Spring 2016

# Learn 2 Learn: Enriching Student Success Through Metacognitive School-Based Intervention - A Developmental Perspective

Lauren O. Thomann
*Trinity College, Hartford Connecticut*, lauren.thomann.2016@trincoll.edu

## Trinity College
### HARTFORD CONNECTICUT

Learn 2 Learn: Enriching Student Success Through Metacognitive School-Based Intervention

A Developmental Perspective

A Thesis submitted in partial fulfillment for the Bachelor's Degree in Psychology

Lauren Thomann
Trinity College
Fall 2015 - Spring 2016

**Acknowledgments**

The development and culmination of this research project over the course of the past year would not have been possible without the support and aid of several individuals.

First and foremost, I would like to thank my thesis advisors, Professor Dina Anselmi and Professor David Reuman, who have been the guiding forces of this entire research study. The project could not have been accomplished without their consistent help and support, and my years at Trinity College would not have been nearly as engaging or enlightening as they have been without their teachings.

I would also like to thank Mr. Timothy Roarty and Ms. Deb Avery, the middle school teachers who believed in this research and allowed me to work with their classes. With this I would also like to acknowledge the students of those classes who made the study successful due to their involvement, cooperation, and enthusiasm to learn.

It is also important to recognize Ms. Ann St.Amand, who was instrumental in helping me obtain all the materials needed in order to execute this research project. Her assistance and support did not go unnoticed.

In addition, a thank you must go out to my research assistants, Kata Sik and Evan Scollard, for their help and contributions to the project.

Moreover, a huge thank you goes out to my thesis partners, Bettina Gonzalez and Liz Caporale. The project this year would not have been nearly as extensive or successful had it not been for their involvement and work alongside me.

And lastly, I would like to acknowledge the endless support and guidance I have received from my parents and family throughout the years. My time at Trinity College and this whole

research experience would not have been possible without their constant encouragement and

love.

**Table of Contents**

Appendices

## Abstract

Metacognition is the awareness and comprehension of one's own way of thinking. It is one of three components of self-regulated learning, the other two being cognition and motivation. Self-regulated learning and metacognitive skill have been found to enhance student learning and achievement (Joseph, 2009). This research study examined the effect of metacognitive training on the self-regulation and academic performance of middle-school students in a social studies classroom. Experimental intervention sessions for sixth and eighth grade children were designed and executed to enrich metacognitive skills and were modeled after Ambrose et al.'s (2010) five-step model of metacognition. Two randomly assigned classes from both the sixth and eighth grades functioned as the experimental group, receiving metacognitive interventions called *Learn 2 Learn*, while another two randomly assigned classes in both grade levels acted as the control groups (*Know How 2-HI School* or *College Knowledge*), receiving information on educational transitions and/or career pathways. Students' levels of metacognition and motivation were measured with pre- and post- quantitative and qualitative assessments. Additionally, student performance was assessed based on student grades from the first, second, and third marking periods. Contrary to predictions, there was no intervention effect on students' metacognition found from the quantitative measure of metacognition or student grades, although there was a significant intervention effect and a significant intervention by time by grade level interaction for the qualitative measure of metacognition. All measures of metacognition were positively correlated with grades. In addition, it was found that sixth grade students consistently had higher levels of metacognition, motivation, and academic performance than did the eighth grade students. This study showed potential developmental changes in metacognition between lower- and upper-middle school students.

## Introduction

The majority of research on self-regulation has identified metacognition as an influential and critical component to one's self-regulatory abilities. Many different aspects of metacognition and its connection to academic achievement have been extensively studied. One current gap in the metacognition literature, however, is an understanding of the developmental trajectory of metacognition. This is an important area of research because it can help to explain how metacognition presents itself at different ages. If it is found that specific elements of metacognition emerge at different developmental stages, then it may become easier to formulate specific age appropriate interventions.

Questions important to address were: (1) Can metacognition be effectively taught in a classroom setting? (2) Is there a developmental trajectory for the various aspects of metacognition, especially for early adolescents? (3) Does an intervention to promote metacognition have differential effects for metacognitive awareness and academic performance, for different aged students?

### Self-Regulated Learning

Self-regulated learning signifies individuals' ability to understand and manage their own learning experiences (Schraw, Crippen, & Hartley, 2006). It is a useful and critical skill to possess for academic achievement, as it allows for individuals to take control of their learning and higher processing in order to advance it. Boekaerts and Corno (2005) suggest that achievement is facilitated by self-regulatory activities that students engage in to reach learning and performance goals. Therefore, students must be able to understand the strategies that can help them reach their goals, utilize those strategies, and monitor their progress towards these goals (Schunk, 1996).

Development of Metacognition

Under this umbrella of self-regulation are three chief components: cognition, metacognition, and motivation. Cognition encompasses the process of gaining knowledge and coming to understand it through thought and experience. Within cognition there are three types of learning abilities, identified as simple strategies, problem solving strategies, and critical thinking skills (Schraw et al., 2006). Examples of specific cognitive strategies are organization and elaboration (Kistner, Rakoczy, Otto, Dignath-van Ewijk, Buttner, & Klieme, 2010). Metacognition, in short, is the knowledge and regulation of one's own cognition (Schraw et al., 2006). This facet involves strategies like planning, monitoring, and evaluating the learning process (Kistner et al., 2010). Lastly, motivation centers on an individual's self-efficacy and epistemological beliefs (Schraw et al., 2006). Some examples of motivational strategies are causal attribution, action control, and resource management (Kistner et al., 2010). Each of these features of self-regulation, which will be discussed in greater detail later, requires sufficient cognitive functioning in order for an individual to properly self-regulate. Although the majority of students do not demonstrate all aspects of self-regulation in school, numerous research studies have found that students with stronger self-regulatory skills generally learn more, using less effort, and report higher levels of academic satisfaction (Pintrich, 2000; Zimmerman, 2000).

Understanding the abilities of students to direct their own learning in academic settings and in general life experiences has become a topic of debate, as two main theories have emerged. Some researchers believe that self-regulation is a general disposition that students carry into the classroom, whereas other researchers hold the belief that self-regulation is domain specific, and pertains to a particular situation or task (Boekaerts & Corno, 2005). Since self-regulation is a process comprised of so many various pieces, many researchers choose to focus on a certain

model of self-regulation (Boekaerts & Corno, 2005). According to Pintrich (2000), each model of self-regulation focuses on different features of self-regulation.

Regardless of whether self-regulation is better described as domain general or specific, the importance of self-regulation in student learning and academic performance in the classroom has been shown in a variety of studies. The relationship between cognition, metacognition, and motivation has especially been demonstrated. Borkowski (1992) describes a bidirectional relationship between learning and motivation, explaining how any important cognitive act has motivational consequences and how these consequences then stimulate or disengage future self-regulatory actions. Successful academic outcomes then come to be attributed to effort and/or ability instead of luck or easiness of the task. These claims emphasize the interdependency of the components of self-regulation, as cognition affects motivation, which then influences the use of future self-regulation.

Pintrich and De Groot (1990) examined the relationship between self-regulated learning, motivation, and academic performance. A total of 173 seventh graders from eight science and seven English classes completed a self-report measure of levels of self-efficacy, intrinsic value, test anxiety, self-regulation, and use of learning strategies. They found that self-efficacy was positively related to student cognitive engagement and performance, and further, that it played a facilitative role in terms of cognitive engagement. These findings suggest that teaching students about various cognitive and self-regulatory skills can be highly valuable for improving actual performance on classroom academic tasks, and that strengthening self-efficacy beliefs of students can lead to greater use of these cognitive strategies. Overall, this study shows the codependent relationship between the various components of self-regulation and how possessing all factors is important for successful self-regulation and greater academic achievement.

Boekaerts and Corno (2005), in a review of self-regulation, showed the importance of the relationship among the three components of the self-regulation process. They suggest that in a classroom environment, students tend to pursue and balance multiple goals, aimed at both learning and having positive experiences. With this, a dual processing self-regulation model that seeks to define how learning objectives interact with specific aspects of psychological well-being was proposed. Boekaerts and Corno (2005) suggest that access to volitional strategies, or good work habits, enables students to expend effort in their learning and move away from situations where stressors impede learning. For example, Boekaerts (1999) claims that students who demonstrate more interest and efficacy towards a certain task or opportunity leads them to mastery goals and activities, whereas students who face the same task or opportunity with disinterest or stress focus more on their well-being. A consequence of students focusing more on their well-being is that they allocate less attention to goals and values, which in turn inhibits their personal skill acquisition. These results show that students are able to take advantage of their ability to focus their learning and set personal goals and sub-goals, which can enhance their academic success.

The findings by Boekaerts and Corno (2005) led to the identification of top-down and bottom-up effects of self-regulation. The top-down effect is defined as the drive for mastery coming from adopted learning goals and motivations like expected satisfaction, personal interest, and values. Bottom-up self-regulation, on the other hand, occurs when cues from the environment trigger self-regulation. Rather than starting a task with mastery goals in mind, feedback from that task and classroom incentives focus a student's attention and produce changes in work styles. When environmental cues send signals that something is not going well, students become worried and strive to fix the issue. These two effects are similar to Paris and

Paris' (2001) two contrasting metaphors of self-regulated learning; one embodies acquisition, involving explicit teaching of skills, practice, and application, and the other emphasizes the maturation of self-regulatory abilities, as students develop new competencies from various situations.  While the first metaphor describes self-regulation as something to be taught and acquired, the latter metaphor describes self-regulation as a process and that organically develops through experience.  Each of these concepts represents a process for developing self-regulation and is contingent on particular circumstances.

Dignath and Buttner (2008) conducted two meta-analyses, one for primary school level students and one for secondary school level students, investigating the effects of various training properties on training outcomes, academic performance, strategy use, and student motivation. Findings showed that for both primary and secondary school levels, self-regulated learning could be advanced effectively, although the type of instruction strategy and theoretical background the training was based on led to a difference in outcomes.  Interestingly, at the primary school level, interventions that were based on social-cognitive theories of self-regulated learning had greater effects on academic performance than theories based on motivational or metacognitive variables. At the secondary school level, however, training programs based on metacognitive theories showed the largest effects.  This suggests not only that self-regulation as a whole can be taught and can lead to enhanced academic achievement, but that metacognitive strategies might not be understood and utilized as much by younger students.  Similar evidence regarding the connection between self-regulated learning and academic achievement has been found in other studies (Purdie and Hattie, 1996; Nota, Soresi, & Zimmerman, 2004; Zimmerman, 1990; Zimmerman and Bandura, 1994; Zimmerman & Schunk, 2001; Veenman, Van Hout-Wolters, Afflerbach, 2006; and Borkowski, 1992; Bielaczyc, Pirolli, & Brown, 1995).

**Metacognition**

Ample research suggests that metacognition is necessary in order to proficiently self-regulate and that metacognition plays an instrumental role in the self- and co-regulation of behavior (Schraw et al., 2006; Efklides, 2008; Veenman et al., 2006). Cognitive strategies and a high level of motivation are not sufficient for self-regulation. The role of metacognition has been highlighted as the most important element of self-regulation because it allows individuals to monitor their existing knowledge and skill levels, plan and distribute limited learning resources with ideal dexterity, and evaluate their current learning state (Schraw et al., 2006). Veenman et al. (2006) suggest that metacognition can counteract students' cognitive limitations. As a key component of self-regulated learning, it is essential that students both possess a strong understanding of metacognition and also use it in academic situations.

As mentioned previously, metacognition serves to monitor and control one's own cognition. In regards to learning and performance, although many researchers describe slightly differing models that detail how learners should ideally use metacognitive skills, what is key is that students apply various metacognitive processes to monitor and control their own learning (Zimmerman, 2001). According to Efklides (2008), metacognition is multifaceted, consisting of metacognitive knowledge, metacognitive experiences, and metacognitive skills. Metacognitive knowledge involves declarative, or factual knowledge that a person knows, stored in memory. This knowledge is continuously enhanced by the integration of information obtained from the monitoring of cognition through the observation of one's own and others' behaviors and outcomes. Furthermore, metacognitive experiences are the elements a person is aware of, as well as what he or she feels when working on a task and processing the information related to it. An additional element invokes the monitoring of cognition, which informs self-awareness and

awareness of cognition. Lastly, metacognitive skills, or procedural knowledge, describe the deliberate use of strategies to control cognition. Dissimilar to metacognitive knowledge and metacognitive experiences, metacognitive skills are involved in strategy use for the control of cognition, such as planning, monitoring, and evaluating.

While Schraw et al. (2006) concur that metacognition contains skills that allow learners to understand and monitor their thought processes, they divide metacognition into only two components: knowledge of cognition and regulation of cognition. Knowledge of cognition is then divided into three subcategories: declarative knowledge, procedural knowledge, and conditional knowledge. Additionally, Schraw et al. (2006) suggest that an individual's knowledge of cognition develops later and explicitly, meaning adults tend to have greater knowledge about their own cognition and are also better at describing that knowledge than children. The second component, regulation of cognition, includes, at the very least, planning, monitoring, and evaluation strategies.

Ambrose, Bridges, Lovett, DiPietro, and Norman (2010) break down metacognition into five different steps of learning: assessing the task, evaluating one's strengths and weaknesses, planning, monitoring one's performance/applying strategies, and reflecting and adjusting. Within each of these steps reside respective cognitive skills, like recalling and problem solving. At the center of the cyclical model is the individual's motivation, reaffirming the strong influence and importance of motivation for self-regulated learning. Although the metacognitive cycle provides for an overall framework of self-regulation, the cycle cannot occur without the motivational aspect, which encompasses values and expectancies of a goal. Ambrose et al. (2010) assert that the different dimensions of metacognition need to be used in order for an individual to become an effective self-directed learner. Further, they suggest that metacognitive

13

skills become more important as individuals advance in their educational and professional levels, where individuals have more responsibility for their own learning and are generally required to take on more elaborate tasks.

Assessing the task, the first step of Ambrose et al.'s (2010) model of metacognition, refers to the consideration of what goals are being asked of an assignment or task and its limitations.  Although somewhat straightforward, research suggests that assessing the task does not come as naturally or easily as it should (Ambrose et al., 2010).  Tasks are often misunderstood or not looked at carefully enough, suggesting that it might be beneficial to teach students how to do this by helping them practice integrating this initial step into their planning process until it is routinized, and also by providing feedback on their understanding of the task at hand before they start working on it.

Research has found that many individuals have difficulty identifying their own strengths and weaknesses, the second step of the model.  Students with greater knowledge and skills are able to more effectively evaluate their abilities than students with lesser knowledge and skills (Ambrose et al., 2010).  This finding is important because either over or under-estimated aptitudes can hinder an individual's goal achievement.  If students falsely believe they are fast writers, for example, they might underestimate the time it takes them to finish a paper and end up not handing it in on time or writing a very poorly completed paper.  Therefore, it is critical to help students understand their weaknesses.  Successful self-regulation relies on the ability to accurately know one's abilities.

Planning, the third step in the Ambrose et al. (2010) model, has been found to be underutilized by less experienced students. Research suggests that taking more time to plan out a problem leads individuals to solve the problem more efficiently and successfully than those who

do not plan out their approach (Chi, Bassok, Lewis, Reimann, & Glaser, 1989). Other findings suggest that even when students do plan, many of their plans are unsuccessful, emphasizing the need for teaching students how to develop effective planning strategies.

The successful application of strategies and monitoring of performance, the fourth stage of the model, proves to be useful for successful learning since self-monitoring is positively correlated with effective learning (Ambrose et al., 2010; Chi et al., 1989). Bielaczyc, Pirolli, and Brown (1995) found that students who are explicitly taught to monitor their own understanding as they worked on a task had greater learning benefits than students who were not told to monitor.

The last step in the metacognitive model is reflecting and adjusting, allowing the cycle to come full circle. Thoughtful contemplation about their latest approach to a task allows individuals to more appropriately assess and adjust how to take on the next task at hand. In sum, research on each step of the Ambrose et al. (2010) model suggests that metacognitive skills should be explicitly taught in the classroom in order to strengthen students' self-regulated learning and help them achieve greater academic success.

**Developmental Course of Metacognition**

Metacognition has been recognized as a critical factor for predicting learning and academic success (Veenman, Wilhelm, & Beishuizen, 2004), suggesting that there are benefits for teaching students metacognition. One key question is if there are developmental differences in the metacognitive skills of children of different ages, which then might suggest that different teaching strategies depend on children's ages.

Research to date shows that all children have some degree of self-regulatory abilities and that certain characteristics of metacognition emerge at specific ages. Flavell (1979) claims that

children's understanding of their own thinking, in terms of their individual knowledge state, the features of tasks that impact their learning, and their own strategies to monitor their learning, increase over time. Further, it is suggested that metacognition is a late-developing skill.

Theory of mind, the understanding of mental experiences and capacity to realize mental states, such as desires, develops around the age of one (Flavell, 2000). This is the very beginning of cognitive awareness. After the age of three, research has shown that children are capable of developing fundamental forms of metacognition and metacognitive awareness (Chatzipanteli, Grammatikopoulos, & Gregoriadis, 2014; Veenman et al., 2004). This awareness stems from primitive recognition of individual differences in mental states, like emotion, knowledge, and desire (Veenman et al., 2004; Pillow, 2008). From here, memory begins to develop and some features of memory monitoring, like feeling-of-knowing and memory accuracy, begin to appear around the age of three or four (Schneider & Lockl, 2008). Chatzipanteli et al. (2014) state that although they lack full understanding of what they are doing, four-year-old children are able to operate mental procedures like 'knowing', 'thinking', and 'remembering'.

Additionally, Schneider & Lockl (2002) maintain that preschool children can apply basic strategic approaches in order to remember and recall items. McLeod (1997) claims that preschool children are able to use simple metacognitive strategies, such as monitoring and planning, when they are faced with challenging tasks. It is not surprising that additional research suggests that metacognitive vocabulary and general metamemory improves throughout preschool and kindergarten years (Weinert & Schneider, 1999). Metamemory, a type of metacognition, is knowledge surrounding an individual's memory abilities and strategies that can aid memory, along with the processes involved in memory self-monitoring (Pannu & Kaszniak, 2005). All of

this implies that from a young age, children are already able to assess their learning and monitor their actions.

As children age, their concepts of cognition and knowledge become more sophisticated (Pillow, 2008). Part of this can be attributed to their increase in metamemory and deeper processing of information. After the preschool years, it appears that students undergo a significant boost in the understanding of cognition and level of self-evaluation. According to Schneider & Lockl (2002), preschool and kindergarten children are less accurate at estimating their memory performance than elementary school students. However, by age six, they are generally able to reflect accurately on their own levels of cognition (Schraw & Moshman, 1995). This is seen, for example, in children's ability to distinguish problem solving based on reasoning, such as making rational inferences, versus shortcuts not involving reasoning, such as flipping a coin (Amsterlaw, 2006). Findings suggest that a transition takes place around the ages of five to seven years old in children's understanding of cognitive behaviors, specifically concerning memory, attention, inference, and interpretation (Pillow, 2008). These features enable children to more accurately process and represent information about the world.

Schneider & Lockl (2002) claim that a bidirectional relationship between metamemory and memory behavior exists, which helps to explain why most studies have concluded that an individual's metacognitive ability increases with age. Likewise, they claim that an ability to concentrate selectively on appropriate aspects of a memory task is an indicator of the learner's understanding of the task. This suggests why the metacognitive step of evaluating or understanding the task, might emerge during early adolescence. In a study by Weil et al. (2013) it was found that metacognitive monitoring and the use of strategies largely developed for children around the ages of seven to twelve. This increase in metacognitive ability was again

17

related to metamemory growth, as researchers have tied monitoring processes with generating knowledge from metamemory (Veenman et al., 2006). Hasselhorn's (1995) "strategy emergence theory" maintains that the change in strategic knowledge comes from a change in knowledge base between the ages of eight and ten, and supports Weil et al.'s (2013) findings that connect metamemory with strategic knowledge. Moreover, throughout late childhood, around the ages of nine and ten, an "adult-like" organization of knowledge concerning mental activities begins to emerge (Pillow, 2008). This organization continues to improve until early adulthood.

Paris and Paris (2001) state that eight to thirteen year olds, however, tend to be reluctant to use strategies such as brainstorming, semantic webs, and peer discussions to guide them. This follows from Dignath and Buttner's (2008) claim that older students learn in more strategic ways. One plausible reason for these differences in strategic use can be attributed to the finding that younger students do not posses as many automatic backup strategies as older students (Alexander et al., 1995), suggesting that although students of this age range might have knowledge of cognitive strategies, they may benefit from being taught how to consistently and appropriately use them.

Some research findings refute the influence of intelligence on metacognitive awareness and ability (Allon, Gutkin, & Bruning, 1994), and Alexander, Fabricius, Fleming, Zwahr, and Brown (2001) state that in the earlier years there is no difference for children with higher IQ scores versus lower IQ scores in relation to metacognitive understanding. Interestingly though, this same study discusses how children with higher IQ scores were more likely to advance to more sophisticated understanding regarding how specific strategies work to increase recall and by third grade, differences in metacognitive understanding about particular strategies paralleled differences in intelligence. This suggests that intelligence begins to play an important role in the

advancement of metacognitive awareness during the later elementary school years.  It is important to note though that intellectual ability should not be equated with metacognitive abilities.  Research evidence shows that despite a correlation between intelligence and metacognitive abilities, metacognition plays a greater role in academic achievement (Veenman et al., 2006).

Metacognitive ability continues to increase during adolescence.  Weil et al. (2013) had participants from age eleven to forty-one complete a computer-based perceptual task. Metacognitive ability was dissociated with task performance and an interaction between age group and metacognitive ability was found.  Additionally, results indicated that metacognitive ability increased with age throughout adolescence and plateaued in adulthood.  Sophistication of concepts of cognition and knowledge has also been found to evolve during adolescence (Pillow, 2008).  These findings are likely related to the increase in self-absorption, sense of self, and developing self-awareness that generally takes place in adolescence (Weil et al., 2013).  Pillow (2008) claims that some forms of epistemological thought take shape during early adolescence, around 13-14 years of age.  These types of features may enable individuals to pay more attention to their own learning and task performance, so they can more accurately monitor their actions and evaluate their abilities (Weil et al., 2013).  Baker (2002) similarly found that older students were more skilled at monitoring by taking advantage of strategies and regulating their own comprehension processes during reading tasks than younger and less skilled readers.

Research on high school and college level individuals suggests that metacognitive differences continue in adulthood; older individuals learn in more strategic ways (Justice & Dornan, 2001; Christopoulos, Rohwer, & Thomas, 1987).  In a study that examined metacognitive differences between traditional-age (18-23 year) and nontraditional-age (24-64

19

year) college students, Justice and Dornan (2001) found that nontraditional-age students reported more often using hyperprocessing and generation of constructive information, two higher level cognitive study strategies. Similarly, Christopoulos et al. (1987) found a linear grade level increase in usage of strategies defined as more specific and productive (i.e., hyperprocessing, selective notetaking, and focus on test relevance) in their comparison of middle school, high school, and college students, as well as a decrease in use of less productive processing strategies. Ross, Green, Salisbury-Glennon, and Tollefson (2006) found that college students adjust their study strategies in order to meet cognitive processing demands of tests, a metacognitive self-regulatory skill. These findings suggest that older individuals engage in more effective strategies and study behaviors than younger individuals, showing that metacognitive ability differences exist at all ages.

The majority of research exploring metacognitive development ends at adolescence. From this body of literature, a trajectory of metacognitive development can be surmised. From an early age, children recognize the existence of mental states (e.g., emotions and desires). This recognition leads to a basic understanding of cognition around preschool and then an awareness of fundamental cognitive properties, such as attention and memory. Metacognitive experiences result from increased cognition and metacognitive awareness, and come to drive metacognitive processes (Veenman et al., 2006; Sperling, 2004). These processes then become more sophisticated with the formation of epistemological beliefs, which arise around adolescence, and can be intensified by greater intelligence level. Ultimately, cognition is the vehicle for metacognition and after its establishment, metacognitive awareness and skill continue to mature through adulthood. Although research places more emphasis on metacognition in children and adolescents, individuals can develop metacognitive skills at any age.

**Motivational Factors**

Motivation encompasses the beliefs and attitudes that tend to affect the implementation and development of cognitive and metacognitive skills (Schraw et al., 2006). Therefore, one possibility is that the more motivation individuals have, the more they will embrace other self-regulatory abilities. Mega, Ronconi, and DeBeni (2013) proposed a theoretical model that connects emotions, self-regulated learning, and motivation to academic achievement. In a study of 5,805 undergraduate students, who completed the Self-Regulated Learning, Emotions, and Motivation Computerized Battery (LEM-B), a 3-pronged set of self-report questionnaires, it was found that positive emotions improved students' delegation of study time and summarization of learning materials in a personal way, as well as their motivation to learn (Mega et al., 2013). Overall, Mega et al.'s (2013) model illustrates how students' emotions impacted their self-directed learning and motivation, which affected their academic achievement.

Mega et al. (2013) also found that positive emotions enhanced students' beliefs of the incremental theory of intelligence and gave them more confidence in their own intelligence. Likewise, Thompson and Musket (2005) found that students who believed in an incremental view of ability and took on a mastery goal orientation showed greater persistence even after initial failure towards a task than the students with an entity view of ability who had social comparison goals. Self-efficacy, which also relates to the incremental theory and is often referred to as an ability belief, signifies the degree of confidence an individual has about accomplishing a specific task or goal and is important for self-regulation because it influences the amount of engagement and tenacity that individuals will put into a difficult task. Self-efficacy positively correlates with academic achievement and self-esteem (Schraw et al., 2006).

21

Students with higher self-efficacy are more likely to attempt and persevere at a challenging task, even after failures (Schraw et al., 2006).

By looking at the developmental changes in metacognitive understanding and use, it becomes evident how factors like motivation, emotion, engagement, and ability beliefs can influence success at different ages. In general, researchers who explain the development of different motivational factors have found a decline in students' self-esteem, task values, and intrinsic interest in academics starting in middle school (Cleary & Zimmerman, 2004). A decrease in self-efficacy beliefs can cause a decrease in motivation, thus leading to less self-regulated learning (e.g., inattention in class or lack of preparation for examinations) (Zimmerman, 2002).

In Dignath and Buttner's (2008) meta-analysis of the effects of self-regulated interventions on primary and secondary school students, they found that primary school students demonstrated greater motivational outcomes than secondary school students. This was in line with previous findings that younger students are typically more motivated to learn upon arriving at school than older students and that motivation declines across years in school (Spinath & Spinath, 2005). Overall, there is substantial research demonstrating that metacognition and motivation are inherently connected aspects of self-regulation that influence each other at every stage of one's development.

**Self-Regulated Learning and Metacognitive Interventions**

Past interventions aimed at enhancing self-regulated learning and metacognition have found that 1) self-regulated learning and metacognition can be taught effectively as early as elementary school and 2) self-regulated learning and metacognition can enhance academic achievement. These findings have, consequently, sparked further research to determine the most

effective methods of training students in regards to factors like program content, setting, and context.

Explicit instruction has been stressed as a necessity for self-regulated learning and metacognitive interventions at any grade level (Kistner et al., 2010; Pintrich, 2002). There is an advantage to explicit over implicit instruction; while both types can boost students' use of certain strategies, explicit instruction makes it easier for students to employ, monitor, and evaluate learned strategies with other tasks or problems (Pintrich, 2002). Ambrose et al. (2010) stress that instructors must clearly articulate goals to their students because it can be challenging for students to know what or how to practice; this argues for an explicit teaching approach for self-regulated learning. In addition, instruction has been found to be most effective when it begins with teacher-led explicit instruction and then progressively transfers responsibility over to the students themselves, referred to as scaffolding (Baker, 2002).

Ambrose et al. (2010) suggest that goal-directed practice with targeted feedback is important for learning. Practice allows students to learn how to set appropriate goals for themselves, and work towards achieving their goals, which also encourages them to monitor their performance. Additionally, it motivates students to strive for other goals after achieving the one at hand. A study by Lee, Lim, and Grabowski (2010) found that learning strategy prompts with metacognitive feedback helped students' recall and understanding by enhancing their self-regulation and strategy use. Feedback must be of high quality in order to best boost students' independent monitoring, strategic action, evaluative benchmarks, and academic performance (Davis & Neitzel, 2011).

After reviewing the research literature, Baker (2002) concluded that in all but one study, instructional methods that incorporated both teacher-led and student-centered elements proved to

23

be effective.  These studies stressed the importance of providing an explicit explanation for how, when, and why students should use cognitive and metacognitive strategies given, along with modeling, scaffolding, and group work.  Souvignier and Mokhlesgerami (2006) developed an intervention aimed at enhancing students' strategy knowledge for reading comprehension with the incorporation of cognitive and metacognitive strategies, along with motivational self-regulation components.  Participants consisted of 20 classes of fifth grade students and pre-, post-, and delayed posttest assessments were given.  The strategy-oriented instructional programs all showed improvements in students' reading comprehension in the post-assessments. Interestingly, a long-term follow-up assessment showed even greater effect sizes than the immediate post-assessment, suggesting that with proper teaching of strategies, students can continue to enhance their skills independently.

Joseph (2009) suggests there are benefits of dividing lesson plans into three components: direct instruction through teacher modeling, continuous discussion about metacognition, and active classroom practice.  Practice of new learning strategies can boost student competence and help students find meaning in their class material (Vacca, 2002).  For classroom practice, Paris & Paris (2001) have found that reading logs and self-assessment checklists can promote metacognitive growth, as they help students reflect on their own learning practices.

In an in-depth literature review, Schraw et al. (2006) classified six types of instructional strategies relating to metacognition and self-regulation.  The first, investigative learning, which encompasses a learning environment that invites students to pose questions, create solutions, and test results, is believed to further self-regulation by engaging students in their own education using cognitive learning strategies and metacognitive monitoring strategies to assess

understanding.  Scaffolding, which is the addition of structure and support to a practice activity, modeling, and reflection aid this type of instruction (Ambrose et al., 2010).

Group collaboration, another highlighted strategy, is effective because it works to boost inquiry, the use of strategies, sharing of mental models, and personal beliefs through collaboration with others.  Ambrose et al. (2010) claim that working in pairs can help students to learn more effectively.  Hogan (1999) looked at the significance of knowledge co-construction regulation, where individuals actively expand their knowledge and reasoning of learning materials to further their understanding, through a Thinking Aloud Together program.  It was found that this program, which incorporated both direct instruction lessons on collaborative mental model building and follow-up reflections where students were placed into small groups in which collaborative thinking practices were emphasized, led to greater metacognitive knowledge than in the control condition, where students were taught how to graph data on a computer and watched videos about famous scientists instead of instructive lessons prior to participating in the follow-up reflection groups.  This study emphasized the beneficial effects of collaboration.

An additional strategy suggested by Schraw et al. (2006) is problem solving and critical thinking training; these two skills can help students to both develop further their metacognitive skills and generalize their strategy use.  The teaching of mental model construction, which involves the perceptual representation of external reality, can help students to think metacognitively about more complex systems (Schraw et al., 2006; Hogan, 1999).  The second to last strategy mentioned, use of technology, can help improve self-regulated learning by its enhancing strategy use, such as reflection through instant feedback, and cognitive scaffolding. Finally, advancement of student and teacher beliefs, in terms of self-efficacy and epistemology,

is the last recommended strategy. Schraw et al. (2006) emphasize that these motivational variables augment other self-regulatory strategies.

Two additional factors that have been found to enhance intervention success at all age levels are: intervention length and type of intervention facilitator. Research shows that longer programs lead to larger effects, and is attributed to the greater amount of time students have to hone, practice, and automate their strategy use (Dignath & Buttner, 2008). In terms of facilitation, findings suggest that interventions led by researchers are more effective than those led by regular class teachers (Dignath & Buttner, 2008). The main reason for this is that regular teachers are not as knowledgeable about self-regulated learning and therefore, do not allocate enough of their time to explicitly teach strategy use and provide skill overview. A second reason may be that teachers do not believe in the value of teaching self-regulated learning, weakening the success of these programs.

Although there is significant research detailing the best techniques for implementing effective self-regulated learning and metacognitive interventions, a remaining question is how self-regulated learning can *most effectively* be brought into classrooms for *respective age groups*. Implementing the appropriate strategies for self-regulated learning at specific ages is especially critical in order to achieve desired learning success. Baker (2002) describes how longitudinal studies of metacognitive development have indicated that children's metacognition over the long term is considerably stable. This means that metacognitive abilities do not automatically develop with age and greater experience, suggesting that interventions may be necessary to improve metacognitive skills.

Interventions have been found to be most effective when a significant amount of student activity and metacognitive awareness is stimulated (Dignath & Buttner, 2008). In their meta-

analysis, Dignath and Buttner (2008) examined 74 studies on training programs to identify the most suitable practices.  At the elementary school level, they found that training programs inspired by social-cognitive theories of self-regulated learning achieved greater success in terms of overall academic performance and strategy use than those based on theories that highlighted motivational or metacognitive elements.  At the middle school level, however, programs with a theoretical focus on metacognition (combining metacognitive strategies, problem-solving strategies, and metacognitive reflection) resulted in the greatest increase in overall academic performance and strategy use.  These findings may be potentially explained by the difference in levels of metacognition between elementary and middle school students.  As previously stated, middle school students tend to have greater metacognitive knowledge and skill than elementary school students.  A study by Paris and Newman (1990) shows that middle school level students reflect and control their learning more than younger students.  This upward trend from younger to older students has also been found for metacognitive components like understanding the task (Schneider & Lockl, 2002), monitoring, and using strategies (Weil et al., 2013).  Consequently, older students can be more successful with a mainly metacognitive-based intervention because they are able to build on the metacognitive strategies they already possess.  It is easier for older students to appreciate and use metacognition more effectively than younger students because they already have markedly more understanding of self-regulation.  Younger students, however, may require a more social-cognitively centered intervention because they are less developed and therefore have less metacognitive awareness or fewer strategies to start.  Not surprisingly, teaching of straightforward metacognitive strategies has been identified as more effective for elementary school students due to their lack of strategy variety, whereas for middle school

students, instruction on how to use strategies appropriately and to reflect on their use in order to enrich current strategy routine is more effective (Dignath & Buttner, 2008).

In a review by Hattie, Briggs, and Purdie (1996), 51 different interventions looking at kindergarten children to adults aimed at increasing individuals' learning through study skills improvement were examined. Task-related skills, self-management skills, and motivational and affective components were analyzed. Interestingly, greater effect sizes were found for elementary and lower middle school students than for older students, suggesting that younger students might be easier to train, even though in developmental terms, older students are advantaged because of their higher level of self-regulation and metacognitive abilities. Mixed-ability students and underachievers were also found to be most receptive to these types of interventions, especially if they were a unistructural or multistructural design. A unistructural design uses direct teaching and focus on one dimension of a task, such as learning mnemonic devices, without relating it to other aspects, where a multistructural design involves several aspects of a task being taught, such as study skills, without metacognitive framework or instruction on how to integrate those aspects. Best results were found when metacognition was applied to the skills training, along with proper motivational and contextual support.

A self-regulated learning intervention was implemented for eighth grade social studies students by Trinity College researchers (Godfrey & Lopez, 2014). The intervention centered on the Ambrose et al. (2010) five-step model and consisted of six sessions of classroom discussions, individual and group activities, and short homework assignments focused on increasing students' metacognitive awareness and skills. Sessions were led by student research instructors who had extensive knowledge of metacognition, instead of the regular classroom teachers. Godfrey and Lopez (2014) found that metacognitive skills measured by both quantitative and qualitative

measures significantly increased for students in the experimental condition. The control condition showed no significant difference. Metacognitive abilities were also found to correlate with academic performance (i.e., students with greater metacognitive abilities showed the greatest improvement in their grades at the end of the academic year).

A follow up metacognitive intervention for eighth grade social studies students focused on the Ambrose et al. (2010) five-step model and included eight sessions featuring explicit instruction, class discussions, and reflection activities (Fulton, 2015). Student research instructors led the intervention sessions. Although this intervention showed no significant increase in metacognitive abilities using a quantitative measure, a marginally significant effect of the metacognitive intervention was found using a qualitative measure. Both the quantitative and qualitative measures were positively correlated with academic performance. Interestingly, this study showed that students have significantly greater skills for certain aspects of metacognition than others. Students scored the highest on items measuring "Assessing the Task" and lowest on "Planning" items, indicating that certain abilities may need more explicit teaching or focus than others.

Based on past interventions and the existing literature on the development of self-regulation and metacognition, some of the most appropriate methods of instruction for students of various ages can be summarized. For elementary school students, interventions focused on explicitly teaching rudimentary metacognitive strategies, like how to monitor tasks and apply simple strategies, or perform basic problem solving, should bring the greatest success. For middle school students, because they possess greater metacognitive awareness and skills to begin with, their interventions should center on honing their skills through group work, goal-orientation, and investigative learning. There are fewer studies for high school and college

students, suggesting that future interventions focusing on these ages could be beneficial for filling in this research gap.

**Assessments of Metacognition**

Various assessments have been used in order to measure students' metacognitive knowledge and skills, along with accompanying factors such as motivation, ability beliefs, and academic engagement. Effective measures include self-report questionnaires, such as quantitative and qualitative reports, diaries, and daily logs, as well as teacher evaluations, interviews, and on-line assessments. Quantitative self-report questionnaires are the most commonly used measure, as they are generally the least cumbersome to use and score for large numbers of students.

One commonly used quantitative self-report measure of metacognition is the Learning and Study Strategies Inventory (LASSI), an 80-item assessment which looks at student awareness and use of learning/study strategies associated with skill, drive, and self-regulation components of strategic learning (Weinstein & Palmer, 2002). Another popular measure is the Motivated Strategies for Learning Questionnaire (MSLQ), which assesses college students' motivational attitudes and use of various learning strategies (Pintrich, Smith, Garcia, & McKeachie, 1991). The Metacognitive Awareness Inventory (MAI), developed by Schraw and Denninson (1994), is another quantitative self-report measure that has been found to effectively measure level of metacognitive awareness. The MAI, which measures metacognition of adults and is comprised of a 52-item inventory, focuses on both knowledge of cognition and regulation of cognition. The knowledge of cognition component measures participants' awareness of their own strengths and weaknesses, knowledge about strategies, and why and when those strategies

should be implemented, whereas the regulation of cognition component measures knowledge

regarding planning, applying, monitoring, and evaluating strategy use.

One limitation of the MAI is that it is designed for older rather than younger learners, so

Sperling, Howard, Miller, and Murphy (2002) developed the Junior Metacognitive Awareness

Inventory (Jr. MAI) to measure metacognition in children from grades three to nine.  The Jr.

MAI looks at the same two components: knowledge of cognition and regulation of cognition.

There are two different versions of the measure, the Jr. MAI Version A and the Jr. MAI Version

B, with the first designed for third to fifth grade students and the latter designed for sixth to ninth

grade students.

A number of studies have measured metacognition using several different assessments,

including the Jr. MAI B.  This measure has become less suitable because it measures

metacognition as a whole, without assessing its subcomponents individually.  A new measure of

metacognition aligned with the Ambrose et al. (2010) five-step model, called the Quantitative

Metacognition 5 (Quantitative MC5), has been developed by researchers at Trinity College

(Howe, Naratil, Anselmi, & Reuman, 2012). This is a 35-item self-report questionnaire designed

to specifically measure each of the five steps of the Ambrose et al. (2010) model of

metacognition (i.e., assessing the task, evaluating strengths and weaknesses, planning, applying

strategies/monitoring performance, and reflecting and adjusting) in adolescent students.  The

measure includes seven-items regarding each specific step of the model using a five-point scale.

Sample items for the steps are: "After I read an assignment, I make sure I know what the main

goal of the assignment is" (Assessing the Task step); "I make an effort to examine my strengths

on the work I do in this class" (Evaluating Strengths and Weaknesses step); "I make a 'to do' list

before I start working on an assignment in this class" (Planning step); "I use skills – like using

flashcards, study guides, and working with a partner to prepare for a test" (Applying Strategies/Monitoring Performance step); and "I turn in tests for this class without checking my answers" (Reflecting and Adjusting step).

Along with self-report quantitative measures of metacognition, self-report qualitative measures have also been found to be of value. With qualitative measures, students are able to thoughtfully reflect on their metacognitive understanding and abilities without being confined to a set of numerical ratings. While quantitative measures assess frequency of understanding and strategy use, qualitative measures are able to examine metacognitive understanding and usage in a more focused way. Boekaerts and Corno (2005) identify work samples, diary records, and interviews as useful qualitative self-reports for self-regulated learning. They describe the effectiveness of student work samples as providing observable traces of students' mental processes and strategy use through aspects like text markings, comments in the margin, and identifiable patterns. Similarly, having students keep diaries and record their metacognitive strategy use is helpful to identify the reasons behind students' work processes, along with tracking their thoughts and factors such as attention, information processing load, and anxiety (Boekaerts & Corno, 2005). Various kinds of interviews (i.e., unstructured, structured, semi-structured, stimulated recall) for gathering qualitative data regarding students' learning experiences, strategy use, thoughts, and feelings can have distinct advantages over quantitative measures.

In a study of third, fourth, and fifth grade students, van Kraayenoord and Paris (1997) implemented a qualitative measure of self-regulatory abilities related to strategic and motivated learning called "Worksamples Interview," which combined a structured interview with student work samples. The "Worksamples Interview" consisted of 10-items and enabled students to

assess self-evaluation of their academic learning.  The five aspects of self-appraisal focused on in the interview consisted of students explaining: 1) the work that was challenging for them and the work that made them proud, 2) their choices of samples of personal work that were to show their reading and writing skills, 3) their progress in various subjects, 4) their frequency of self-review and expectations for future academic progression, 5) how they share their work with their parents and how they view feedback from teachers.  Student responses were coded based on their ability to reflect appropriately on their work using the following 0-2 scale:

0- Student did not assess the dimension or feature addressed by the question; gave an inappropriate response

1- Student showed some evaluation of the work sample but included explanations, reactions, and feelings that were based on the appearance of the work or on superficial features (e.g., neatness or length of work)

2 - Student was able to evaluate the work sample according to the required feature and showed some insight about psychological bases for the judgments

The overall quality of students' comments in the "Worksamples Interview" suggests that students can effectively assess their work and offer both cognitive and affective evaluations based on the specific features that influence their learning, as well as that students who are more effective at self-appraisal generally possess more positive attitudes about school.  Findings showed that the older students were more successful at assessing their work samples and progress than the younger students.

Implementing a similar qualitative self-report that could extend beyond the limitations of close-ended self-reports for their study, Godfrey, Lopez, Anselmi, & Reuman (2014) developed the Qualitative Metacognition 5 (Qualitative MC5).  Like the Quantitative MC5, this measure is based on the Ambrose et al. (2010) five-step model and designed to assess students' reflection of metacognitive awareness and use in their social studies classroom.  It consists of eight open-

ended questions that evaluate students' level of implementation of the five-steps of the model.

The Qualitative MC5 scoring system used modified the scoring system of van Kraayenoord and

Paris (1997). Coding criteria consists of a 0-3 scale outlined as follows:

0- Student did not assess the dimension or feature addressed by the question; gave an inappropriate response

1- Partial explanation or superficial analysis; not sufficient to demonstrate metacognitive processes

2- Relevant/reasonable complete response

3- Complete response with elaboration or a demonstration of multiple metacognitive strategies

Findings from this study using the Qualitative MC5 showed a significant condition by

time interaction, indicating that metacognitive abilities increased overtime for the experimental

group (Godfrey & Lopez, 2014). Additionally, the individual items that measured "Assessing

the Task", "Applying Strategies/Monitoring Performance", and "Reflecting and Adjusting"

showed the highest scores, while the "Planning" and "Evaluating Strengths and Weaknesses"

items showed the lowest scores. This supports the benefit of using the Qualitative MC5, as it can

assess both metacognition as a whole and in terms of its individual components, which is

important for identifying the differences in metacognitive skills and which skills might need

more emphasis during instruction.

Boekaerts and Corno (2005) suggest that the validity of self-report measures can be

problematic because student recall is not necessarily always accurate, as students tend to under-

or over-estimate their abilities. In an attempt to move past self-report, assessments like teacher

evaluations, teacher ratings of students, and think-aloud tasks have been tested in various studies.

Zimmerman (1990) claims that using teacher ratings of student metacognition in combination

with student self-reports can help to separate students' achievement outcomes related to their use of self-regulated learning strategies from their general cognitive ability. In addition, Sperling et al. (2002) asked teachers to rate each of their students' metacognition on a 1-6 scale based on student behaviors/examples provided and compared those ratings to the student self-reports. Their findings suggest that teacher ratings can measure metacognition alone, as such measures have been found to slightly correlate with student self-reports and moderately correlate to student achievement values. Further, in a study looking at on-line versus off-line methods of measuring metacognition, Veenman et al. (2006) indicated that on-line measures, like think-aloud tasks, are more predictive of learning performance than off-line measures. Klug, Ogrin, Keller, Ihringer, and Schmitz (2011) similarly argue that using structured diaries as on-line methods can help to measure student learning as a process because they record responses in the moment, leaving less room for memory error. These findings suggest that although using measures aside from self-reports are beneficial, the reliability of self-reports can also be made more effective by being used during tasks rather than after, as recall issues can be avoided.

**Implications of Research**

Research has shown that a strong relationship between self-regulation, especially in regards to metacognitive ability, and academic performance exists. Based on numerous intervention studies, researchers have found that academic performance can be enhanced through the teaching of self-regulated learning skills and metacognitive strategies, and that effective learning relies on these skills. Research has also shown how motivational components play an integral role in the success of students' self-regulation. Further, a large body of developmental research on self-regulated learning and metacognition suggests that students of different ages require different teaching techniques and programs to become more successful learners. The

effectiveness of interventions at distinct age points is dependent on style of instruction, suggesting that students acquire knowledge and strategies differently at various age-related stages.  Overall, explicit instruction and the teaching of specific metacognition strategies are consistently considered as the best methods of metacognitive training in the classroom for students of all ages, demonstrating the most gains in academic achievement (Dignath & Buttner, 2008; Hattie et al., 1996).

School systems, however, have not taken full advantage of these findings and continue to give little regard for the positive effects that high self-regulatory and metacognitive abilities can have on the learning and achievement of students.  It is important, therefore, advocate for the importance of self-regulated learning and metacognitive instruction to public figures, such as community leaders and school administrators, recognizing there may be differences in the type of teaching strategies that should be implemented for respective age groups.

One limitation of past research centers on the types of subject domains that have been the focus of metacognition research.  The majority of metacognitive studies have looked at the benefits of metacognitive awareness and skills in math, reading, or science domains.  The issues with this are that various disciplines necessitate different demands of metacognition and environments are always changing for students.  This suggests that more domain specific research needs to be undertaken and that metacognitive instruction programs need to be developed for other subjects, like history or language studies.  Once more programs have been constructed, the question of whether metacognitive skill is domain specific or generalizable will become clearer.

**Current Study**

The aim of the current study was to enhance self-regulated learning and academic performance for sixth and eighth grade social studies students through the implementation of a metacognitive intervention. Ambrose et al.'s (2010) five-step model of self-regulated learning was at the core of the intervention design, which was comprised of numerous metacognitive instruction sessions, and supplemented by informative handouts, worksheets, and group activities. Intervention sessions included explicit teaching of the metacognitive cycle and how metacognitive strategies can be effectively implemented into the student learning process. Individual and group work, preceding and following interactive discussions, were utilized to amplify metacognitive learning. Feedback and reflection on the session's activity and discussion were offered at the end of each session. The importance of motivational and engagement components were also stressed throughout the intervention, as research has found a strong link between self-regulated learning, metacognitive ability, and motivation.

The social studies domain was used for this intervention, as there is little to no existing research focusing on this subject, and thus, the best methods for metacognitive instruction in this important curricula area have not yet been identified. In addition, social studies is a more generalizable learning domain than others like math or reading, as success in this subject does not rely on specific formulas or procedures, indicating that the findings from this type of intervention may be more transferable.

The findings that eighth grade social studies students' metacognitive abilities could be improved by a metacognition intervention (Godfrey & Lopez, 2014) and that metacognitive skills correlate with academic performance (Godfrey & Lopez, 2014; Fulton, 2015) show that metacognitive instruction is beneficial. Building on past Trinity College metacognitive

37

interventions through the addition of a sixth grade program, we hoped to better study the

developmental trajectory of metacognitive learning in social studies students.  Based on evidence

that younger and older students learn in distinct ways, teaching approaches were tailored to the

sixth and eighth grades, respectively.

**Hypotheses**

*Hypothesis 1:* The experimental intervention group, *Learn 2 Learn*, will show an increase in

awareness of metacognition and enhanced academic performance.

*Hypothesis 2:* The 8th graders will show more metacognitive awareness than the 6th graders,

leading to a greater improvement in academic performance for the 8th graders.

*Hypothesis 3:* Students reporting higher levels of motivation will report higher metacognitive

awareness.

## Method

**Participants**

The participants (N = 149) in this study consisted of a sample of sixth grade students (33

females and 27 males) and eighth grade students (39 females and 50 males) attending a magnet

school in Hartford, Connecticut.  Prior to the start of this study, the school's administration and

teachers were briefed on its content and ultimate goals and agreed to participate.  The study was

also approved by the Institutional Review Board of Trinity College to confirm it met the

necessary ethical standards.  In order to obtain consent for the student participants, parents were

given a letter explaining the objectives of the study and were asked to provide written approval

or disapproval regarding their child's participation (see Appendices A, B, and C).

Since the participating Hartford magnet school attracts and admits students from various

school districts, the study's sample of participants was diverse.  The majority of students

identified themselves as Hispanic (31 percent), White (30 percent), or Black (22 percent). The remainder of students identified themselves as mixed race/ethnicity (13 percent) or Asian (5 percent). Most students designated their hometown as Hartford (45 percent), while the rest came from 24 surrounding towns.

The participants were from four blocks of sixth grade social studies classes taught by one teacher (Teacher A) and four blocks of eighth grade social studies classes taught by another teacher (Teacher B). This was the first year that Teacher A was involved in the research, whereas Teacher B had already participated in the study for several years. The classroom size for sixth grade ranged from 11 to 20 students (average = 15) and ranged from 21 to 24 (average = 22.5) for the eighth grade. Students with special needs and/or language barriers were omitted from the study, as they would have been unable to complete assessments independently in class.

**Measures**

The measures utilized in this study were administered to all students at the end of their first marking period in early November of 2015 prior to the start of the intervention (pre-intervention) and at the end of the third marking period in mid-March, 2016 upon completion of the intervention (post-intervention). Pre-intervention and post-intervention periods were broken up into three days of testing for the sixth grade students and two days for the eighth grade students. This differentiation was due to the variation in workload capacity between the grades. For the sixth graders, quantitative measures were administered during the first two days of testing, and the qualitative measure was administered on the third day. Meanwhile for the eighth graders, quantitative measures were administered on both the first and second day, with the qualitative measure also administered on the second day. All students were given as much time as required to complete each questionnaire during testing sessions. Both the student research

instructor (RI) and social studies teacher were present throughout the testing sessions in order to clarify any questions students may have had concerning the measures.

**Demographic Information.** The demographic measure was comprised of four items, regarding the participant's date of birth, sex, race/ethnicity, and hometown (see Appendix D). It was only administered during the pre-testing stage of the intervention.

**Quantitative Metacognition 5 (Quantitative MC5).** The Quantitative MC5, originally developed by Naratil, Howe, Reuman, and Anselmi (unpublished, 2013), was administered to the fourth cohort of students in this ongoing study. It is a self-report measure that consists of 35 questions based on Ambrose et al.'s (2010) five-step model of metacognition, with seven items corresponding to each respective step. Every question required an answer based on a five-point Likert-style scale ranging from "Never" to "Always" (see Appendix E). Wording was revised for the current study from "Seldom" to "Rarely" for one of the scale options in order to make the wording more understandable for the sixth grade students. The directions instructed students to answer questions in regards to their social studies class. The scores were computed by finding the average for each participant's responses. Cronbach's alpha was found to be .91 at pre-testing and .93 at post-testing.

**Qualitative Metacognition 5 (Qualitative MC5).** The Qualitative MC5 is a measure developed by Godfrey, Lopez, Reuman, and Anselmi (2013) and revised by Fulton, Schackner, Sager, Reuman, and Anselmi (2014), consisting of eight open-ended questions based on Ambrose et al.'s (2010) five-step model of metacognition (see Appendix J). The measure was designed with tasks for a social studies class in mind, with questions such as "Do you usually make sure you understand the purpose of an assignment or project in history class? Explain why or why not". The scoring criteria, which consists of a 0 to 3 point scale, was developed by

Godfrey, Lopez, Reuman, and Anselmi (2013) and is based on a system created by van Kraayenoord and Paris (1997) for their "Worksamples Interview". The general guidelines for scoring were first revised by Fulton, Schackner, Sager, Reuman, and Anselmi (2014) and then by Thomann, Scollard, and Reuman (2016) in order to enhance the relation between the 0-3 scale and each individual question, as well as to increase overall reliability (see Appendix L). Cronbach's Alpha was found to be 0.50 at pre-testing and 0.61 at post-testing. Inter-rater reliability was calculated and an average intra-class correlation of 0.79 was found, as well as an average kappa co-efficient of 0.70.

**Self-Efficacy.** The self-efficacy subscale, derived from the MSLQ (Pintrich & De Groot, 1990), was used to measure students' motivation. One of the variables considered was students' self-efficacy with respect to their own classroom performance. The Self-Efficacy scale is comprised of nine items on a seven-point Likert scale ranging from "Not at all true of me" to "Very true of me" (see Appendix F). The total score was determined by the average of students' responses to the nine questions. The Self-Efficacy scale of the MSLQ had a Cronbach's alpha of .91 at pre-testing and .93 at post-testing.

**Achievement Values.** Another motivational variable assessed was students' Achievement Values. The Achievement Values scale was derived from Wigfield and Eccles (2000) and assessed students' beliefs about their perceived usefulness and interest in the subject of history. The Achievement Values scale is comprised of five items on various seven-point Likert (see Appendix G). The total score was determined by the average of students' responses to the five questions. The Achievement Values subscale had a Cronbach's alpha of .87 at pre-testing and .87 at post-testing.

**Engagement versus Disaffection (E vs. D).** The Engagement versus Disaffection measure is a 20-item questionnaire developed by Wellborn (1991) to assess students' emotional and behavioral engagement or disaffection in the classroom. A version of the instrument for college students was further developed by Chi, Skinner, and Kindermann (2010), which further divided behavioral engagement into in-class, out-of-class, and above and beyond engagement; behavioral disaffection was divided into in-class, care-less, and out-of-class disaffection; and emotional disaffection was divided into boredom, worry, and amotivation categories. The original 20-item questionnaire was used, including 2 additional behavioral disaffection items (one from the careless category and the other from the in-class category), 1 item from emotional disaffection (amotivation), and an alternate emotional disaffection question from the Wellborn (1991) version. Responses for E vs. D items were on a four-point Likert scale ranging from "Not at all true" to "Very true" (see Appendix H). The total score for engagement or disaffection was determined by the average of students' responses to the twenty-four questions; lower scores reflect disaffection in the classroom while high scores reflect more engagement. The Engagement versus Disaffection subscale had a Cronbach's alpha of .91 at pre-testing and .91 at post-testing.

**Test Anxiety.** The Test Anxiety scale was also derived from the MSLQ, and the assessment consisted of five items on a seven-point Likert scale ranging from "Not at all true of me" to "Very true of me" (see Appendix I). The total score was determined by the average of students' responses to the five questions. The Test Anxiety scale of the MSLQ had a Cronbach's alpha of .75 at pre-testing and .75 at post-testing.

**Performance measures.** To assess students' academic performance, quarterly marking period grades for their social studies class were collected from both sixth and eighth grade teachers for the first three marking periods.

**Procedure**

The intervention took place during the 2015-2016 academic school year and consisted of six in-class sessions for the sixth graders and eight in-class sessions for the eighth graders. Sessions ranged from twenty-five to forty minutes long. Two blocks of social studies classes from each grade were assigned to the experimental condition (*Learn 2 Learn*), while another two blocks from each grade were assigned to the control condition (*Know How 2-HI School* or *College Knowledge*). All experimental and control sessions were conducted by four college student researchers.

Pre-intervention measures were administered to student participants over the course of three days for the sixth graders and two days for the eighth graders. After the culmination of the intervention, which had a duration of sixteen weeks (excluding pre- and post-testing periods), post-intervention measures were given to student participants in early March. Post-intervention measures consisted of the same measures used for pre-intervention, minus the demographic questions, and were administered in the original manner.

All confidential information, such as pre- and post-intervention documents and consent forms, was held in a locked research laboratory. In addition, participants were each given an identification number at the beginning of the study in order to keep their identities confidential when handling and analyzing the data. Using these unique identification numbers, all information was de-identified and recorded in an electronic program, which was only accessible to the researchers.

**Experimental treatment sessions**

      Students in the eighth grade received a total of eight intervention sessions on metacognition called *Learn 2 Learn*, while those in sixth grade only received six sessions. The *Learn 2 Learn* sessions involved individual and group activities and discussions to foster students' understanding and use of the metacognition to improve their academic performance in their respective social studies classes (see Table 1).

      **Session 1: Introducing *Learn 2 Learn*.** The first session for both the sixth and eighth grade introduced metacognition and the *Learn 2 Learn* process to the student. The session began with an icebreaker to familiarize the research instructor (RI) and students with each other. Afterwards, students were handed a *Learn 2 Learn* folder for them to store materials used throughout the intervention, including a laminated version of the Ambrose five-step model of metacognition that was adapted for middle-school aged students. The model was referred to as *Learn 2 Learn Steps* (see Appendix M). After passing out the folders, the RI briefly introduced the plan for the day, which included a presentation and an activity. The students watched a presentation with videos about metacognition to introduce the concept of "thinking about thinking" and to further explain what the 5-step model means. As the RI went through each of the five steps, she asked students to give examples of each step that they personally use in the classroom setting, then presented them with further examples.

      After the presentation, students were then divided into groups of five and instructed to begin a Tower Building Activity using marshmallows and toothpicks. They were given approximately ten minutes to build the tallest tower possible that could stand up on its own. No specific instruction was given and students were free to take apart the marshmallows if they pleased.

Later, each group worked together to complete a blank *Learn 2 Learn* model matching to identify how they applied each metacognitive step to their tower building process (see Appendix N). A class discussion followed on how each group used the *Learn 2 Learn* steps. For example, monitoring allowed groups to assess whether their arrangement of the toothpicks was efficient or needed to be changed; applying various strategies on the other hand, such as dividing the marshmallows into smaller pieces gave students more material to build their tower with.

To conclude the session, the students were given notecards and asked to provide feedback about the activity to the RI as a means of modeling metacognition. The RI explained that learning to learn is a lifelong process, and that even college students needed to use the *Learn 2 Learn* process to do well in their academics.

**Session 2: Motivation.** The second session for both the sixth and eighth grade focused on motivation, which was the central part of the Ambrose et al. (2010) model, as well as their *Learn 2 Learn* model. Again, students were told the plan for the day, which included a presentation on the topic and a short activity. The presentation covered the notion of fixed versus fluid intelligence and was intended to motivate students by stressing to them that they can learn anything they set their minds to. The topic also covered neuroplasticity, albeit in a simplistic way to make comprehension appropriate for middle-school aged students. Neuroplasticity was described to the students as the idea that the brain is like a muscle that needs to be exercised in order to grown and learn. Following, the RI also discussed the role of emotions and learning, and asked students to share strategies they used to motivate themselves whenever they felt discouraged or down. After hearing their ideas, the RI presented them with further tips for motivation, such as staying positive, finding value in what they are learning, and setting goals. The presentation further expounded on how to set SMART goals (goals that are

specific, measurable, attainable, relevant, and timely).  As a brief exercise, the students were asked to analyze one of the RI's personal goals, such as "My goal is to finish my senior project by the spring so that I can graduate from college", based on the SMART goals criteria.

After the presentation, the RI handed out a brief worksheet called "I Think I Can" (see Appendix O) and asked the students to write one goal they wanted to achieve in their social studies classroom and one "positive power statement" about themselves, their learning, or their classroom that would help them stay motivated to reach their goal.

**Session 3: Metacognition & Homework.** The third session for both the sixth and eighth graders focused on how to use metacognition/the *Learn 2 Learn* steps while completing homework.  The session began with the RI handing out a blank *Learn 2 Learn* model to let students practice recalling the *Learn 2 Learn* steps.  For each step, students were asked to provide an academic example (e.g. Understand the assignment; example: ask the teacher for help).  The RI reviewed the model with the students to make sure they all had the correct steps in order. After the warm-up exercise, the RI facilitated a discussion on how students can use the *Learn 2 Learn* steps to complete assignments with a brief presentation, which included brief videos on different homework and studying strategies.  At each step, the RI asked students for strategies they used personally before providing additional examples.  Students were then given a homework assignment that asked them to reflect on the metacognitive process for their next social studies assignment (see Appendix P).  The homework reflection worksheets were collected during the next *Learn 2 Learn* session.

**Session 4: *The Oregon Trail*, Metacognition outside the classroom (Eighth Grade Only)**. As preparation for a corollary study on online versus offline assessments of metacognition, the fourth session for eighth graders showed them how metacognition can be

applied to non-academic areas such as the videogame, *The Oregon Trail*.   Fortunately, the

eighth grade social studies curriculum was at the time focused on Westward Expansion, allowing

the introduction of the game to be smoothly integrated into the *Learn 2 Learn* lesson plan.  The

RI modeled how the *Learn 2 Learn* process and metacognition could be applied while playing

*The Oregon Trail*.  With help from the class, the RI played *The Oregon Trail* for approximately

20 minutes (displayed on the projector) while relating each decision or action they made back to

*Learn 2 Learn*.  For instance, looking at the map within the game was an example of monitoring

and applying strategies.  Students were then handed out another blank *Learn 2 Learn* model,

which again asked students to recall the steps, but this time to fill in example of each step

relating to how the class played the game (see Appendix N).

**Winter Booklet (see Appendix Q & R).** Before the close of the fall semester, the RI

briefly visited the students to bring a "Winter Booklet" that they were asked to complete over

winter break. It consisted of 4 activities for the sixth graders and 5 activities for the eighth

graders.  The first activity asked the students to complete a blank *Learn 2 Learn* model with the

correct steps in the process, as well as examples of each step.  The second activity asked the

students to read two vignettes about two college students, Alex and Jesse, writing history papers

for their class.  Students were asked to think about how metacognitive Alex and Jesse were by

assessing which *Learn 2 Learn* step each student used to write their papers.

For the sixth graders, the fourth and final activity asked them to brainstorm and create a

new civilization, which matched with their social studies curriculum at that time.  Each question

in the activity was designed to correspond with a *Learn 2 Learn* step, and students were asked to

determine which metacognitive step was used after completing each activity question.

For the eighth graders, the fourth activity was entitled "Lewis & Clark Expedition" activity and was structured similarly to the sixth graders' New Civilization activity. For the "Lewis & Clark Expedition", students were asked to brainstorm and think about strategies they would use if they were to embark west at the time of Lewis and Clark. Again, each question was designed to correspond with a *Learn 2 Learn* step, and students were asked to determine which step was used after completing each activity question. The final activity for the eighth grade version of the Winter Booklet asked students to play *The Oregon Trail* by themselves at least three times, once for each occupation. They were then asked to answer questions about their in-game decisions and their thought processes for each position in order to prepare for the think-aloud assessments for the corollary study.

**Session 4/5: The Winter Booklet Review.** The first session of the spring term was the fourth session overall for the sixth graders and the fifth for the eighth graders. During this session, the RI reviewed the Winter Booklet with the students to ensure each activity was completed and fully understood. The review session began by going over the *Learn 2 Learn* steps again in the first activity, followed by students sharing their answers on the vignettes.

In the sixth grade classrooms, students shared their strategies for completing their New Civilization activity and how the process related to the *Learn 2 Learn* steps.

Similarly, in the eighth grade classrooms, students shared strategies they would use if they were to embark on a Westward journey for the Lewis and Clark activity and discussed how the activity related to *Learn 2 Learn*. They also shared strategies they used when they played *The Oregon Trail*.

Students in both grades who completed the whole packet on time received a five-dollar Subway gift card as an incentive.

**Session 5/6: The Writing Process, Part 1.** For sixth graders, their fifth session focused on the entire writing process and how it relates to the *Learn 2 Learn* steps. Again, students were given a presentation on the writing process from the planning phase to the editing phase, completing the *Learn 2 Learn* process. After the presentation, the RI handed out an activity to the students asking them to create writing goals for themselves, as well as a plan to achieve those goals (see Appendix S).

For the eighth graders, their sixth session gave a general overview of the writing process and its relationship to metacognition as well, but with specific attention on planning and outlining, which corresponded to the first through third steps of *Learn 2 Learn* (i.e. understanding the assignment, knowing strengths and weaknesses, planning). The session coincided with a long-term research paper assignment in the class on inventions and was designed to aid students' completion of their papers. The eighth graders were also given the same activity as the sixth graders, but were asked to give themselves deadlines for each step in their plan to achieve their writing goals.

**Session 7: The Writing Process, Part 2 (Eighth grade only).** The second session on the writing process was given only to eighth grade students who were at the time finalizing their inventions paper. This session focused primarily on drafting and the revision process (which corresponded to the monitoring performance/applying strategies and reflecting and adjusting portion of *Learn 2 Learn*). Again, the RI gave a presentation on the topic, which included a video modeling how to turn their outlines completed after the previous session into drafts. The RI also provided students tips on how to revise and edit their papers before turning them in. To further aid the students in their writing assignment, the RI handed out a Writing Process Revision

Checklist (see Appendix T), which modeled the revision process and gave students a list of must-dos to ensure that they were revising their papers thoroughly and efficiently.

**Session 6/8: Review.** For the last session in both the sixth and eighth grade, the class played a *Learn 2 Learn* Jeopardy game to review the use of study skills and *Learn 2 Learn* steps taught throughout the intervention. Students were split into five teams to ensure the game proceed in an orderly way, while the classroom teacher assisted in keeping score for the game. The game provided the students with a fun opportunity to test what they learned about various learning strategies, specifically when to use a specific strategy and its purpose. If groups ended up in a tie, the tiebreaker question consisted of each group of students listing the five *Learn 2 Learn* Steps in the proper order. Candy and magnet prizes were given to the winning group of students.

**Control Treatment Sessions**

The control group for the sixth grade (*Know How 2-HI School*) received six sessions focused on school transitions and career paths, whereas the eighth grade (*College Knowledge*) received eight sessions focused on various aspects of college and the application process. Two different control programs were used because learning specifically about college was deemed less suitable and relevant for the younger students, just as talking about school transitions was determined to be less beneficial for the 8th graders.

**Session 1.** The first session for the sixth grade began with an introduction to the *Know How 2-HI School* curriculum and an overview on transitions. The RI had the students describe what they knew about transitions, their experiences with transitioning from elementary school to middle school, and what they thought a transition into high school would entail. Responses were recorded on the board and categorized into categories (e.g. emotions, differences in

responsibilities, changes in social structure). The session closed with a discussion about new freedoms that would be encountered in high school and what increased responsibilities would come with those freedoms.

For the eighth grade, the first session opened with an overview of the *College Knowledge* program and an icebreaker so that the RI and students could get to know one another. It then transitioned into an interactive discussion about the students' ideal jobs and potential reasons for wanting to enter into those respective professions (e.g. good financial compensation, corresponds with interest, etc.). Various components like pay scales, school investment, and percentage of people in each profession were shown on the Smart Board.

**Session 2.** The second session for the sixth grade focused on objective differences between middle school and high school and the expectations that come with young adulthood. The structure of high school class schedules, types of social studies homework assignments, and change in student population were then discussed. The session ended with a general discussion about what high school teachers value the most in their students (e.g. academic honesty, acceptance of others, responsible citizenship).

The eighth grade's second session centered on the different types of colleges/universities and the positives and negatives of each type of school. The RI had the students do a group activity where they were broken up into groups and had to pick a piece of folded paper at random that had a specific question about college on it (e.g. "What does it mean to be a private college/university?") and then had them each answer their question to the best of their abilities. The RI then elaborated on all the answers the students provided to the questions.

**Session 3.** For the third session for the sixth grade, the RI discussed with the students how they could guide their own education through factors like class choice, school choice, and

alternative pathways. Students were taught about electives and various kinds of training methods, as well as exciting possibilities they could look forward to for high school (e.g. dress code changes, taking classes at Trinity College, having their phones).

The third session for the eighth grade focused on reasons for attending college and the advantages of pursuing higher education. Discussion included elements like improving chances of achieving later success in desired occupations, yearly salaries based on educational attainment, social opportunities at college, and how everyone defines success differently.

**Session 4.** The sixth grade's fourth session shifted from the previous discussion on variances in education to a general discussion of employment. Students were asked to describe their career aspirations and a combination of a slideshow and guided discussion was then used to describe various jobs, related educational schooling components, and academic focuses. The session fixated on the importance of each educational step for achieving their individual goals.

The fourth session for the eighth grade concentrated on the teaching of *The Oregon Trail* PC game and having the students practice playing the game as a class. Guidelines for playing the game during the winter break period were given out to the students, directing them to play at least three times in order to make sure they understood the objective and basic structure of the game.

**Session 5.** For the sixth grade's fifth session, emphasis was placed on educational niches, especially in regards to educational fields the students might not have been as familiar with (e.g. anthropology, sports management, creative writing). Various majors were written on the board and the academic skills they require and what careers they encompass were described. Students were then invited to explain any unique career paths or majors they were interested in potentially pursuing in the future.

The eighth grade's fifth session began with the RI handing out index cards for the students, asking them to write down various aspects of playing *The Oregon Trail* game over their winter break (e.g. Did you play the Oregon Trail? How many times? With which professions did you win?).  A poll was then taken regarding where the students wanted to go to college and later the class' statistics and a variety of celebrities who went to college were shown on the board.

**Session 6.** The sixth session for the sixth grade entailed the RI explaining how interests may shift overtime and how students will most likely have try out an array of jobs before encountering the one they find they are most passionate about.  As this was the last session, students were also given the opportunity to ask any questions regarding the *Know How 2-HI School* program, what they had learned, and any curiosities they had about Trinity College.

Meanwhile, the sixth session for the eighth grade focused on how to pick a college properly and what the students hoped to accomplish there.  The RI described the reasons she had chosen to attend Trinity College and asked the students their reasons for going to school.  She then went over various types of degrees needed for specific occupations, along with potentially important factors for deciding on a college, like school size, academic rigor, affordability, etc.

**Session 7 (Eighth grade only).** The seventh session for the eighth grade consisted of a discussion about the college application process, how students can get started on them early, and different tips and tricks for getting ahead.  Index cards were handed out at the beginning of class, where students were invited to write down questions they might have had about the application process that they did not understand or were embarrassed to outwardly ask about.  The RI then answered the collected questions.

**Session 8 (Eighth grade only).** The eighth and last session for the eighth grade summarized what the students had discussed throughout the *College Knowledge* program, such

as where they all wanted to go to college and what celebrities went to college. Final questions

and comments were encouraged and students provided feedback on the usefulness of the

program itself.

## Results

### Correlations among Measures

Correlations among the Quantitative MC5, the Qualitative MC5, the Motivational Scales,

and quarterly grades were determined (see Table 2). The Quantitative MC5 correlated positively

with the Qualitative MC5 at pre-intervention (.30) and post-intervention phases (.38). The

Quantitative MC5 correlated positively with all of the Motivational Scales except for Anxiety at

post-intervention, showing overall convergence in the quantitative metacognition and motivation

measures at both time points. The Quantitative MC5 correlated positively with quarterly grades

at pre-intervention (range = .39 to .43) and post-intervention (range = .46 to .51). Similarly, the

Qualitative MC5 correlated positively with all of the Motivational Scales at both pre- and post-

intervention (except for pre-intervention Qualitative MC5 and Anxiety), again demonstrating

convergence in the qualitative metacognition and motivation measures. The Qualitative MC5

correlated positively with quarterly grades at pre-intervention (range = .27 to .33) and post-

intervention (.38 to .41).

### Intervention Effects on the Quantitative MC5

Intervention effects for the Quantitative MC5 are illustrated in Table 3. No main effect

was found for condition, $F (1, 136) = .77$, $p = 0.38$, partial eta$^2$ = .01, nor was a main effect

found for time, $F (1, 136) = 3.67$, $p = .06$, partial eta$^2$ = .03. Although the interaction effect for

condition by time was not significant, $F (1, 136) = 2.56$, $p = .11$, partial eta$^2$ = .02, the pattern of

the effect was consistent with my prediction (see Figure 1). A significant main effect was found

for grade level, $F$ (1, 136) = 8.36, $p < .01$, partial eta$^2$ = .06, with sixth graders scoring higher ($M$ = 3.69, $SE$ = .07) than eighth graders ($M$ = 3.44, $SE$ = .06). There was also a significant interaction effect of grade by time $F$ (1, 136) = 4.02, $p = .05$, partial eta$^2$ = .03; sixth graders remained level in the Quantitative MC5 from pre-intervention ($M$ = 3.69, $SE$ = .07) to post-intervention ($M$ = 3.68, $SE$ = .07), whereas eighth graders increased from pre-intervention ($M$ = 3.37, $SE$ = .06) to post-intervention ($M$ = 3.50, $SE$ = .06).

In order to look at individual components of the Quantitative MC5, a four factor repeated-measures ANOVA was performed. The intervention never interacted with step. However, this analysis did show a large main effect associated with Step in the metacognition cycle, $F$ (4, 544) = 59.13, $p < .001$, partial eta$^2$ = .303 (see Figure 2). Students were most likely to report metacognition use at the steps of "Assessing the Task" and "Reflect and Adjust"; they were least likely to report metacognition use of the "Planning" step. The repeated-measures ANOVA also showed a significant Grade Level by Metacognition Step interaction, $F$ (4, 544) = 3.72, $p = .005$, partial eta$^2$ = .03. The pattern of the interaction can be seen in Table 4 and in Figure 3. Sixth graders reported using more metacognition than did eighth graders at all steps, but the difference was larger at "Assessing the Task" and at "Planning", and smaller at "Applying Strategies/Monitoring Performance".

**Intervention Effects on the Qualitative MC5**

Two student researchers independently coded two of the same sets of 20 student responses and went through two rounds of inter-rater reliability checking, resolving all discrepancies. By the second round, the researchers had achieved a sufficient Kappa of .70, enabling them to move forward and each independently code separate portions of the rest of the

responses. Descriptive statistics on the Qualitative MC5 pre- and post-test for the intervention and control groups separately for sixth and eighth graders are shown in Table 5 and Figure 4.

A repeated-measures ANOVA was performed with condition and grade level as the between subjects factors and time and qualitative item as the repeated measures. A significant main effect of condition was found, $F (1, 135) = 3.97$, $p < .05$, partial eta$^2$ = .029, with the *Learn 2 Learn* group scoring higher ($M = 2.09$, $SE = .04$) than the control group ($M = 1.98$, $SE = .04$). A marginally significant main effect for time was found, $F (1, 135) = 3.70$, $p = .06$, partial eta$^2$ = .027. No main effect for grade level, $F (1, 135) = .91$, $p = .34$, partial eta$^2$ = .007 was found. A significant metacognition condition by time by grade interaction was found, $F (1, 135) = 5.23$, $p = .02$, partial eta$^2$ = .037, with only sixth graders showing the expected pattern of the intervention on the Qualitative MC5 (see Figure 4).

A four factor repeated-measures ANOVA was performed to better examine the individual items of the Qualitative MC5. A main effect was found for the items, $F (7, 945) = 48.63$, $p < .001$, partial eta$^2$ = .265, with means being the highest for "Assessing the Task" and "Reflecting and Adjusting", and lowest for "Evaluating Strengths and Weaknesses" and "Planning" (see Figure 5). In addition, a highly significant grade level by metacognition step interaction was found, $F (7, 945) = 4.47$, $p < .001$, partial eta$^2$ = .032 (see Figure 6). Eighth graders scored higher than sixth graders on Item 1 of "Assessing the Task" and on Item 2 of "Evaluating Strengths and Weaknesses" (see Figure 6). Overall though, the sixth and eighth grade students scored similarly on most items.

**Intervention Effects on Motivational Measures**

Repeated-measures ANOVAs were performed in order to test for effects of intervention condition, time, and grade level on motivational measures. There were no significant main

effects of intervention condition on any of the motivational measures, nor were there any significant 3-way interactions involving condition, time, and grade level. There were, however, significant condition by time interactions for Self-Efficacy, $F (1, 136) = 4.16$, $p = .04$, partial eta$^2$ = .03 (see Figure 7); Behavioral Engagement, $F (1, 138) = 4.80$, $p = .03$, partial eta$^2$ = .03 (see Figure 8); and Anxiety, $F (1, 138) = 7.23$, $p = .008$, partial eta$^2$ = .05 (see Figure 9). Unfortunately, the patterns of these significant interaction effects were not consistent, nor were they interpretable.

Significant grade level differences did emerge for all but one of the motivational measures (see Table 6). Sixth graders scored higher than eighth graders on Self-Efficacy, $F (1, 136) = 7.29$, $p = .008$, partial eta$^2$ = .051, and on Engagement versus Disaffection, $F (1, 138) = 23.74$, $p < .001$, partial eta$^2$ = .147; sixth graders scored lower than eighth graders on Anxiety, $F (1, 138) = 7.79$, $p = .006$, partial eta$^2$ = .053. There was no relation between grade level and Achievement Values, $F (1, 136) = 0.36$, $p = .55$, partial eta$^2$ = .003.

**Intervention Effects on Academic Performance**

Descriptive statistics for the sixth and eighth grade experimental and control groups' mean quarterly grades are displayed in Table 7. Unlike what had been hypothesized, there was not a significant condition by time interaction effect, $F (2, 284) = 0.85$, $p = .43$, partial eta$^2$ = .006. Thus, there was no effect of the *Learn 2 Learn* intervention on academic performance from Quarter 1 to Quarter 3. However, a marginally significant condition by time by grade level interaction effect was found $F (2, 284) = 2.94$, $p = .054$, partial eta$^2$ = .02 (see Figure 10). Whereas quarterly grades did not differ as a function of intervention condition in the sixth grade, intervention condition did matter in the eighth grade. Eighth graders in the experimental

condition earned somewhat higher grades in Quarter 1, but they earned somewhat lower grades in Quarter 3.

No main effect of condition was found, $F(1, 142) < .01$, $p = .94$, partial eta$^2$ < .001. However, there was a significant main effect of time, $F(2, 284) = 33.25$, $p < .001$, partial eta$^2$ = .19. Grades decreased from Quarter 1 ($M = 87.7$) to Quarter 2 ($M = 82.8$) and then increased at Quarter 3 ($M = 84.1$). A significant main effect of grade level was also found, $F(1, 142) =$ 16.89, $p < .001$, partial eta$^2$ = .106. This grade effect can be described as the sixth grade students' grades ($M = 89.4$) consistently being higher than the eighth grade students' grades ($M =$ 81.8) across all three quarters (see Figure 11). There was also a significant time by grade effect, $F(2, 284) = 6.12$, $p = .003$, partial eta$^2$ = .041.

**Intervention Effects on Teacher Ratings**

Contrary to my prediction, no time by condition interaction effect was found, $F(1, 141) =$ 1.38, $p = .24$, partial eta$^2$ = .010. A significant main effect of time was found for teacher ratings of metacognition $F(1, 141) = 240.74$, $p < .001$, partial eta$^2$ = .631 (see Figure 12). This means that the teacher ratings of metacognition significantly increased from pre- ($M = 3.41$, $SE = .11$) to post-intervention ($M = 4.62$, $SE = .11$). In addition, a significant interaction effect of time by grade level was found, $F(1, 141) = 30.20$, $p < .001$, partial eta$^2$ = .176. This interaction may be described as the sixth grade students showing a larger gain in teacher rating of metacognition from pre- to post-intervention, in contrast to the eighth grade students (see Figure 13).

<div align="center">

**Discussion**

</div>

Metacognitive interventions have been found to help boost students' metacognitive awareness and skills, as well as enhance academic performance (Dignath & Buttner, 2008). Although studies have been conducted on a wide range of grade levels and classroom subjects,

very few have been designed specifically for eighth grade students in a social studies setting. Further, there have been very few studies that have examined the developmental differences between sixth and eighth grade students' levels of metacognition. In an attempt to fill these gaps, the current study implemented a metacognitive intervention for both sixth and eighth grade social studies students at a nearby middle school. Adding to past eighth grade social studies metacognitive interventions employed by Godfrey and Lopez (2014) and Fulton and Schackner (2015), this study consisted of eight sessions focused on the Ambrose et al. (2010) five-step model of metacognition and included interactive discussions, practice activities, and reflection exercises. Several alterations were made to the Fulton and Schackner (2015) intervention in order to increase the success of this intervention. Additional activities and handouts were given to students so that they could have ample practice applying each of the metacognitive strategies, and instructive lessons were transitioned into more collaborative discussions so that students could easily ask questions, get feedback, and actively learn about metacognition. In order to make the intervention more applicable to the sixth grade students, the research instructors tailored the sessions to the specific grade level they were working with. For example, simpler vocabulary was used for the sixth grade sessions and sixth grade students were given more time to complete assessments. In addition, the research instructors linked session activities to each grade's specific social studies curriculum when applicable.

**Metacognitive Abilities**

Unlike Godfrey and Lopez's (2014) findings and contrary to my prediction, students in the *Learn 2 Learn* groups showed a small but non-significant increase in metacognitive abilities on the Quantitative MC5. There are several possible reasons for the lack of findings. First, the teachers' own use of metacognition in their lesson plans could have reduced the effects of the

intervention.  The eighth grade teacher had already participated in the ongoing study for the past several years, making her more likely to have incorporated the teaching and promoting of metacognition to her students during this year's intervention.  This may account for why the eighth grade *Learn 2 Learn* students did not show any change in metacognition over the course of the intervention; they may have had already been using metacognition prior to the pre-testing phase.  As for the sixth grade *Learn 2 Learn* students not showing an increase in metacognition, teacher evaluations demonstrated that the sixth grade teacher also gave explicit metacognitive instructions to his students, suggesting that his students may have had also already been using metacognitive strategies prior to the start of our intervention (Sik, 2016).  Additionally, metacognition can be difficult to measure through pre- and post-intervention questionnaires, as middle school students are not always yet able to successfully reflect on their own skills.

Interestingly, large grade level differences were found on the Quantitative MC5.  The largest grade level gaps in how often sixth and eighth graders reported using the various steps from the Ambrose et al. (2010) five-step model were found for "Assessing the Task" and "Planning" steps, whereas the smallest gap was found for the "Applying Strategies/Monitoring Performance" step.  This indicates that grade level matters in terms of implementation of the various steps and that different grade levels may receive more explicit instruction pertaining to specific steps, depending on which ones the teacher and curriculum emphasizes more.  For example, greater emphasis may be placed on the "Planning" step for younger students, as it is an important strategy to grasp when transitioning from elementary to middle school.  This could explain why sixth graders reported using "Planning" more often than the eighth graders.  These findings support past research studies that found that students of varying ages utilize different metacognitive strategies and possess different metacognitive skill levels (Weil et al., 2013; Paris

& Newman, 1990; Schneider & Lockl, 2002).  This suggests that interventions need to cater to the particular age of the students, as various grade levels perform differently and possess individual metacognitive skills.

A significant effect of grade level and metacognition was found on the Quantitative MC5, with the sixth grade students in both the *Learn 2 Learn* and control groups consistently showing higher levels of metacognition than the eighth grade students in both groups.  This was the opposite of my hypothesis but is consistent with another hypothesis that students reporting higher levels of motivation would also report higher levels of metacognitive awareness.  The sixth graders reported higher levels of self-efficacy and engagement, and lower levels of anxiety than the eighth graders.  As past research has indicated, a strong relationship between metacognition and motivation exists (Schraw et al., 2006).  Students who are more motivated to learn and succeed are more likely to have strong metacognitive skills, and younger students tend to show higher levels of motivation than older students (Dignath & Buttner, 2008; Spinath & Spinath, 2005).  Further, it is plausible that the sixth grade students were found to be higher in metacognition and motivation because they were the newest students to their school and were enthusiastic to learn and do their best.  In addition, the magnet school where the study took place is difficult to get into, so the sixth grade students were more likely to be engaged and motivated to succeed since they may have been excited and felt lucky to have been accepted into the school and very highly motivated to succeed.  Because the eighth graders had been in this school for several years, were in the process of preparing for high school, and were exposed to even more standardized testing, they may have experienced greater pressure and a larger workload, making it understandable that they showed higher levels of anxiety and lower levels of motivation, which could have affected their use of metacognition.

61

As predicted, the sixth grade students in the *Learn 2 Learn* group showed a significant increase in metacognition over time, when metacognition was measured by the Qualitative MC5. However, contrary to what was hypothesized, the eighth grade students in the *Learn 2 Learn* group did not show increased levels of metacognition. This could again be due to the differences in motivational levels and more intense workloads of the eighth grade students. Since the eighth graders are under significant pressure, the *Learn 2 Learn* intervention may have overwhelmed them and increased their anxiety. Since there was a different instructor for the sixth grade and eighth grade *Learn 2 Learn* intervention, differences in instructor styles of teaching for the two grade levels may have contributed to the differences found for the qualitative measure.

**Academic Performance in Relation to Metacognition**

My hypothesis that the *Learn 2 Learn* groups would show enhanced academic performance as a result of an increase in metacognitive ability was not supported, although a marginally significant effect in the predicted direction was found for the sixth grade, *Learn 2 Learn* group. This finding can be attributed to the many measures that contribute to quarterly grades, such as homework assignments, quizzes/exams, and projects, all of which do not necessarily require high degrees of metacognitive skill. However, academic performance was positively correlated with all the measures of metacognition and the motivational measures, aside from the anxiety subscale. This suggests that although the metacognitive intervention did not have the desired effect on students' levels of metacognition, metacognition and motivation do play important roles in students' academic performance. Likewise, it shows that teaching metacognition to students can be advantageous to their learning success.

Additionally, significant main effects of time and grade level were found for academic performance. Both grade levels showed a decrease in academic performance following the first

quarter and then an increase by the end of the third quarter. This was consistent with previous research (Godfrey & Lopez, 2014; Fulton & Schackner, 2015); the first quarter generally encompasses a large amount of review material from the past year, making it easier to obtain higher grades than in the following quarters when new and challenging material is presented. Similar to the patterns found for metacognition and motivation between the grade levels, the sixth graders demonstrated significantly higher levels of academic performance than the eighth grade students across all three quarters. This finding could help to explain why the sixth grade students showed higher levels of metacognition and less anxiety than the eighth graders. Since the sixth graders obtained consistently higher grades, this most likely helped keep them motivated and using metacognition. Receiving higher grades also potentially could help to keep their anxiety levels lower than for the eighth graders, who were receiving lower grades. Additionally, for the sixth graders, quarter and condition did not appear to matter for academic performance. For the eighth graders, however, there was an appreciable drop from Quarter 1 to Quarter 2 in grades, with the steepest drop off for the *Learn 2 Learn* group. Further, eighth grade students in the control group dropped less and rebounded slightly more in grades than the eighth grade students in *Learn 2 Learn*, though the *Learn 2 Learn* students inexplicably started off with somewhat higher grades.

**Limitations**

One of the most important reasons that our metacognitive intervention my not have been effective was because of time constraint. Although the intervention took place over a five-month period, a seemingly sufficient amount of time, it only included six sessions for the sixth graders and eight sessions for the eighth graders. In addition, there was a large winter break period where the students did not receive any metacognitive lessons from the research instructors. This

could have affected the success of the intervention, as longer interventions have proven to be more successful and students need constant practice in order to apply and retain metacognitive skills (Dignath & Buttner, 2008).

Additionally, although past studies have shown that interventions led by research instructors are more effective than those led by the regular classroom teachers (Dignath & Buttner, 2008; Paris & Paris, 2001), because the Trinity research instructors had only six or eight sessions to work with the students, they might not have had enough time to develop a strong relationship with them that would have made the students feel more engaged in the intervention. In this case, their regular classroom teachers might have had more success in giving them metacognitive instruction because the students were very comfortable with them and had already formed a rewarding professional relationship with them. The classroom teachers would also have more opportunities to give the students metacognitive practice throughout the year and allow them to really hone their skills, which is important, given that practice has been found to greatly boost metacognitive ability (Vacca, 2002). Lastly, teachers are more able to connect metacognition to their own classroom teachings and assignments, which is more of a challenge for research instructors who are there for only a limited amount of time.

Another limitation to this study may have been the measures used. The Qualitative MC5 may have been easier for students to use than the Quantitative MC5 in terms of self-evaluation because it allowed them to openly express how they used metacognition in the classroom, whereas the Quantitative MC5 had students rate their levels of metacognition on a set scale of frequencies with questions that are more general in nature. In addition, both measures of metacognition had students reflect on their learning and strategy use, which can be difficult. Students may have benefited from using daily logs or diaries in order to accurately track their

metacognitive usage and understanding in the moment, rather than having to reflect on it a later time. Veenman et al. (2006) have stressed the benefits of using on-line measures, which assess performance during rather than after a task, in order to more accurately predict and assess students' learning performance.

Lastly, because few studies have implemented metacognitive interventions in a social studies classroom setting, especially on two different grade levels, it was challenging to know how to link certain metacognitive skills to the classroom material and create activities that connect with the students' curriculum to help them practice and strengthen their metacognition. The intervention may have suffered from being too general, which was due in part from the desire to maintain consistency of training between the sixth and eighth graders.

**Future Research**

The current study's findings indicate that future research should look to repeat successful past metacognitive interventions in terms of instruction strategy, activities, and reflective discussions in order to achieve strong effects. Additionally, future interventions should include classes of students from at least two different teachers at each grade level in order to increase the size of the study and be able to better generalize the findings across teachers. Evaluation of each teacher's personal level of metacognition and their incorporation of metacognition into the classroom should also be studied so that potential differences in findings between students with different teachers can be better understood. Findings from this study show the importance of implementing unique interventions for younger and older students, as students' usage of certain metacognitive skills are different depending on grade levels. They also suggest that more focus during interventions should be placed on motivation, as this is clearly a key contributor to

students' usage of metacognition.  Lastly, future studies should continue to focus on unexplored

domains such as social studies, which may allow for greater generalizability of skill-set findings.

## References

Alexander, J., Fabricius, W., Fleming, V., Zwahr, M., Brown, S. (2001). The development of metacognitive causal explanations. *Learning and Individual Differences, 13*(3), 227-238. doi:10.1016/S1041-8080(02)00091-2

Allon, M., Gutkin, T. B., & Bruning, R. (1994). The relationship between metacognition and intelligence in normal adolescents: Some tentative but surprising findings. *Psychology in the Schools*, *31*(2), 93-97. doi: 10.1002/1520-6807(199404)31:2<93::AID-PITS2310310202>3.0.CO;2-X

Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., & Norman, M. K. (2010). *How learning works: Seven research-based principles for smart teaching*. John Wiley & Sons.

Amsterlaw, J. (2006). Children's beliefs about everyday reasoning. *Child Development*, *77*(2), 443-464. doi: 10.1111/j.1467-8624.2006.00881.x

Baker, L. (2002). Metacognition in comprehension instruction. *Comprehension instruction: Research-based best practices*, 77-95.

Bielaczyc, K., Pirolli, P. L., & Brown, A. L. (1995). Training in self-explanation and self-regulation strategies: Investigating the effects of knowledge acquisition activities on problem solving. *Cognition and Instruction*, *13*(2), 221-252. doi: 10.1207/s1532690xci1302_3

Boekaerts, M., & Corno, L. (2005). Self- regulation in the classroom: A perspective on assessment and intervention. *Applied Psychology*, *54*(2), 199-231. doi: 10.1111/j.1464-0597.2005.00205.x

Borkowski, J. G. (1992). Metacognitive theory: A framework for teaching literacy,

writing, and math skills. *Journal of Learning Disabilities*, *25*(4), 253-257. doi: 10.1177/002221949202500406

Chatzipanteli, A., Grammatikopoulos, V., & Gregoriadis, A. (2014). Development and evaluation of metacognition in early childhood education. *Early Child Development and Care, 184*(8) 1223-1232. doi:10.1080/03004430.2013.861456

Chi, M. T., Bassok, M., Lewis, M. W., Reimann, P., & Glaser, R. (1989). Self-explanations: How students study and use examples in learning to solve problems. *Cognitive Science*, *13*(2), 145-182. doi: 10.1016/0364-0213(89)90002-5

Chi, U., Skinner, E. A., & Kindermann, T. A. (2010). *Engagement and Disaffection in the College Classroom: Construction and Validation of a Measurement Tool to Assess Students' Motivation to Learn.* Technical Report, Portland State University.

Christopoulos, J. P., Rohwer, W. D., & Thomas, J. W. (1987). Grade level differences in students' study activities as a function of course characteristics. *Contemporary Educational Psychology*, *12*(4), 303-323. doi: 10.1016/S0361-476X(87)80003-6

Cleary, T., & Zimmerman, B. (2004). Self-regulation empowerment program: A school-based program to enhance self-regulated and self-motivated cycles of student learning. *Psychology in the Schools, 41*(5), 537-550.  doi:10.1002/pits.10177

Davis, D.S. and Neitzel, C. (2011). A self-regulated learning perspective on middle grades classroom assessment. *The Journal of Educational Research, 104*(3), 202-215. doi:10.1080/00220671003690148

Dignath, C. and Buttner, G. (2008). Components of fostering self-regulated learning among students. A meta-analysis on intervention studies at primary and secondary school level. *Metacognition Learning, 3*(3), 231-264. doi:10.1007/s11409-008-9029-x

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

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American Psychologist*, *34*(10), 906-911. doi: 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. doi: 10.1080/016502500383421

Fulton, M. (2015). *Learn 2 Learn Intervention: Teaching Metacognitive Strategies to Middle School Students to Enhance their Metacognition and Academic Performance.* Unpublished Thesis, Department of Psychology, Trinity College, Hartford, Connecticut.

Fulton, M., Schackner, J., Sager, D., Reuman, D., and Anselmi, D. (2014). Unpublished Metacognition 5 Revised Coding Guidelines. Department of Psychology, Trinity College, Hartford, Connecticut.

Godfrey, T. K. (2014). *Self-Regulated Learning Intervention: Teaching Metacognition to Enhance School Performance and Motivation of Middle School Students.* Unpublished Thesis, Department of Psychology, Trinity College, Hartford, Connecticut.

Godfrey, T. K., Lopez, M. J., Shimmel, J., Reuman, D. A., & Anselmi, D. L. (2014). *The Metacognition 5*. Unpublished measure of metacognition, Department of Psychology, Trinity College, Hartford, Connecticut.

Hattie, J., Biggs, J., & Purdie, N. (1996). Effects of learning skills interventions on student

    learning: A meta-analysis. *Review of Educational Research*, *66*(2), 99-136.

    doi: 10.3102/00346543066002099

Hogan, K. (1999). Thinking aloud together: A test of an intervention to foster students'

    collaborative scientific reasoning. *Journal of Research in Science Teaching*, *36*(10),

    1085-1109. doi: 10.1002/(SICI)1098-2736(199912)36:10<1085::AID-TEA3>3.0.CO;2-D

Howe, E. Naratil, T., Reuman, D., & Anselmi, D. (2012). *The Metacognition 5*.

    Unpublished measure of metacognition, Department of Psychology, Trinity College,

    Hartford, Connecticut.

Joseph, N. (2010). Metacognition needed: Teaching middle and high school students to develop

    strategic learning skills. *Preventing School Failure: Alternative Education for Children and

    Youth, 54*(2), 99-103. doi:10.1080/10459880903217770

Justice, E. M., & Dornan, T. M. (2001). Metacognitive differences between traditional-age and

    nontraditional-age college students. *Adult Education Quarterly*, *51*(3), 236-249. doi:

    10.1177/074171360105100305

Kistner, S., Rakoczy, K., Dignath, C., Otto, B., Büttner, G., & Klieme, E. (2010). Teachers'

    promotion of self-regulated learning in classrooms and its effects on student performance.

    In *Annual Meeting of the American Educational Research Association, Denver, CO*.

Klug, J., Ogrin, S., Keller, S., Ihringer, A., & Schmitz, B. (2011). A plea for self-regulated

    learning as a process: modelling, measuring and intervening. *Psychological Test and

    Assessment Modeling*, *53*(1), 51-72.

Lee, H., Lim, K., Grabowski, B. (2010). Improving self-regulation, learning strategy use,

and achievement with metacognitive feedback. *Education Technology Research and Development, 58*(6), 629-648. doi:10.1007/s11423-010-9153-6

McLeod, L. (1997). Young children and metacognition: Do we know what they know they know? And if so, what do we do about it? *Australian Journal of Early Childhood*, *22*(2), 6-11.

Mega, C., Ronconi, L., & De Beni, R.  (2013). What makes a good student? How emotions, self-regulated learning, and motivation contribute to academic achievement. *Journal of Educational Psychology,* 106(1), 121-131. doi:10.1037/a0033546

Nota, L., Soresi, S., & Zimmerman, B. J. (2004). Self-regulation and academic achievement and resilience: A longitudinal study. *International Journal of Educational Research*, *41*(3), 198-215. doi: 10.1016/j.ijer.2005.07.001

Pannu, J. K., & Kaszniak, A. W. (2005). Metamemory experiments in neurological populations: A review. *Neuropsychology review*, *15*(3), 105-130. doi: 10.1007/s11065-005-7091-6

Paris, S. G., & Newman, R. S. (1990). Development aspects of self-regulated learning. *Educational psychologist*, *25*(1), 87-102. doi: 10.1207/s15326985ep2501_7

Paris, S., & Paris, A. (2001). Classroom applications of research on self-regulated learning. *Educational Psychologist, 36*(2), 89-101. doi:10.1207/s15326985ep3602_4

Pillow, B. (2008). Development of Children's understanding of cognitive activities. *The Journal of Genetic Psychology: Research and Theory on Human Development, 169*(4), 297-321. doi:10.3200/GNTP.169.4.297-321

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). A manual for the use of the Motivated Strategies for Learning Questionnaire (Technical Report 91-B-004). *The Regents of the University of Michigan*.

Pintrich, P. R., & De Groot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*(1), 33-40. doi:10.1037//0022-0663.82.1.33

Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology*, *92*(3), 544-555. doi: http://dx.doi.org/10.1037/0022-0663.92.3.544

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

Ross, M. E., Green, S. B., Salisbury-Glennon, J. D., & Tollefson, N. (2006). College students' study strategies as a function of testing: An investigation into metacognitive self-regulation. *Innovative Higher Education*, *30*(5), 361-375. doi:10.1007/s10755-005-9004-2

Schneider, W., & Lockl, K. (2002). The development of metacognitive knowledge in children and adolescents. *Applied metacognition*, 224-258.

Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning.  *Research in Science Education. 36*(1-2), 111-139. doi: 10.1007/s11165-005-3917-8

Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, *19*(4), 460-475.

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

Schunk, D. H. (1996). Goal and self-evaluative influences during children's cognitive skill learning. *American Educational Research Journal*, *33*(2), 359-382. doi: 10.3102/00028312033002359

Sik, K. (2016). Teachers' Knowledge and Use of Strategies to Teach Metacognition.

    Unpublished Poster, Trinity College Spring 2016 Science Symposium, Hartford,

    Connecticut.

Souvignier, E., & Mokhlesgerami, J. (2006). Using self-regulation as a framework for

    implementing strategy instruction to foster reading comprehension. *Learning and*

    *Instruction*, *16*(1), 57-71. doi: 10.1016/j.learninstruc.2005.12.006

Sperling, R. A., Howard, B. C., Miller, L. A., & Murphy, C. (2002). Measures of children's

    knowledge and regulation of cognition. *Contemporary Educational Psychology*, *27*(1), 51-

    79.

Spinath, B., & Spinath, F. M. (2005). Longitudinal analysis of the link between learning

    motivation and competence beliefs among elementary school children. *Learning and*

    *Instruction*, *15*(2), 87-102. doi: 10.1016/j.learninstruc.2005.04.008

Thompson, T. & Musket, S. (2005). Does priming for mastery goals improve the performance of

    students with an entity view of ability? *British Journal of Educational Psychology, 75*(3),

    391-409. doi: 10.1348/000709904x22700

Vacca, R. T. (2002). From efficient decoders to strategic readers. *Educational Leadership*, *60*(3),

    6-11.

van Kraayenoord, C. E., & Paris, S. G. (1997). Australian students' self-appraisal of their work

    samples and academic progress. *The Elementary School Journal*, 523-537.

Veenman, M. V. J., Van Hout-Wolters, B., & Afflerbach, P. (2006). Metacognition and learning:

    Conceptual and methodological considerations. *Metacognition Learning 1*(1), 3-14. doi:

    10.1007/s11409-006-6893-0

Veenman, M. V. J., Wilhelm, P., & Beishuizen, J. J. (2004). The relation between intellectual and metacognitive skills from a development perspective. *Learning and Instruction, 14*(1), 89-109. doi: *10.1016/j.learninstruc.2003.10.004*

Weil, L. G., Fleming, S. M., Dumontheil, I., Kilford, E. J., Weil, R. S., Rees, G., Dolan, R. J., and Blakemore, S. (2013). The development of metacognitive ability in adolescence. *Consciousness and Cognition*, *22*(1), 264-271. doi: 10.1016/j.concog.2013.01.004

Weinert, F. E., & Schneider, W. (1999). *Individual Development from 3 to 12: Findings from the Munich Longitudinal Study*. Cambridge University Press.

Weinstein, C. E., & Palmer, D. R. (2002). *LASSI User's Manual: For Those Administering the Learning and Study Strategies Inventory*. H & H Pub.

Wellborn, J. G. (1991). Engaged and disaffected action: The conceptualization and measurement of motivation in the academic domain. *Unpublished doctoral dissertation*. New York: University of Rochester.

Wigfield, A., & Eccles, J. (2000). Expectancy–Value theory of achievement motivation. *Contemporary Educational Psychology, 25*, 68-81.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, *41*(2), 64-70. doi: 10.1207/s15430421tip4102_2

Zimmerman, B. J., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment *31*(4), 845-862. *American Educational Research Journal, 31*(4). doi:10.3102/00028312031004845

Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, *25*(1), 82-91. doi: 10.1006/ceps.1999.1016

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An

overview. *Educational Psychologist*, *25*(1), 3-17. doi: 10.1207/s15326985ep2501_2

Zimmerman, B. J., & Schunk, D. H. (Eds.). (2001). *Self-regulated learning and academic

achievement: Theoretical perspectives*. Routledge.

# Tables

*Table 1. Summary of Experimental and Control Sessions*

| Session | Experimental Treatment | | | Control Treatment | |
|---|---|---|---|---|---|
| | Lesson | Activity | Goal | 6th Grade Lesson/Activity | 8th Grade Lesson/Activity |
| 1 | Introduction to the 5-step model | Tower Building Activity | All metacognitive steps (overview) | Introduction/Discussion about transitions and high school freedoms/emotions. | Introduction/ Discussion about future job professions |
| 2 | Fixed vs. Fluid Intelligence + Motivation | Students set a goal they can work on in their history class. | Motivational, minor planning activity | Discussion about objective differences and expectations between middle school and high school. | Different types of colleges/Question & Answer Exercise |
| 3 | Instructor guides group discussions linking homework checklist to 5-step model | Homework Checklist, Better Grades YouTube video | Monitoring | Guided discussion on educational variance and various potential school/career pathways. | Discussion on important of college and advantages/ disadvantages |
| 4 (8th grade only) | Instructor guides small group discussions linking activity to 5-step model | Researchers introduce Oregon Trail game to students and practice game with them. Match steps of thinking process to the 5-step model.  *Winter Booklet is passed out, which consists of stories for students to analyze others' thinking processes and playing Oregon Trail 3 times tied to 5-step model (with follow up questions) | All metacognitive steps | Discussion about employment and popular career fields and interests/Presentation with job descriptions. | Introduce the Oregon Trail game as a fun activity that involves a lot of different careers and interests.  Show the students how to play the Oregon Trail game and after have them each do a practice round so they get comfortable with it.  *Give them Winter Booklet instructions on needing to play Oregon Trail 3 times during that period, once for each different occupation option, and answer follow up questions. |
| 5 | Winter Booklet review | Discussion about the Winter Booklet and what makes learning hardest. Students share their Oregon Trail strategies from their Winter Booklet while one researcher takes students outside to do Think-Alouds. | All metacognitive strategies but mostly reflect/adjust | Discussion on academic skills related to various educational niches and what student passions are related to academic fields. | Poll on where students want to go to college, class stats, and celebrities who went to college. Oregon Trail index cards collected. |

Development of Metacognition

| 6 | Writing techniques and clips of video animating the writing process | Discussion about writing process and different strategies that can be utilized. | Applying strategies and planning | Discussion about shifting interests and how students may have to try out a slew of jobs before finding their desired vocation. | Discussion on picking a college properly and what students hope to accomplish there. |
|---|---|---|---|---|---|
| 7 (8th grade only) | Writing techniques, part II - Revising | Discussion with students about how to complete their papers from a rough draft to a final paper, including how to revise and edit effectively. | Reflect/adjust | N/A | Application Process/ Discussion on what students don't understand about it. |
| 8 | Review of strategies, study skills, and 5-step model | Jeopardy Review Game | All metacognitive steps | N/A | Back to celebrities, Colleges, and Wrap up |

*Table 2. Correlations among all Metacognition Measures, Motivational Measures, and Quarter 1 through 3 Grades*

| Measures | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-Intervention | | | | | | | | | | | | | | |
| 1. Quant. MC5 | | | | | | | | | | | | | | |
| 2. Qual. MC5 | .30*** | | | | | | | | | | | | | |
| 3. Self-Efficacy | .63*** | .22** | | | | | | | | | | | | |
| 4. Achievement Values | .53*** | .19* | .47*** | | | | | | | | | | | |
| 5. Engagement | .70*** | .29** | .61*** | .56*** | | | | | | | | | | |
| 6. Anxiety | -.21* | .11 | -.18* | .06 | -.24** | | | | | | | | | |
| Post-Intervention | | | | | | | | | | | | | | |
| 7. Quant. MC5 | .74*** | .29** | .56*** | .53*** | .69*** | -.11 | | | | | | | | |
| 8. Qual. MC5 | .31*** | .49*** | .23** | .22** | .25** | .11 | .38*** | | | | | | | |
| 9. Self-Efficacy | .41*** | .16 | .69*** | .40*** | .56*** | -.22** | .60*** | .29*** | | | | | | |
| 10. Achievement Values | .33*** | .26** | .23** | .69*** | .49*** | -.01 | .51*** | .33*** | .42*** | | | | | |
| 11. Engagement | .58*** | .30*** | .52*** | .52*** | .80*** | -.27** | .73*** | .35*** | .61*** | .56*** | | | | |
| 12. Anxiety | -.16 | .11 | -.17* | .01 | -.20* | .66*** | -.00 | .17* | -.06 | -.02 | -.22** | | | |
| Grades | | | | | | | | | | | | | | |
| 13. Q1 | .41*** | .33*** | .49*** | .19* | .46*** | -.09 | .47*** | .38*** | .48*** | .11 | .48*** | -.01 | | |
| 14. Q2 | .43*** | .28*** | .54*** | .24** | .51*** | -.13 | .51*** | .41*** | .56*** | .21* | .55*** | -.12 | .84*** | |
| 15. Q3 | .39*** | .27*** | .48*** | .21* | .43*** | -.06 | .46*** | .40*** | .50*** | .17* | .48*** | -.02 | .80*** | .88*** |

Note: N's range from 139 to 148. Quant. = Quantitative; Qual. = Qualitative; MC5 = Metacognition 5; Q = Quarter Marking Period.
*** Correlation is significant at the .001 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).
 * Correlation is significant at the .05 level (2-tailed).

*Table 3. Effects of Grade by Time by Condition on Quantitative MC5*

| Time | Experimental (*N* = 72) | | Control (*N* = 68) | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| Pre-Testing | | | | |
| 6th Grade | 3.75 | 0.44 | 3.62 | 0.51 |
| 8th Grade | 3.33 | 0.59 | 3.41 | 0.54 |
| Post-Testing | | | | |
| 6th Grade | 3.79 | 0.62 | 3.58 | 0.48 |
| 8th Grade | 3.53 | 0.59 | 3.48 | 0.49 |

Development of Metacognition

*Table 4. Descriptive Statistics for Separate Steps in the Quantitative MC5*

| Step | M | SE | 95% CI |
|---|---|---|---|
| Assess the Task | | | |
| 6th Grade | 3.92 | 0.07 | (3.78, 4.06) |
| 8th Grade | 3.63 | 0.06 | (3.52, 3.75) |
| Evaluate Strengths/Weaknesses | | | |
| 6th Grade | 3.62 | 0.07 | (3.48, 3.76) |
| 8th Grade | 3.39 | 0.06 | (3.27, 3.51) |
| Plan | | | |
| 6th Grade | 3.50 | 0.08 | (3.36, 3.65) |
| 8th Grade | 3.08 | 0.06 | (2.96, 3.21) |
| Apply Strategies/Monitor Performance | | | |
| 6th Grade | 3.50 | 0.08 | (3.34, 3.66) |
| 8th Grade | 3.36 | 0.07 | (3.23, 3.49) |
| Reflect and Adjust | | | |
| 6th Grade | 3.89 | 0.09 | (3.71, 4.06) |
| 8th Grade | 3.72 | 0.07 | (3.57, 3.86) |

*Table 5. Effects of Time and Condition on Qualitative MC5*

| Time | Experimental (*N* = 72) | | Control (*N* = 70) | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| Pre-Testing | | | | |
| 6th Grade | 15.83 | 2.42 | 15.46 | 2.08 |
| 8th Grade | 16.81 | 3.06 | 15.52 | 3.92 |
| | | | | |
| Post-Testing | | | | |
| 6th Grade | 16.93 | 4.14 | 15.46 | 2.03 |
| 8th Grade | 16.65 | 3.29 | 16.26 | 3.17 |

*Table 6. Descriptive Statistics for Grade Level Differences in Motivational Variables*

| Motivational Variable | 6th Grade ($N = 57$) | | 8th Grade ($N = 83$) | |
|---|---|---|---|---|
| | *M* | *SE* | *M* | *SE* |
| Self-Efficacy | 5.61 | 0.13 | 5.15 | 0.11 |
| Achievement Values | 4.97 | 0.17 | 4.83 | 0.14 |
| Engagement vs. Disaffection Overall | 3.30 | 0.05 | 2.98 | 0.04 |
| Anxiety | 3.69 | 0.16 | 4.28 | 0.13 |

*Table 7. Descriptive Statistics for 6th and 8th Grade Students' Quarterly Grades*

| Time | Experimental ($N = 72$) | | Control ($N = 74$) | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| First Quarter | | | | |
| 6th | 90.59 | 6.10 | 91.07 | 7.70 |
| 8th | 86.58 | 11.04 | 84.64 | 12.69 |
| Second Quarter | | | | |
| 6th | 88.03 | 7.52 | 88.20 | 7.67 |
| 8th | 78.65 | 14.06 | 79.77 | 13.58 |
| Third Quarter | | | | |
| 6th | 89.72 | 7.23 | 88.63 | 10.62 |
| 8th | 79.70 | 15.28 | 81.73 | 13.65 |

**Figures**

*Figure 1. Effects of Time and Condition on Quantitative MC5*
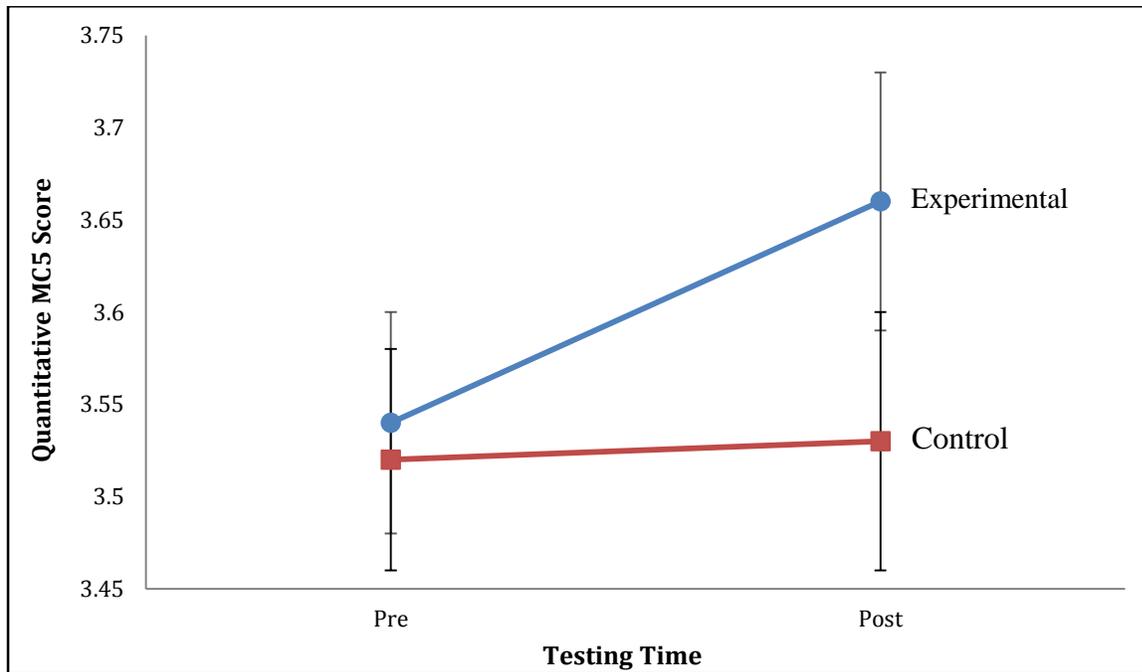
*Figure 2. Main Effect of Step for the Quantitative MC5*
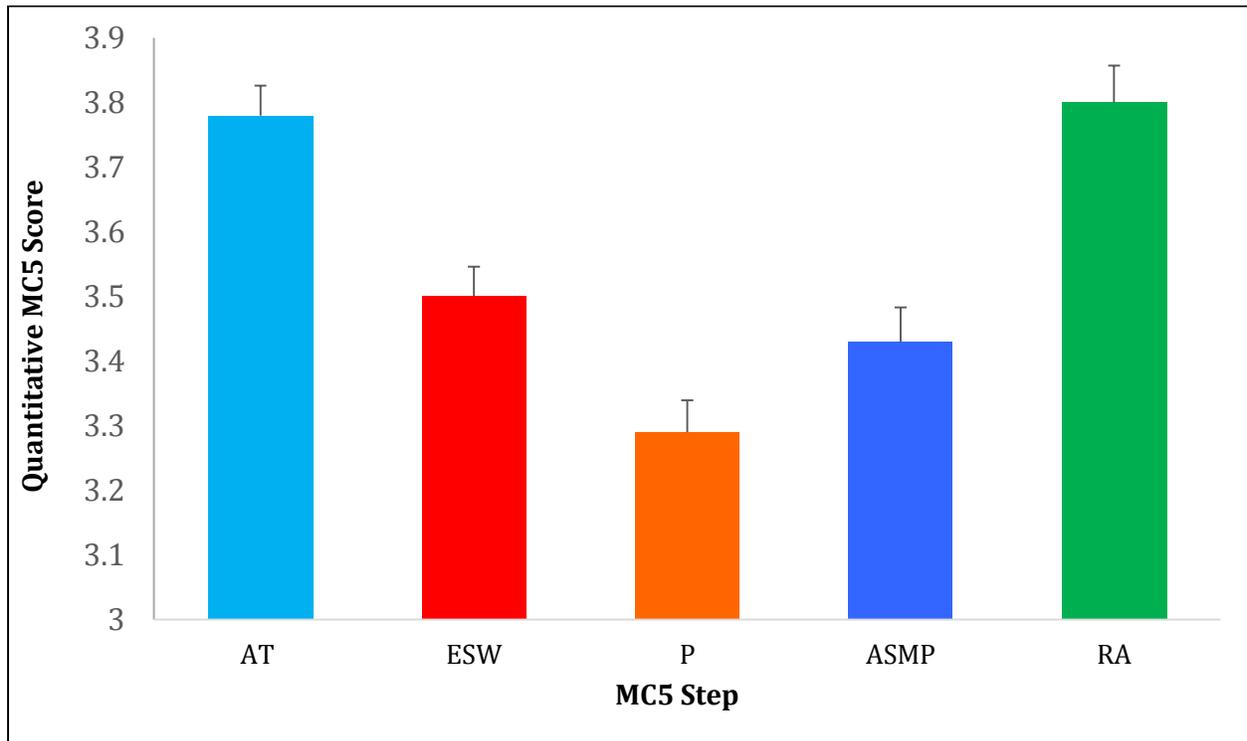


AT = Assess the Task; ESW = Evaluate Strengths & Weaknesses; P = Plan; ASMP = Apply Strategies & Monitor Performance; RA = Reflect & Adjust

*Figure 3. Grade Level by Step Interaction for the Quantitative MC5*
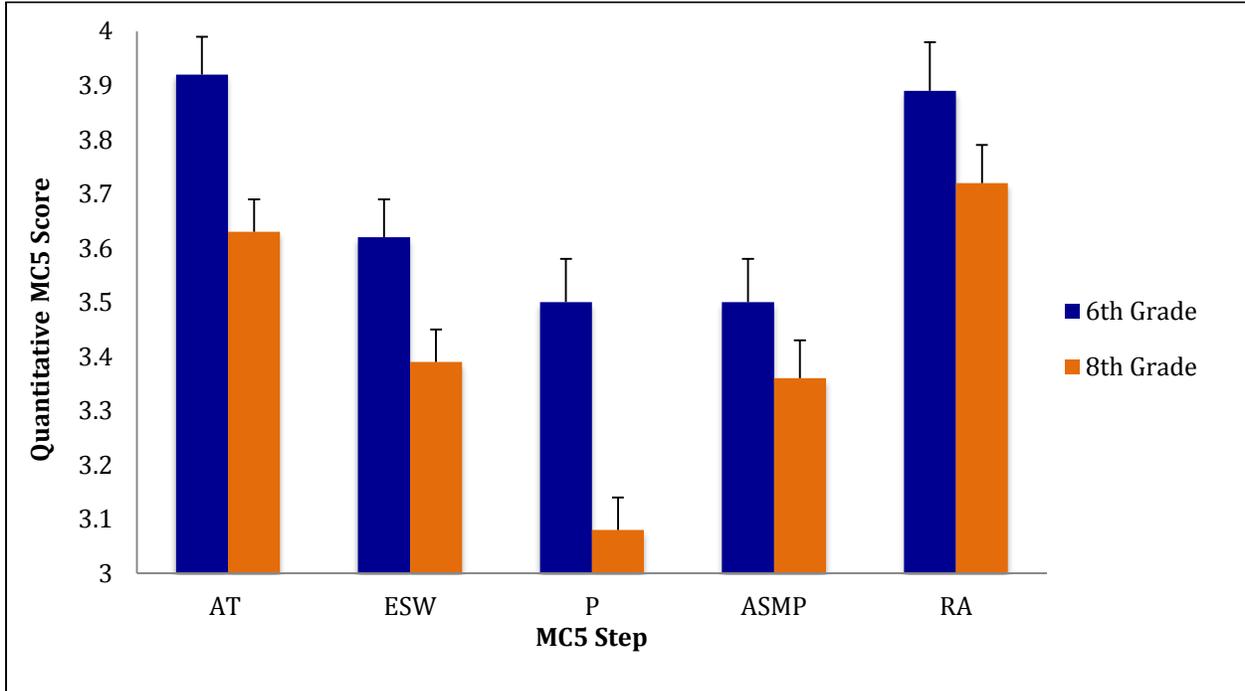


AT = Assess the Task; ESW = Evaluate Strengths & Weaknesses; P = Plan; ASMP = Apply Strategies & Monitor Performance; RA = Reflect & Adjust

*Figure 4. Interaction Effect of Condition by Time by Grade on the Qualitative MC5*
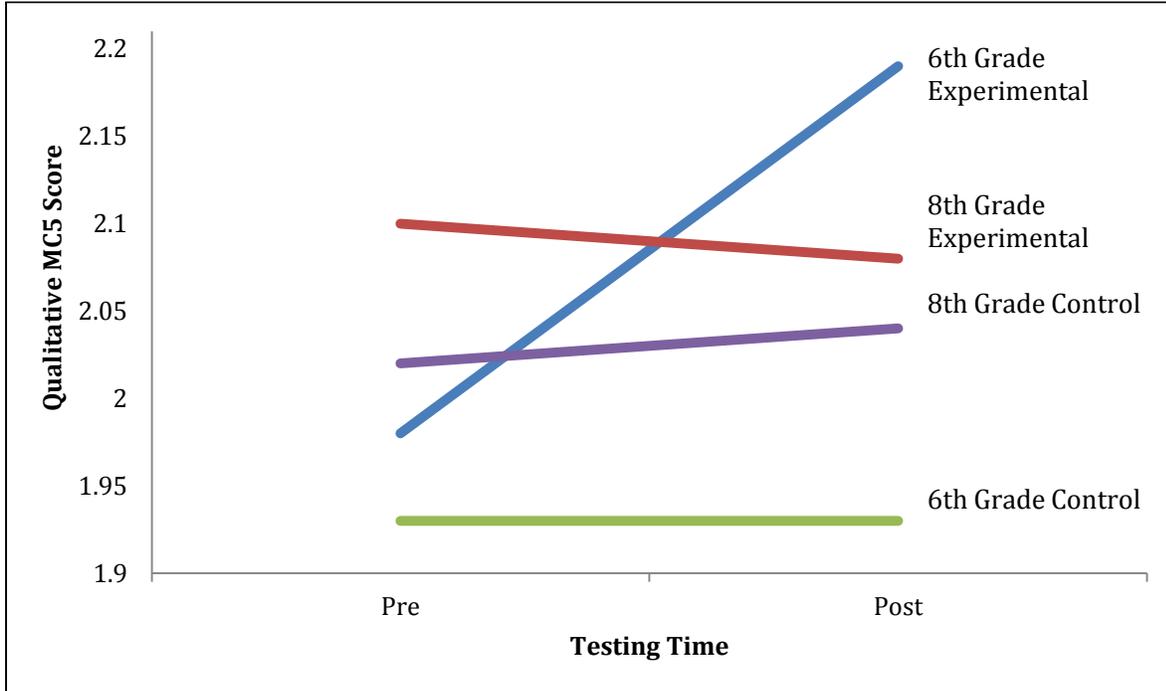
*Figure 5. Main Effect of Step for the Qualitative MC5*
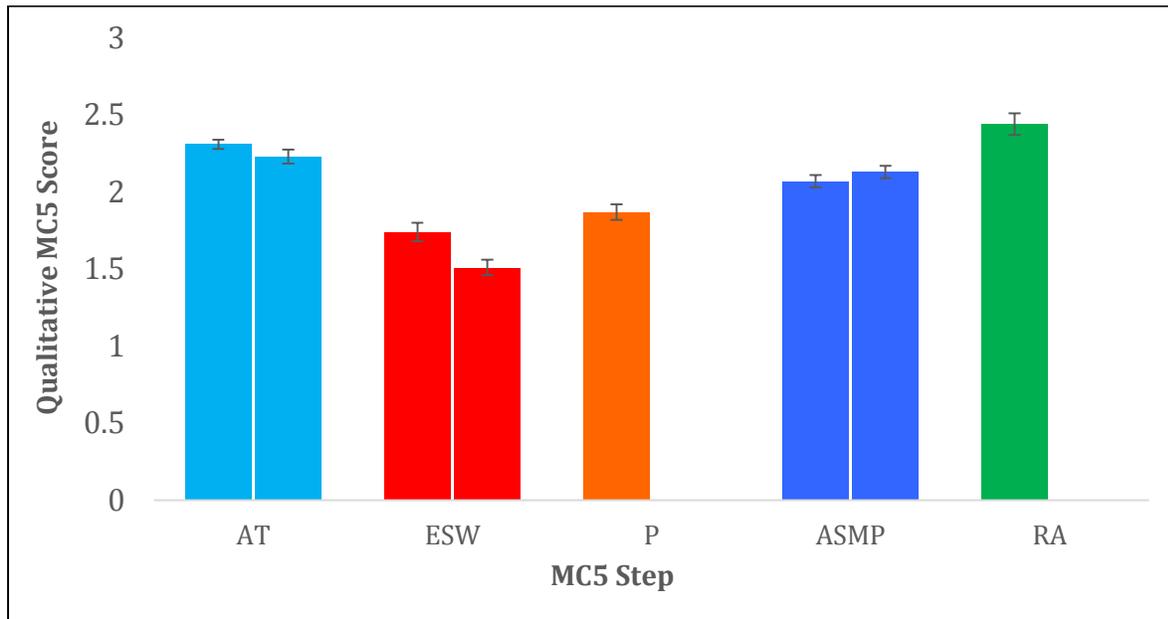


AT = Assess the Task; ESW = Evaluate Strengths & Weaknesses; P = Plan; ASMP = Apply Strategies & Monitor Performance; RA = Reflect & Adjust

*AT, ESW, ASMP had two questions per item

*Figure 6. Grade Level by Step Interaction for the Qualitative MC5*
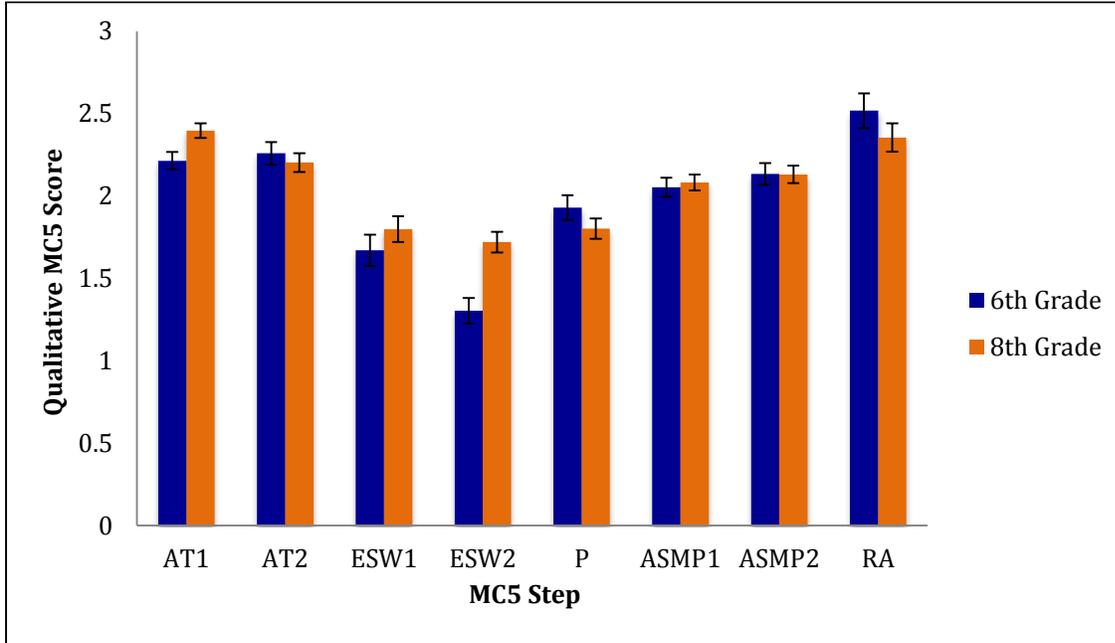


AT = Assess the Task; ESW = Evaluate Strengths & Weaknesses; P = Plan; ASMP = Apply Strategies & Monitor Performance; RA = Reflect & Adjust

*AT, ESW, ASMP had two questions per item

*Figure 7. Condition by Time Interaction for Self-Efficacy*
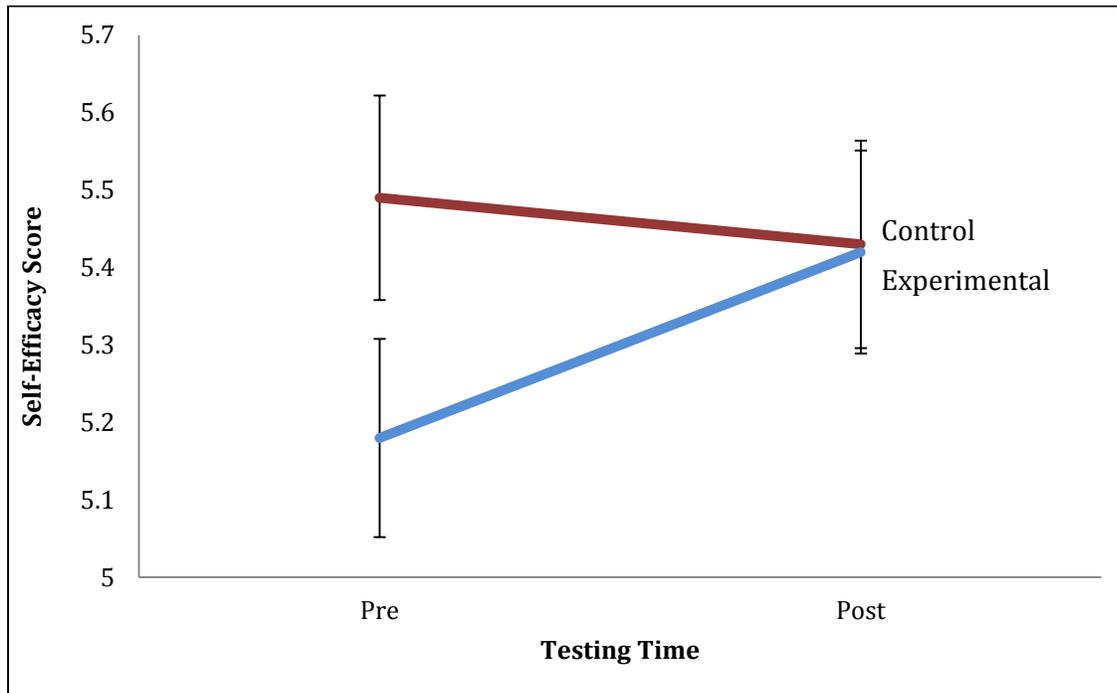
*Figure 8. Condition by Time Interaction for Behavioral Engagement*
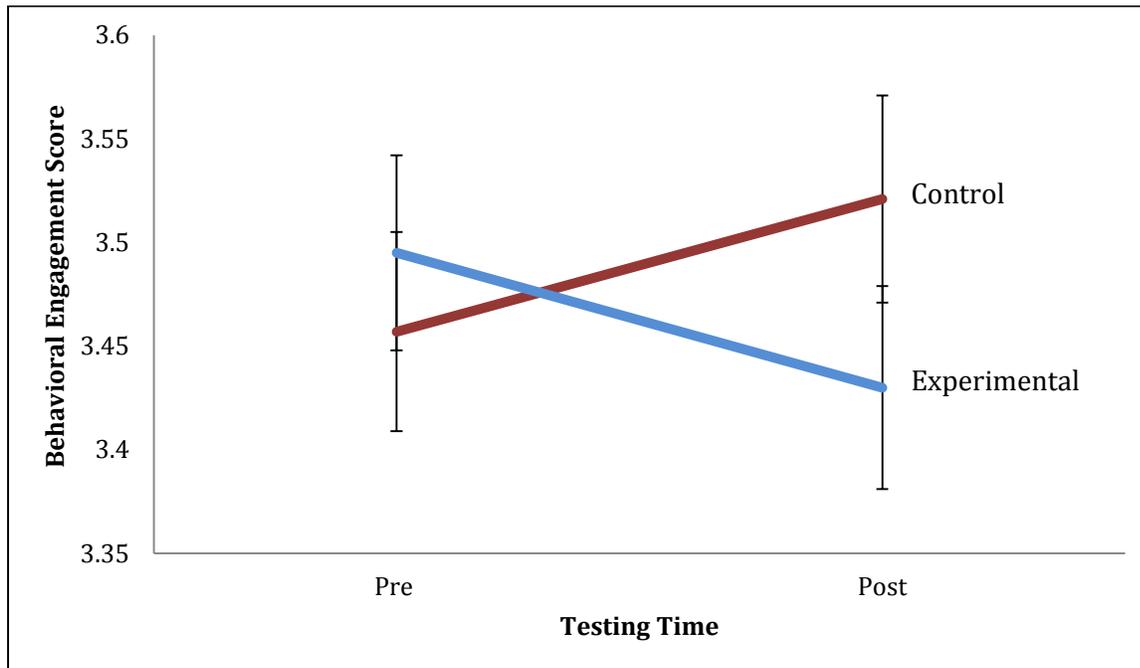
*Figure 9. Condition by Time Interaction for Anxiety*

*Figure 10. Quarterly Grades for 6th and 8th Grade Students as a function of Intervention Condition*

*Figure 11. Effect of Grade Level on Academic Performance Across Quarters*
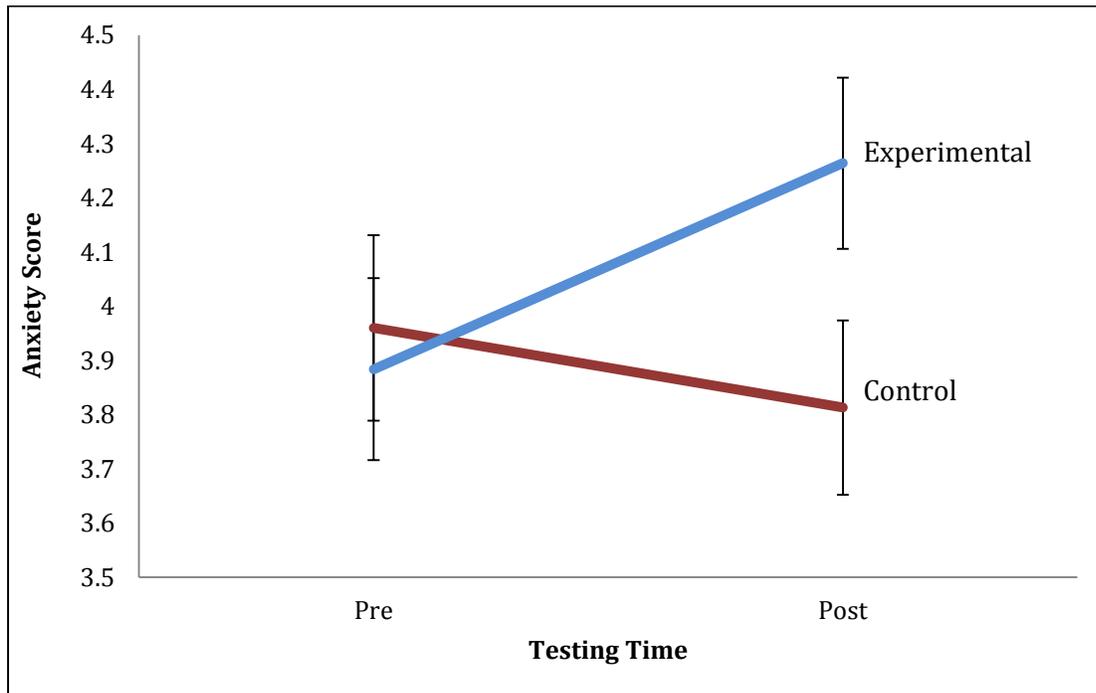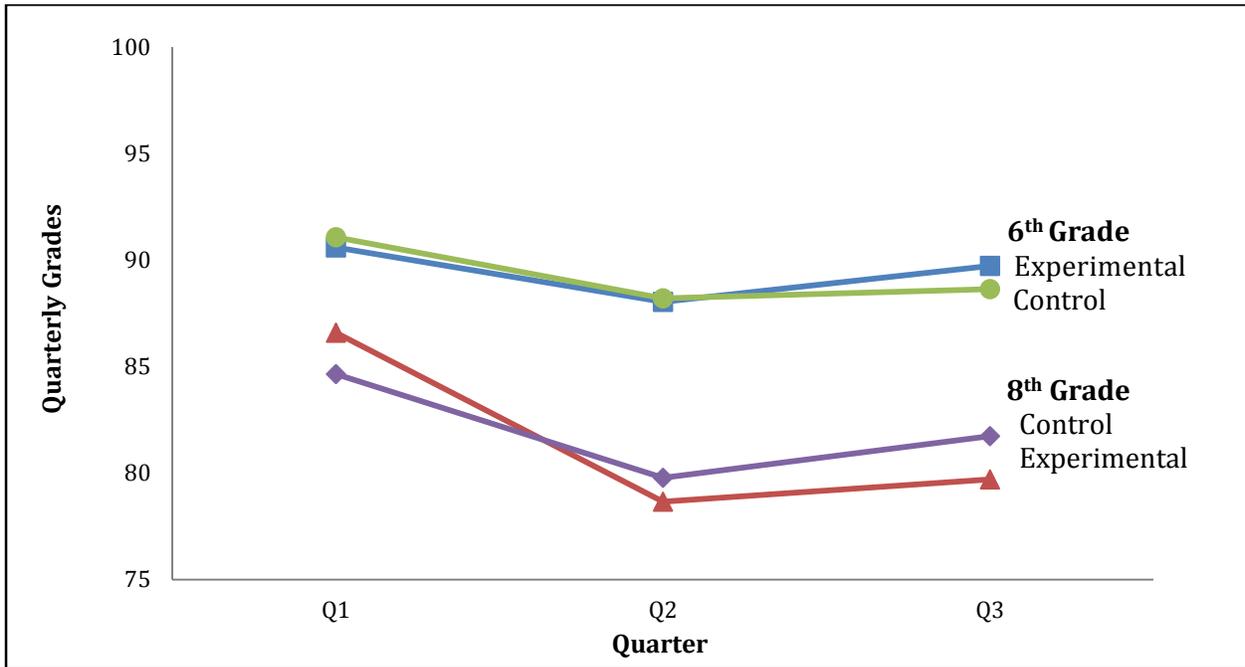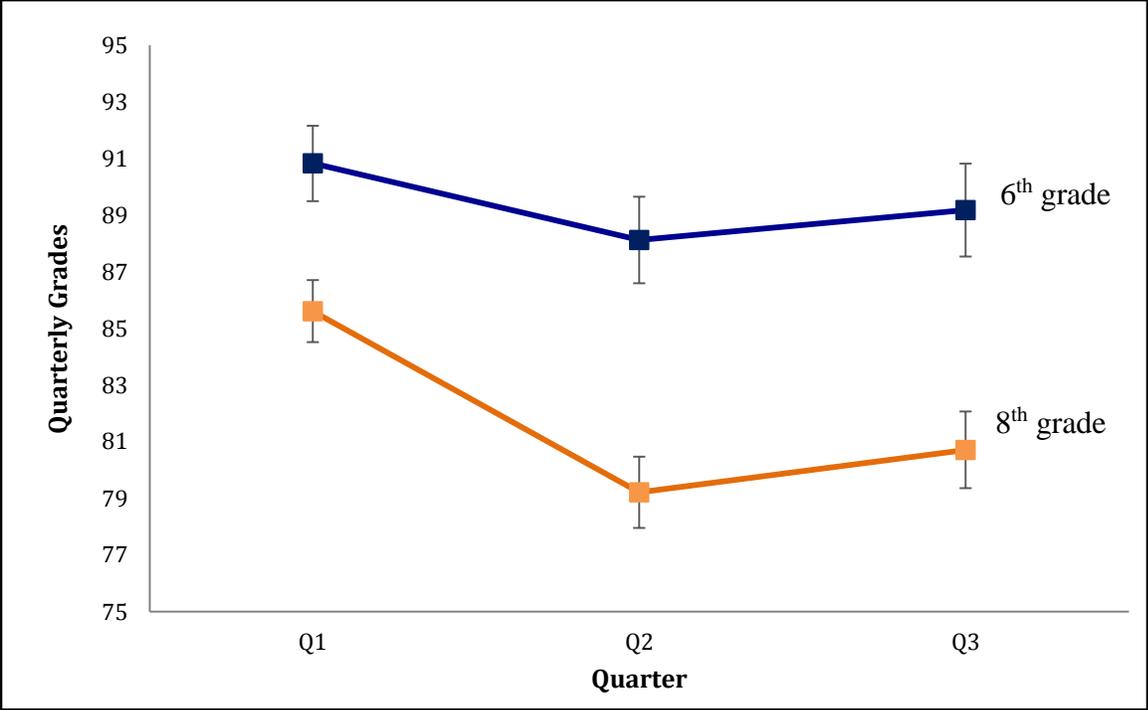
*Figure 12. Effect of Time on Teacher Ratings of Metacognition*
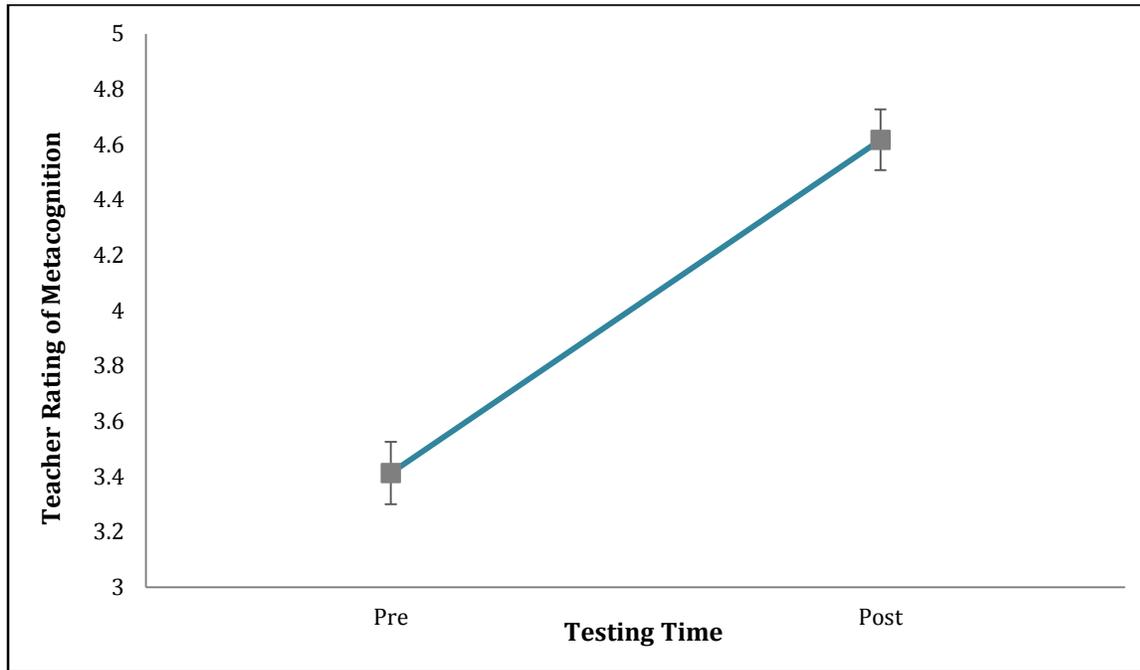
*Figure 13. Grade Level by Time Teacher Ratings of Student Metacognition Interaction Effect*

Development of Metacognition

**Appendices**

Appendix A

**HARTFORD Public Schools**
CHOOSE. ACHIEVE. SUCCEED.

**HARTFORD MAGNET TRINITY COLLEGE ACADEMY**
*at The Learning Corridor*
  *Sally A. Biggs, Principal*

**Trinity College**
*Hartford, Connecticut*

Dear Parent/Guardian,

      As part of the Learning Corridor partnership and our relationship with Trinity College we have been invited to participate in a promising ongoing research project. The students in my class will be learning about strategies that may help improve academic motivation. The study, *Self-Regulated Learning in 6th Grade Social Studies*, is designed to measure students' motivational beliefs and ways in which students self-regulate their learning.

      During the 2nd marking period students will answer questions about their learning styles, learn effective study techniques, and engage in small group activities to stimulate learning. We anticipate the project will take approximately 4-5 hours (typically 20-30 minute sessions) spread out over the duration of one marking period. Trinity Professors Dina Anselmi and David Reuman will be overseeing the project. The classroom activities will be conducted by Trinity students under my direct supervision.

      If you have any questions or concerns regarding this exciting opportunity, please feel free to contact me (860-302-2627) and/or Mrs. Biggs (860-695-7201). We look forward to sharing our research results in the spring. Please sign this consent form indicating you have read this letter and agree to have your child participate in this study.

      Sincerely, Mr. Roarty

Title of Project:       *Self-Regulated Learning in 6th Grade Social Studies*

Principal Investigators:       Dina Anselmi, Ph.D. (860) 297-2236 or Dina.Anselmi@trincoll.edu
      Department of Psychology, Trinity College, Hartford, CT 06106

      David Reuman, Ph.D. (860) 297-2341 or David.Reuman@trincoll.edu
      Department of Psychology, Trinity College, Hartford, CT 06106

      Timothy Roarty Timothy.Roarty@hartfordschools.org
      Hartford Magnet Middle School, Hartford, CT 06106

I acknowledge that I have received and read a letter explaining the *Self-Regulated Learning in 8th Grade Social Studies* study. I understand that there are no known risks to participants in the study, that my 8th grade child is free to withdraw from participation at any time, and that any questions that I may have about the study will be answered fully by the principal investigators.

      ☐ I grant permission for my 8th grade son / daughter to participate.
      ☐ I do not grant permission for my child to participate.

_____        _____
Print Your 6th grade Son's / Daughter's Name        Print Your Name

_____        _____
Your Son's / Daughter's Signature        Your Signature

Appendix B

**HARTFORD MAGNET TRINITY COLLEGE ACADEMY**
*at The Learning Corridor*
  *Sally A. Biggs, Principal*

Dear Parent/Guardian,

   As part of the Learning Corridor partnership and our relationship with Trinity College we have been invited to participate in a promising ongoing research project. The students in my class will be learning about strategies that may help improve academic motivation. The study, *Self-Regulated Learning in 8th Grade Social Studies*, is designed to measure students' motivational beliefs and ways in which students self-regulate their learning.

   During the 2nd marking period students will answer questions about their learning styles, learn effective study techniques, and engage in small group activities to stimulate learning. We anticipate the project will take approximately 4-5 hours (typically 20-30 minute sessions) spread out over the duration of one marking period. Trinity Professors Dina Anselmi and David Reuman will be overseeing the project. The classroom activities will be conducted by Trinity students under my direct supervision.

   If you have any questions or concerns regarding this exciting opportunity, please feel free to contact me (860-695-7226) and/or Mrs. Biggs (860-695-7201). We look forward to sharing our research results in the spring. Please sign this consent form indicating you have read this letter and agree to have your child participate in this study.

        Sincerely, Ms. Avery

Title of Project:        *Self-Regulated Learning in 8th Grade Social Studies*

Principal Investigators:   Dina Anselmi, Ph.D. (860) 297-2236 or Dina.Anselmi@trincoll.edu
             Department of Psychology, Trinity College, Hartford, CT 06106

             David Reuman, Ph.D. (860) 297-2341 or David.Reuman@trincoll.edu
             Department of Psychology, Trinity College, Hartford, CT 06106

             Deb Avery davery@hartfordschools.org
             Hartford Magnet Middle School, Hartford, CT 06106

I acknowledge that I have received and read a letter explaining the *Self-Regulated Learning in 8th Grade Social Studies* study. I understand that there are no known risks to participants in the study, that my 8th grade child is free to withdraw from participation at any time, and that any questions that I may have about the study will be answered fully by the principal investigators.

   ☐ I grant permission for my 8th grade son / daughter to participate.
   ☐ I do not grant permission for my child to participate.

_____        _____
Print Your 8th grade Son's / Daughter's Name        Print Your Name


_____        _____
Your Son's / Daughter's Signature        Your Signature

Appendix C

**HARTFORD** Public Schools

CHOOSE. ACHIEVE. SUCCEED.

**RTFORD MAGNET TRINITY COLLEGE ACADEMY**
*at The Learning Corridor*
        *Sally A. Biggs, Principal*

**Trinity College**
*Hartford, Connecticut*

Dear Parent/Guardian,
        As you already know, we have been invited to participate in a promising ongoing research project proctored by faculty and students at Trinity College. The students in my class will be learning about strategies that may help improve academic motivation. The study, *Self-Regulated Learning in 8th Grade Social Studies*, is designed to measure students' motivational beliefs and ways in which students self-regulate their learning.
        In addition to the general experimental design, your child has been selected to join a subset of students who will be asked to answer questions related to their thought processes during an educational game that all of the students will play. Accordingly, they will be audio-video recorded initially, but once the answers are transcribed and assigned to their confidential ID numbers, the recordings will be destroyed.
        If you have any questions or concerns regarding this exciting opportunity, please feel free to contact me (860-695-7226) and/or Mrs. Biggs (860-695-7201). We look forward to sharing our research results in the spring. Please sign this consent form indicating you have read this letter and agree to have your child participate in this specific aspect of the larger study that you have already consented to.
        Sincerely, Ms. Avery

Title of Project:             *Self-Regulated Learning in 8th Grade Social Studies*

Principal Investigators:      Dina Anselmi, Ph.D. (860) 297-2236 or Dina.Anselmi@trincoll.edu
                             Department of Psychology, Trinity College, Hartford, CT 06106

                             David Reuman, Ph.D. (860) 297-2341 or David.Reuman@trincoll.edu
                             Department of Psychology, Trinity College, Hartford, CT  06106

                             Deb Avery davery@hartfordschools.org
                             Hartford Magnet Middle School, Hartford, CT  06106

I acknowledge that I have received and read a letter explaining this specific student assignment within the *Self-Regulated Learning in 8th Grade Social Studies* study and will be the subject of audio-visual recording. I understand that there are no known risks to participants in the study, that my 8th grade child is free to withdraw from participation at any time, and that any questions that I may have about the study will be answered fully by the principal investigators.

☐ I grant permission for my 8th grade son / daughter to participate.
☐ I do not grant permission for my child to participate.

_____          _____
Print Your 8th grade Son's / Daughter's Name          Print Your Name

_____          _____
Your Son's / Daughter's Signature                      Your Signature

Appendix D

1. WHAT IS YOUR BIRTH DATE?  (MM / DD / YYYY)


2. WHAT IS YOUR SEX:      □ FEMALE    □ MALE


3. WHICH OF THE FOLLOWING GROUPS BEST DESCRIBES YOU?

    (YOU MAY CHECK MORE THAN ONE GROUP, IF APPROPRIATE)

    □    ASIAN OR PACIFIC ISLANDER

    □    HISPANIC, REGARDLESS OF RACE

    □    BLACK / AFRICAN-AMERICAN, NOT OF HISPANIC ORIGIN

    □    WHITE / CAUCASIAN, NOT OF HISPANIC ORIGIN

    □    AMERICAN INDIAN OR ALASKAN NATIVE


4. IN WHAT CITY OR TOWN DO YOU LIVE?
_____

Appendix E

**INSTRUCTIONS:** *We are interested in what you, as a learner, do when you work on and prepare for assignments or tests as a part of your history class.*

*Please read the following sentences and choose the answer that relates to you and the way you are when doing work for class.* <u>*Please answer as honestly as possible.*</u> *Your teacher may see some of your answers.*

---

1. When I am given an assignment in this class that asks me to remember a lot of information, I can tell what works best for me to remember everything.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

2. After completing a test or assignment in this class, I think about what went well.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

3. When I have a test coming up, I do most of my studying at the last minute.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

4. I read directions more than once before I start working on an assignment.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

5. I use skills – like taking notes, asking myself questions, and slowing down – when I read for this class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

6. I know what my strengths are on the work I do in this class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

7. After I get an assignment back, I try to figure out how I could improve my work for next time.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

8. When I start an assignment I check that I have all the things I will need – for example, a textbook, a computer, my notes, or the assignment itself – to complete the assignment.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

9. I do not understand the purpose of assignments in this class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

10. I review my writing for this class before I hand it into the teacher.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

11. I make an effort to examine my weaknesses on the work I do in this class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

12. I change my ways of completing an assignment when I realize that they are not working.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

13. When I work on a writing assignment, I immediately start writing without making an outline or a graphic organizer.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

14. I read directions carefully to make sure I understand all the different parts of an assignment.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

15. I ask my teacher for help.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

16. I can tell just how much time it will take me to complete assignments in this class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

17. When I get a bad grade in this class, I do not study any differently for the next assignment.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

18. When my homework requires specific materials, I remember to bring them home from school.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

19. I understand directions for assignments in this class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

20. When I read for this class I first focus on headings, bold words, and summaries and then read the material more carefully.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

21. My grades on assignments in this class are different from what I expect them to be.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

22. After completing a test or assignment in this class, I think about what did not work well.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

23. When I have an assignment that will be due more than a week in the future, I start working on it as soon as possible.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

24. I rush through directions to get started on a test as soon as possible.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

25. I compare my most recent grades in this class to my earlier grades in order to see if I'm improving.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

26. I know what my weaknesses are on the work I do in this class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

27. When my teacher returns a test, I try to figure out what I didn't understand.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

28. When I have a writing assignment due, I do most of my work at the last minute.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

29. After I read an assignment, I make sure I know what the main goal of the assignment is.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

30. I use skills – like using flash cards, study guides, and working with a partner – when I prepare for a test.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

31. I make an effort to examine my strengths on the work I do in this class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

32. When I get teacher comments or corrections on a writing assignment in this class, I don't pay any attention to them.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

33. I make a "to do" list before I start working on an assignment in this class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

34. When I have nearly finished an assignment, I read the directions one last time to make sure I have completed all parts of the assignment.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

35. I turn in tests for this class without checking my answers.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NEVER | RARELY | SOMETIMES | OFTEN | ALWAYS |

Appendix F

*Self-Efficacy*

36. Compared with other students in this class I expect to do well.

|  1  |  2  |  3  |  4  |  5  |  6  |  7  |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| **NOT AT ALL TRUE OF ME** | | | | | | **VERY TRUE OF ME** |

37. I'm certain I can understand the ideas taught in this course.

|  1  |  2  |  3  |  4  |  5  |  6  |  7  |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| **NOT AT ALL TRUE OF ME** | | | | | | **VERY TRUE OF ME** |

38. I expect to do very well in this class.

|  1  |  2  |  3  |  4  |  5  |  6  |  7  |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| **NOT AT ALL TRUE OF ME** | | | | | | **VERY TRUE OF ME** |

39. Compared to others in this class, I think I'm a good student.

|  1  |  2  |  3  |  4  |  5  |  6  |  7  |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| **NOT AT ALL TRUE OF ME** | | | | | | **VERY TRUE OF ME** |

40. I am sure I can do an excellent job on the problems and tasks assigned for this class.

|  1  |  2  |  3  |  4  |  5  |  6  |  7  |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| **NOT AT ALL TRUE OF ME** | | | | | | **VERY TRUE OF ME** |

41. I think I will receive a good grade in this class.

|  1  |  2  |  3  |  4  |  5  |  6  |  7  |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| **NOT AT ALL TRUE OF ME** | | | | | | **VERY TRUE OF ME** |

42. My study skills are excellent compared with others in this class.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL**
**TRUE OF ME**

**VERY TRUE**
**OF ME**

43. Compared with other students in this class I think I know a great deal about the subject.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL**
**TRUE OF ME**

**VERY TRUE**
**OF ME**

44. I know I will be able to learn the material for this class.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL**
**TRUE OF ME**

**VERY TRUE**
**OF ME**

Appendix G

*Achievement Values*

45. In general, how useful is what you learn in history?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL
USEFUL**                                                                **VERY
USEFUL**

46. How useful do you think the history you are learning will be for what you want to do in the future?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL
USEFUL**                                                                **VERY
USEFUL**

47. For me, being good at history is

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL
USEFUL**                                                                **VERY
USEFUL**

48. In general, I find working on history assignments

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL
USEFUL**                                                                **VERY
USEFUL**

49. Would you take more history if you didn't have to? (Check one answer.)

\_\_\_\_\_ **1) I very definitely would take more history.**

\_\_\_\_\_ **2) I probably would take more history.**

\_\_\_\_\_ **3) Maybe I would take more history.**

\_\_\_\_\_ **4) I'm not sure.**

\_\_\_\_\_ **5) Maybe, but not that likely.**

\_\_\_\_\_ **6) I probably would not take any more history.**

\_\_\_\_\_ **7) I very definitely would not take any more history.**

Appendix H

*Engagement versus Disaffection*

15. I try hard to do well in school.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

16. I enjoy learning new things in class.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

17. When I'm in class, I can't wait for it to be over.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

18. When we work on something in class, I feel discouraged.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

19. In class, I do just enough to get by.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

20. Class is fun.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

21. In class, I work as hard as I can.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

22. When I'm in class, I feel bad.

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

23. When I'm in class, I listen very carefully.

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

24. When I'm in class, I feel worried.

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

25. When we work on something in class, I get involved.

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

26. I don't care if I miss class.

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

27. When I'm in class, I think about other things.

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

28. When we work on something in class, I feel interested.

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

29. Class is not all that fun for me.

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

30. When I'm in class, I just act like I'm working.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

31. When I'm in class, I feel good.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

32. When I'm in class, my mind wanders.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

33. I work on other things when I'm in class.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

34. When I'm in class, I participate in class discussions.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

35. When we work on something in class, I feel bored.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

36. I don't try very hard at school.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

37. I pay attention in class.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

38. When I can't answer a question, I feel frustrated.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| **NOT AT ALL TRUE** | **NOT VERY TRUE** | **SORT OF TRUE** | **VERY TRUE** |

## Appendix I

*Test Anxiety*

39.　When I take a test, I think about how poorly I am doing compared with other students.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL**
**TRUE OF ME**
　　　　　　　　　　　　　　　　　　　　　　　　　**VERY TRUE**
　　　　　　　　　　　　　　　　　　　　　　　　　**OF ME**

40.　When I take a test I think about items on other parts of the test I can't answer.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL**
**TRUE OF ME**
　　　　　　　　　　　　　　　　　　　　　　　　　**VERY TRUE**
　　　　　　　　　　　　　　　　　　　　　　　　　**OF ME**

41.　When I take tests I think of the consequences of failing.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL**
**TRUE OF ME**
　　　　　　　　　　　　　　　　　　　　　　　　　**VERY TRUE**
　　　　　　　　　　　　　　　　　　　　　　　　　**OF ME**

42.　I have an uneasy, upset feeling when I take a test.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL**
**TRUE OF ME**
　　　　　　　　　　　　　　　　　　　　　　　　　**VERY TRUE**
　　　　　　　　　　　　　　　　　　　　　　　　　**OF ME**

43.　I feel my heart beating fast when I take a test.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**NOT AT ALL**
**TRUE OF ME**
　　　　　　　　　　　　　　　　　　　　　　　　　**VERY TRUE**
　　　　　　　　　　　　　　　　　　　　　　　　　**OF ME**

Appendix J

---

## SHORT ANSWERS: *INSTRUCTIONS*

- *Please answer every question in regards to your history class.*
- *Give lots of examples and that there are no right or wrong answers.*
- *Please EXPLAIN your answers when asked to do so.*
- *These answers will not be graded.*

---

1. At the beginning of an assignment or project for your history class, what would you do if you did not understand the directions?

    _____

    _____

    _____

    _____

    _____

    _____

2. Do you usually make sure you understand the purpose of an assignment or project in history class? **(circle one)**

        **YES**            **NO**

    a)    *Explain why or why not:*

    _____

    _____

    _____

    _____

    _____

    _____

3.  What are some of the skills that you are good at in history class?

    _____

    _____

    _____

    _____

    _____

    _____

4.  What are some skills you need to improve on in history class?

    _____

    _____

    _____

    _____

    _____

    _____

5.  When you have an assignment or project in this class, do you *(check one):*

    ☐ **Plan how you are going to complete it before you start**

    ☐ **Immediately begin working on it**

    a) *Explain why you do one or the other:*

    _____

    _____

    _____

    _____

6.  Which strategies have you used to help yourself in this class? *(Check all that apply)*

    ☐ **Making study guides**
    ☐ **Flash cards**
    ☐ **Taking notes**
    ☐ **Talking to the teacher**
    ☐ **Other** (please specify) _____

    a) *How have these strategies been helpful to you in this class?*

    _____
    _____
    _____
    _____

7.  How do you monitor your work progress as you complete a project or assignment? *(Check all that apply)*

    ☐ **Ask the teacher**
    ☐ **Talk to my friends**
    ☐ **Use a grading rubric**
    ☐ **Check off things on my to-do-list**
    ☐ **Other** (please specify) _____

    b) *How do these help you complete a project or assignment well?*

    _____
    _____
    _____
    _____
    _____

8.  When you get an assignment back in this class that you did not do well on, or as well as you hoped, do you think about what went wrong? **(Check one of the following)**

    ☐ **I don't think about it at all**

    ☐ **I think about it a little**

    ☐ **I think about it until I figure out how I can do better**

    a) *Explain why you do this:*

    _____

    _____

    _____

    _____

    _____

Appendix K

**Teacher name** _____

**Block      A        B        C        D        E**

### Teacher Rating of Student Metacognition

Metacognition refers to reflecting on and directing one's own thinking to become a more effective learner. Listed below are several behavior descriptors that would distinguish students who are LOW and HIGH in metacognition. Using the following scale below, rate each student in your class regarding your best judgment of his or her level of metacognition and assign a number for that student's level of metacognition.

| **LOW Metacognition** | **HIGH Metacognition** |
|---|---|
| 1. Misunderstands purpose of assignments or tests | 1. Understands purpose of assignments or tests |
| 2. Overestimates strengths and weaknesses when preparing for a test or assignment | 2. Accurately estimates strengths and weaknesses when preparing for a test or assignment |
| 3. Does not plan purposefully for assignments or tests | 3. Plans purposefully for assignments or tests |
| 4. Does not monitor own performance | 4. Monitors own performance |
| 5. Unwilling or unable to adjust based on feedback or self reflection | 5. Willing or able to adjust based on feedback or self reflection |

### Level of Metacognition

| **Student name** | Very low | | | | | Very high |
|---|---|---|---|---|---|---|
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |
| _____ | 1 | 2 | 3 | 4 | 5 | 6 |

**Teacher name** _____

**Block**    **A**       **B**      **C**      **D**      **E**

### Teacher Rating of Student Mindset

There are two main types of beliefs about the modifiability of one's intelligence. Someone with a FIXED MINDSET believes that intelligence is static and desires to look smart. On the other hand, a person with a GROWTH MINDSET believes that intelligence can be developed and desires to learn. Using the following scale below, rate each student in your class regarding your best judgment of his or her type of mindset and assign a number for that student's level of intelligence beliefs.

| **Fixed Mindset** | **Growth Mindset** |
|---|---|
| 1. Avoids challenges | 1. Embraces challenges |
| 2. Gives up easily | 2. Persists in the face of setbacks |
| 3. Sees effort as fruitless or worse | 3. Sees effort as the path of mastery |
| 4. Ignores useful negative feedback | 4. Learns from criticism |
| 5. Feels threatened by the success of others | 5. Finds lessons and inspiration in the success of others |

### Type of Mindset

| **Student name** | Fixed | | | | | Growth |
|---|---|---|---|---|---|---|
| _____ | **1** | **2** | **3** | **4** | **5** | **6** |
| _____ | **1** | **2** | **3** | **4** | **5** | **6** |
| _____ | **1** | **2** | **3** | **4** | **5** | **6** |
| _____ | **1** | **2** | **3** | **4** | **5** | **6** |
| _____ | **1** | **2** | **3** | **4** | **5** | **6** |
| _____ | **1** | **2** | **3** | **4** | **5** | **6** |
| _____ | **1** | **2** | **3** | **4** | **5** | **6** |
| _____ | **1** | **2** | **3** | **4** | **5** | **6** |
| _____ | **1** | **2** | **3** | **4** | **5** | **6** |
| _____ | **1** | **2** | **3** | **4** | **5** | **6** |

Appendix L

**Qualitative MC5 2015-2016 Coding Criteria (Revised from 2014-2015)**

General Coding Outline:

0 – student did not assess the dimension or feature addressed by the question; gave no response; gave an inappropriate response

1 – partial explanation or superficial analysis, not sufficient to demonstrate metacognitive processes

2 – relevant/reasonable complete response

3 – complete response with elaboration or a demonstration of multiple strategies

\*In questions with multiple parts, answering 'No' in part A automatically disqualifies the answer from receiving a 3.

\*\*When coding, code for the explicit presence of criteria.  When in doubt, code down.\*\*


**Question 1 (Assess the Task): At the beginning of an assignment or project for your history class, what would you do if you did not understand the directions?**

0 – No response/Nonsensical response/Incomplete response

1 – Student provides a relevant response, but it does not indicate an initiative to seek any sort of advice or help to further understand the directions.
    *Ex. I complain and won't do the assignment.*

2 – Student provides no recognition of a sequence of multiple steps and indicates only one strategy (note: asking a friend or the teacher is considered to be the same strategy, unless there is sequencing indicated).
    *Ex. I would ask the teacher or a friend for help.*
    *Ex. I would ask a parent for help.*

3 – Student provides recognition that there are multiple strategies you could use or a reasonable sequence
    *Ex. I would ask a friend and then ask the teacher.*
    *Ex. I would try to plan out the assignment or ask the teacher.*

**Question 2: Do you usually make sure you understand the purpose of an assignment or project in history class? Yes     No // Explain why or why not**

0 – No response/inappropriate response/incomplete nonsensical answer
> *Ex. Yes*
> *Because I might not know it so I just*

1 – Repetition of question, or student answers no he or she doesn't make sure to understand the purpose of the assignment.
> *Ex. Yes*
> *I make sure I understand the purpose of the assignment.*
>
> *Ex. No*
> *Because I have to do the assignment either way and if I don't do it I'll get a bad grade, and everything has a good purpose to it.*

2 – Student says yes but doesn't address why understanding the purpose of the assignment is important **for learning**.
> *Ex. Yes*
> *The teacher tries to explain*
>
> *Ex. Yes*
> *Because I want to get a good grade.*
>
> *Ex. Yes*
> *I want to get into a good college.*

3 – Complete response that addresses **why** understanding the purpose of an assignment matters **for learning**.
> *Ex. Yes*
> *Yes, because if I understand the purpose of an assignment I know I am doing the assignment for a good reason.*
>
> *Ex. Yes*
> *If you do not know how to understand your assignment then how would you be able to do it.*

**Question 3: What are some of the skills that you are good at in history class?**
0 – No answer/irrelevant answer/incomplete answer
> *Ex. No*
> *Not exactly sure*

Development of Metacognition

1 – Response is related to a performance skill and can also be responses related to being good at a skill in specific content area that is not a cognitive learning strategy. It would be a 2 if the student indicated being good at "studying" for tests.

Performance Skill: Participation, taking tests, projects/posters, writing essays

Ability/Learning Strategy: Studying, taking notes, listening, asking questions, group work, memorizing/remembering facts, researching, creative thinking/problem solving, key points/main ideas

    *Ex. Yes*

    *I'm good at finding things on maps doing activities from the book.*

2 –Response is related to a learning strategy, rather than a performance skill.
    *Ex. Yes*
    *I'm good at asking questions in class*

    *Ex. Yes*
    *I'm good at identifying key points that happened during large happenings*
    *such as wars, revolts, etc.*

3 – Participant gives examples of multiple learning strategies

    *Ex. Yes*
      *I am good at note taking, writing and reading especially when I*
      *have to find main ideas*
    *Ex. Yes*
      *-remembering things -writing -taking notes*

**Question 4: What are some skills you need to improve on in history class?**

0 – No response/inappropriate response/Incomplete response
    *Ex. I do not need to improve on anything.*

1 – Provides a complete response to the question, but gives performance skills.
    *Ex. Remembering "Name date & block"*
    *Ex. Learning the places of where there at on the u.s. map 50 states*

    *Ex. turning in my homework*

2- Student provides a complete response and indicated he or she makes an effort to think about learning skills or what they need to improve on.
    *Ex. I need to improve on my studying skills.*

3- Student provides a learning skill with an elaboration.
>  *Ex. well, I'm really not so premium at remembering dates and years because in my brain, numbers and maths are difficult to understand.*
>
> *Ex. One skill that I have to improve on is taking notes in history class. When we take notes we have to take bullet notes and for me, instead of taking bullet notes I write down the whole paragraph.*

**Question 5 - (Planning): When you have an assignment or project in this class, do you (check one): Plan how you are going to complete it before you start or Immediately begin working on it**
> **Explain why you do one or the other**

0 – No answer/Nonsensical/Incomplete
>  *Ex. Immediately begin working*
> > *I don't really know (I don't know = incomplete)*
>
> *Ex. Plan* (with nonsensical explanation)
> >  *I like pizza.*

1 – Student immediately begins working, but answer does not indicate use metacognitive strategy.
>  *Ex. Immediately begin working*
>
> >  *It's a habit*
>
> *Ex. Immediately begin working*
>
> > *When I have an assignment in this class I immediately begin working cause it's faster.*

2 – Student writes down a plan and provides an explanation as to why they do this.  If student begins working immediately, they indicate reflection or adjustment.
>  *Ex. Write down a plan*
> > *Because it doesn't seem as big when I plan it out*
>
> *Ex. Immediately begin working*
> > *So I can revise it later.*
>
> *Ex. Write down a plan*
> > *Before I start an assignment I usually write down a plan because I want it to be organized.*
>
> *Ex. I write down a plan because I could understand the assignment more and get an idea of what to accomplish.*

3 – Student provides a **process** understanding of why planning is helpful and necessary when approaching an assignment.
>  *Ex. Write down a plan*

*Because I don't want to just start it really quick and then mess up and
then start all over.*

**Question 6 (Apply Strategies and Monitor Performance): What strategies have you used to
help yourself in this class? How have these strategies been helpful?**

0 – Incomplete/blank/inappropriate response

1 – Strategy listed with no explanation, or an explanation that shows no conceptual or even
superficial understanding of the strategy.
    *Ex. Taking notes*
        *No because I forget to use them*

    *Ex. Taking notes*
        *Yes they have*

2 – Response with one strategy (or more) and a reasoning of why the strategy is helpful.
    *Ex. Making study guides, taking notes*
        *I will get questions right on a quiz because I studied with notes and study guides*
    *Ex. Taking notes*
        *It gives me a quick reference when I am doing work*

    *Ex. Making study guides*
        *Because it helps me do well in my classes*

3 – Conceptual, process understanding of the strategies listed above. More than one strategy
listed with a clear explanation of how the student applies both of them.
    *Ex. Making study guides, taking notes*
        *Having notes is helpful for the process of studying and study guides give me examples of
what will be on the test.*

**Question 7: How do you monitor your work progress as you complete a project or
assignment? (Check all that apply)**
**Ask the teacher/Talk to my friends/Use a Grading Rubric /Check off things on my to-do list
/Others (please specify) _____**
        **How do these help you complete a project or assignment well?**

0 – Incomplete/blank/inappropriate response

1- Student checked one or more strategies, but the explanation is unclear or repeats the words
from the question.

    *Ex. Ask the teacher*
    *they help because I get help for I can have a good grade in class*

    *Ex. Powerschool*

*This helps me.*

2- Student provides one or more strategies and an explanation that does not address how each specific strategy is helpful for an assignment.

> *Ex. use a grading rubric*
> *A grading rubric will tell me exactly what I need to do and its easy*
>
> *Ex. ask the teacher, talk to my friends, use a grading rubric*
> *They help me do good and get ideas on what I am doing right*

3- Student provides more than one strategy and explanations how **at least 2** of the strategies have helped them on their assignments

> *Ex. use a grading rubric; check off things on my to do list*
> *Using a grading rubric helps me by telling me what I need to on an assignment in order to get an A on it and the to-do list lets me know what else I need to do.*

**Question 8: When you get an assignment back in this class that you did not do well on, or as well as you hoped, do you think about what went wrong? (Check one of the following) I don't think about it at all. / I think about it a little. / I think about it until I figure out how I can do better.**
> **Explain why you do this:**

0 – Incomplete/blank/inappropriate response or student doesn't think about it at all
> *Ex. I don't think about it at all.*
> *When I get my work back I don't mind cause it was in the past and I can't change it.*

1 – Student thinks a little about what went wrong, but explanation does not indicate the student has a reflection or desire to change strategy use
> *Ex. I think about it a little.*
> *I only think about it a little because I have other classwork and things to do.*

2- Student thinks a little about what went wrong with an explanation.
> *Ex. I think about it a little*
> *I do this because I like to know why I did that bad on it.*
> *Ex. I think about it a little*
> *because I think about what I can do better to get a good grade*

3- Student thinks about how it until he or she can figure out how to do better and explanation addresses why this is important or helpful for future.
> *Ex. I think about it until I figure out how I can do better.*
*I do this so I know for the next test and if it is a test I find out what I did wrong so I can change my study habits for the next test.*

125

Appendix M
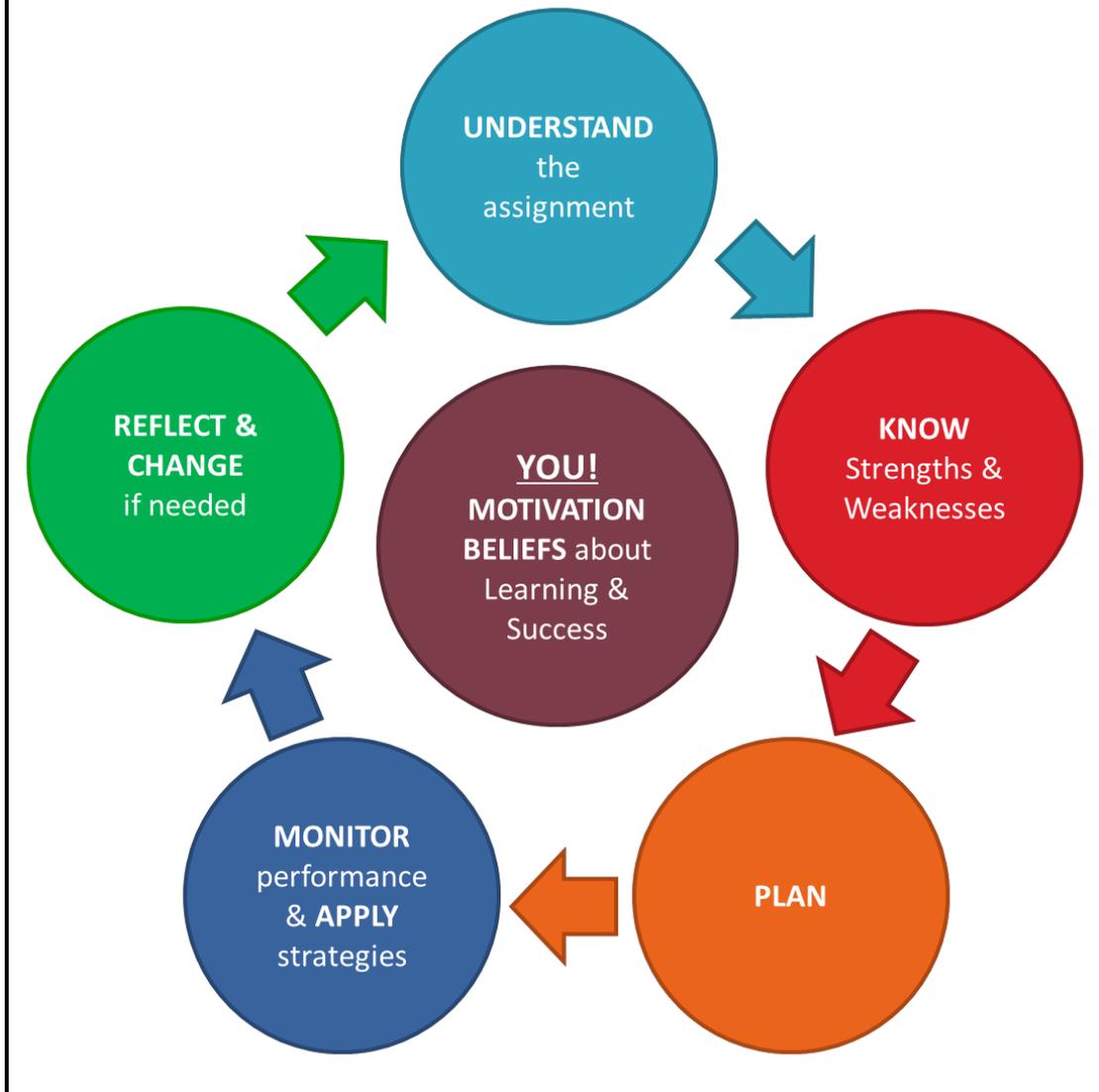
# LEARN 2 LEARN
## STEPS

## 1. UNDERSTAND the Assignment

**Before you do anything, make sure you know what the assignment is asking you to do.**

> Ex. Ask the teacher questions; Reread directions; Check the rubric

## 2. KNOW Strengths & Weaknesses

**Knowing what you are good at versus what you need to improve on will help you along the way.**

> Ex. Look back on past work (what did you do well on?); Ask for feedback

## 3. PLAN

**Keep yourself organized as you are completing an assignment.**

> Ex. Use a planner; Make an outline; Don't procrastinate!

## 4. MONITOR Performance & APPLY Strategies

**Make sure you're checking your progress along the way. Use strategies to help you get further!**

> Ex. Making a rough draft; Go to the library; Practice presentations

## 5. REFLECT & CHANGE (if needed)

**Before turning in your assignment, make sure to double-check your work for any mistakes you might have made.**

> Ex. Proofread your essays; Make edits

## MOTIVATION & BELIEFS about Learning & Success

**Believe in yourself! You can learn anything you set your mind to!**

Appendix N

**Name:_____ Block: _____**

**Date:_____**

## LEARN2LEARN : ARE YOU LEARNING TO LEARN?

**WARM UP.** Without looking at your notes/model, write down **each of the LEARN 2 LEARN steps** in the empty circles. Then, write down **one example** of each step.
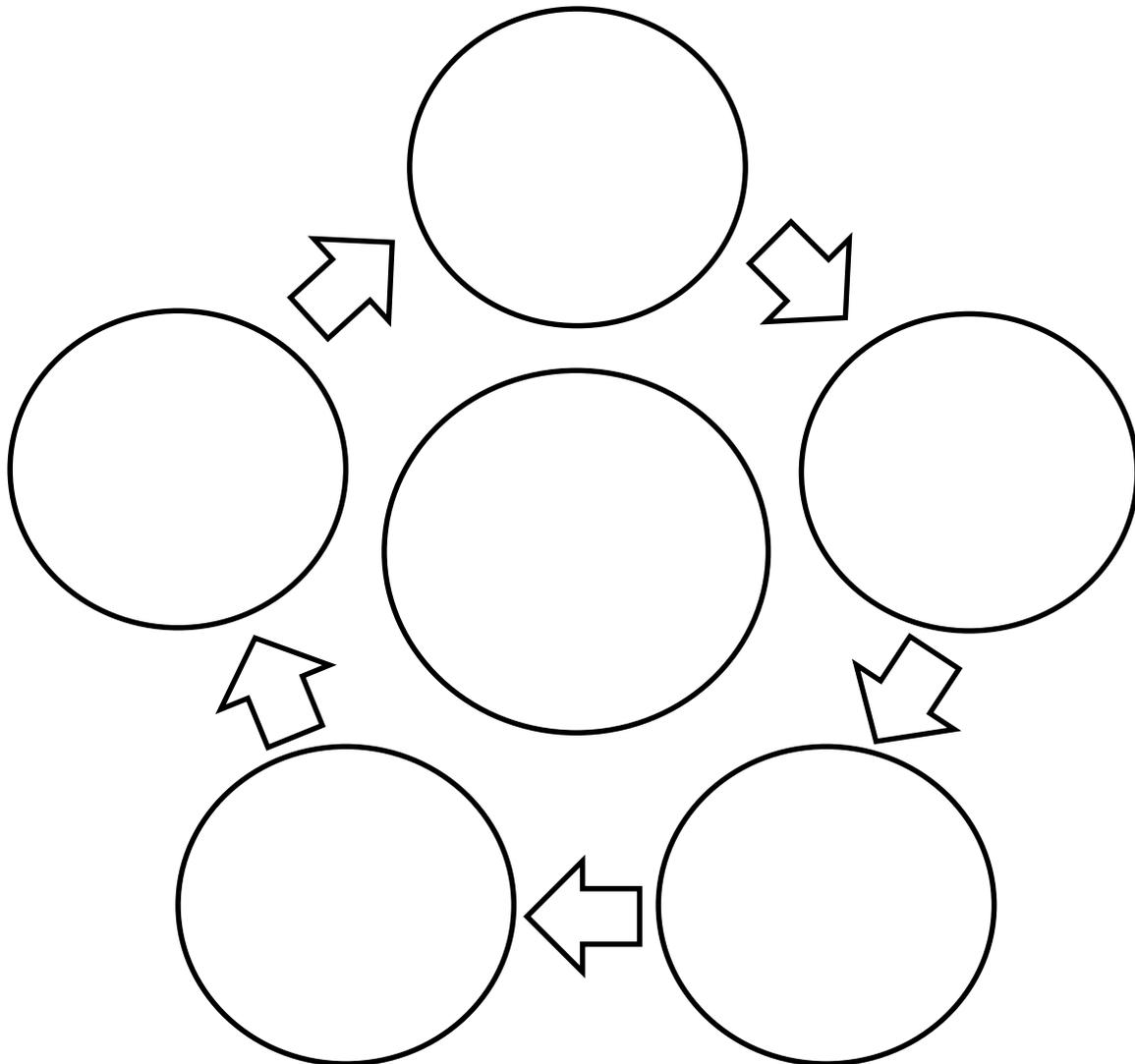
Appendix O

# LEARN2LEARN : "I THINK I CAN"

**Session 2: Metacognition & Motivation.** Write down one **GOAL** you would like to achieve in your social studies class, and one **POSITIVE POWER STATEMENT** about yourself, your learning, or your class that will help you keep motivated.

*My Goal is* _____

_____

_____


*My Power Statement:* _____

_____

_____

Appendix P

**Name**_____ **Block**_____ **Date**_____

# LEARN2LEARN : HOMEWORK REFLECTION

**Directions:** Before our fourth session next week, please complete the following questions about how you complete your homework assignments in social studies.

## Step 1. Review previous progress.

Grade on last assignment: _____

Study Strategies used: _____

_____

Time spent preparing: _____

Effort exerted (1 = very little, 5 = very much): _____

## Step 2. Set a new goal & create a plan for meeting the goal.

Grade desired: _____

Other goals: _____

Strategies I **will** use: _____

_____

Time I **will** spend: _____

Effort I **will** exert (1 = very little, 5 = very much):_____

## Step 3. Monitor my progress.

Am I following my plan? _____

   *If not, why?* _____

Am I putting in the time & effort that I planned? Explain.

_____

_____

Do I need to make any changes to the plan? Explain.

_____

_____

## Step 4. Assess the outcome.

Grade I earned: _____

    Did I reach my goals?        **YES**        **NO**

Strategies I used: _____

_____

Time spent completing assignment: _____

Effort exerted (1 = very little, 5 = very much): _____

## Step 5. Look ahead to next time.

What will I do the same to prepare next time?

_____

What will I do differently next time?

_____

What are my new goals?

_____

Appendix Q

# LEARN2LEARN
## WINTER BOOKLET

**Name: _____ Block: _____**

Check and date the activities that you have completed:

☐ **Are You Learning to Learn?**
    (Date completed: _____)

☐ **Jesse's History Paper**
    (Date completed: _____)

☐ **Alex's History Paper**
    (Date completed: _____)

☐ **My New Civilization Activity**
    (Date completed: _____)

*COMPLETE YOUR BOOKLET BY JAN. 25TH FOR A SURPRISE REWARD!*

## ACTIVITY #1
### ARE YOU LEARNING TO LEARN?

**DIRECTIONS:**

*First, fill out the empty Learn 2 Learn steps as best as you can without looking at your notes. Afterwards, make sure you have the correct steps in order by checking against your laminated* Learn 2 Learn Model*. Write down <u>one example</u> of each step.*

**STEP:**

**EXAMPLE:**

**STEP:**

**EXAMPLE:**

**STEP:**

**EXAMPLE:**

**What's central to learning to learn?**

**STEP:**

**EXAMPLE:**

**STEP:**

**EXAMPLE:**

**Did you get them all right the first time? Which steps did you miss at first?**

_____

_____

# ACTIVITY #2
## JESSE'S HISTORY PAPER

**DIRECTIONS:**

*Please read Jesse's story and answer <u>ALL</u> the questions.*

---

Jesse's history professor at Trinity started the class announcing that they were being assigned a paper on the Civil War. Jesse was handed a sheet with directions for the assignment and its due date, which he quickly skimmed while talking to one of his friends. The following week he ran into Alex who was in the same History class. Alex asked Jesse how he was doing with the paper, which he had completely forgotten about. He then realized that the paper was due in one week.

Swamped with assignments for other classes, Jesse had to start working on the paper the day before it was due. Since it was a paper that required a lot of work and research, Jesse had to stay up all night working on it. Doing the research and readings took up a lot of time so he wasn't able to write out an outline for the paper, and had to jump right into the writing. He had a lot of ideas and knew what he wanted to write, but didn't know how to organize it. He was able to write just the right number of pages but was hesitant that he had included everything the professor had asked for. Rushing to finish it on time, he was unable to proofread it before handing it in for a grade.

---

**QUESTIONS:**

**1) Did Jesse use any sort of strategies to help himself complete the assignment efficiently?**

      YES           NO

    **a. If yes, explain what strategies he used…**

_____

_____

_____

**2)  Do you think Jesse should have done anything differently? If yes, explain.**

_____

_____

_____

_____

_____

_____

**3)  Which steps of the 5-step Learn 2 Learn model did Jesse apply when he was writing his paper? For each step that he used, describe how he did so.**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

# ACTIVITY #3

**ALEX'S HISTORY PAPER**

**DIRECTIONS:**

*Please read Alex's story and answer <u>ALL</u> the questions.*

---

Alex's history professor at Trinity began class with the announcement that they were being assigned a paper. Alex was handed directions for the paper from his Professor and began to read carefully. He read that the paper would be due in 2 weeks and was on the Civil War. He immediately took out his planner and wrote down when the paper was due.

After class, Alex went back to his room and began to write out a plan for the next two weeks. He knew that he had two other papers and another big project to do before the end of the year and would have to manage his time well. He decided to spend an hour on the paper every day. He first began by doing research on the subject until he was ready to make an outline of everything he planned to write about. After making an outline, he realized his paper was going to be too long and needed to be shortened. He took out some of the information he believed to be irrelevant and started to write the paper. He was done two days early, giving him plenty of time to read the paper over for spelling mistakes before handing it in for a grade.

---

**QUESTIONS:**

1) **Did Alex use any sort of strategies to help himself complete the assignment efficiently?**

    YES             NO

    a.  **If yes, explain what strategies he used…**

    _____

    _____

    _____

**2) Do you think Alex should have done anything differently? If yes, explain.**

_____

_____

_____

_____

_____

_____

**3) Which steps of the 5-step Learn 2 Learn model did Alex apply when he was writing his paper? For each step that he used, describe how he did so.**

_____

_____

_____

_____

_____

_____

_____

_____

# ACTIVITY #4

**MY NEW CIVILIZATION ACTIVITY**

**DIRECTIONS:**

*Imagine you are embarking on a quest to start a new civilization.  Please answer <u>ALL</u> of the following questions about your civilization, providing as many examples as possible:*

1) **Where should your civilization be located (mountains, coast, islands, etc.)? Why?**

_____

_____

_____

   a. **List positives and negatives of the location you chose.**

| Positives | Negatives |
|---|---|
|  |  |

**\* WHICH <u>LEARN 2 LEARN STEP(S)</u> DID YOU USE TO ANSWER QUESTION 1?**

_____

**2)** **Using the empty box below, <u>draw</u> a map of your civilization that shows important natural resources and settlements.**

*Example:* *Your map does not have to be as detailed, but you should include different resources (like water sources, farm lands, etc.) and settlements. Use symbols that make sense to you and add a key on the bottom of your map.*
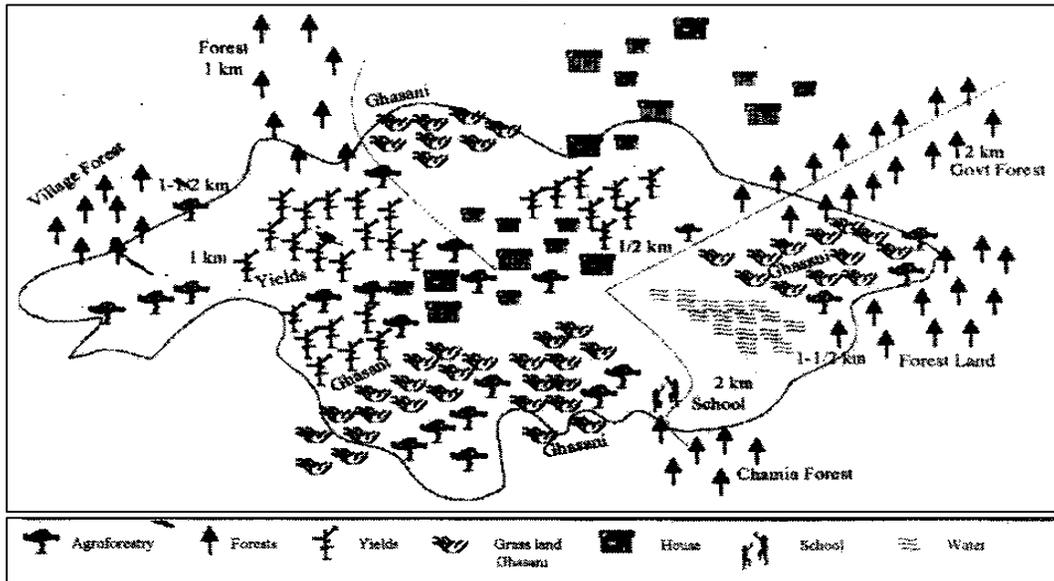


**DRAW YOUR ORIGINAL MAP BELOW.** Keep in mind the location that you chose for Question 1 (ex. draw mountains if you chose to be near mountains).

139
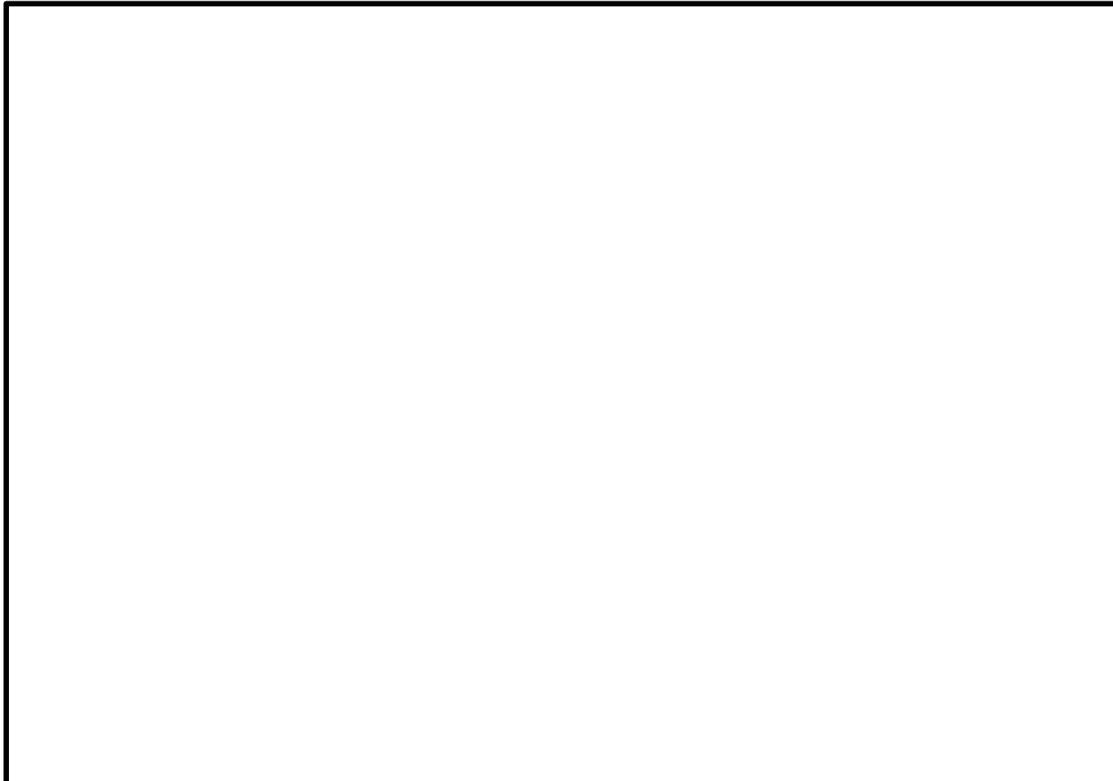
    a. **Explain why you drew the resources or settlements you did.**

_____

_____

_____

_____

**\* WHICH <u>LEARN 2 LEARN STEP(S)</u> DID YOU USE TO ANSWER QUESTION 2?**

_____



3) **What types of food will you try to collect, be it by hunting, gathering, or harvesting? Why? Give examples of these foods.**

_____

_____

_____

_____

_____

_____

**\* WHICH <u>LEARN 2 LEARN STEP(S)</u> DID YOU USE TO ANSWER QUESTION 3?**

_____

**4) What kinds of occupations will your citizens have in your civilizations? Why?**

_____

_____

_____

_____

_____

_____

**\* WHICH <u>LEARN 2 LEARN STEP(S)</u> DID YOU USE TO ANSWER QUESTION 4?**

_____
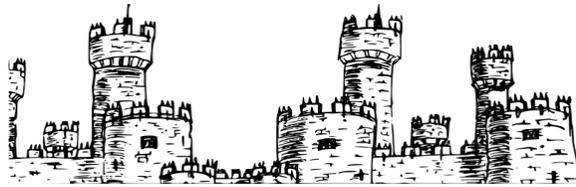
**5) If your civilization is attacked, how will you have prepared to defend your people?**

_____

_____

_____

_____

_____

_____

**\* WHICH <u>LEARN 2 LEARN STEP(S)</u> DID YOU USE TO ANSWER QUESTION 5?**

_____

*Once your civilization had been established, an enemy army burned your necessary food sources…*

6) **How would you alter your previous defenses to avoid the loss of your civilization's food the next time?**

_____

_____

_____

_____

_____

_____

**\* WHICH <u>LEARN 2 LEARN STEP(S)</u> DID YOU USE TO ANSWER QUESTION 6?**

_____

☺

REMEMBER TO TURN IN YOUR COMPLETED

WINTER BOOKLET FOR A SURPRISE REWARD!

Appendix R

# LEARN2LEARN

WINTER BOOKLET

**Name: _____ Block: _____**

Check and date the activities that you have completed:

☐ **Are You Learning to Learn?**
(Date completed: _____)

☐ **Jesse's History Paper**
(Date completed: _____)

☐ **Alex's History Paper**
(Date completed: _____)

☐ **Lewis & Clark Expedition**
(Date completed: _____)

☐ ***The Oregon Trail* Practice**
(Date completed: _____)

*COMPLETE YOUR BOOKLET BY JAN. 25TH FOR A SURPRISE REWARD!*

ACTIVITY #1
**ARE YOU LEARNING TO LEARN?**

**DIRECTIONS:**
*First, fill out the empty Learn 2 Learn steps as best as you can without looking at your notes. Afterwards, make sure you have the correct steps in order by checking against your laminated* Learn 2 Learn Model. *Write down one example of each step.*

**STEP:**

**EXAMPLE:**

**STEP:**

**EXAMPLE:**

**STEP:**

**EXAMPLE:**

**What's central to learning to learn?**

**STEP:**

**EXAMPLE:**

**STEP:**

**EXAMPLE:**

**Did you get them all right the first time? Which steps did you miss at first?**

_____

_____

ACTIVITY #2
**JESSE'S HISTORY PAPER**

**DIRECTIONS:**

*Please read Jesse's story and answer <u>ALL</u> the questions.*

---

Jesse's history professor at Trinity started the class announcing that they were being assigned a paper on the Civil War. Jesse was handed a sheet with directions for the assignment and its due date, which he quickly skimmed while talking to one of his friends. The following week he ran into Alex who was in the same History class. Alex asked Jesse how he was doing with the paper, which he had completely forgotten about. He then realized that the paper was due in one week.

Swamped with assignments for other classes, Jesse had to start working on the paper the day before it was due. Since it was a paper that required a lot of work and research, Jesse had to stay up all night working on it. Doing the research and readings took up a lot of time so he wasn't able to write out an outline for the paper, and had to jump right into the writing. He had a lot of ideas and knew what he wanted to write, but didn't know how to organize it. He was able to write just the right number of pages but was hesitant that he had included everything the professor had asked for. Rushing to finish it on time, he was unable to proofread it before handing it in for a grade.

---

**QUESTIONS:**

1) **Did Jesse use any sort of strategies to help himself complete the assignment efficiently?**

   YES          NO

   a. **If yes, explain what strategies he used…**

   _____

   _____

   _____

145

**2) Do you think Jesse should have done anything differently? If yes, explain.**

_____

_____

_____

_____

_____

_____

**3) Which steps of the 5-step Learn 2 Learn model did Jesse apply when he was writing his paper? For each step that he used, describe how he did so.**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ACTIVITY #3
**ALEX'S HISTORY PAPER**

**DIRECTIONS:**

_Please read Alex's story and answer ALL the questions._

Alex's history professor at Trinity began class with the announcement that they were being assigned a paper. Alex was handed directions for the paper from his Professor and began to read carefully. He read that the paper would be due in 2 weeks and was on the Civil War. He immediately took out his planner and wrote down when the paper was due.

After class, Alex went back to his room and began to write out a plan for the next two weeks. He knew that he had two other papers and another big project to do before the end of the year and would have to manage his time well. He decided to spend an hour on the paper every day. He first began by doing research on the subject until he was ready to make an outline of everything he planned to write about. After making an outline, he realized his paper was going to be too long and needed to be shortened. He took out some of the information he believed to be irrelevant and started to write the paper. He was done two days early, giving him plenty of time to read the paper over for spelling mistakes before handing it in for a grade.

---

**QUESTIONS:**

1) **Did Alex use any sort of strategies to help himself complete the assignment efficiently?**

   YES          NO

   a. **If yes, explain what strategies he used…**

   _____

   _____

   _____

2) **Do you think Alex should have done anything differently? If yes, explain.**

_____

_____

_____

_____

_____

3) Which steps of the 5-step Learn 2 Learn model did Alex apply when he was writing his paper? For each step that he used, describe how he did so.

_____

_____

_____

_____

_____

_____

_____

_____

ACTIVITY #4
**LEWIS & CLARK EXPEDITION ACTIVITY**

**DIRECTIONS:**

*Imagine you are either Lewis or Clark and are about to embark on your expedition across the western portion of the United States. Please answer ALL of the following questions about your civilization, providing as many examples as possible:*

1) What types of supplies should you take on the expedition? Why?

_____

_____

_____

_____

**\* WHICH LEARN 2 LEARN STEP(S) DID YOU USE TO ANSWER QUESTION 1?**

_____

2) What are some positives and negatives of going on this expedition? You might consider the journey itself and the potential outcomes.

| Positives | Negatives |
|---|---|
|  |  |

**\* WHICH <u>LEARN 2 LEARN STEP(S)</u> DID YOU USE TO ANSWER QUESTION 2?**

_____

*Lewis and Clark made many maps of the area during their expedition. Along the way, they recorded the different animals and resources they saw as they crossed rivers, lakes, and mountains.*

**3) As you cross the following areas, list what <u>resources</u> you might have seen AND <u>explain how it could help</u> you along your journey:**

| Lewis & Clark traveling down the river | Crossing the Rocky Mountains | Viewing the Pacific Ocean for the first time |
|---|---|---|
| *Example:*<br><br>1. **Fish – it provided them food so that they did not starve.** |  |  |

**\* WHICH <u>LEARN 2 LEARN STEP(S)</u> DID YOU USE TO ANSWER QUESTION 3?**

_____

*Below is a map of Lewis & Clark's trek to the Pacific Coast. Imagine you are on the same route BUT must stop upon finding that a wildfire has wiped out the rest of the trail.*
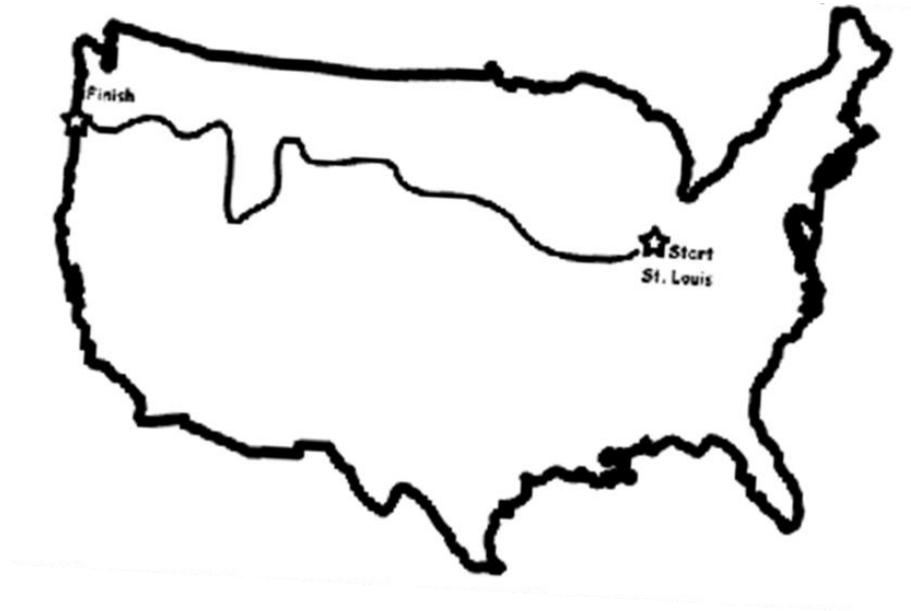


**4) What might you do to fix the situation and get yourself back on course? Why?**

_____

_____

_____

_____

**\* WHICH <u>LEARN 2 LEARN STEP(S)</u> DID YOU USE TO ANSWER QUESTION 4?**

_____

ACTIVITY #5
*THE OREGON TRAIL* PRACTICE
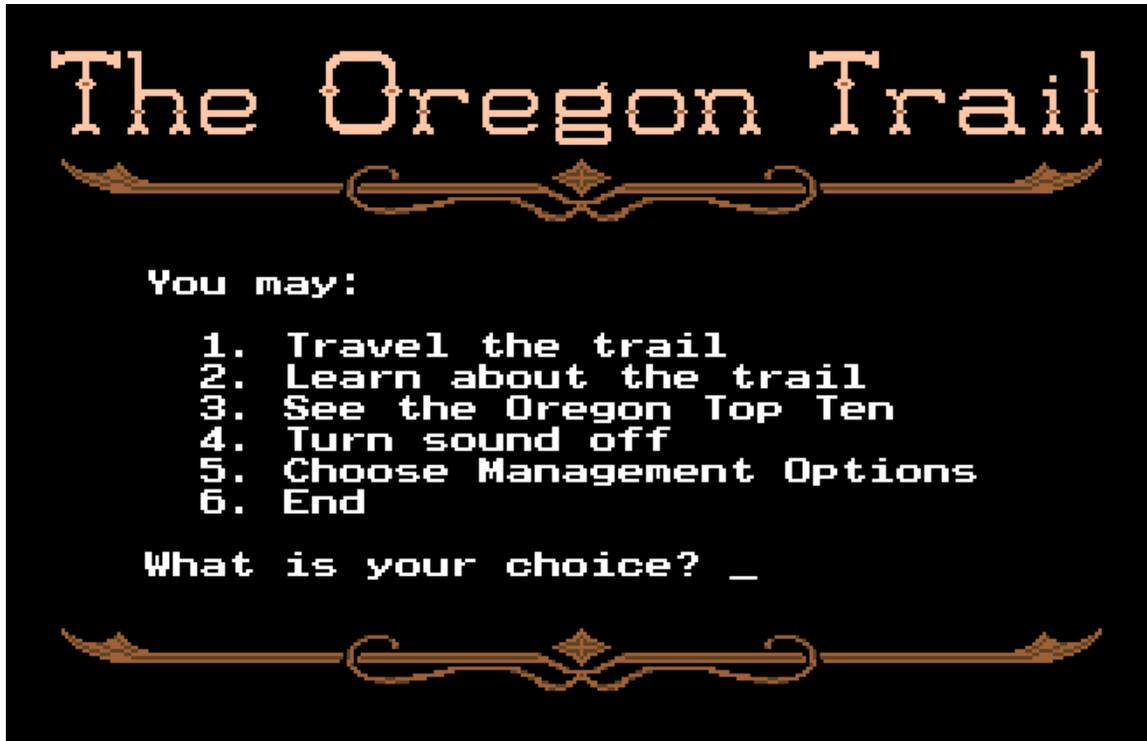


**DIRECTIONS:**

*After learning how to play* The Oregon Trail*, play the game* **AT LEAST THREE TIMES,** *once as each occupation (**banker, carpenter, and farmer**). Do not worry about finishing the game entirely each time, but do make sure you know the differences between each occupation.*

TO ACCESS THE GAME: Open an internet browser and type in the following URL to access *The Oregon Trail* game: **http://j.mp/L2L-Oregon**

*During one of your games, answer the following questions on the next page, giving explanations when necessary:*

1) **What character/occupation did you chose to be?** (Circle one)

     **BANKER**                  **CARPENTER**               **FARMER**

**Explain why you chose this job:** _____

_____

_____

_____

**2) What month did you choose to leave?** (Circle one)

           **MARCH**         **APRIL**         **MAY**   **JUNE**         **JULY**

**Explain why you chose to leave for this month:** _____

_____

_____

_____

_____

**3) How did you spend your money? List <u>how many</u> of each item you bought and the cost, then <u>explain why</u> you chose to spend your money that way.**

  **Oxen:** _____

  _____

  **Food:** _____

  _____

  **Clothing:** _____

  _____

  **Ammunition:** _____

  _____

  **Spare Parts:** _____

  _____

**4) If you ever stopped along the way, what changes did you make (if any)? Why?**

_____

_____

_____

_____

**5) Whenever someone got sick/injured/died, what did you do? Why?**

_____

_____

_____

_____

**6) Whenever you crossed a river, which option did you pick? Why?**

_____

_____

_____

**7) Did you make it to Oregon?** (Circle one)

        **YES**              **NO**

    a. **If yes, report your score:** (Including how many people, items, and food you have left)

        _____

        _____

        _____

        _____

**8) What could you have done differently to finish successfully if you died or to improve your score if you survived?**

_____

_____

_____

153

_____

_____

**9) How many times did you play the game in total?** (Remember, you need to play the game at least three times, once under each occupation).

_____

☺

REMEMBER TO TURN IN YOUR COMPLETED

WINTER BOOKLET FOR A SURPRISE REWARD!

Appendix S

# LEARN2LEARN: YOUR WRITING GOALS

**What is your goal for this paper/essay?** *(Improve your writing, get a better grade than your last essay, find different ways to research, etc.?)*

_____

_____

_____

## Your Writing Process to Achieve These Goals

**DIRECTIONS:** For each step along the way, *set a due date for yourself* so that you stay on the right track!

| | | |
|---|---|---|
| Due by: | Due by: | Due by: |

| | | |
|---|---|---|
| Due by: | Due by: | Due by: |
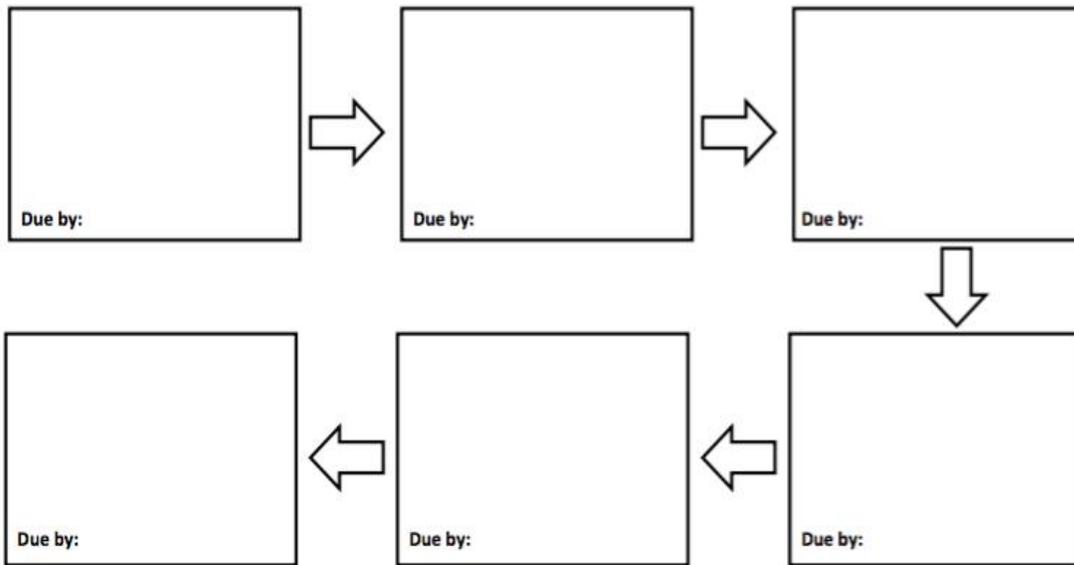
Appendix T

**Name**_____ **Block**_____ **Date**_____

# LEARN2LEARN: WRITING PROCESS REVISING CHECKLIST

***Directions:*** *Answer the following questions to help you revise and edit your rough drafts so that you turn in the best possible paper that you can.*

## **\*\*I completed my rough draft on: _____ (date)\*\***

### REVIEWING MY IDEAS

1. Have I selected an interesting topic? _____  Have I included enough details? _____
2. How long is my rough draft now? _____  How long does it need to be? _____
3. Briefly list the topic of the paper and the subtopic of each body paragraph:

   *Intro (Main Topic):* _____

   *Body paragraph #1:* _____

   *Body paragraph #2:* _____

   *Body paragraph #3:* _____

   _____

   _____

### (RE)ARRANGING THE ORGANIZATION

4. Do my details appear to be in the best order? _____
5. What type of order are they in? (chronological, cause & effect, compare & contrast, etc.)

   _____
6. Do my opening sentences introduce my ideas in each paragraph? _____
7. Do my closing sentences tie up my ideas in each paragraph? _____
8. Do I use transitions to make my organization clear? _____
   a. List some transition words found in the paper: _____

   _____

   _____
9. Do I have an introduction? _____ and a conclusion? _____

### CHECKING HOW MY PAPER 'SOUNDS'

**10.** Does my voice show my interest in the topic? _____

**11.** Does my voice fit my audience? (Is it formal or informal?) _____

**12.** Have I written clear, complete sentences? _____

**13.** Do I have varied sentence structure and word choice? _____

### POLISHING UP MY PAPER

**14.** Did I proofread the paper for grammatical mistakes? _____

**15.** Has someone given me feedback on the paper? _____

**16.** Ask a classmate, friend, family member, etc. to write down **one feedback/review about your paper** in the space below:

_____

_____

_____

**Name/signature of reviewer:** _____

### ADDING THE WOW FACTOR

**17.** What can I do to make this assignment a 'WOW'? (Get creative, think outside the box, integrate your passions, do some extra research, let you teacher see that you went above and beyond!)

_____

_____

_____

## **\*\*I turned in/will turn in my paper on _____ (date)\*\***

---

*Review this worksheet often and make sure you're on track for an A!*
☺

---