better plan, monitor, and evaluate their learning goals. Critical reflection is the conduit between cognition and metacognition in our academic, social, and emotional lives. Critical reflection helps students search for the best and most appropriate strategies and tools to succeed in our cognitive enterprises. It pulls together all the necessary

components of self-regulation for goal-oriented and practical problem-solving. These competencies can prove to be very beneficial for ELL students, and the teachers in this sample can recognize and communicate these essential beliefs.

In answering RQ1 and RQ2, it is evident from the data that the teachers in this *P* set express a strong positive sentiment regarding metacognition and how to teach it. Their viewpoints show concern about the benefits and results of metacognition. The data underscores metacognition resulting in self-aware, self-led learners. Furthermore, the results show that ELL students can benefit from metacognition, despite its complex nature. Finally, for teachers to teach metacognition, they should practice it through their self-reflection.

Their beliefs regarding teaching metacognition align with what instructional strategies are necessary to create metacognitive students and a metacognitive environment in their classroom. As communicated by the data, the beliefs involve instructional strategies that address planning, monitoring, and post-lesson reflection with ELL students. Visual organizers clearly stated learning goals, explicit modeling of thinking strategies, asking higher order thinking questions, and post-reflection activities are the primary vehicles that allow teachers to bridge student cognition and metacognition. The remainder of this section will focus on RQ3.

What educational and professional development resources support such fondness for metacognition and metacognitive instructional practices? As presented by the baseline survey, all the teachers in the *Q* set had multiple exposure to metacognition as a topic. They all reported receiving undergraduate or graduate education in incorporating metacognition. The entire *P* set also reported receiving professional development through seminars, courses, in-school training, supervisory feedback, and literature such as research articles or books. This group of teachers received training in the topic and had extensive teaching experience. Variations along the lines

of metacognitive training and years of experience may have provided different results. Few studies with general education teachers present data that teachers use metacognitive instructional strategies coherently and widely (Perry, Lundie, & Golder, 2018). This sample of teachers communicates a fresh take on metacognition.

This study presented results derived from reported viewpoints and beliefs regarding metacognition; therefore, it is also possible that what the ELL teachers strive for, and implement do not align. The possibilities of misalignment between what was reported and practiced, will be discussed further in this study's strengths and limitation section, and implications for future research in the next section.

5.12 Conclusions and Implications for Research, Policy, Theory, and Practice

The implications for future research are multiple since this study is the first step in the inquiry about ELL teacher metacognition. A follow-up study with post-*Q* sort interviews would be beneficial. Follow-up interviews can answer questions about the reasoning behind some of the arrangement of statements made by the teachers. As noted earlier, *Q* model 2 placed both statements regarding higher-level thinking and lower levels of thinking on the positive side of the *Q* sort. It would be interesting to find out if that was an error or there is meaning behind the placement of such opposite statements. Furthermore, follow-up interviews can explore *Q* model 2's viewpoints and beliefs regarding teachers needing adequate instruction about metacognition.

Follow-up interviews could also explore the placement of statements in the neutral column of the *Q* sort. The neutral column placement of statements regarding teacher metacognition requires further inquiry. It would be interesting to ascertain if the teachers used the neutral column as an extension of negative salience, positive salience, or uncertain about the meaning of

such statements. Neutral statements have meaning in *Q* sort methodology that is difficult to extract without follow-up interviews.

Researchers can also conduct studies on the same topic with a different methodology. Mixed method studies that use methodologies generalizable to the larger ELL teacher population would be helpful. Moreover, these studies can use observations to derive data that can inform implementation of metacognitive instructional practices. Future research may observe the frequency and fidelity of reported metacognitive instruction. If ELL teachers' dominant viewpoints and beliefs hold metacognition in a positive light, then their delivery of metacognitive instruction must align.

Finally, if metacognitive instruction is effective for ELL students, and teachers are incorporating it into their practice, why are ELL students underperforming academically? Studies of this nature can begin to explain the reasons for ELL student underachievement pertaining to instruction and report it in the literature. ELL student populations are rapidly growing; therefore, the academic needs of these students warrant closer observation.

Regarding implications for theory and practice, metacognition requires a more unified definition. The multiple names and differences of metacognition, self-regulation, and executive function remain challenging for the research community. Once the research community reaches a definition consensus, it is vital to study and write more about metacognitive pedagogy in a way that bridges the gap between theory and practice. Bridging the gap between theory, research, and education practice remains a significant issue affecting teacher practice on many research topics. Metacognition is just one topic that remains in the research and theory silos, failing to give teachers an adequate understanding of its use.

Additionally, the inquiry into teacher rating tools that include the explicit evaluation of teacher metacognition may be of value. Sections on teacher use of metacognitive instruction would be helpful for administrators when giving feedback for practice. Popular teacher evaluation tools and rubrics such as Danielson include metacognitive evaluation implicitly in some areas; however, the importance of metacognitive instruction and pedagogy relies on tools that assess metacognition explicitly. Such advancements would enable teachers and supervisors to exchange more precise information regarding metacognitive instructional practice.

Finally, ELL teacher use of metacognition has policy implications. Metacognitive skills are vital to educational policy because they impact learning, such as critical thinking, problem-solving, increased academic achievement, improved social and cognitive skills, and many more positive outcomes (OECD, 2019). Furthermore, now more than ever, we have an increased need to come to the aid of the children of migrants and asylees who speak a language other than English, our ELL learners. They, too, deserve the benefits of metacognitive instruction and the ability to join the ranks of a twenty-first-century workforce capable of earning a living and contributing to society. For the United States to produce a competitive, flexible, and capable workforce, it is necessary to codify metacognitive instruction and pedagogy, into our learning standards, in a more explicit fashion. As mentioned in Chapter II, although most prominent learning standards implicitly imply metacognitive instruction, they need to be adjusted for explicit metacognitive moves and shifts that ELL teachers can practically apply to the classroom with their ELL students.

5.13 Strengths and Limitations

This study provided an example of the unique nature of the *Q* methodology to produce empirically grounded quantitative and qualitative data. *Q* methodology possesses the strength of

taking a sample of humans, converting their subjectivities into variable, and analyzing them statistically and qualitatively. *Q* methodology data about ELL teacher metacognition gave a holistic view of the subjectivities, viewpoints, and beliefs regarding the use of metacognitive instructional strategies by ELL teachers. Combined with the baseline survey, demographics about the sample shed light on teachers' experience with metacognition, and level of education that was loaded onto each *Q* model. This study made a unique contribution to metacognitive research by studying the subjectivities of ELL teachers regarding metacognition. It also showed that *Q* methodology is useful to education, particularly when gathering opinions, views, and perceptions of all stakeholders in education.

Some limitations of this study include not planning to follow up with one-to-one interviews with some participants. One-to-one interviews would have added to the qualitative value of this study by answering some questions created by some of the sorting decisions made on their *Q* sorts. Furthermore, interviews may have provided additional in depth understanding. Interviews procure anecdotal data that can culminate into themes. These themes can strengthen the analysis of the statements arranged in the *Q* sort.

Limitations also include that the *Q* methodology is not generalizable to the target population in the study. Therefore, this data is not generalizable to ELL teachers. As mentioned, a generalizable alternative methodology on this topic would be a great companion to this study. To make an impact on policy and practice, data that can represent a wide swath of the population is necessary. The next section will be a concluding paragraph on the study.

5.14 Conclusion

The significance of personal teacher metacognition and incorporating metacognitive instructional practices with general education and English Language Learner (ELL) students has

been well documented in research and the literature. The use of metacognitive instructional practices positively impacts student achievement in literacy, math, and all other subject areas (Ohtani & Hisasaka, 2018). As per forty years of studies and theory, metacognition should be a key component of effective teaching practices. This is primarily the case for ELL students who currently need it the most. ELL students face great challenges as they are required to concurrently learn content and a new language. This challenge is well documented and evident as ELL students are not scoring proficiently in their state English Language Arts and Math examinations (USDOE, 2022).

Very few studies have researched personal general education teacher metacognition, and use of metacognitive strategies in their classrooms. As per those studies, metacognitive instructional strategies are not used coherently and in a widely accepted manner (Perry, Lundie & Golder, 2018). To the student researcher's knowledge, no studies exist on ELL teacher metacognitive dispositions and use of metacognitive instructional practices in the ELL classroom. This study served as the starting point of such exploration. Using *Q* methodology, teacher viewpoints and beliefs provided data concerning ELL teacher metacognitive understanding and utilization of these practices. More specifically, the dominant viewpoints shed light on their perceptions and understandings regarding metacognition, and the beliefs demonstrated which metacognitive strategies they utilize in their classrooms.

This study found that this sample of ELL teachers understand that metacognition is important as it leads to self-aware, independent learners. Furthermore, the teachers communicate through the data, that metacognition is not too elaborate or complex of a concept to expose to ELL students. The data also identified personal self-reflection as an important practice of metacognition. The importance of metacognition with ELL students and ELL teachers is well

understood by this sample of teachers. The results highlight and align with the literature on the outcomes of metacognition in the classroom, as it pertains to ELL students and ELL teachers.

Furthermore, the data suggests that teacher viewpoints were reinforced by their beliefs of which metacognitive practices are more useful for facilitating metacognitive students. Salient *Q* sort statements highlighted visual organizers, asking higher order thinking questions, explicitly modeling thinking strategies to support student planning and monitoring, clearly stating learning goals for students, and post-lesson activities that promote self-reflection as effective practices in supporting metacognitive instruction. The metacognitive instructional practices prioritized in this study's *Q* sort, touch upon all the phases in most metacognitive and self-regulation models described in the literature review in this dissertation. The most salient statements present ELL teacher beliefs that address planning, monitoring, and post-lesson reflection regarding metacognitive instructional practices and pedagogy.

As per the data in the baseline survey, the teachers in this sample had exposure to metacognition as a topic through their education and professional development opportunities. This sample of teachers exemplifies that ELL teachers that have access to training and education with metacognition as a topic, are more likely to express through the data viewpoints and beliefs that align with metacognitive and self-regulation models documented in the literature. Follow up studies can shed light on actual use of metacognitive instructional strategies and provide generalizable data through different methodologies. It would also be beneficial to sample a wider and larger group of ELL teachers to ascertain if similar viewpoints and beliefs are expressed, along with and without a thorough and extensive exposure to metacognition as a topic in their educational and professional training.

References

Adams, S. R., & Richie, C. (2017). Social emotional learning and english language learners: A review of the literature. *International TESOL Journal*, *14*(1).

Akturk, A., & Sahin, I. (2011). Literature review on metacognition and its measurement. *Procedia - Social and Behavioral Sciences*, *15*, 3731–3736. https://doi.org/10.1016/j.sbspro.2011.04.364

Alhefnawy, P. M. (2020). *Teachers' metacognitive awareness and metacognitive instructional practice: A mixed method study in Egypt.* [Doctoral dissertation, The American University in Cairo Graduate School of Education].

Alzahrani, K. S. (2017). Metacognition and its role in mathematics learning: An exploration of the perceptions of a teacher and students in a secondary school. *International Electronic Journal of Mathematics Education*, *12*(3), 521–537.

Anderson, N. J. (2002). The Role of metacognition in second language teaching and learning. *ERIC Digest*.

Annevirta, T., Laakkonen, E., Kinnunen, R., & Vauras, M. (2007). Developmental dynamics of metacognitive knowledge and text comprehension skill in the first primary school years. *Metacognition and Learning*, *2*(1), 21–39. https://doi.org/10.1007/s11409-007-9005-x

Annevirta, T., & Vauras, M. (2001). Metacognitive knowledge in primary grades: A longitudinal study. *European Journal of Psychology of Education*, *16*(2), 257–282. https://doi.org/10.1007/bf03173029

Ansarin, A., & Khatibi, S. (2018). The relationship between multiple intelligences and language learning strategies and gender. *English Language Teaching*, *11*(5), 84. https://doi.org/10.5539/elt.v11n5p84

Aristotle, & McKeon, R. (2001). *The basic works of Aristotle (modern library classics)* (Revised ed.). Modern Library.

Atkinson, L., Slade, L., Powell, D., & Levy, J. P. (2017). Theory of mind in emerging reading comprehension: A longitudinal study of early indirect and direct effects. *Journal of Experimental Child Psychology*, *164*, 225–238. https://doi.org/10.1016/j.jecp.2017.04.007

August, D., & Blackburn, T. (2019). *Promoting success for teachers of english learners. Tool aligned with the Marzano Focused Teacher Evaluation Model*. American Institute For Research; Education Northwest.

August, D., Carlo, M., Dressler, C., & Snow, C. (2005). The critical role of vocabulary development for english language learners. *Learning Disabilities Research and Practice*, *20*(1), 50–57. https://doi.org/10.1111/j.1540-5826.2005.00120.x

Azevedo, R. (2009). Theoretical, conceptual, methodological, and instructional issues in research on metacognition and self-regulated learning: A discussion. *Metacognition and Learning*, *4*(1), 87–95. https://doi.org/10.1007/s11409-009-9035-7

Azevedo, R. (2020). Reflections on the field of metacognition: Issues, challenges, and opportunities. *Metacognition and Learning*, *15*(2), 91–98. https://doi.org/10.1007/s11409-020-09231-x

Balcinkali, C. (2011). Metacognitive awareness inventory for teachers (MAIT). *Electronic Journal of Research in Educational Psychology,*, *9*(3), 1309–1332.

Bashatah, L. S. (2016). Q-methodology: What and how? *Journal of Research & Method in Education*, *6*(5), 27–33.

Baten, E., & Desoete, A. (2019). Metacognition and motivation in school-aged children with and without mathematical learning disabilities in Flanders. *ZDM*, *51*(4), 679–689. https://doi.org/10.1007/s11858-018-01024-6

Becker, F., & Lieder, F. (n.d.). *Promoting metacognitive learning through systematic reflection* [Study]. 35th Conference on Neural Information Processing Systems, Sydney, Australia.

Bodrova, E., & Leong, D. J. (2019). *Tools of the mind: The Vygotskian approach to early childhood education (2nd edition)*. Pearson.

Borkowski, J. G., Milstead, M., & Hale, C. (1988). Components of children's meta memory: Implications of strategy generalization. In F. E. Weinert & M. Perlmutter (Eds.), *Memory Development: Universal Changes and Individual Differences* (pp. 73–100). NJ: Lawrence Erlbaum Associates.

Brinck, I., & Liljenfors, R. (2012). The developmental origin of metacognition. *Infant and Child Development*, *22*(1), 85–101. https://doi.org/10.1002/icd.1749

Brown, A. (1978). Knowing when, where and how to remember: A problem of metacognition. In *Advances in Instructional Psychology* (In R. Glaser (Ed.) ed., pp. 77–165). New York: Halstead Press.

Brown, A. L. (1975). The development of memory: Knowing, knowing about knowing, and knowing how to know. In *Advances in child development and behavior* (pp. 103–152). Elsevier. https://doi.org/10.1016/s0065-2407(08)60009-9

Brown, R., & McNeill, D. (1966). The "tip of the tongue" phenomenon. *Journal of Verbal Learning and Verbal Behavior*, *5*(4), 325–337. https://doi.org/10.1016/s0022-5371(66)80040-3

Brown, S. R. (1980). *Political subjectivity: Applications of Q methodology in political science*. Yale University Press.

Brown, S. R. (1996). Q methodology and qualitative research. *Qualitative Health Research*, *6*(4), 561–567. https://doi.org/10.1177/104973239600600408

Bryce, D., & Whitebread, D. (2012). The development of metacognitive skills: Evidence from observational analysis of young children's behavior during problem-solving. *Metacognition and Learning*, *7*(3), 197–217. https://doi.org/10.1007/s11409-012-9091-2

Bryce, D., Whitebread, D., & Szűcs, D. (2014). The relationships among executive functions, metacognitive skills, and educational achievement in 5 and 7-year-old children. *Metacognition and Learning*, *10*(2), 181–198. https://doi.org/10.1007/s11409-014-9120-4

Cabrera, L., Sokolow, J., & Cabrera, D. (2021). Developing and validating a measurement of systems thinking: The systems thinking and metacognitive inventory (STMI). In *Routledge Handbook of Systems Thinking* (pp. 3–35). Routledge, London UK.

Celce-Murcia, M., O'Malley, J., & Chamot, A. (1993). Learning strategies in second language acquisition. (Cambridge applied linguistics series). *TESOL Quarterly*, *27*(1), 115. https://doi.org/10.2307/3586954

Černe, T., & Juriševič, M. (2018). The self-regulated learning of younger adolescents with and without learning difficulties – a comparative multiple case study. *Center for Educational Policy Studies Journal*, 1. https://doi.org/10.26529/cepsj.42

Cetin, B. (2017). Metacognition and self-regulated learning in predicting university students' academic achievement in Turkey. J*ournal of Education and Training Studies*, *5*(4), 132–138.

Çetin, B. (2017). The influence of Pintrich's self-regulated learning model on elementary teacher candidates in a life science course. *Journal of Education and Training Studies*, *5*(8), 30. https://doi.org/10.11114/jets.v5i8.2460

Chatzara, K., Karagiannidis, C., & Stamatis, D. (2014). Cognitive support embedded in self-regulated e-learning systems for students with special learning needs. *Education and Information Technologies*, *21*(2), 283–299. https://doi.org/10.1007/s10639-014-9320-1

Chatzipanteli, A., Grammatikopoulos, V., & Gregoriadis, A. (2013). Development and evaluation of metacognition in early childhood education. *Early Child Development and Care*, *184*(8), 1223–1232. https://doi.org/10.1080/03004430.2013.861456

Chick, N. (2015). Metacognition: Thinking about one's thinking. *Vanderbilt University-The Centre for Teaching*.

Clark, I., & Dumas, G. (2016). The regulation of task performance: A trans-disciplinary review. *Frontiers in Psychology*, *6*. https://doi.org/10.3389/fpsyg.2015.01862

Cleary, T. J., & Zimmerman, B. J. (2001). Self-regulation differences during athletic practice by experts, non-experts, and novices. *Journal of Applied Sport Psychology*, *13*(2), 185–206. https://doi.org/10.1080/104132001753149883

Coogan, J., & Herrington, N. (2011). Q methodology: an overview. *Research in Teacher Education*, *1*(2), 24–28.

Cooper, J. M., & Hutchinson, D. (1997). *Plato: Complete works* (1st ed.). Hackett Publishing Co.

Corsini, D. (1971). Memory: Interaction of stimulus and organismic factors. *Human Development*, *14*(4), 227–235. https://doi.org/10.1159/000271217

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications, Inc.

Creswell, J. W., & Gutterman, T. C. (2018). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (6th ed.). Pearson.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications, Inc.

Cross, D. R., & Paris, S. G. (1988). Developmental and instructional analyses of children's metacognition and reading comprehension. *Journal of Educational Psychology*, *80*(2), 131–142. https://doi.org/10.1037/0022-0663.80.2.131

Darling-Hammond, L. (2003). *Thinking about thinking: Metacognition* [Video]. Annenberg Learner. https://www.learner.org/series/the-learning-classroom-theory-into-practice/thinking-about-thinking-metacognition/

Deanna, K. (2000). Children's reasoning and the mind. In P. Mitchell, & K. John (Eds.), *Theory of mind, metacognition, and reasoning: A life-span perspective* (1st ed., pp. 301–326). Psychology Press: Taylor Francis.

Deng, Q. (2016). *The effect of a self-regulated vocabulary intervention on world knowledge, reading comprehension, and self-regulated learning for elementary English language learners* (10102763) [Doctoral dissertation, The Graduate College at the University of Nebraska]. Proquest.

Desautel, D. (2009). Becoming a thinking thinker: Metacognition, self-Reflection, and classroom practice. *Teachers College Record*, *111*(8), 1997–2020.

Desoete, A., Roeyers, H., & Buysse, A. (2001). Metacognition and mathematical problem solving in grade 3. *Journal of Learning Disabilities*, *34*(5), 435–447. https://doi.org/10.1177/002221940103400505

Desoete, A., Roeyers, H., & Huylebroeck, A. (2006). Metacognitive skills in Belgian third grade children (age 8 to 9) with and without mathematical learning disabilities. *Metacognition and Learning*, *1*(2), 119–135. https://doi.org/10.1007/s11409-006-8152-9

Dewey, J. (1910). *How we think*. D C Heath and company.

DiBenedetto, M. K., & Zimmerman, B. J. (2010). Differences in Self-Regulatory processes among students studying science: A microanalytic investigation. *The International Journal of Educational and Psychological Assessment*, *5*(1), 2–24.

Diestel, S., Cosmar, M., & Schmidt, K. H. (2013). Burnout and impaired cognitive functioning: The role of executive control in the performance of cognitive tasks. *Work & Stress*, *27*(2), 164–180. https://doi.org/10.1080/02678373.2013.790243

Dignath, C., Buettner, G., & Langfeldt, H. P. (2008). How can primary school students learn self-regulated learning strategies most effectively? *Educational Research Review*, *3*(2), 101–129. https://doi.org/10.1016/j.edurev.2008.02.003

Dignath, C., & Büttner, G. (2018). Teachers direct and indirect promotion of self-regulated learning in primary and secondary school mathematics classes – insights from video-based classroom observations and teacher interviews. *Metacognition and Learning*, *13*(2), 127–157. https://doi.org/10.1007/s11409-018-9181-x

Dinsmore, D. L., Alexander, P. A., & Loughlin, S. M. (2008). Focusing the conceptual lens on metacognition, self-regulation, and self-regulated learning. *Educational Psychology Review*, *20*(4), 391–409. https://doi.org/10.1007/s10648-008-9083-6

Donato, R., & Hernandez, J. S. (1993). Metacognitive equity for Mexican-American language minority students: Questions of policy. *The Journal of Educational Issues of Language Minority Students*, *12*, 17–34.

Dragnic-Cindric, D., & Greene, J. A. (2021). Social regulation of learning as a base for successful collaboration. *Rapid Community Report Series*.

Drigas, A., & Mitsea, E. (2020). The 8 pillars of metacognition. *International Journal of Emerging Technologies in Learning (IJET)*, *15*(21), 162. https://doi.org/10.3991/ijet.v15i21.14907

Duffy, G. G., Roehler, L. R., Sivan, E., Rackliffe, G., Book, C., Meloth, M. S., Vavrus, L. G., Wesselman, R., Putnam, J., & Bassiri, D. (1987). Effects of explaining the reasoning associated with using reading strategies. *Reading Research Quarterly*, *22*(3), 347. https://doi.org/10.2307/747973

Dunlosky, J., & Nelson, T. O. (1992). Importance of the kind of cues for judgments of learning (jol) and the delayed-jol effect. *Memory & Cognition*, *20*(4), 374–380. https://doi.org/10.3758/bf03210921

Dweck, C. S. (2017). *Mindset: The new psychology of success*. Carol S. Dweck.

Dwyer, C. (2017). *Reflective judgment*. Psychology Today. https://www.psychologytoday.com/us/blog/thoughts-thinking/201712/reflective-judgment

Efklides, A. (2005). Metacognitive experiences in problem solving. In *Trends and prospects in motivation research* (pp. 297–323). Kluwer Academic Publishers. https://doi.org/10.1007/0-306-47676-2_16

Efklides, A. (2006). Metacognition and affect: What can metacognitive experiences tell us about the learning process? *Educational Research Review*, *1*(1), 3–14. https://doi.org/10.1016/j.edurev.2005.11.001

Efklides, A. (2008). Metacognition: Defining its facets and level of functioning in relation to self and co-regulation. *European Psychologist*, *13*(4), 277–287. https://doi.org/10.1027/1016-9040.13.4.277

Efklides, A. (2010). Editorial. *Learning and Instruction*, *20*(1), 1. https://doi.org/10.1016/j.learninstruc.2009.10.005

Efklides, A. (2011). Interactions of metacognition with motivation and affect in self-regulated learning: The MASRL model. *Educational Psychologist*, *46*(1), 6–25. https://doi.org/10.1080/00461520.2011.538645

Efklides, A. (2013). Metacognition, motivation, and affect in the school context. In *Cognition and motivation* (pp. 383–406). Cambridge University Press. https://doi.org/10.1017/cbo9781139021463.022

Efklides, A. (2015). *Metamemory and affect* (J. Dunlosky & S. K. Tauber, Eds.). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199336746.013.1

Efklides, A., Samara, A., & Petropoulou, M. (1999). Feeling of difficulty: An aspect of monitoring that influences control. *European Journal of Psychology of Education*, *14*(4), 461–476. https://doi.org/10.1007/bf03172973

Egizii, R. (2021). *An exploratory sequential mixed methods study investigating pedagogical value at a research-intensive university* (http://dx.doi.org/10.11575/PRISM/39008) [Unpublished doctoral dissertation]. University of Calgary. The Vault: Electronic Theses and Dissertations. http://hdl.handle.net/1880/113628

Ellis, A. K., Denton, D. W., & Bond, J. B. (2014). An analysis of research on metacognitive teaching strategies. *Procedia - Social and Behavioral Sciences*, *116*, 4015–4024. https://doi.org/10.1016/j.sbspro.2014.01.883

Fagnant, A., & Crahay, M. (2010). Theories of mind and personal epistemology: Their interrelation and connection with the concept of metacognition. *European Journal of Psychology of Education*, *26*(2), 257–271. https://doi.org/10.1007/s10212-010-0045-2

Fani, A., Karuniasih, N., & Rusdiati, I. (2021). Metacognitive reading strategies of EFL learners: A narrative research. *Tefla Journal*, *3*(1), 1–6.

Feliz, V.A. (2018). *Teach them to read: Implementing high leverage pedagogical practices to increase english language learner academic achievement* (2058880021) [Doctoral dissertation, University of Southern California]. Education Database. http://0-search.proquest.com.liucat.lib.liu.edu/dissertations-theses/teach-them-read-implementing-high-leverage/docview/2058880021/se-2?accountid=12142

Feuerstein, R., Feuerstein, R. S., & Falik, L. H. (2010). *Beyond smarter: Mediated learning and the brain's capacity for change* (annotated ed.). Teachers College Press.

Finders, J. K., McClelland, M. M., Geldhof, G., Rothwell, D. W., & Hatfield, B. E. (2021). Explaining achievement gaps in kindergarten and third grade: The role of self-regulation and executive function skills. *Early Childhood Research Quarterly*, *54*, 72–85. https://doi.org/10.1016/j.ecresq.2020.07.008

Flavell, J. H. (1975). *Metamemory* [Paper Presentation]. Annual Meeting of The American Psychological Association, Bethesda, MD, United States. https://doi.org/https://files.eric.ed.gov/fulltext/ED115405.pdf

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, *34*(10), 906–911. https://doi.org/10.1037/0003-066x.34.10.906

Flavell, J. H. (2000). Development of children's knowledge about the mental world. *International Journal of Behavioral Development*, *24*(1), 15–23. https://doi.org/10.1080/016502500383421

Fox, E., & Riconscente, M. (2008). Metacognition and self-regulation in James, Piaget, and Vygotsky. *Educational Psychology Review*, *20*(4), 373–389. https://doi.org/10.1007/s10648-008-9079-2

Fuller, G., Stecker, R., Wright, J. P., & Locke, J. (2000). *John Locke: An essay concerning human understanding in focus (Routledge philosophers in focus series)* (1st ed.). Routledge.

Gao, J., & Soranzo, A. (2020). Applying q-methodology to investigate people' preferences for multivariate stimuli. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.556509

Gateway qualifications. (2021). *Personal learning and thinking skills (PLTS) from gateway qualifications*. Gateway Qualifications. Retrieved June 14, 2021, from https://www.gatewayqualifications.org.uk/qualification-area/personal-social-development/personal-learning-thinking/

Gayle Morris Sweetland Center for Writing. (2021). *Metacognition – Cultivating reflection to help students become self-directed learners*. University of Michigan.

Goh, C. C., & Vandergrift, L. (2021). *Teaching and learning second language listening metacognition in action* (2nd ed.). Routledge.

Greene, J. A. (2018). *Self-regulation in education*. Routledge.

Guo, L. (2020). Teachers' mediation in students' development of cognition and metacognition. *Asia-Pacific Journal of Teacher Education*, 1–16. https://doi.org/10.1080/1359866x.2020.1846158

Gutierrez de Blume, A. P. (2017). The effects of strategy training and an extrinsic incentive on fourth- and fifth-grade students' performance, confidence, and calibration accuracy. *Cogent Education*, *4*(1), 1314652. https://doi.org/10.1080/2331186x.2017.1314652

Gutierrez de Blume, A. P. (2021). Calibrating calibration: A meta-analysis of learning strategy instruction interventions to improve metacognitive monitoring accuracy. *Journal of Educational Psychology*.

Haberkorn, K., Lockl, K., Pohl, S., Ebert, S., & Weinert, S. (2014). Metacognitive knowledge in children at early elementary school. *Metacognition and Learning*, *9*(3), 239–263. https://doi.org/10.1007/s11409-014-9115-1

Hadwin, A., Järvelä, S., & Miller, M. (2018). Self-regulation, co-regulation, and shared regulation in collaborative learning environments. In D. Schunk & J.A. Greene (Eds.), *Handbook of self-regulation of learning and performance* (pp. 83–106). Routledge/Taylor & Francis Group.

Hall, B., & Howard, K. (2008). A synergistic approach. *Journal of Mixed Methods Research*, *2*(3), 248–269. https://doi.org/10.1177/1558689808314622

Hammond, Z. (2021). Liberatory Education. *American Educator*, *45*(2), 4–11.

Han, I. (2021). Development of professional identity and related metacognitive thinking procedures of english language teachers through spontaneous collaboration for

pedagogical problem-solving. *SAGE Open*, *11*(2), 215824402110094. https://doi.org/10.1177/21582440211009483

Händel, M., Lockl, K., Heydrich, J., Weinert, S., & Artelt, C. (2014). Assessment of metacognitive knowledge in students with special educational needs. *Metacognition and Learning*, *9*(3), 333–352. https://doi.org/10.1007/s11409-014-9119-x

Hartman, H. J. (2013). Developing students' metacognitive knowledge and skills. In *Metacognition in learning and instruction* (pp. 33–68). Springer Netherlands. https://doi.org/10.1007/978-94-017-2243-8_3

Hedlund, A. (2021). *Making thinking and learning visible: An empirical approach to teaching*. ED Crocks. https://edcrocks.com/2021/08/04/making-thinking-and-learning-visible-an-empirical-approach-to-teaching/

Hedlund, A., & Gallery Teachers. (2021). *Live Q&A: Making thinking and learning visible* [Webinar]. You Tube. https://www.youtube.com/watch?v=UfARi8xbKaI&t=3027s

Hernberg, S. (2020). Metacognition and language learning: creating effective K–12 learners. *BC Teal*, *5*(1), 109–122.

Hertel, S., & Karlen, Y. (2020). Implicit theories of self-regulated learning: Interplay with students' achievement goals, learning strategies, and metacognition. *British Journal of Educational Psychology*, *91*(3), 972–996. https://doi.org/10.1111/bjep. 12402

Hofer, B. K. (2004). Introduction: Paradigmatic approaches to personal epistemology. *Educational Psychologist*, *39*(1), 1–3. https://doi.org/10.1207/s15326985ep3901_1

Hofer, B. K., & Sinatra, G. M. (2009). Epistemology, metacognition, and self-regulation: Musings on an emerging field. *Metacognition and Learning*, *5*(1), 113–120. https://doi.org/10.1007/s11409-009-9051-7

Horell, S., Marcette, J., & Kant, S. (2019). Metacognition: A tool for overcoming discrimination. *Peer Review*, *21*(1/2), 30–33.

Howard, S., & Vasseleu, E. (2020). Self-regulation and executive function longitudinally predict advanced learning in preschool. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.00049

Huang, J. (2013). Integrating metacognitive strategy instruction in regular ESL curricula. *AEIS Newsletter*.

Hulbig, P. R. (2021). *Fundamentals of metacognition: A qualitative study of metacognition, pedagogy, and transformation.* [Doctoral dissertation, Lesley University and Curry College]. Digital Commons. https://digitalcommons.lesley.edu/education_dissertations/180

International Association for the Evaluation of Educational Achievement. (2021). *21cs map information package | IEA.* Yea.nl. Retrieved June 25, 2021, from https://www.iea.nl/publications/21cs-map-information-package-0.

Introducing q methodology: The inverted factor technique. (2014). In *Doing q methodological research: Theory, method, and interpretation* (pp. 3–23). SAGE Publications Ltd. https://doi.org/10.4135/9781446251911.n1

Irvine, J. (2020). Marzano's new taxonomy as a framework for investigating student affect. *Journal of Instructional Pedagogies, 24*.

Israel, S. E., Block, C. C., Bauserman, K. L., & Kinnucan-Welsch, K. (2015). *Metacognition in literacy learning: Theory, assessment, instruction, and professional development* (2nd ed.). Routledge.

Jain, S. (2006). *Test anxiety and mathematics anxiety as a function of mediated learning experience and metacognitive skills* (3233985) [Doctoral dissertation, University of Wyoming]. ProQuest.

James, W. (1890). *The Principals of Psychology* (2nd ed.). New York: Holt.

Jeyaraj, J. (2016). Promotion of student metacognition in ell: A distant dream or a near reality. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3486734

Jia, X., Li, W., & Cao, L. (2019). The role of metacognitive components in creative thinking. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.02404

Jennings, J. W., Caldwell, J. S., Lerner, J. W. (2013). *Reading problems* (7th ed.). Pearson Education (US).

Kao, Y. C., Davis, E. S., & Gabrieli, J. E. (2005). Neural correlates of actual and predicted memory formation. *Nature Neuroscience*, *8*(12), 1776–1783. https://doi.org/10.1038/nn1595

Karlen, Y. (2016). Differences in students' metacognitive strategy knowledge, motivation, and strategy use: A typology of self-regulated learners. *The Journal of Educational Research*, *109*(3), 253–265. https://doi.org/10.1080/00220671.2014.942895

Kelemen, W. L. (2000). Metamemory cues and monitoring accuracy: Judging what you know and what you will know. *Journal of Educational Psychology*, *92*(4), 800–810. https://doi.org/10.1037/0022-0663.92.4.800

Kenza, T. (2021). The effect of self-assessment on the development of EFL reading comprehension skills. *Journal of English Education and Teaching (JEET)*, *5*(2), 231–247.

Kim, Y., & Moore, T. J. (2019). Multiple levels of metacognition: Circumstances interfering with students' spontaneous metacognitive activities. *Journal of Educational Research and Practice*, *9*(1). https://doi.org/10.5590/jerap. 2019.09.1.12

King, P. A., & Kitchener, K. (2002). The reflective judgment model: twenty years of research on epistemic cognition. In B.K. Hofer & P.R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 37–61). Mahwah, NJ: Erlbaum.

King, P. A., & Kitchener, K. (2004). Reflective judgment: Theory and research on the development of epistemic assumptions through adulthood. *Educational Psychologist*, *39*(1), 5–18. https://doi.org/10.1207/s15326985ep3901_2

Kitsantas, A., & Zimmerman, B. J. (2002). Comparing self-regulatory processes among novice, non-expert, and expert volleyball players: A microanalytic study. *Journal of Applied Sport Psychology*, *14*(2), 91–105. https://doi.org/10.1080/10413200252907761

Kluwe, R. H. (2011). Cognitive knowledge and executive control: Metacognition. In *Animal mind — human mind* (pp. 201–224). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-68469-2_12

Kolb, A. Y., & Kolb, D. A. (2012). Metacognitive experiential learning. In *Encyclopedia of the sciences of learning* (pp. 2234–2236). Springer US. https://doi.org/10.1007/978-1-4419-1428-6_233

Kovalcikova, I., & Runcakova, I. (2020). *Theoretical context of the constructs executive functioning and metacognition* [Paper]. GLOBETS online: International Conference on Education, Technology and Science, International Online Conference.

Kozulin, A., & Presseisen, B. Z. (1995). Mediated learning experience and psychological tools: Vygotsky's and Feuerstein's perspectives in a study of student learning. *Educational Psychologist*, *30*(2), 67–75. https://doi.org/10.1207/s15326985ep3002_3

Ku, K. L., & Ho, I. T. (2010). Metacognitive strategies that enhance critical thinking. *Metacognition and Learning*, *5*(3), 251–267. https://doi.org/10.1007/s11409-010-9060-6

Kuhn, D. (2000). Metacognitive development. *Current Directions in Psychological Science*, *9*(5), 178–181. https://doi.org/10.1111/1467-8721.00088

Kuhn, D., & Dean, D., (2004). Metacognition: A bridge between cognitive psychology and educational practice. *Theory into practice*, *43*(4), 268–273.

Kuhn, T. (1962). *The Structure of Scientific Revolutions*. University of Chicago Press.

Kurzer, K. (2015). Metacognition in the common core state standards. *NYS TESOL Journal*, *2*(2), 33–48.

Kurzer, K., Dewey, D., & Belnap, K. (2011). *Arabic study abroad: An exploratory study of connections between journal writing and language gains* [Master's thesis, Brigham Young University.].

Lee, B. S. (2017). The fundamentals of q methodology. *Journal of Research Methodology*, *2*(2), 57–95. https://doi.org/10.21487/jrm.2017.11.2.2.57

Locke, J. (2018). *Locke's essays. an essay concerning human understanding. and a treatise on the conduct of the understanding. with the author's last additions*. Franklin Classics.

Looichin, C., Unin, N., & Johari, A. (2017). *Metacognitive awareness strategies for listening comprehension* [Paper Presentation]. International Conference on The Teaching & Learning Languages, Sarawak, Malaysia.

Magno, C. (2010). The role of metacognitive skills in developing critical thinking. *Metacognition and Learning*, *5*(2), 137–156. https://doi.org/10.1007/s11409-010-9054-4

Marope, P. M. (2014). Learning and competences for the 21st century. *PROSPECTS*, *44*(4), 483–486. https://doi.org/10.1007/s11125-014-9333-y

Marulis, L. M., & Nelson, L. J. (2020). Metacognitive processes and associations to executive function and motivation during a problem-solving task in 3–5-year-olds. *Metacognition and Learning*. https://doi.org/10.1007/s11409-020-09244-6

Marzano, R. J. (2011). *The Marzano Teacher Evaluation Scales*. Marzano Research Laboratory.

Mavropalias, T., & Andronidi, C. (2017). The metacognitive deficits in middle schools in Athens. *International Journal of Research in Humanities and Social Studies*, *4*(5), 24–31.

McGuire, S. (2021). *Metacognition: The best tool to improve learning!* [Paper Presentation]. Tools For Teaching Conference, Indianapolis, IN, United States.

McKeown, B. F., & Thomas, D. B. (2013). *Q methodology (quantitative applications in the social sciences book 66)* (2nd ed.). SAGE Publications, Inc.

Meltzer, L., Greschler, M., Davis, K., & Vanderberg, C. (2021). Executive function, metacognition, and language: Promoting student success with explicit strategy instruction. *Perspectives of the ASHA Special Interest Groups*, 1–14. https://doi.org/10.1044/2021_persp-21-00034

Metcalfe, J., & Bjork, R. A. (2008). Evolution of metacognition. In J. Dunlosky (Ed.), *Handbook of metamemory and memory* (pp. 29–40). Psychology Press.

Mevarech, Z., & Kramarski, B. (2014). *Critical math for innovative societies*. OECD. https://doi.org/10.1787/9789264223561-en

Mokhtari, K., & Reichard, C. A. (2002). Assessing students' metacognitive awareness of reading strategies. *Journal of Educational Psychology*, *94*(2), 249–259. https://doi.org/10.1037/0022-0663.94.2.249

Monroe, B. (2019). *Metacognition and the Next Generation Science Standards* (MonroeB0818) [Master's thesis, Montana State University]. Scholar Works. https://scholarworks.montana.edu/xmlui/bitstream/handle/1/14795/MonroeB0818.pdf?sequence=6&isAllowed=y

Morton, A. (2010). *Epistemic emotions*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199235018.003.0018

Mujis, D. (2011). *Doing quantitative research in education with SPSS* (2nd ed.). SAGE Publications Ltd. https://doi.org/10.4135/9781849203241.n1

Myers, S. J., Rhodes, M. G., & Hausman, H. E. (2020). Judgments of learning (jols) selectively improve memory depending on the type of test. *Memory & Cognition*, *48*(5), 745–758. https://doi.org/10.3758/s13421-020-01025-5

Nagy, W. E., Scott, J. A., Kamil, M. L., Mosenthal, P. B., Pearson, P. D., & Barr, R. (2000). Vocabulary processes. In *Handbook of reading research, volume III* (1st ed.). Taylor & Francis.

Nash-Ditzel, S. (2010). Metacognitive reading strategies can improve self-regulation. *Journal of College Reading and Learning*, *40*(2), 45–63.

National Center for Education Statistics & Schools and Staffing Surveys. (2011). *Total number and percentage distribution of public-school teachers who reported having various*

degree types in English as a Second Language (ESL), by highest degree earned and selected school and teacher characteristics: 2011–12 [Data set]. NCES. https://doi.org/https://nces.ed.gov/surveys/sass/tables/sass1112_500_t1n.asp#f1

Nejad, B. S., & Shaherebabaki, M. M. (2015). Effects of metacognitive strategy instruction on the reading comprehension of English language learners through cognitive academic language learning approach. *International Journal of Languages Education and Teaching*, *3*(2), 133–164.

Nelson, T., Kruglanski, A., & Jost, J. (2014). Knowing thyself and others: Progress in metacognitive social psychology. In *Metacognition: Cognitive and social dimensions* (pp. 69–89). SAGE Publications Ltd. https://doi.org/10.4135/9781446279212.n5

Nelson, T. O., & Narens, L. (1990). Metamemory: A theoretical framework and new findings. In *Psychology of learning and motivation* (pp. 125–173). Elsevier. https://doi.org/10.1016/s0079-7421(08)60053-5

Nelson, T. O., Narens, L., & Shimamura, A P. (1994). Why investigate metacognition? In J. Metcalfe (Ed.), *Metacognition Knowing about Knowing* (pp.1–24). MIT Press.

New York State Education Department. (2019a). *ELL and ML educator certification*. http://www.nysed.gov. Retrieved March 20, 2022, from http://www.nysed.gov/bilingual-ed/ell-and-ml-educator-certification.

New York State Education Department. (2019b). *Multilingual learner (MLL)/English language learner (ell) program quality review continuum* [PDF]. http://www.nysed.gov/. Retrieved April 1, 2022, from http://www.nysed.gov/common/nysed/files/programs/bilingual-ed/prog-quality-review-continuum-final-a.pdf.

Newman, I., & Ramlo, S. (2015). Using q methodology and q factor analysis in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Sage handbook of mixed methods in social & behavioral research* (pp. 505–530). SAGE Publications, Inc. https://doi.org/10.4135/9781506335193.n20

Nian, Z. (2020). To promote the development of teachers' teaching beliefs from reflective teaching. *Open Journal of Social Sciences*, *8*(11), 120–126. https://doi.org/10.4236/jss.2020.811012

Nicolielo-Carrilho, A., & Hage, S. (2017). Estratégias metacognitivas de leitura de crianças com distúrbio de aprendizagem. *CoDAS*, *29*(3). https://doi.org/10.1590/2317-1782/20172016091

Ohtani, K., & Hisasaka, T. (2018). Beyond intelligence: A meta-analytic review of the relationship among metacognition, intelligence, and academic performance. *Metacognition and Learning*, *13*(2), 179–212. https://doi.org/10.1007/s11409-018-9183-8

Organization for Economic Co-operation and Development. (2020). *PISA 2018 Results*. www.oecd.org. https://www.oecd.org/pisa/publications/pisa-2018-results.htm

Organization for Economic Development. (2018). *The Future of Education and Skills, Education for 2030* [Report]. OECD. https://doi.org/https://www.oecd.org/education/2030-project/contact/E2030%20Position%20Paper%20(05.04.2018).pdf

Owen, D., Vista, A., & Brookings. (2017). Strategies for teaching metacognition in classrooms. *Education Plus Development*. https://www.brookings.edu/blog/education-plus-development/2017/11/15/strategies-for-teaching-metacognition-in-classrooms/

Oxford, R. L. (1990). *Language learning strategies, what every teacher should know*. Oxford, Harper Collins.

Ozturk, N. (2017). Assessing metacognition: Theory and practices. *International Journal of Assessment Tools in Education*, 134–134. https://doi.org/10.21449/ijate.298299

Ozturk, N. (2018). The relation between teachers' self-reported metacognitive awareness and teaching with metacognition. *International Journal of Research in Teacher Education*, *9*(2), 26–35.

Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.00422

Papleontiou-louca, E. (2003). The concept and instruction of metacognition. *Teacher Development*, *7*(1), 9–30. https://doi.org/10.1080/13664530300200184

Paris, S. G., & Winograd, P. (1990). Promoting metacognition and motivation of exceptional children. *Remedial and Special Education*, *11*(6), 7–15. https://doi.org/10.1177/074193259001100604

Perez, A. (2019). *Assessing quality in mixed methods research: A case study operationalizing the legitimation typology* (5-2019) [Master's thesis, University of Nebraska]. Digital Commons. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1335&context=cehsdiss

Perry, J., Lundie, D., & Golder, G. (2018). Metacognition in schools: What does the literature suggest about the effectiveness of teaching metacognition in schools? *Educational Review*, *71*(4), 483–500. https://doi.org/10.1080/00131911.2018.1441127

Pintrich, P. R. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory Into Practice*, *41*(4), 219–225. https://doi.org/10.1207/s15430421tip4104_3

Pintrich, P. R., Wolters, C. A., & Baxter, G. P. (2000). Assessing metacognition and self-regulated learning. In G. Schraw & J. C. Impara (Eds.), *Issues in the Measurement of Metacognition* (pp. 43–97). Lincoln, NE: Buros Institute of Mental Measurements.

Plano Clark, Vicki L. & Ivankova, N.V. (2015). *Mixed methods research: A guide to the field (mixed methods research series)* (1st ed.). SAGE Publications, Inc.

Ponce, O. A., & Pagán-Maldonado, N. (2015). Mixed methods research in education: Capturing the complexity of the profession. *International Journal of Educational Excellence*, *1*(1), 111–135.

Porter, L. A. (2021). *Examining the influence of professional development and pre-service training on the use of self-regulation pedagogical practices of middle school teachers.* (Theses and Dissertations 231) [Doctoral dissertation, St. John's University]. St. John's Scholar. https://scholar.stjohns.edu/cgi/viewcontent.cgi?article=1267&context=theses_dissertations

Pratt, S. M., & Martin, A. M. (2017). *Exploring effective professional development strategies for in-service teachers on guide beginning readers to become more metacognitive in their oral reading.* [PDF]. https://scholarworks.wmich.edu/cgi/viewcontent.cgi?article=3417&context=reading_horizons. https://scholarworks.wmich.edu/cgi/viewcontent.cgi?article=3417

Proust, J. (2016). *The philosophy of metacognition* (Reprint ed.). Oxford University Press.

Q Methodology for the Scientific Study of Human Subjectivity. (n.d.). *Welcome to qmethod.org*. QMethod.org. Retrieved March 8, 2022, from

Qizhen, D. (2016). *The effect of a self-regulated vocabulary intervention on word knowledge, reading comprehension, and self-regulated learning for elementary English language learners* (10102763) [Doctoral dissertation, University of Nebraska]. ProQuest. https://0-www-proquest-com.liucat.lib.liu.edu/education/docview/1786671927/5A989DF1178D469CPQ/2?accountid=12142

Qmethod.org. (n.d.). *Q methodology for the scientific study of human subjectivity*. Retrieved March 11, 2022, from https://qmethod.org/.

Rahman, Q., & Yunus, T. (2020). Study of metacognitive skills development and reflection of self-learning in education. *Education and Development*, *10*(20), 28–27.

Richter, T., & Schmid, S. (2009). Epistemological beliefs and epistemic strategies in self-regulated learning. *Metacognition and Learning*, *5*(1), 47–65. https://doi.org/10.1007/s11409-009-9038-4

Ritchhart, R., Turner, T., & Hadar, L. (2009). Uncovering students' thinking about thinking using concept maps. *Metacognition and Learning*, *4*(2), 145–159. https://doi.org/10.1007/s11409-009-9040-x

Roebers, C. M. (2002). Confidence judgments in children's and adult's event recall and suggestibility. *Developmental Psychology*, *38*(6), 1052–1067. https://doi.org/10.1037/0012-1649.38.6.1052

Roebers, C. M., Cimeli, P., Röthlisberger, M., & Neuenschwander, R. (2012). Executive functioning, metacognition, and self-perceived competence in elementary school children: An explorative study on their interrelations and their role for school

achievement. *Metacognition and Learning*, *7*(3), 151–173. https://doi.org/10.1007/s11409-012-9089-9

Roebers, C. M., Schmid, C., & Roderer, T. (2009). Metacognitive monitoring and control processes involved in primary school children's test performance. *British Journal of Educational Psychology*, *79*(4), 749–767. https://doi.org/10.1348/978185409x429842

Rolstad, K., Mahoney, K., & Glass, G. V. (2005). The big picture: A meta-analysis of program effectiveness research on English language learners. *Educational Policy*, *19*(4), 572–594. https://doi.org/10.1177/0895904805278067

Salatas, H., & Flavell, J. H. (1976). Perspective taking: The development of two components of knowledge. *Child Development*, *47*(1), 103. https://doi.org/10.2307/1128288

Saldana, J., & Omasta, M. (2018). *Qualitative research: Analyzing life* (1st ed.). Sage Publications, Inc.

Samuels, S. J., Ediger, K. A. M., Willcutt, J. R., & Palumbo, T. J. (2015). Role of automaticity in metacognition and literacy instruction. In S. E. Israel, C. Block, K. L. Bauserman, K. (Eds.), *Metacognition in literacy learning* (pp. 41–59). Routledge. https://doi.org/10.4324/9781410613301

Scharff, L., Draeger, J., Verpoorten, D., Devlin, M., Dvorakova, L. S., Lodge, J. M., & Smith, S. (2017). Exploring metacognition as support for learning transfer. *Teaching & learning Inquiry: The ISSOTL Journal*, *5*(1). https://doi.org/10.20343/teachlearninqu.5.1.6

Schmitz, B., & Wiese, B. S. (2006). New perspectives for the evaluation of training sessions in self-regulated learning: Time-series analyses of diary data. *Contemporary Educational Psychology*, *31*(1), 64–96. https://doi.org/10.1016/j.cedpsych.2005.02.002

Schofield, L. (2012). Why didn't I think of that? Teacher influence on student's metacognitive knowledge of how to help students acquire metacognitive abilities. *Kairaranga*, *13*(1), 56–62.

Schraw, G. (2008). A conceptual analysis of five measures of metacognitive monitoring. *Metacognition and Learning*, *4*(1), 33–45. https://doi.org/10.1007/s11409-008-9031-3

Schraw, G., & Dennison, R. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, *19*(4), 460–475. https://doi.org/10.1006/ceps.1994.1033

Schraw, G., Kuch, F., Gutierrez, A. P., & Richmond, A. S. (2014). Exploring a three-level model of calibration accuracy. *Journal of Educational Psychology*, *106*(4), 1192–1202. https://doi.org/10.1037/a0036653

Schraw, G., & Moshman, D. (1995). Metacognitive theories. *Educational Psychology Review*, *7*(4), 351–371. https://doi.org/10.1007/bf02212307

Sekar, J. (n.d.). Creative thinking skills as specific outcome of English language learning.

Siegesmund, A. (2017). Using self-assessment to develop metacognition and self-regulated learners. *FEMS Microbiology Letters*, *364*(11). https://doi.org/10.1093/femsle/fnx096

Sinkavich, F. J. (1995). Performance and metamemory: Do students know what they don't know. *Journal of Instructional psychology*, *22*(1), 77.

Spruce, R., & Bol, L. (2014). Teacher beliefs, knowledge, and practice of self-regulated learning. *Metacognition and Learning*, *10*(2), 245–277. https://doi.org/10.1007/s11409-014-9124-0

Stanton, J., Sebesta, A. J., & Dunlosky, J. (2021). Fostering metacognition to support student learning and performance. *CBE—Life Sciences Education*, *20*(2), fe3. https://doi.org/10.1187/cbe.20-12-0289

Stephenson, W. (1953). *The study of behavior; Q-technique and its methodology*. The University of Chicago Press.

Stetser, M. C., & Stillwell, R. (2014). *Public high school four-year on-time graduation rates and event dropout rates: School years 2010-11 and 2011-12.* [Press release]. National Center for Education Statistics.

Stone, T. E. (2016). Q methodology: An introduction. *Pacific Rim International Journal of Nursing Research*, *19*(3), 183–186.

Sun, Q., Zhang, L., & Carter, S. (2021). Investigating students' metacognitive experiences: Insights from the English as a foreign language learners' writing metacognitive experiences questionnaire. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.744842

Supeno, S. (2021). Metacognitive model in teaching reading and writing. *DEIKSIS*, *13*(1), 93. https://doi.org/10.30998/deiksis.v13i1.8407

Sweet, C., Blythe, H., & Carpenter, R. (2016). *It works for me, metacognitively*. New Forums.

Tanner, K. D. (2012). Promoting student metacognition. *CBE—Life Sciences Education*, *11*(2), 113–120. https://doi.org/10.1187/cbe.12-03-0033

Tarricone, P. (2011). *The taxonomy of metacognition* (1st ed.). Psychology Press.

Tashakkori, A. M., & Teddlie, C. B. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences* (1st ed.). SAGE Publications, Inc.

Tashakkori, A., & Teddlie, C. B. (2002). *Handbook of mixed methods in social & behavioral research* (1st ed.). SAGE Publications, Inc.

Thinking Maps. (2021). *A shared visual language for learning*. thinkingmaps.com. Retrieved September 25, 2021, from https://www.thinkingmaps.com/.

Tracy, S. J. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative Inquiry*, *16*(10), 837–851. https://doi.org/10.1177/1077800410383121

Tulving, E., & Madigan, S. A. (1970). Memory and verbal learning. *Annual Review of Psychology*, *21*(1), 437–484.

U.S. Department of Education. (2015). *Every student succeeds act (ESSA)*. Ed.gov. https://www.ed.gov/essa?src=rn

Uka, A., & Uka, A. (2020). The effect of students' experience with the transition from primary to secondary school on self-regulated learning and motivation. *Preprints.org*. https://doi.org/10.20944/preprints202009.0636.v1

United States Department of Education. (n.d.). *Academic performance and outcomes for English learners*. Www2.ed.gov. Retrieved April 1, 2022, from https://www2.ed.gov/datastory/el-outcomes/index.html#one.

Van Loon, M. H., Bayard, N. S., Steiner, M., & Roebers, C. M. (2020). Connecting teachers' classroom instructions with children's metacognition and learning in elementary school. *Metacognition and Learning*. https://doi.org/10.1007/s11409-020-09248-2

Veenman, M., & Elshout, J. J. (1999). Changes in the relation between cognitive and metacognitive skills during the acquisition of expertise. *European Journal of Psychology of Education*, *14*(4), 509–523. https://doi.org/10.1007/bf03172976

Veenman, M. J., Van Hout-Wolters, B. M., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition and Learning*, *1*(1), 3–14. https://doi.org/10.1007/s11409-006-6893-0

Veenman, M. V., & Beishuizen, J. J. (2004). Intellectual and metacognitive skills of novices while studying texts under conditions of text difficulty and time constraint. *Learning and Instruction*, *14*(6), 621–640. https://doi.org/10.1016/j.learninstruc.2004.09.004

Veenman, M. V., & Spaans, M. A. (2005). Relation between intellectual and metacognitive skills: Age and task differences. *Learning and Individual Differences*, *15*(2), 159–176. https://doi.org/10.1016/j.lindif.2004.12.001

Victor, A. M. (2004). *The effects of metacognitive instruction on the planning and academic achievement of first and second grade children* (3152786) [Doctoral dissertation, Graduate College of the Illinois Institute of Technology]. ProQuest.

Vogl, E., Pekrun, R., & Loderer, K. (2021). Epistemic emotions and metacognitive feelings. In *Trends and prospects in metacognition research across the life span* (pp. 41–58). Springer International Publishing. https://doi.org/10.1007/978-3-030-51673-4_3

Vygotsky, L. (1978). Socio-cultural theory. In M. Cole (Ed.), *Mind in society* (pp. 52–58). Cambridge, MA: Harvard University Press.

Walker, B., Lin, Y., & McCline, R. M. (2018). Q methodology and q-perspectives online: Innovative research methodology and instructional technology. *TechTrends*, *62*(5), 450–461. https://doi.org/10.1007/s11528-018-0314-5

Wallace, C. (2008). The key to teaching English language learners to read. *The Education Digest*, *73*(9), 36.

Walshaw, M., & Anthony, G. (2008). The teacher's role in classroom discourse: A review of recent research into mathematics classrooms. *Review of Educational Research*, *78*(3), 516–551. https://doi.org/10.3102/0034654308320292

Watts, S., & Stenner, P. (2005). Doing q methodology: Theory, method, and interpretation. *Qualitative Research in Psychology*, *2*(1), 67–91. https://doi.org/10.1191/1478088705qp022oa

Watts, S., & Stenner, P. (2012). Introducing q methodology: The inverted factor technique. In *Doing q methodological research: Theory, method, and interpretation* (pp. 3–23). SAGE Publications Ltd. https://doi.org/10.4135/9781446251911.n1

Wheeler, M. A., Stuss, D. T., & Tulving, E. (1997). Toward a theory of episodic memory: the frontal lobes and autonoetic consciousness. *Psychological bulletin*, *121*(3), 331.

Whitebread, D., Coltman, P., Pasternak, D., Sangster, C., Grau, V., Bingham, S., Almeqdad, Q., & Demetriou, D. (2008). The development of two observational tools for assessing metacognition and self-regulated learning in young children. *Metacognition and Learning*, *4*(1), 63–85. https://doi.org/10.1007/s11409-008-9033-1

Whitebread, D., & Neale, D. (2020). Metacognition in early child development. *Translational Issues in Psychological Science*, *6*(1), 8–14. https://doi.org/10.1037/tps0000223

Wilson, D., & Conyers, M. (2016). *Teaching students to drive their brains: Metacognitive strategies, activities, and lesson ideas*. ASCD.

Wilson, N. S., & Bai, H. (2010). The relationships and impact of teachers' metacognitive knowledge and pedagogical understandings of metacognition. *Metacognition and Learning*, *5*(3), 269–288. https://doi.org/10.1007/s11409-010-9062-4

Winckelmann, B., & Draeger, J. (2020). How metacognitive instructors can use their learning management system to facilitate student learning. *Journal of Teaching and Learning with Technology*, *9*(1). https://doi.org/10.14434/jotlt.v9i1.29159

Winne, P. H. (2005). Key issues in modeling and applying research on self-regulated learning. *Applied Psychology*, *54*(2), 232–238. https://doi.org/10.1111/j.1464-0597.2005.00206.x

Winne, P. H., & Hadwin, A. F. (1998). *Motivation and self-regulated learning: Theory, research, and applications*. Lawrence Erlbaum Associates Publishers.

Worley, P. (2018). Plato, metacognition, and philosophy in schools. *Journal of Philosophy in Schools*, *5*(1). https://doi.org/10.21913/jps.v5i1.1486

Yetis, K. (2021). *The impact of metacognitive instruction on EFL learners' listening comprehension skill* [Master's thesis, Hacettepe Universitesi]. Hacettepe Universitesi, Ankara Turkey.

Yussen, S. R., & Berman, L. (1981). Memory predictions for recall and recognition in first-, third-, and fifth-grade children. *Developmental Psychology*, *17*(2), 224–229. https://doi.org/10.1037/0012-1649.17.2.224

Zabala, A. (2014). Q method: A package to explore human perspectives using q methodology. *The R Journal*, *6*(2), 163. https://doi.org/10.32614/rj-2014-032

Zeller, R. A. (2005). Measurement error, issues, and solutions. In *Encyclopedia of social measurement* (pp. 665–676). Elsevier. https://doi.org/10.1016/b0-12-369398-5/00109-2

Zhang, Y., & Goh, C. C. (2018). A self-regulated learning approach to extensive listening and its impact on listening achievement and metacognitive awareness. *Studies In Second Language Learning and Teaching*, *8*(2), 193–218.

Zhang, D., & Goh, C. C. (2006). Strategy knowledge and perceived strategy use: Singaporean students' awareness of listening and speaking strategies. *Language Awareness*, *15*(3), 109–119.

Zimmerman, B. J. (2000). *Handbook of self-regulation* (M. Boekaerts, P. R. Pintrich, & M. Zeidner, Eds.). Elsevier. https://doi.org/10.1016/b978-0-12-109890-2.x5027-6

Zimmerman, B. J. (2007). Attaining self-regulation. In *Handbook of self-regulation* (pp. 13–39). Elsevier. https://doi.org/10.1016/b978-012109890-2/50031-7

Zimmerman, B. J., & Moylan, A. R. (2009). Self-Regulation: Where metacognition and motivation intersect. In Hacker, J., Dunlosky, A. C., Graesser (Eds.), *Handbook of Metacognition in Education* (pp. 299–315). Routledge.

Appendix A Baseline Questionnaire

Date:

Name:

Title:

What grade do you teach?

What school do you work in?

What is your highest degree in education?

List your certifications.

Years of experience as an ELL teacher:

◯ 1-5 years ◯ 5-10 years ◯ 10-15 ◯ 15-20 ◯ 20+

Have you taken any formal undergraduate or graduate courses that included metacognition as a topic? (This includes teacher college courses on metacognition or that explain metacognition and how to teach it). YES/NO

If so, was it as the graduate or undergraduate? (Check all that apply)

___graduate

___undergraduate

Did the course present metacognition as a matter of psychology or education? (Check all that apply)

___psychology

___education

Have you received any professional development on metacognition through your district or outside organizations? (Check all that apply)

____ Training courses

____ Conferences

____ CTLE credits

____ Seminars

Have you ever received support from your administration on metacognition? (Check all that apply)

____ In-house trainings

____ Observations/intervisitations

____ Supervisory feedback

Have you received materials from your district on metacognition? (Check all that apply)

____ Research articles

____ Standards

____ Videos

____ Books

____ Magazine articles

Appendix B Informed Consent

LONG ISLAND UNIVERSITY

INSTITUTIONAL REVIEW BOARD (IRB)

RESEARCH PARTICIPANT INFORMED CONSENT FORM

Study Title: **An exploration of ELL teacher understanding and utilization of metacognitive instructional practices.**

Sponsor/Supporter/Funded By: **Student Investigator**

Faculty Investigator: ***Jeff Kane, Educational Leadership, Technology and Ed.D.***
Jeff.Kane@liu.edu
516-299-2244

Student Investigator: ***Arete Galanis, Educational Leadership, Technology and Ed.D.***
Alod123@gmail.com
646-529-3237

You are being asked to join a research study. Participation in this study is voluntary. Even if you decide to join now, you can change your mind later.

1. Research Summary (Key Information):

The information in this section is intended to be an introduction to the study only. Complete details of the study are listed in the sections below. If you are considering participation in the study, the entire document should be discussed with you before you make your final decision. You can ask questions about the study now and at any time in the future.

2. Why is this research being done?

This research is being done to explore English Language Learner (ELL) teacher understanding of metacognition and the utilizations of metacognitive instructional practices. It is important to understand if ELL teachers are being trained in metacognition and metacognitive instructional practices which have potential benefits for ELL student achievement. Only masters or doctorate certified teachers in TESOL

(Teaching English to Speakers of Other Languages), TEFL (Teaching English as a foreign language), or Bilingual studies. We anticipate that about **40** people will take part in this study.

3. What will happen if you join this study?

If you agree to be in this study, we will ask you to do the following things:

- Provide short answer questions in a baseline questionnaire regarding some identifying information, name, age, years of experience, and any prior training in metacognition during formal, informal education, professional development, and supervision at work.

- Sort about 50 statements online, in order of importance to you on the topic of metacognition and how you utilize it inside your classroom (Time varies for each participant).

I. *Metacognition is the study of how one perceives, regulates, and monitors their cognitions. *

How long will you be in the study?

Participation in the study will last if it takes you to sort the statements.

4. What are the risks or discomforts of the study?

II. The risks associated with participation in this study are no greater than those encountered in daily life [or during the performance of routine physical or psychological examinations or tests].

Although your IP Address will not be stored in the survey results, there is always the possibility of tampering from an outside source when using the Internet for collecting information. While the confidentiality of your responses will be protected once the data is downloaded from the Internet, there is always the possibility of hacking or other security breaches that could threaten the confidentiality of your responses.

5. Are there benefits to being in the study?

There is no direct benefit to you from being in this study. This study may benefit society if the results lead to a better understanding of teacher understanding and use about metacognition.

6. What are your options if you do not want to be in the study?

III. Your participation in this study is entirely voluntary. You choose whether to participate. If you decide not to participate, there are no penalties, and you will not lose any benefits to which you would otherwise be entitled.

7. Will it cost you anything to be in this study?

IV. No.

8. Will you be paid if you join this study?

In compensation for your time, you will be eligible to receive a $25 Amazon Gift Card. You understand that you may stop participation at any time. However, you also understand that you will only receive the research compensation if you complete the research protocol, and your participation is deemed adequate.

You may be required to provide your social security number to be paid for taking part in this study. Federal tax law requires that you report your research payments when you file your taxes. If your total payments from LIU exceed $600 per year, LIU will report these payments to the Internal Revenue Service, and you will receive a 1099-MISC form from us.

9. Can you leave the study early?

- You can agree to be in the study now and change your mind later, without any penalty or loss of benefits, except for the compensation.
- If you wish to stop, please tell us right away.
- If you want to withdraw from the study, please email the student investigator Arete Galanis at alod123@gmail.com.

10. Why might we take you out of the study early?

You may be taken out of the study if:

- You fail to follow instructions.
- The study is cancelled.
- There may be other reasons to take you out of the study that we do not know at this time.

If you are taken out of the study early, LIU may use or give out your information that it has already collected if the information is needed for this study or any follow-up activities.

11. How will the confidentiality of your data be protected?

Any study records that identify you will be kept confidential to the extent possible by law. The records from your participation may be reviewed by people responsible for making sure that research is done properly, including members of the Long Island University Institutional Review Board and officials from government agencies such as the National Institutes of Health and the Office for Human Research Protections. (All of these people are required to keep your identity confidential.) Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

All study records will be created, stored, analyzed, and maintained to protect confidential information. Only the student investigator will have access to the data under password-protection. Data will be viewed for supervision purposes by study committee members, and statisticians, who will only view code numbers in place of participant names on data sheets.

12. What other things should you know about this research study?

What is the Institutional Review Board (IRB) and how does it protect you?

This study has been reviewed by an Institutional Review Board (IRB), a group of people that reviews human research studies. The IRB can help you if you have questions about your rights as a research participant or if you have other questions, concerns, or complaints about this research study. You may contact the IRB at osp@liu.edu.

What should you do if you have questions about the study?

Contact the student investigator Arete Galanis at 646-529-3237 or alod123@gmail.com or the faculty investigator Jeff Kane at 516-299-2244 or Jeff.Kane@liu.edu. If you wish, you may contact the principal investigator by letter. The address is on page one of this consent form. You can also contact the department chair, Joseph Piro at 516-299-2244 joseph.piro@liu.edu. If you cannot reach the investigators or wish to talk to someone else, contact the IRB office at osp@liu.edu. You can ask questions about this research study now or at any time during the study.

If you have questions about your rights as a research participant or feel that you have not been treated fairly, please call the Institutional Review Board at Long Island University at osp@liu.edu.

13. What does your signature on this consent form mean?

Your signature on this form means that: You understand the information given to you in this form, you accept the provisions in the form, and you agree to join the study. You will not give up any legal rights by signing this consent form.

WE WILL GIVE YOU A COPY OF THIS SIGNED AND DATED CONSENT FORM

_____

Signature of Participant Date/Time (Print Name)

_____

Signature of Person Obtaining Consent

Appendix C Q Sort Statements and Condition of Instruction

Condition of Instruction (COI):

"Please sort these statements into the template in order of importance and in a way that best describes your views about metacognition and how metacognition is incorporated in your instruction with only your English Language learners (ELL) students"

Gradients of teacher understanding

1) Teachers have adequate understanding about how to incorporate metacognitive skill teaching in their lessons.
2) Teaching metacognition is a straightforward process accomplished through embedding discussion with students about metacognitive knowledge.
3) Teaching metacognition to ELL students is an involved process that requires more time.
4) Metacognition is an elaborate concept that ELL students will eventually learn through classroom experiences.
5) Metacognition is implicitly passed on to students through teacher modeling.
6) Metacognition is a complex concept making it difficult to teach with ELL students.

Student outcomes of metacognition

7) It is important for teachers to incorporate metacognitive strategies because they increase student awareness of their thinking process.
8) It is important for teachers to incorporate metacognitive strategies because it promotes independent learning amongst our students.
9) It is important for teachers to incorporate metacognitive skills because it enables students to evaluate their learning abilities.
10) Metacognitive strategies may not be effective for my students at this time as they are still acquiring skills in the English language.
11) The addition of metacognitive strategies in my lesson plans may cause cognitive overload for my students at this time.
12) It is better for students if evaluation of their learning abilities is provided by their teachers as it allows them to focus on learning content.

Instructional shifts that help students to plan

13) In the beginning of a lesson, it is important for teachers to provide students with clearly stated learning goals.
14) Prior to beginning a lesson, it is important for teachers to explicitly model planning strategies for upcoming tasks.
15) It is important to introduce visual organizers to my students.

16) Due to a limited time allotted for instructional blocks, it is better for teachers to activate prior learning and move on to concept development.
17) Explicitly modeling planning strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson.
18) The introduction of visual organizers is valuable in theory; however, lesson blocks are limited to the delivery of content.

Instructional shifts that help students to monitor during a lesson

19) It is important for teachers to explicitly model for students on how to monitor their own thinking during tasks.
20) It is important for teachers to ask questions that promote a higher level of thinking.
21) It is important for teachers to incorporate tools such as learning maps to help students make their thinking visible for monitoring.
22) Explicitly modeling monitoring strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson.
23) It is better to ask lower-level questions to accommodate students who struggle with academic English proficiency.
24) Although teachers value monitoring tools such as thinking maps, additional professional development that highlights tools on helping students make their thinking visible would be beneficial.

Instructional shifts that help students to evaluate their learning

25) It is important for teachers to engage students in post lesson activities that help them reflect on their learning.
26) It is important for teachers to provide students with recognition of their knowledge gain relative to their learning goals.
27) It is important for teachers to facilitate students checking their own work.
28) Although teaching reflective thinking practices is important, it is better to use post lesson activities for the teacher to recap what was learned during the lesson.
29) When student received graded work through scores provided by me, they then could compare their performance to their learning goals with their family members.
30) It is better for teachers to grade student work and prioritize other evidence based instructional strategies.

Teacher metacognitive disposition

31) It is important for teachers to self-reflect on their teaching practices.
32) It is important for teachers to seek feedback their supervisors regarding their instructional performance relative to their goals.
33) It is important for teachers to seek continuous professional development to engage in life-long learning opportunities.
34) Although I value self-reflection, other professional priorities limit my time for self-reflection.
35) Although supervisory feedback is important, it can sometimes feel like an intimidating process.
36) Although professional development is important, it can also detract from valuable time allotted for lesson planning.

Appendix D Q statements and sources

Q Statements	Sources
1. Teachers have adequate an understanding about how to incorporate metacognitive skill teaching in their lessons.	Alhefnawy, P. M. (2020). *Teachers' metacognitive awareness and metacognitive instructional practice: A mixed method study in Egypt.* [Doctoral dissertation, The American University in Cairo Graduate School of Education].
2. Teaching metacognition is a straightforward process accomplished through the embedding of discussion with students about metacognitive knowledge.	Mavropalias, T., & Andronidi, C. (2017). The metacognitive deficits in middle schools in Athens. *International Journal of Research in Humanities and Social Studies*, *4*(5), 24–31. McGuire, S. Y. (2021b). Close the metacognitive equity gap: Teach all students how to learn. *Journal of College Academic Support Programs*, *4*(1), 69–72. https://doi.org/10.36896/4.1ep1 Pintrich, P. R. (2002a). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory Into Practice*, *41*(4), 219–225.
3. Teaching metacognition to ELL students is an involved process that requires more time.	Inverse or negative of statement 2.
4. Metacognition is an elaborate concept that ELL students will eventually learn through classroom experiences.	Inverse or negative of statement 5.
5. Metacognition is implicitly passed on to students through teacher modeling.	Pintrich, P. R. (2002). The role of metacognitive knowledge in learning,

	teaching, and assessing. *Theory Into Practice*, *41*(4), 219–225.
6. Metacognition is a complex concept making it difficult to teach with ELL students.	Ali, A. M., & Razali, A. (2019). A review of studies on cognitive and metacognitive reading strategies in teaching reading comprehension for ESL/EFL learners. *English Language Teaching*, *12*(6), 94
7. It is important for teachers to incorporate metacognitive strategies because they increase student awareness of their thinking process.	Bransford, J., Brown, A. L., & Cocking, R. R. (1999). *How people learn: Brain, mind, experience, and school*. Washington, D.C.: National Academy Press, 1999.
8. It is important for teachers to incorporate metacognitive strategies because it promotes independent learning amongst our students.	Papleontiou-louca, E. (2003). The concept and instruction of metacognition. *Teacher Development*, *7*(1), 9–30.
9. It is important for teachers to incorporate metacognitive skills because it enables students to evaluate their learning abilities.	Proust, J. (2016). *The philosophy of metacognition* (Reprint ed.). Oxford University Press.
10. Metacognitive strategies may not be effective for my students at this time as they are still acquiring skills in the English language.	Inverse or negative of statements 7 & 8.
11. The addition of metacognitive strategies in my lesson plans may cause cognitive overload for my students at this time.	Sulaiman, T., Rahim, S. S. A., Yong, W. K., & Subramaniam, P. (2020). Primary science teachers' perspectives about metacognition in science teaching. *European Journal of Education*, *10*(1), 75–84.
12. It is better for students if evaluation of their learning abilities is provided by their teachers as it allows them to focus on learning content.	Inverse or negative of statement 9.
13. In the beginning of a lesson, it is important for teachers to provide students with clearly stated learning goals.	Marzano, R. J. (2011). *The Marzano Teacher Evaluation Scales*. Marzano Research Laboratory.
14. Prior to beginning a lesson, it is important for teachers to explicitly model planning strategies for upcoming tasks.	Marzano, R. J. (2011). *The Marzano Teacher Evaluation Scales*. Marzano Research Laboratory.
15. It is important to introduce visual organizers to my students.	Thinking Maps. (2021). *A shared visual language for learning*.

	thinkingmaps.com. Retrieved September 25, 2021
16. Due to a limited time allotted for instructional blocks, it is better for teachers to activate prior learning and move on to concept development.	Negative or inverse of statement 13.
17. Explicitly modeling planning strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson.	Negative or inverse of statement 14.
18. The introduction of visual organizers is valuable in theory; however, lesson blocks are limited to the delivery of content.	Negative or inverse of statement 15.
19. It is important for teachers to explicitly model for students on how to monitor their own thinking during tasks.	Chatzipanteli, A., Grammatikopoulos, V., & Gregoriadis, A. (2013). Development and evaluation of metacognition in early childhood education. *Early Child Development and Care*, *184*(8), 1223–1232.
20. It is important for teachers to ask questions that promote a higher level of thinking.	Marzano, R. J. (2011). *The Marzano Teacher Evaluation Scales*. Marzano Research Laboratory.
21. It is important for teachers to incorporate tools such as learning maps to help students make their thinking visible for monitoring.	Thinking Maps. (2021). *A shared visual language for learning*. thinkingmaps.com. Retrieved September 25, 2021
22. Explicitly modeling monitoring strategies by teachers is not necessary, as students are implicitly exposed to planning during the concept development portion of the lesson.	Negative or inverse of statement 19.
23. It is better to ask lower-level questions to accommodate students who struggle with academic English proficiency.	Negative or inverse of statement 20.
24. Although teachers value monitoring tools such as thinking maps, additional professional development that highlights tools on helping students make their thinking visible would be beneficial.	Negative or inverse of statement 21 Thinking Maps. (2021). *A shared visual language for learning*. thinkingmaps.com. Retrieved September 25, 2021
25. It is important for teachers to engage students in post lesson activities that help them reflect on their learning.	Desautel, D. (2009). Becoming a thinking thinker: Metacognition, self-Reflection, and classroom practice.

	Teachers College Record, *111*(8), 1997–2020.
26. It is important for teachers to provide students with recognition of their knowledge gain relative to their learning goals.	Pintrich, P. R. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory Into Practice*, *41*(4), 219–225.
27. It is important for teachers to facilitate students checking their own work.	Tanner, K. D. (2012). Promoting student metacognition. *CBE—Life Sciences Education*, *11*(2), 113–120.
28. Although teaching reflective thinking practices is important, it is better to use post lesson activities for the teacher to recap what was learned during the lesson.	Negative or inverse of statement 25.
29. When student received graded work through scores provided by me, they then could compare their performance to their learning goals with their family members.	Negative or inverse of statement 26 & 27.
30. It is better for teachers to grade student work and prioritize other evidence based instructional strategies.	Negative or inverse of statement 27.
31. It is important for teachers to self-reflect on their teaching practices.	Nian, Z. (2020). To promote the development of teachers' teaching beliefs from reflective teaching. *Open Journal of Social Sciences*, *08*(11), 120–126.
32. It is important for teachers to seek feedback their supervisors regarding their instructional performance relative to their goals.	Schofield, L. (2012). Why didn't I think of that? Teacher influence on student's metacognitive knowledge of how to help students acquire metacognitive abilities. *Kairaranga*, *13*(1), 56–62.
33. It is important for teachers to seek continuous professional development to engage in life-long learning opportunities.	Porter, L. A. (2021). *Examining the influence of professional development and pre-service training on the use of self-regulation pedagogical practices of middle school teachers.* (Theses and Dissertations 231) [Doctoral dissertation, St. John's University]. St. John's Scholar.
34. Although I value self-reflection, other professional priorities limit my time for self-reflection.	Negative or inverse of statement 31.

35. Although supervisory feedback is important, it can sometimes feel like an intimidating process.	Negative or inverse of statement 32.
36. Although professional development is important, it can also detract from valuable time allotted for lesson planning.	Negative or inverse of statement 33.