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# Self-Regulated Learning Intervention: Teaching Metacognition to Enhance School Performance and Motivation of Middle School Students

Taylor K. Godfrey

*Trinity College*, [taylor.godfrey@trincoll.edu](mailto:taylor.godfrey@trincoll.edu)

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Self-Regulated Learning Intervention: Teaching Metacognition to Enhance School Performance  
and Motivation of Middle School Students

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

Taylor Kate Godfrey

Trinity College

Fall 2013 – Spring 2014

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### **Abstract**

Self-regulated learning is comprised of motivation, cognition, and metacognition. This study aimed to improve eighth grade social studies students' self-regulated learning and academic performance through the implementation of an intervention in the social studies curriculum. The intervention centered on exposing students to the different dimensions of metacognition (i.e., comprehending and being able to control one's own cognitive processes) based on research findings that showed a link between metacognition and academic performance (Dignath & Büttner, 2008; Kistner et al., 2010). The intervention was designed to foster the students' knowledge and use of metacognitive strategies through group work and cognitive discussions based on the research by Paris and Paris (2001). Four eighth-grade history sections taught by one teacher and two sections taught by a second teacher participated in the study. Three sections were randomly assigned to the intervention group and the other three to the control group. All students completed pre- and post-testing qualitative and quantitative measures of metacognition. In addition, student performance was evaluated in terms of overall changes in grades from the first to third marking period. As predicted, the experimental group showed an increase in metacognition assessed through qualitative and quantitative measures. There was no effect of the intervention on student performance; however, both the qualitative and quantitative measures of metacognition were positively correlated with course grades.

## **Introduction**

### *Self-Regulated Learning*

The concept of self-regulated learning, as defined by Schraw, Crippen, and Hartley (2006), is the ability to understand and control one's learning processes and environments. They explain that self-regulated learning is comprised of three main components, cognition, metacognition, and motivation. Cognition entails the use of cognitive strategies, problem solving, and critical thinking. Metacognition consists of two main subcategories, knowledge of cognition (i.e., declarative, procedural, and conditional) and regulation of cognition (i.e., planning, monitoring, and evaluating). The final component, motivation, refers to beliefs about one's intelligence. Cognition and metacognition are theorized to have a bidirectional relationship with motivation because meaningful cognitive acts have motivational outcomes, which then further encourage self-regulatory behaviors (Borkowski, 1992). Therefore, over time students are able to both enjoy learning and to develop an incremental view of intelligence, indicating they believe their actions have the potential to lead to an enhancement in their own learning.

In order to put theory into practice, Pintrich and DeGroot (1990) conducted a study of seventh graders from both science and english classes in order to measure the relationship between the three components of self-regulated learning and academic performance. They found that improvement in academic performance was correlated with instruction of cognitive and self-regulated learning strategies. Furthermore, they found that self-regulated learning is the best predictor of academic performance and is essential for classroom learning. Two decades later, Kistner (2010) conducted a study of ninth grade mathematics students in Germany and also found that instruction of self-regulated learning leads to a gain in academic performance.

Further research supporting the multidimensionality of self-regulated learning, done by Paris and Paris (2001), links the use of cognitive strategies, metacognition, motivation, and task



engagement to classroom practices and curriculum. They found that all of the factors involved in the process of self-regulated learning must work together in order to develop effective learning strategies in the classroom. Cleary and Zimmerman (2004) continued to advance this research when they found students must be taught learning strategies in a cyclical manner in order to develop into successful self-regulated learners.

Ambrose, Bridges, Lovett, Dipietro, and Norman (2010) developed a theory of self-regulated learning aimed to help students attain an accurate assessment of their learning across various disciplines in order to ultimately improve their academic performance. They developed a five-step model of self-regulated learning, which consists of students' ability to; a) assess the task, b) evaluate their strengths and weaknesses, c) plan, d) apply strategies and monitor their performance, and e) reflect and adjust if necessary after the task has been completed. Assessing the task entails accurately understanding the purpose or the goal of the assignment. Students tend to incorrectly assess a task, as they do not necessarily read an assignment carefully or they assume they understand what the assignment is asking for without assessing that understanding. Prior to beginning an assignment, students must receive feedback to assure they have assessed the task accurately. For the second step, students often have unrealistic evaluations of their knowledge and skill in regards to a specific task. The ability to accurately self-assess one's knowledge and skills leads to the correct use of learning strategies, which in turn leads to positive outcomes on various tasks. Planning decreases the time it takes to complete a task and improves the quality of the work being completed. Students either do not acknowledge the need for planning or ineffectively plan for certain tasks. After planning, students begin the task at hand by applying strategies to the assignment. Throughout this process, students must monitor their strategies in order to avoid the use of ineffective strategies. Monitoring one's performance

throughout task completion has been shown to result in learning gains. Finally, adjusting and applying new strategies follows the identification of a faulty strategy use if the learner is exhibiting true self-regulation. This type of reflection might allow a writer to think about the perspective of their audience and therefore revise their writing as a result of that insight.

### *Metacognition*

Metacognition is a complex aspect of self-regulated learning that involves the comprehension and control over one's own cognitive processes. Flavell (1979) found that students have limited knowledge about cognitive phenomena and therefore do not spend much time monitoring and controlling their own cognitive processes, memory, and comprehension abilities. He developed a model of cognitive monitoring that consists of two main concepts: metacognitive knowledge and metacognitive experiences. The former is defined as knowledge or beliefs about factors that impact cognitive operations, whereas the latter involves cognitive experiences that occur in an intellectual setting. Flavell's (1979) model has three critical implications for learning. First, self-monitoring of cognitive processes has the potential to improve student learning both in and out of school. Second, it is possible to develop interventions that provide training to increase metacognition. Finally, the incorporation of this model into a teaching method could help students improve their learning in schools.

Expanding on Flavell's (1979) definition of metacognition, Paris, Cross, and Lipson (1984) identified two fundamental aspects of metacognition, knowledge about cognition and self-directed thinking. Knowledge about cognition is comprised of declarative, procedural, and conditional knowledge. Declarative knowledge is the knowledge of factual information, whereas procedural knowledge is the knowledge of how to perform a task. Declarative and procedural knowledge are not sufficient for the proper application of strategies. Therefore, conditional

knowledge is necessary for the development of a self-regulated learner because this knowledge teaches children how, when, and why to use various comprehension strategies. The latter aspect of metacognition consists of evaluating the difficulty of a task, assessing the strategies that would be most effective for the task, planning appropriately for task completion, and regulating one's ability to follow a set plan and monitor the effectiveness of that plan.

Similarly, Belfiore, and Hornyak (1998) theorize the best learning environment for academic success is one that fosters students' ability to self-monitor, reflect on, and modify their own performance. They emphasize the importance of students engaging in active self-reflection. This act allows students to develop the necessary skills to understand what was monitored throughout a task, in order for them to evaluate the outcome of the task compared to the desired results, and to then adjust by developing a new approach based on the information attained throughout the reflective process. They suggest the use of journals and portfolios as self-reflective practices that can enhance academic success in the classroom.

### *Self-Regulated Learning Interventions*

The positive link between self-regulated learning and academic performance has encouraged researchers to find the most effective method of teaching self-regulated learning to students. A meta-analysis consisting of 51 studies assessed the effectiveness of cognitive interventions in comparison to metacognitive interventions in improving study skills (Hattie, Briggs, and Purdie, 1996). They determined that metacognitive interventions address the self-management of learning, which entails planning, applying, and monitoring one's learning abilities and knowing how to appropriately apply strategies in a given context. These interventions are evaluated in contrast to cognitive interventions, which focus solely on developing task-related skills. Consequently, they found metacognitive interventions are more

successful when compared to cognitive interventions; the effectiveness of these interventions, however, was enhanced when taught in combination with motivational support and in an appropriate learning context. Furthermore, these interventions are most beneficial when conducted in a classroom setting because teachers are able to assess their students' strategy use in order to provide constructive feedback throughout the training process.

Borkowski's (1992) theory on self-regulated learning hypothesizes that strategy instruction between the teacher and students must be developed in a unique manner for each individual student. The teacher's perception of a student's progress will determine the rate at which a student acquires a particular learning strategy and when the student will be able to engage in the strategy without assistance. Harvey (2002) explored the idea of self-regulated learning interventions further and found that researchers must collaborate with teachers when teaching study skills to students to ensure that the strategies being taught are in line with the specific aspects of the curriculum that are being taught. She also found that when the strategies being taught are embedded in the classroom curriculum and catered to the individual learning needs of the students, they are more likely to be maintained over time.

The studies mentioned above highlight how critical the setting for self-regulated learning interventions are; the content of these particular interventions is also equally important. Paris and Winograd (2003) reviewed 12 principles of self-regulated learning and found that a lack of reflection by students leads them to assume they understand the information being taught when in actuality they do not. They claim it is critical for students to engage in a period of self-appraisal where they reflect and review material after individual activities, opposed to blindly following a lesson plan without checking for comprehension of the material along the way. They propose the use of journals and portfolios as the best self-regulated learning assessment tool to

use when developing interventions. They also suggest the use of goal setting in order for students to record the goals they meet, as well as keeping track of the grades they receive on class assignments. Paris and Paris (2001) further stressed the need to eliminate interventions that are primarily based on the rote following of directions. These interventions included didactic instruction that neglected to teach explanations as to why, how, and when strategies should be used and instead led to superficial use of strategies in the classroom. Paris and Paris (2001) found that the most effective interventions emphasize the use of group work, cognitive discussions, and self-reflection to foster students' knowledge and use of metacognitive strategies. These activities give students the opportunity to take initiative over their self-assessment, with feedback from the instructor and peers, in order to develop the learning strategies that work best for them in a given context.

More recently, Kistner (2010) studied whether teachers taught self-regulated learning either implicitly or explicitly and the impact each type of instruction had on their students' academic performance. Implicit instruction provides students with the opportunity to engage self-regulatory skills and strategies, but does not inform students about the purpose of the activity. Explicit instruction allows students to learn and maintain skills and additionally, explains that an activity is aimed to develop a learning strategy that can help the student's performance on different tasks or assignments. Kistner found that most instruction of cognitive, metacognitive, and motivational strategies was implicit for the 20 teachers he observed, but when explicit instruction was used, it was associated with higher academic performance.

Dignath and Büttner (2008) conducted a more recent meta-analysis of 74 studies, assessing the impact various characteristics of successful self-regulated learning interventions have on the improvement of academic performance, strategy use, and motivation among students

at both the secondary and primary school level. They found that interventions, when taught at a secondary level, should be developed based on a specific theory of self-regulated learning that emphasizes the use of specific metacognitive strategies, rather than focused on improving student motivation. They also found that interventions are more effective if they are of longer duration and taught by a researcher rather than the classroom teacher. This showed that the instruction of metacognitive strategies in isolation does not improve learning outcomes. Self-regulated learning only becomes effective when supplemented by feedback and metacognitive reflection on one's own strategy use. It is critical for students to understand the benefit of using the strategies they are being taught; furthermore, they found that creating a collaborative learning environment is beneficial in enhancing the reflection process. Their overall conclusion was that self-regulated learning can be effectively implemented at both the secondary and primary school level.

### *Metacognitive Interventions*

As previously mentioned, metacognition is a key component of self-regulated learning that involves the ability to comprehend and control one's own thinking. Based on this definition, numerous research studies have been conducted to measure the improvement of students' metacognitive abilities in the classroom. Cross and Paris (1988) conducted a study with third and fifth graders, aimed to improve students' use of learning strategies. They implemented an experimental curriculum titled Informed Strategies for Learning (ISL) that was designed to help educate students on the best strategies to use in a given context and how to correctly apply those strategies. It also included teacher and peer feedback throughout the curriculum. ISL involved three distinct stages, beginning with the teacher modeling the skills and strategies, then implementation of guided practice with worksheets, and finally students being taught to apply

the skills learned to content areas. Cross and Paris found that ISL improved students' reading skills in the experimental condition and concluded that direct instruction of metacognition can result in an improvement of reading performance and awareness skills.

Similarly, Englert, Raphael, Anderson, Anthony, and Stevens (1991) implemented a metacognitive intervention with fourth and fifth grade students from low socio-economic backgrounds. The intervention consisted of explicit instruction on effective cognitive strategies for writing assignments, and emphasized an interactive dialogue between students and teachers about writing strategies. Students were specifically provided with five strategies to help them with their writing: Plan, Organize, Write, Edit, and Revise (POWER). They also completed "think sheets" throughout the writing process. They found the metacognitive intervention improved the student's overall writing quality, and that the group discussions among students and student-teacher discussions were the most effective instructional strategy.

#### *Quantitative and Qualitative Self-Regulation Assessments*

Two prominent assessment methods have emerged as valuable measures of self-regulation and metacognition. Several quantitative self-report questionnaires have shown to be accurate measures of the effects of metacognitive interventions. The Motivated Strategies for Learning Questionnaire (MSLQ) measures the metacognitive abilities of students in relationship to their motivational beliefs (Pintrich, Smith, Garcia, & McKeachie, 1992). Shraw and Dennison (1994) developed the Metacognition Awareness Inventory (MAI), which was shown to be both a valid and reliable measure of metacognition for adults. More recently, Sperling, Howard, Miller, and Murphy (2001) developed the Junior Metacognitive Awareness Inventory (Jr. MAI) in order to assess the metacognitive abilities exhibited by sixth to ninth graders. This measure contained eighteen items and was also found to be a reliable measure of metacognition.

Second, a number of researchers have suggested that qualitative measures are needed to accurately capture the use of self-regulatory skills among students, as well as the motivational components underlying the use of self-regulated learning (Borkowski, 1992). Boekaerts and Corno (2005) examined the use of structured interviews, student work samples, and diary entries. They suggest that structured interviews allow the students to provide thoughtful answers by asking critical questions in regards to their cognitive processes. Student work samples may consist of text passages or written summaries of passages that allow the instructor to see the learning process of students in order to determine the level of self-regulation that is occurring. Diary entries written by students are used to describe the daily learning difficulties or strengths the students are experiencing and can then be coded based on a thematic analysis.

Van Kraayenoord & Paris (1997) conducted a study with third, fourth, and fifth grade students where their ability to reflect on cognitive and motivational aspects of their schoolwork was assessed through a 10 item “Worksamples Interview,” which incorporated structured interviews with student work samples. The interview assessed five components of the students’ self-regulatory abilities by asking them to explain the following: a) The work that was most difficult for them and the work that they were proud of, b) The identification of work related to their literacy abilities, c) To show samples of their work that exhibited progress over time, d) To discuss their attitudes about self-assessment and how they will continue to develop academically, e) To discuss how they share their work with their parents and their feelings in regards to feedback from their teachers (Paris and Paris, 2001). The coding criteria used to assess this work based on a score from 0-to-2 of students’ ability to appropriately reflect on their work was:

- 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

To determine the reliability of this coding system, two trained coders individually scored the student responses to the interviews and exhibited a 97% agreement rate.

In order to determine the benefits and drawbacks of these two assessment methods, researchers at Trinity College developed a new quantitative and a new qualitative measure of metacognition. Both measures were aligned with Ambrose et al.'s (2010) five-step model of self-regulated learning and were designed specifically for academic tasks in an eighth grade social studies classroom. The Metacognition 5 (MC5) is a 35-item self-report measure, with seven items pertaining to each of the five steps in the model. This measure was first developed in 2013 (Naratil 2013, Howe, 2013) and used for the second time in the current study after undergoing revisions. The Qualitative Metacognition 5 (Qual-MC5) is a qualitative measure of metacognition designed specifically for the current study with nine open-response items focused on the five steps in the model. This measure was developed to assess the active reflection students experience in regards to their metacognitive abilities. The scoring criteria were developed based on the research done by van Kraayenoord and Paris (1997). A 0-to-3 scale of metacognitive abilities was developed by the researchers. The scoring system was:

- 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

### *Implications of Research*

Self-regulated skills are essential for students to be able to further develop their learning strategies and to improve their academic performance. However, research has found that the instruction of cognitive strategies alone (e.g., planning and monitoring) does not improve performance on academic tasks. Self-regulated learning interventions must be supplemented by metacognitive reflection and feedback from peers and instructors (Dignath and Büttner, 2008). Additionally, interventions need to be developed in collaboration with classroom teachers, pertinent to specific academic content, and conducted in an educational setting (Dignath and Büttner, 2008).

At present, the most successful self-regulated learning and metacognitive interventions have been in the areas of math and science. Research on effective interventions implemented in social studies courses has been absent from the literature. Fortunately, evidence of these interventions improving tasks related to social studies curricula, which include writing and reading skills, has been identified in the literature, indicating the possibility of adapting interventions specifically for social studies (Cross and Paris, 1988; Englert et al., 1991). There are a variety of methodologies suggested for the implementation of these interventions and some commonalities can be seen in the research literature, including the use of cognitive discussion, self-reflection, and feedback from peers and teachers.

In a preliminary study conducted during the 2012 – 2013 academic school year, a nine session self-regulated learning intervention with eighth grade social studies students based on Ambrose et al.'s (2010) model was implemented (Howe, 2013). She measured changes in

metacognitive ability with the Jr. MAI and the MC5 and found no significant improvements after the intervention. Similarly, she found no improvements in academic performance, as measured by quarterly grades. These findings suggest that the quantitative measures of metacognition may not have been sufficiently in line with the Ambrose et al.'s (2010) theory of self-regulated learning. Conversely, the content of the intervention may not be in line with the metacognitive activities suggested by the research literature.

### *Current Study*

The current study sought to develop an effective self-regulated learning intervention in eighth grade social studies classrooms, to improve students' metacognitive abilities, academic performance, and beliefs about their own intelligence through explicit instruction on incremental theories of intelligence. A previously existing self-report measure of metacognition (Jr. MAI) and a newly developed self-report measure of metacognition (MC5) were used in this study to measure the effects of the intervention on students' metacognitive awareness. Since previous studies using these quantitative measures failed to produce significant findings, this study used a newly developed open-response qualitative measure of metacognition aligned with Ambrose et al.'s (2010) five-step model.

The intervention in this study was designed based on extensive review of the literature on self-regulated learning and metacognition. In line with the research, I also worked closely with the two classroom teachers from the middle school where the intervention occurred. Through this collaboration with the teachers, I was able to design the intervention to be aligned with both of their curricula. The six sessions were based on Ambrose et al.'s (2010) model of self-regulated learning and emphasized the cyclical manner of the five steps. Five of the sessions were designed to apply all five steps to an activity relevant to social studies course work. The final session

focused on showing students how intelligence is a malleable entity by providing a basic explanation of how the brain is a muscle that can grow and strengthen with time and practice. The activities used in the intervention involved cognitive discussions, group work, and constantly demanded reflection from the students and incorporated feedback from the research-instructor and peers. The intervention aimed to improve the self-regulated learning of the students, with the ultimate goal of improving their academic performance.

### *Hypotheses*

Based on previous research, four hypotheses were developed for this study:

**H1:** Students in the experimental group would show an increase in their metacognitive abilities on the Qualitative MC5

**H2:** The Qualitative MC5 would positively correlate with all quantitative measures of metacognition (self-developed and pre-existing).

**H3:** The Qualitative MC5 would be a positive predictor of grades.

**H4:** The metacognitive intervention would lead to an increase in course grades across marking periods.

## **Methods**

### *Participants.*

The participants (N = 129) in this study were eighth grade students from a magnet school in Hartford, Connecticut. Prior to the commencement of the study, the school's administration and teaching staff agreed to participate in the project and were informed of its focus and overall logistics. In addition, the protocol for this project was approved by the Trinity College Institutional Review Board. Parents of student participants were provided with a letter detailing the components of the study, and they provided written consent for their child to participate (see

Appendix A). Sixty-nine student participants (53.5 percent) identified as female, and 9.3 percent did not report their sex. All the participants in the study were in eighth grade but they ranged in age from 12.75 to 15.33 years, for a sample average of 13.46 years ( $SD = 5.36$ ).

Because magnet schools are public institutions that encourage the enrollment of students from multiple school districts, the sample of participants in this study was diverse in regards to their residential and racial/ethnic background. Most students identified as Hispanic (36.5 percent), White (29.6 percent), or Black (19.1 percent). The remaining students identified as multi-racial (13 percent) or Asian (1.7 percent). The most common hometown listed by participants was Hartford (39.6 percent), and the rest came from 18 surrounding towns in Connecticut.

The participants were from six sections of 8<sup>th</sup> grade social studies classes, four sections taught by one teacher (Teacher A) and the remaining sections taught by a second teacher (Teacher B). The classroom size ranged from 18 to 22, for a study-wide average of 20 students per section. Both teachers were females of the same race and had similar levels of pedagogical experience. Teacher A had been involved in previous years of the project, while this was the first time that Teacher B collaborated in a study conducted by the research group.

#### *Measures.*

The following measures were administered to all students at the end of the first quarter marking period (pre-testing) and upon completion of the intervention at the end of the third quarter marking period (post-testing). The pre-testing and post-testing stages took place over three different sessions each; all the quantitative measures were evenly split and administered during the first two days, and the qualitative measure was completed on the third day. The questionnaires were printed on colored paper and using a font considered to be visually

appealing to adolescents. All participants were given enough time to complete the entire questionnaire during each testing session. The social studies teacher and/or research-instructor were present throughout the testing sessions to supervise and clarify any questions regarding the measures.

*Demographics.* The demographic measures consisted of four items, specifically: date of birth, sex, ethnicity/race, and hometown (see Appendix B). These measures were collected only at pre-testing.

*Junior Metacognitive Awareness Inventory (Jr. MAI).* The Jr. MAI was designed by Sperling et al. (2002) to measure metacognitive knowledge and ability in students from sixth to ninth grade. The measure consists of 18 self-report items that participants were asked to respond to on a five-point Likert scale ranging from “Never” to “Always” (see Appendix C). The scores were determined by finding the average of the eighteen responses. The Jr.MAI had a Cronbach’s alpha of .85 at pre-testing and .88 at post-testing.

*Metacognition 5 (MC5).* The MC5 was first developed by Naratil (2013) and Howe (2013) and was revised for the current study as a measure of adolescents’ metacognitive abilities. The measure is based on Ambrose et al.’s (2010) five-step model of metacognition. The measure was developed with age appropriate wording referring to specific academic tasks relevant to middle school. The instructions asked the students to answer with their social studies class in mind. The measure consisted of 35 self-report items on a five-point frequency scale ranging from “Never” to “Always” (see Appendix D). There were seven items pertaining to each one of the five steps in the metacognitive cycle. The scores were found by determining the average for each of the participant’s responses on the thirty-five questions. The MC5 had a Cronbach’s alpha of .91 at both pre- and post-testing.

*Qualitative Metacognition 5 (Qual-MC5)*. The Qual-MC5 was used in the current study as a qualitative measure of metacognition for adolescents based on the five-step model of metacognition (Ambrose et al., 2010). The measure was specifically designed for tasks in an eighth grade social studies class and consisted of nine open-response questions (e.g., “*At the beginning of a project for your history class, what would you do if you did not understand the directions?*”). There were two items related to “Assess the Task,” two items related to “Evaluating Strengths and Weaknesses,” three items related to “Planning,” two items related to “Apply Strategies and Monitor Performance,” and finally one item related to “Reflect and Adjust” (See Appendix E). The scoring criteria for this measure were developed following the scoring system created by van Kraayenoord and Paris (1997) in their Worksamples Interviews. For the Qual-MC5, general scoring guidelines were developed based on a 0-to-3 scale of metacognitive abilities (e.g., 0 – student did not assess the dimension or feature addressed by the question; gave no response; gave an inappropriate response; 3 – complete response with elaboration or a demonstration of multiple strategies). The foundation of the general guidelines was used to tailor the 0-3 scale to each of the individual questions (see Appendix F).

*Performance Measures*. The students’ quarterly marking period grades for their social studies class were collected from both teachers for the first three marking periods.

#### *Procedure*.

The intervention was conducted during the 2013-2014 academic school year, over the course of six in-class sessions ranging from thirty to forty-five minutes. Three of the six sections of social studies classes were assigned to the experimental condition (*Learn 2 Learn*), and the other half were assigned to the control condition (*College Knowledge*). Two college student researchers and a college student research assistant (referred to as research-instructors 1, 2, and

3, respectively) conducted all classroom sessions for both experimental and control conditions (See Table 1).

Pre-testing measures were administered on three separate occasions to all participants in mid-October, towards the beginning of their second quarter marking period. The first two days of testing consisted solely of demographic questions and quantitative paper-and-pencil questionnaires. Prior to administering the qualitative paper-and-pencil measure during the third day of testing, the research-instructors introduced themselves and conducted icebreaker activities with the students. Following the completion of the intervention over a period of seventeen weeks, post-testing was administered to all participants in mid-March. The post-testing stage was conducted in the same manner as the pre-testing and was comprised of all the same measures, with the exception of the demographic questions. After the post-testing stage was finalized, all participants of the study were taken on a college campus tour at Trinity College.

Pre- and post-testing information and consent forms were kept confidentially in a locked research laboratory. Additionally, participants were assigned an identification number in order to protect their identities while processing the data. Throughout the process of data management, all information was de-identified and entered into an electronic file, which was only accessible to the researchers.

#### *Treatment Protocol.*

The intervention period had a duration of seventeen weeks (excluding pre- and post-testing time), which encompassed a total of six in-class sessions for both experimental and control groups. During the first session of both treatments, the research-instructors explained to the students that they were participating in a project conducted by senior college students and faculty at Trinity College. Both social studies teachers reminded the students that their parents



had signed permission slips (i.e. consent forms) allowing them to participate in the study. The sections in the experimental condition (*Learn 2 Learn*) were told by the research-instructor that he/she would be coming in on a regular basis to teach them about ways to improve their learning. The research-instructors teaching the sections of the control condition (*College Knowledge*) explained that the purpose of their weekly sessions would be to provide the students with general insight about college. Teachers A and B, and on a few occasions substitute teachers, were present throughout all treatment sessions in order to help maintain discipline in the classroom.

### *Experimental Treatment Sessions*

The experimental treatment consisted of individual and group activities, classroom discussions, and short homework assignments focused on increasing the students' metacognitive knowledge and abilities. From the beginning of the intervention the research-instructors explained that the *Learn 2 Learn* activities and assignments would not be graded. A point system was implemented as an incentive for students to complete all activities and worksheets; and if participants obtained ninety percent of the total points they received a T-shirt after completion of the post-testing. Furthermore, all students in the experimental treatment received a binder in order to keep track of the handouts and activities that were completed throughout the intervention.

**Session 1.** Because the research-instructors had already introduced themselves and explained the purpose of the *Learn 2 Learn* sessions during the pre-testing stage, there was no icebreaker or introductory activity during the first session. All students were provided with the *Learn 2 Learn* binder and were given a couple minutes to personalize it. They were also given a laminated sheet with a version of Ambrose et al.'s (2010) five step model, which had been graphically modified and wording-revised to be suitable and appealing to adolescents (see Appendix G). The research-

instructor gave basic explanations of each step, provided examples relevant to each component, and prompted students to think about each step throughout the rest of the session.

Next, students were seated in groups of three or four and given a set of instructions for a “Tower Building Activity” (see Appendix H). All groups were given eight minutes to build the tallest tower they could out of toothpicks and marshmallows (provided to them), keeping in mind how they could apply the *Learn 2 Learn* steps to the activity. After they finished, all groups filled out a blank model handout (see Appendix I), listing the specific tasks of the activity that could correspond to the different steps on the laminated sheet. Then, the research-instructors asked each group to share what they had written for one of the steps, concluding the discussion with a brief explanation of how applying the steps could have led them to the best strategy (e.g. using the toothpicks to build triangular bases, as opposed to quadrangular). Lastly, the session was concluded with an in-class quiz on the *Learn 2 Learn* steps (see Appendix J). The students were asked to complete a homework assignment for the following session, which asked them to explain how they could apply the *Learn 2 Learn* steps if they had to build a tower strong enough to hold their empty binder for five seconds, without falling apart, using the same materials (see Appendix K).

**Session 2.** For the second session, the research-instructor divided the classroom into groups of three or four and explained that each group was going to build a tower with the specifications mentioned in the homework. The students were asked to discuss their homework assignments with their group and to come up with the best strategy to successfully complete the task. The same materials were provided and the students were encouraged to cover up their structures in the construction process in order to prevent other groups from mimicking their strategy. After eight minutes, all groups were asked to uncover their towers and the research-instructor tested if

they could hold the binder without falling apart. Upon completion of the activity, the research-instructor guided a classroom discussion linking the activity to the *Learn 2 Learn* steps, prompting the students to think about (1) what the best approach for the task would be, and why, (2) what had gone wrong throughout the activity, and lastly (3) how they could apply that information to their schoolwork. In order to foster the students' understanding of the *Learn 2 Learn* steps and of their relevancy to the academic setting, they were asked to complete a homework assignment explaining how they would apply the steps to a particular assignment due before the following session (see Appendix L).

**Session 3.** For the third session, the research-instructor handed back the in-class quiz on the *Learn 2 Learn* steps and discussed the common mistakes made (e.g., misunderstanding the difference between the steps “monitor performance and apply strategies” and “reflect and adjust” because they did not understand that the former is done throughout the task and the latter is done after the task or assignment has been completed). Second, the students were asked to take out their homework assignment that was provided to them in the previous session. The research-instructor wrote the five steps of the *Learn 2 Learn* model on the board and asked for a student volunteer to come up to the board for each step and write his/her application of the step to their homework assignment for their social studies class. The research-instructor then went over what the students wrote on the board and asked for feedback from the rest of the class to see if they had written anything different or had any feedback for their classmates. Finally, after discussion and reflecting on the homework assignment, the research-instructor explained the fact that there would be a five-week break from the sessions due to Trinity College's winter break.

**Winter Booklet** (see Appendix M). At the end of session three, the students were given a “Winter Booklet” to complete over the break, which had four activities to be completed over the

course of four weeks in order to keep the information that had been covered in the first three sessions fresh in their minds. The goal of the first activity was to remind the students that thinking about your own thinking can improve the outcome of a task. The goal of the second activity was to ask the students to reflect on a vignette about a college student who exhibited low levels of metacognition when assigned a paper for class, and the third activity required the same reflection, except the vignette provided an example of a college student who exhibited high levels of metacognition. The purpose of the final activity was to have the students reflect on the strengths and weaknesses both college students exhibited in the previously mentioned vignettes. The students were asked questions regarding what they would do similarly and what they would do differently if given the same assignment.

**Session 4.** For the fourth session, the research-instructor reviewed the activities done in the Winter Booklet through an interactive discussion prompted by a PowerPoint presentation. The first component of the discussion asked students to share with the class what they believed both college students in the vignettes did well, and what they needed to improve on in order to do well on their paper assignment. The second component asked the students to discuss how the college student who exhibited high metacognition applied the *Learn 2 Learn* steps when writing his paper (e.g., read directions carefully, balanced heavy workload, outlined his paper, made an outline, and proofread his work).

Finally, the research-instructor provided examples of what made learning hard for him/her in school, in addition to more general difficulties individuals experience when learning. The session was concluded with an activity (see Appendix N) that asked students to write one example of what made learning hardest for them, which would be collected by the research-instructor.

**Session 5.** Based on responses to the activity done in the previous session, the fifth session was catered to the specific learning difficulties experienced by the students in the current study. The research-instructor provided a PowerPoint presentation of learning tips for the students to help them with busy schedules, distractions, lack of interest in or difficulties understanding their subject matter, and personal life conflicts. The session was concluded with an activity (see Appendix O), which first asked students to sign a paper that promised they would make a commitment to not distract their fellow classmates when they are in school. Second, the students were asked to write one short-term goal from the learning tips that they believed would help them the most and one long-term goal that they believed would keep them motivated even when their work was boring. Finally, the research-instructor asked for volunteers to share their goals with the class.

**Session 6.** For the final session, the research-instructor introduced the notions of fluid and fixed intelligence through a PowerPoint presentation that was made suitable for an eighth grade audience. The idea that one's intelligence is fluid, malleable and something that can be improved was emphasized throughout the entire session. The research-instructor explained that the brain is similar to a muscle, with brain cells that can grow and multiply with practice and repetition of a certain task or skillset. In regards to the *Learn 2 Learn* model, it was explained to students that believing intelligence is fluid and can be improved is related to their motivation to learn, especially when experiencing feelings of incompetence in certain subjects.

The session concluded with an activity asking the students to imagine they were entering ninth grade and to think about the advice they would have given to themselves when they were entering eighth grade. The research-instructor shared with the students the advice he/she would

have given to him/herself in eighth grade as an example for them to feed off of. The students were then asked to share their advice with the rest of the class.

### *Control Treatment Sessions*

The control group received six sessions on information regarding college and the process of applying and transitioning to college. The first session discussed earnings and unemployment rates based on educational attainment in order to solidify the importance of a bachelor's degree in today's society. The session was concluded with a conversation regarding the social aspects of college, including what living with roommates entails, the cultural experiences you can have, and the diversity of various campuses.

The second session covered the differences between public, private, and community colleges and universities. Participants were informed of the differences in student enrollment numbers and shown various campus maps to observe the range of campus sizes they could choose from. Finally, the research-instructor addressed the process of selecting a location for your college or university in relation to your family or the part of the country you would like to be in.

In the third session, the research-instructor addressed the cost breakdown of a typical college and the different ways to afford tuition, such as financial aid and academic and athletic scholarships. Additionally, the experience of a college visit was described and the research-instructor mentioned his/her college visits and what the process entails.

The fourth session was a spin off of the game "MASH" and was catered to subject matter pertaining to college and university life. The fifth session first focused on extracurricular activities that are available at most colleges and then focused on the application process. The students were provided with advice in regards to the interview process, the college essay, and the

activities they should participate in to build their transcript. The final session included a tour of a college campus with the research-instructor.

## Results

### *Correlations among measures*

Correlations were examined among Jr. MAI scores, MC5 scores, Qual-MC5 scores, and Quarterly Grades (see Table 2). As predicted, the Qual-MC5 was significantly positively correlated with the Jr. MAI and the MC5 at pre- and post-testing,  $p \leq .01$ , showing that this newly developed measure was reliable. Similarly, the Qual-MC5 was significantly positively correlated with quarterly grades at pre- and post-testing,  $p \leq .01$ . The MC5 and Qual-MC5 predict grades equally well and both self-developed measures predicted grades better than the Jr. MAI did.

### *Metacognition 5 (MC5)*

Descriptive statistics for the intervention and control groups on the MC5 pre- and post-test are presented in Table 3. I conducted a repeated-measures ANOVA with Condition as the between subjects factor and Time as the repeated measure. There were no initial condition differences on MC5 scores at pre-testing. There was no significant main effect of condition  $F(1, 104) = .43, p = .51$  and no effect of time  $F(1, 104) = .44, p = .51$ . As expected, there was a significant condition by time interaction  $F(1, 104) = 5.35, p = .023$  (see Figure 1). Therefore, the repeated-measures ANOVA revealed that the intervention had a significant effect in increasing metacognitive abilities in the experimental condition.

### *Qualitative Metacognition 5 (Qual-MC5)*

Descriptive statistics for the intervention and control groups on the Qual-MC5 pre- and post-test are presented in Table 4. I conducted a repeated-measures ANOVA with Condition as

the between subjects factor and Time as the repeated measure. There were initial condition differences on the Qual-MC5 scores at pre-testing, with the control condition scoring higher than the experimental condition. There was no significant main effect of condition  $F(1, 94) = 2.90, p = .09$ . There was no significant main effect of time  $F(1, 94) = 1.60, p = .21$ , and a marginally significant condition by time interaction  $F(1, 94) = 3.16, p = .079$  (see Figure 2). Therefore, the repeated-measures ANOVA revealed that the intervention had a significant effect in increasing the experimental conditions' metacognitive abilities.

Descriptive statistics for the individual Qual-MC5 items are reported in Table 5. I conducted a repeated-measures MANOVA with Condition as the between subjects factor, Time as a repeated measure, and Qualitative Item as another repeated-measures factor. There was a significant main effect of item  $F(9, 702) = 39.30, p \leq .001, \text{partial } \eta^2 = .335$  (see Table 5). The individual items measuring "Assess the Task," "Apply Strategies and Monitor Performance," and "Reflect and Adjust" showed the highest metacognitive scores, whereas the items measuring "Planning" and "Evaluating Strengths and Weaknesses" showed the lowest scores. There was no significant condition by item interaction  $F(9, 702) = .73, p = .68$  and no significant item by time and condition interaction  $F(9, 702) = .40, p = .94$ . As expected, there was a significant condition by time interaction  $F(1, 78) = 7.11, p = .009$  and a significant time by item interaction  $F(9, 702) = 2.20, p = .02$ . Therefore, the repeated-measures MANOVA showed the intervention still had a significant effect in increasing the experimental condition's metacognitive abilities when broken down by individual item.

#### *Performance Measures: Quarter Grades*

Descriptive statistics for the first, second, and third quarter grades are shown in Table 6. I conducted a repeated-measures ANOVA with Condition as the between subjects factor and Time



as the repeated measure. There was no significant main effect of condition  $F(1, 108) = .21, p = .65$ , and no significant condition by time interaction  $F(2, 216) = 1.58, p = .21$ . There was, however, a main effect of time  $F(2, 216) = 24.51, p \leq .001$  (see Figure 3). Therefore, the repeated-measures ANOVA revealed that grades in both conditions declined from first to third quarter. Contrary to my hypothesis, this finding reveals that the intervention did not lead to an increase in grades for the experimental condition.

### **Discussion**

Self-regulated learning interventions have been found to improve metacognitive abilities and academic performance among students (Dignath & Büttner, 2008). The current study found the self-regulated learning intervention implemented with eighth grade social studies students successfully improved their metacognitive abilities, but did not show a positive effect on short-term academic performance. Additionally, the current study was able to validate a new qualitative measure of metacognition and positively correlate this measure to academic performance.

#### *Improvement in Metacognitive Abilities*

As predicted, the intervention led to an increase in metacognitive abilities for students in the experimental condition, as measured by, the Qualitative MC5. There are several reasons why the intervention in the current study was successful in changing students' self reported metacognition, whereas in previous years it was not. First, significant modification was made to the interventions designed by Brady (2012) and Howe (2013). Self-regulated learning theory highlights the importance of teaching learning strategies in a cyclical manner (Cleary & Zimmerman, 2004). Howe's (2013) intervention addressed all five learning strategies within the Ambrose et al. (2010) model, but taught each strategy independently and in separate sessions.

The current intervention incorporated the entire model into every session and explicitly applied all five steps of the cycle to the activities completed throughout the sessions. Similarly, research clearly states how critical self-reflection and feedback are to ensure the success of self-regulated learning interventions through the use of activities such as group work and cognitive discussions (Belfiore & Hornyak, 1998; Paris & Winograd, 1999; Dignath & Büttner, 2008; Paris & Paris, 2001). Throughout the current intervention, students were given feedback on all assignments, either from their peers or the research-instructor. Additionally, the research-instructor consistently engaged the students in reflective class discussions after the completion of an activity in order to encourage the students to adjust their strategies for the next session.

Consistent with studies recommending a researcher conduct the intervention rather than the classroom teacher (Dignath & Büttner, 2008), the current intervention was taught by student research-instructors opposed to the eighth grade social studies teachers. Thus, the research-instructors may have held more credibility with the eighth grade students due in part to their proximity in age. Additionally, the research-instructors had extensive knowledge of the subject matter taught, in comparison to the classroom teachers, which then assured high fidelity in the delivery of the metacognitive curriculum.

The current study changed the subject matter of the curriculum for the control condition from American Presidents (Howe, 2013) to information about the college admission process. This revision was made because the sessions on American Presidents were embedded into the curriculum of the social studies classrooms. Therefore, the control sessions were potentially leading to an increase in the academic performance of the students in that condition because both the control and experimental groups took quizzes and wrote papers on the Presidents for grades in their social studies class.

*Qualitative Measure (Qual-MC5)*

Consistent with my hypothesis, the Qual-MC5 was positively correlated with both quantitative measures of metacognition (Jr. MAI and MC5) and was a positive predictor of quarterly grades. This suggests that the Qual-MC5 was a reliable measure of metacognition and was able to assess the five-steps of the Ambrose et al. (2010) model. This finding contrasts with past research by Brady (2012) and Howe (2013), which did not find a correlation between metacognition and grades. Thus, the Qual-MC5 was able to link metacognitive abilities with academic performance (i.e., students with higher metacognition had higher course grades).

Through the analysis of the individual items on the Qual-MC5, it was found that students showed more improvement on certain aspects of metacognition than on other aspects. The items associated with “Assessing the Task” and “Reflect and Adjust” showed the greatest improvement, compared to “Planning,” which showed the lowest improvement. The discrepancy between items could be attributed to two circumstances. First, it may be that the two social studies teachers plan tasks and assignments so well for the students that there is then little need for the students to plan on their own. Second, students may have misunderstood wording of the questions aimed to assess students’ ability to plan. For example, the first part of the fifth qualitative item assessing “Planning” asked:

When you have an assignment in this class, do you (check one):

- Write down a plan of how you are going to complete it before you start
- Immediately begin working

a. Explain Why:

A number of students indicated they immediately begin working, which would have counted as a poor indicator of planning. In their explanations, however, many students wrote responses such as, “I immediately begin working on a rough draft of the report and from there on

I make corrections and write the final” or “I immediately begin working because it gives me more time to start and make changes.” These responses demonstrate that the students are planning ahead of time to be able to write multiple drafts and to revise their work, but because they are not actively “writing down a plan” they receive lower scores on their responses.

### *Quarterly Grades*

Contrary to my hypothesis, the intervention did not produce an effect on course grades at the third quarter. This is not entirely surprising since students’ quarterly grades produce a substantial drop from first to third quarter every year because the first quarter is spent reviewing old material, whereas the third quarter is entirely new material. As a positive indicator, the current study was able to show a slight halt in the decline of grades for the intervention group from the first to third quarter, even though it did not produce a significant finding. By the fourth quarter, student grades tend to show an increase again after the students have adjusted to the shift from review to new information. Therefore, an analysis of fourth quarter grades (which is beyond the scope of this study) may show that the intervention does have an effect on long-term academic performance.

The difficulty in producing significant effects on academic performance could be due to the multiple factors that go into a marking period grade. Quarterly grades are comprised of assignments such as, homework, quizzes, group projects, and exams. Metacognitive abilities may be more important for group project assignments where students need to work together, plan meetings, and evaluate their strengths and weaknesses in order to properly divide up the work, whereas a quiz on the abbreviations of the 50 states would involve mostly rote memorization and less metacognitive ability.

*Limitations*

Prior to beginning the intervention, research-instructors had limited interaction with the students in the social studies classrooms. Throughout the current study, the rapport established with the students was the same in both the experimental and control conditions. In order for learning strategies to be maintained over time, metacognitive instruction must be catered to the individual learning needs of the students (Harvey, 2002). Therefore, the effects of the intervention could be strengthened with the development of stronger relationships between the research-instructors and the students, especially since the research shows that researchers are best suited to implement the metacognitive interventions.

The current study expanded research conducted in previous years (Brady, 2012; Howe, 2013; Naratil, 2013) to include two eighth grade social studies teachers at the same middle school. For this study to be generalized, it is necessary to expand the current study to eighth grade social studies classrooms at a variety of middle schools. Additionally, the intervention is currently embedded in a social studies curriculum and would need to undergo slight adjustments in order to be generalizable to every subject matter in the eighth grade curriculum, not exclusively social studies courses. Finally, working with two teachers presented difficulty in attaining finer grained measures of academic performance due to the discrepancies between their assignments. Anselmi, Reuman, Howe, Brady, and Avery (2013) found long-term group projects to exhibit higher levels of self-regulated learning, indicating that metacognition might be more applicable to certain tasks than others. Therefore, future research should take into consideration developing micro measures of academic performance that can be used for comparability purposes across teachers and classrooms.

*Future Research*

Findings from the current study suggest that future research should focus on replicating and analyzing the characteristics of an effective metacognitive intervention in eighth grade social studies classrooms (i.e., group work, cognitive discussion, feedback, reflection). Additionally, schools should implement explicit instruction of self-regulated learning, specifically metacognitive strategies, as part of their curricula in order to enhance their students' academic performance.

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## Tables

Table 1.

*Distribution of 8<sup>th</sup> grade sections across conditions and research-instructors*

Section	Teacher A		Teacher B	
	Condition	RI	Condition	RI
A	Experimental	1	-	-
B	Experimental	1	-	-
C	Control	2	-	-
D	-	-	Control	3
E	Control	3	Experimental	2

Note. RI = Research-instructor.

Table 2.

*Correlations among all Measures*

Measures	1	2	3	4	5	6
<u>Pre-Testing</u>						
1. MC5						
2. Qual-MC5	.49					
3. Jr.MAI	.76	.34				
<u>Post-Testing</u>						
4. MC5	.75	.33	.66			
5. Qual-MC5	.41	.40	.25	.42		
6. Jr.MAI	.59	.23	.64	.72	.31	
<u>Quarterly Grades</u>						
Q1	.39	.45	.24	.42	.42	.27
Q2	.35	.33	.20	.44	.36	.25
Q3	.30	.37	.12	.34	.31	.12

*Note.* MC5 = Metacognition 5; Qual-MC5 = Qualitative Metacognition 5; Jr. MAI = Junior Metacognitive Awareness Inventory; Q = Quarter Marking Period. N's range from 78 to 126. Critical values of  $r$  at  $\alpha = .05$  and  $.01$  are .196 and .232 respectively.

Table 3.

*Effects of Time and Condition on Overall MC5 Scale*

<b>Time</b>	<b>Condition</b>	<i>M</i>	<i>SD</i>
Pre-Treatment	Experimental	3.58	.51
	Control	3.60	.52
Post-Treatment	Experimental	3.68	.46
	Control	3.54	.52

*Note.*  $N = 53$  for Experimental Group and  $N = 53$  for Control Group

Table 4.

*Descriptive Statistics for Qual-MC5*

<b>Time</b>	<b>Condition</b>	<i>M</i>	<i>SD</i>
Pre-Treatment	Experimental	15.33	4.81
	Control	17.45	3.07
Post-Treatment	Experimental	16.74	5.54
	Control	17.21	3.86

*Note.*  $N = 44$  for Experimental Group and  $N = 52$  for Control Group

Table 5.

*Descriptive Statistics for Individual Items in the Qual-MC5*

<b>Item</b>	<i>M</i>	<i>SE</i>
AT1	2.28	0.05
AT2	1.80	0.06
ESW1	1.52	0.05
ESW2	1.59	0.05
P1	1.51	0.06
P2	1.44	0.07
P3	1.62	0.06
ASMP1	1.86	0.05
ASMP2	2.01	0.03
RA1	2.19	0.06

*Note.* AT1 = Assess the Task Question 1; AT2 = Assess the Task Question 2; ESW1 = Evaluate Strengths and Weaknesses Question 3; ESW2 = Evaluate Strengths and Weaknesses Question 4; P1 = Planning Question 5 Part 1; P2 = Planning Question 5 Part 2; P3 = Planning Question 6; ASMP1 = Apply Strategies and Monitor Performance Question 7; ASMP2 = Apply Strategies and Monitor Performance Question 8; RA1 = Reflect and Adjust Question 9. N = 80.

Table 6.

*Effects of Time and Condition on Quarterly Grades*

<b>Time</b>	<b>Condition</b>	<i>M</i>	<i>SD</i>
Quarter 1	Experimental	83.10	12.56
	Control	83.59	12.08
Quarter 2	Experimental	82.19	11.18
	Control	81.36	11.76
Quarter 3	Experimental	78.79	12.92
	Control	76.22	13.45

*Note.*  $N = 52$  for Experimental Group and  $N = 58$  for Control Group



Figures

Figure 1. MC5 Means at Pre- and Post-Test

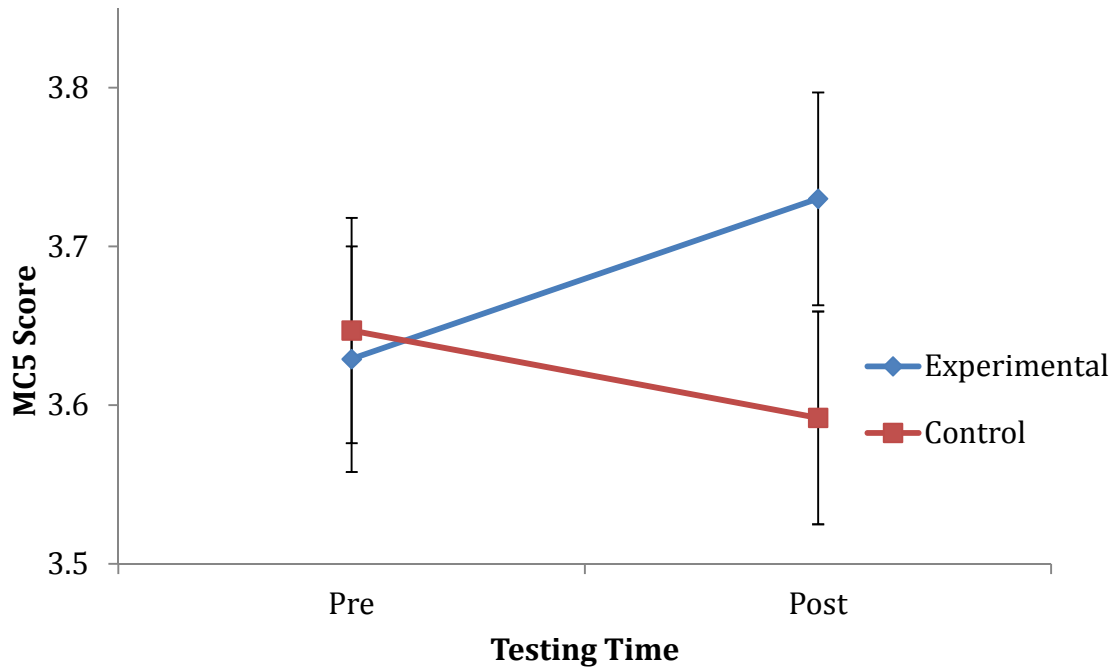


Figure 2. Qual-MC5 Means at Pre- and Post-Test

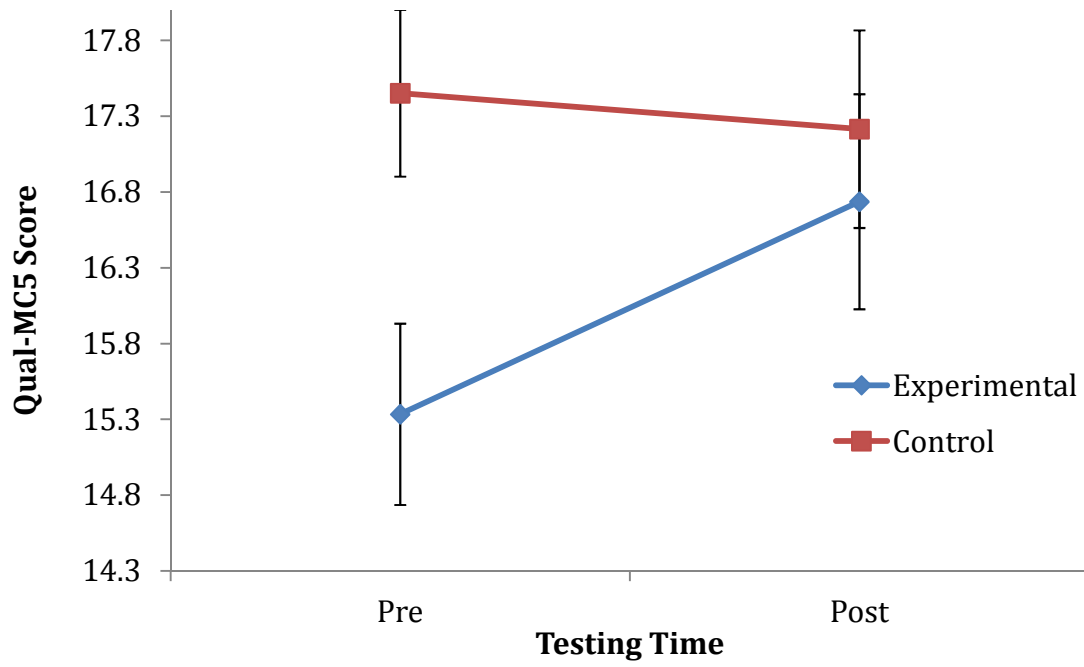
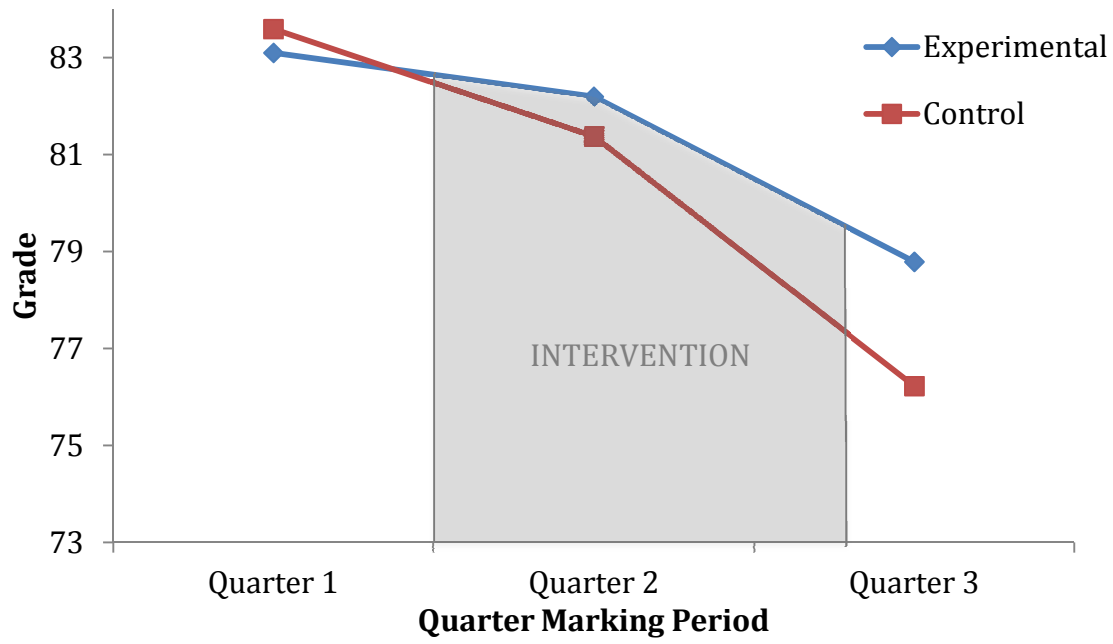


Figure 3. Quarter Grades for The Experimental and Control Groups



Appendix A



**HARTFORD MAGNET TRINITY COLLEGE ACADEMY**

*at The Learning Corridor*

*Sally A. Biggs, Principal*

*Stacy Chambers, Resident Principal*

*Sheldon Neal, Assistant Principal*

*Gwyndolyn Adams, Assistant Principal*



Dear Parent/Guardian,

As part of the Learning Corridor partnership and our relationship with Trinity College we have been invited to participate in the piloting of a research project. The students in Ms. Avery’s class will be learning about strategies that may help improve academic motivation. The study, *Self-Regulated Learning- Metacognition & Achievement in Middle School*, is designed to measure students’ motivational beliefs and ways in which students self-regulate their learning.

During the 2<sup>nd</sup> Marking Period students will answer questions about their learning styles, learn effective study skills, and engage in small group activities to stimulate learning. We anticipate the project will take approximately 4-5 hours (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 and the classroom activities will be conducted by Trinity students with the direct supervision of Ms. Avery.

If you have any questions or concerns regarding this exciting opportunity, please feel free to contact Ms. Avery (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 & agree to have your child participate in this study.

Sincerely, Ms. Avery

Title of Project: Self-Regulated Learning: Metacognition & Achievement in Middle School

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

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

Deb Avery [davery@hartfordschools.org](mailto:davery@hartfordschools.org)  
Hartford Magnet Middle School, Hartford, CT 06106

I acknowledge that I have received and read a letter explaining the study of *Self-Regulated Learning: Metacognition & Achievement in Middle School*. I understand that there are no known risks to participants in the study, that my 8<sup>th</sup> 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 8<sup>th</sup> grade son / daughter to participate.
- I do not grant permission for my child to participate.

\_\_\_\_\_  
Print Your 8<sup>th</sup> grade Son’s / Daughter’s Name

\_\_\_\_\_  
Print Your Name

\_\_\_\_\_  
Your Son’s / Daughter’s Signature

\_\_\_\_\_  
Your Signature



at *The Learning Corridor*

**Sally A. Biggs, Principal**

**Sheldon Neal, Assistant Principal**

**Gwyndolyn Adams, Assistant Principal**

**MariAnne Lalama**

CONSENT FORM

Please return this form to Ms. Avery/Ms. Lanza

Title of Project: Self-Regulated Learning: Metacognition & Achievement in Middle School

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

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

Ms. Avery  
[averd001@hartfordschools.org](mailto:averd001@hartfordschools.org)  
Hartford Magnet Trinity College Academy, Hartford, CT 06106

Ms. Lanza  
[Lanzs001@hartfordschools.org](mailto:Lanzs001@hartfordschools.org)  
Hartford Magnet Trinity College Academy, Hartford, CT 06106

I acknowledge that I have received and read a letter explaining the study *Self-Regulated Learning: Metacognition & Achievement in Middle School*. I understand that there are no known risks to participants in the study, that my 8<sup>th</sup> 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 8<sup>th</sup> grade son / daughter to participate.

I do not grant permission for my child to participate.

\_\_\_\_\_  
Print Your 8<sup>th</sup> grade Son's / Daughter's Name

\_\_\_\_\_  
Print Your Name

\_\_\_\_\_  
Your Son's / Daughter's Signature

\_\_\_\_\_  
Your Signature

Date \_\_\_\_\_

Appendix B

1. WHAT IS YOUR BIRTH DATE?

MONTH \_\_\_\_\_ DAY \_\_\_\_\_ YEAR \_\_\_\_\_

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 C

**INSTRUCTIONS: WE ARE INTERESTED IN WHAT YOU, AS A LEARNER, DO WHEN YOU STUDY FOR YOUR HISTORY CLASS. PLEASE READ THE FOLLOWING SENTENCES AND CHOOSE THE ANSWER THAT RELATES TO YOU AND THE WAY YOU ARE WHEN YOU'RE DOING SCHOOLWORK OR HOMEWORK. PLEASE ANSWER AS HONESTLY AS POSSIBLE.**

1. I KNOW WHEN I UNDERSTAND SOMETHING.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

2. I CAN MAKE MYSELF LEARN WHEN I NEED TO.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

3. I TRY TO USE WAYS OF STUDYING THAT HAVE WORKED FOR ME BEFORE.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

4. I KNOW WHAT THE TEACHER EXPECTS ME TO LEARN.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

5. I LEARN BEST WHEN I ALREADY KNOW SOMETHING ABOUT THE TOPIC.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

6. I DRAW PICTURES OR DIAGRAMS TO HELP ME UNDERSTAND WHILE LEARNING.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

7. WHEN I AM DONE WITH MY SCHOOL WORK, I ASK MYSELF IF I LEARNED WHAT I WANTED TO LEARN.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

8. I THINK OF SEVERAL WAYS TO SOLVE A PROBLEM AND THEN CHOOSE THE BEST ONE.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

9. I THINK ABOUT WHAT I NEED TO LEARN BEFORE I START WORKING.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

10. I ASK MYSELF HOW WELL I AM DOING WHILE I AM LEARNING SOMETHING NEW.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

11. I REALLY PAY ATTENTION TO IMPORTANT INFORMATION.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

12. I LEARN MORE WHEN I AM INTERESTED IN THE TOPIC.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

13. I USE MY LEARNING STRENGTHS TO MAKE UP FOR MY WEAKNESSES.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

14. I USE DIFFERENT LEARNING STRATEGIES DEPENDING ON THE TASK.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

15. I OCCASIONALLY CHECK TO MAKE SURE I'LL GET MY WORK DONE ON TIME.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

16. I SOMETIMES USE LEARNING STRATEGIES WITHOUT THINKING.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

17. I ASK MYSELF IF THERE WAS AN EASIER WAY TO DO THINGS AFTER I FINISH A TASK.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

18. I DECIDE WHAT I NEED TO GET DONE BEFORE I START A TASK.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS



## Appendix D

**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. PLEASE ANSWER AS HONESTLY AS POSSIBLE.**

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	SELDOM	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	SELDOM	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	SELDOM	SOMETIMES	OFTEN	ALWAYS

4. I READ DIRECTIONS MORE THAN ONCE BEFORE I START WORKING ON AN ASSIGNMENT.

1	2	3	4	5
NEVER	SELDOM	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	SELDOM	SOMETIMES	OFTEN	ALWAYS

6. I KNOW WHAT MY STRENGTHS ARE ON THE WORK I DO IN THIS CLASS.

1	2	3	4	5
NEVER	SELDOM	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	SELDOM	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	SELDOM	SOMETIMES	OFTEN	ALWAYS

9. I DO NOT UNDERSTAND THE PURPOSE OF ASSIGNMENTS IN THIS CLASS.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

10. I REVIEW MY WRITING FOR THIS CLASS BEFORE I HAND IT INTO THE TEACHER.

1	2	3	4	5
NEVER	SELDOM	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	SELDOM	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	SELDOM	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	SELDOM	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	SELDOM	SOMETIMES	OFTEN	ALWAYS

15. I ASK MY TEACHER FOR HELP.

1	2	3	4	5
NEVER	SELDOM	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	SELDOM	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	SELDOM	SOMETIMES	OFTEN	ALWAYS

18. WHEN MY HOMEWORK REQUIRES SPECIFIC MATERIALS, I REMEMBER TO BRING THEM HOME FROM SCHOOL.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

19. I UNDERSTAND DIRECTIONS FOR ASSIGNMENTS IN THIS CLASS.

1	2	3	4	5
NEVER	SELDOM	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	SELDOM	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	SELDOM	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	SELDOM	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	SELDOM	SOMETIMES	OFTEN	ALWAYS

24. I RUSH THROUGH DIRECTIONS TO GET STARTED ON A TEST AS SOON AS POSSIBLE.

1	2	3	4	5
NEVER	SELDOM	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	SELDOM	SOMETIMES	OFTEN	ALWAYS

26. I KNOW WHAT MY WEAKNESSES ARE ON THE WORK I DO IN THIS CLASS.

1	2	3	4	5
NEVER	SELDOM	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	SELDOM	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	SELDOM	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	SELDOM	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	SELDOM	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	SELDOM	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	SELDOM	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	SELDOM	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	SELDOM	SOMETIMES	OFTEN	ALWAYS

35. I TURN IN TESTS FOR THIS CLASS WITHOUT CHECKING MY ANSWERS.

1	2	3	4	5
NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS

Appendix E

**DIRECTIONS:** PLEASE TRY TO ANSWER EVERY QUESTION AND KNOW THAT THESE ANSWERS WILL NOT BE GRADED OR SEEN BY YOUR TEACHER. AS YOU ANSWER THESE QUESTIONS PLEASE THINK ABOUT THEM IN REGARDS TO YOUR HISTORY CLASS. REMEMBER TO GIVE LOTS OF EXAMPLES AND THAT THERE ARE NO RIGHT OR WRONG ANSWERS.

5. AT THE BEGINNING OF A PROJECT FOR YOUR HISTORY CLASS, WHAT WOULD YOU DO IF YOU DID NOT UNDERSTAND THE DIRECTIONS?

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5. DO YOU USUALLY MAKE SURE YOU UNDERSTAND THE PURPOSE OF AN ASSIGNMENT IN HISTORY CLASS?

YES NO (CIRCLE ONE)

A. EXPLAIN WHY OR WHY NOT

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B. GIVE SPECIFIC EXAMPLES OF ASSIGNMENTS FROM HISTORY CLASS

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5. DO YOU MAKE AN EFFORT TO THINK ABOUT WHAT YOU ARE GOOD AT IN YOUR HISTORY CLASS?

YES NO (CIRCLE ONE)

A. GIVE SPECIFIC EXAMPLES OF WHAT YOU ARE GOOD AT

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5. DO YOU MAKE AN EFFORT TO THINK ABOUT WHAT YOU NEED TO IMPROVE ON IN YOUR HISTORY CLASS?

YES NO (CIRCLE ONE)

A. GIVE SPECIFIC EXAMPLES OF WHAT YOU NEED TO IMPROVE ON

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5. WHEN YOU HAVE AN ASSIGNMENT IN THIS CLASS, DO YOU (CHECK ONE):

- WRITE DOWN A PLAN OF HOW YOU ARE GOING TO COMPLETE IT BEFORE YOU START
- IMMEDIATELY BEGIN WORKING

A. EXPLAIN WHY:

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B. DO YOU USE ANY OF THESE WHEN YOU BEGIN AN ASSIGNMENT?

- GRAPHIC ORGANIZERS
- OUTLINES
- PILLARS
- OTHERS (PLEASE SPECIFY)

C. HOW HAVE THESE STRATEGIES BEEN HELPFUL TO YOU IN THIS CLASS?

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5. CHOOSE WHICH BEST DESCRIBES YOUR STYLE IN HISTORY CLASS, DO YOU (CHECK ONE)

- LEAVE ASSIGNMENTS FOR THE LAST MINUTE
- BEGIN WORKING ON THEM AHEAD OF TIME

A. EXPLAIN WHY AND GIVE EXAMPLES:

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5. WHEN IT COMES TO YOUR GRADES IN THIS CLASS, DO YOU (CHECK ONE)

- KEEP TRACK OF YOUR GRADES IN THIS CLASS
- NOT WORRY ABOUT KEEPING TRACK OF THEM

A. HOW OFTEN DO YOU TALK ABOUT YOUR GRADES OR SHARE YOUR WORK WITH YOUR PARENTS?

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5. WHICH STRATEGIES HAVE YOU USED TO HELP YOURSELF IN THIS CLASS?

A. (CHECK ALL THAT APPLY)

- MAKING STUDY GUIDES
- FLASH CARDS
- TAKING NOTES
- OTHERS (PLEASE SPECIFY)

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B. HOW HAVE THESE STRATEGIES BEEN HELPFUL TO YOU IN THIS CLASS?

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5.

A. WHEN YOU GET AN ASSIGNMENT BACK IN THIS CLASS THAT YOU DID NOT DO WELL ON, OR AS WELL AS YOU HAD WANTED TO, DO YOU THINK ABOUT WHAT WENT WRONG?

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B. DO YOU THINK ABOUT HOW YOU COULD MAKE IT BETTER?

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C. GIVE EXAMPLES OF WHEN YOU HAVE APPROACHED YOUR WORK DIFFERENTLY AFTER NOT DOING AS WELL AS YOU WOULD HAVE LIKED?

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## Appendix F

**Qualitative Metacognition 5 Coding Criteria**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

Question 1 (Assess the Task):

0 – No 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 re-read the directions and then ask the teacher.*

*Ex. I would try to plan out the assignment or ask the teacher.*

Question 2 (Assess the Task)

0 – No response/inappropriate response/incomplete nonsensical answer

*Ex: Yes*

*A. Because I might not know it so I just*

*B. Ask teacher*

1 – Repetition of question, or superficial answer.

*Ex. Yes*

*A. It is much easier to complete an assignment when you understand it*

*B. Dec. of Independence, Medal of honor, Preamble*



2 – Complete response with some indication of insight with regards to the question. Examples given are relevant, but do not provide elaboration.

*Ex. Yes*

*A. Yes, because if I understand the purpose of an assignment I know I am doing the assignment for a good reason.*

*B. One example is when she assigned us to write a essay on if Columbas day should be a real holiday.*

*Ex. Yes*

*A. If you do not know how to understand your assignment then how would you be able to do it.*

*B. some examples are the essay; I didn't really know how to do it in the beginning.*

3 – Parts A and B provide elaboration and insight in regards to the question. Additionally, the example given in part B is connected to the reasoning in part A.

*Ex. Yes*

*A. Because if I didn't make sure I understood it, how would I do well on it?*

*B. When we had to do an essay on wether or not war was necessary, I made sure I knew it was that and not wether or not we thought war was a good practice*

*Ex. Yes*

*A. I do usually make sure I understand the purpose of an assignment because I would ask questions on the assignment*

*B. Eunice Williams organizer, I asked questions on what to do*

### Question 3 (Evaluate Strengths and Weaknesses)

0 – No answer/irrelevant answer/incomplete answer

*Ex. No*

*A. Not exactly sure*

1 – Response is related to a performance skill (e.g. taking tests, maps, geography) and can also be responses related to being good at a skill in specific content area that is not a cognitive learning strategy (writing essay, tests, debates). It would be a 2 if the student indicated being good at “studying” for tests.

*Ex. No*

*A. I'm not sure, probably taking notes*

*Ex. Yes*

*A. I'm good at geography of places and the kinds of settlements they had*

2 –Response is related to a learning skill (e.g. studying, taking notes, memorization), rather than a performance skill. If student says no, but their response is strong in regards to being good at a specific strategy, then a 2 can be given.

*Ex. Yes*

*A. Taking notes and memorizing facts*

*Ex. Yes*

A. *One example is I'm good at doing/studying for a map quiz; I am really good at that.*

3 – Participant justifies why they think they are good at a particular learning skill or explains why being good at that learning skill makes a difference

*Ex. Yes*

A. *When we were studying for the constitution exam I tested myself to see what I did and did not know, and this helped me do better on the exam.*

#### Question 4 (Evaluate Strengths and Weaknesses)

0 – No response/inappropriate response

1 – Provide a complete response to the question. The student may not make an effort to think about what they need to improve on and explains why they do not. Alternatively, the student can say they make an effort and provide either examples that are related to a performance skill or completely superficial (e.g. remember to write the date and block).

*Ex. No*

A. *Elaboration*

*Ex. Yes*

A. *I ask for help*

2 – Student provides a complete response and indicates they make an effort to think about learning skills they need to improve on. Their examples are relevant, but do not provide elaboration.

*Ex. Yes*

A. *Studying, effort, homework, classwork*

3 – Student makes an effort and their example provides an elaboration that indicates what they need to improve on and what they do to improve on it.

*Ex. Yes*

A. *I check if I studied in a specific way then fix what didn't work*

#### Question 5 - 1<sup>st</sup> part of question and part A (Planning):

0 – Student immediately begins working with no explanation as to why, or no response/irrelevant response

*Ex. Immediately begin working*

A. *I don't really know*

1 – Student immediately begins working, but provides insight in regards to why they immediately begin working, opposed to making a plan. Explanation makes it clear that they do not use the metacognitive strategy of planning.

*Ex. Immediately begin working*

A. *I immediately start working because usually making a plan is a waste of time and I don't use it.*

2 – Student writes down a plan and provides an explanation as to why they do this, but the reasoning is superficial in that it does not indicate a process understanding of why planning is helpful.

*Ex. Write down a plan*

*A. Because it doesn't seem as big when I plan it out*

3 – Student provides a process understanding of why planning is helpful and necessary when approaching an assignment.

*Ex. Write down a plan*

*A. Because if I start immediately I might forget something and then have to do it again so I make a plan so I'll know what goes in order*

Question 5 – Parts B and C (Planning):

0- No response/irrelevant response. Student does not use any strategies when they begin an assignment and they give an irrelevant reasoning or no reasoning as to how the strategies have been helpful to them.

1- Student checked one or more strategies, but the explanation simply repeats the words used in the question or the strategy (ex. because it helps me do my work, graphic organizers because they keep me organized).

*Ex.*

*B. Graphic organizers, outlines*

*C. It helps me complete writing assignments*

2- Student provides at least one strategy and the explanation as to how it has been helpful gives a clear understanding of how the strategy should be used to help them on an assignment.

*Ex.*

*B. Graphic organizers*

*C. I use graphic organizers because they help me find the information I might need for the assignment*

*Ex.*

*B. Others: Small paper drawings (models)*

*C. They have helped me by giving me a basic idea of what I am going to do*

3- Student provides more than one strategy and the explanation provided elaborates on how the strategies have helped them on their assignments and what the outcome was (ex. they used graphic organizers because it helped them find the information they needed for the assignment and this helped them do better on the assignment).

Question 6 (Planning):

0 – no response/irrelevant response

1 – Student either leaves assignment for the last minute or begins working ahead of time, but his/her reasoning is examples like to “get it done faster so I can do other things” or “I am lazy.”

*Ex. Leave assignment for the last minute*

*A. Because I have other homework to do*

2 – Student’s response indicates an understanding of what types of assignments are best to begin early and which you can leave until the last minute, or student begins work ahead of time and indicates a basic understanding of how/why beginning ahead of time is a better learning strategy than leaving work until the last minute.

*Ex. Begin working ahead of time*

*A. Because it’s just better to do the assignment when you get it instead of doing it at the last minute. It’s less stressful*

3 – Student begins work ahead of time and indicates an understanding of how/why this is a beneficial learning strategy, but the differentiation from a two is that this student’s explanation will touch upon the outcome of beginning ahead of time on his/her performance.

*Ex. Begin working ahead of time*

*A. It gave me more time to make sure I am on the right track, which then gave me an opportunity to get a better grade*

Question 7 (Apply Strategies and Monitor Performance):

0 – Incomplete/inappropriate response

1 – Provided complete response to question, even if they do not keep track of their grades, or indicates keeping track of their grades, but rarely or sporadically sharing them with their parents (not consistently or regularly)

*Ex. Keep track of your grades in this class*

*A. Every once and a while*

*Ex. Not worry about keeping track of them*

*A. Never*

2 – Participant keeps track of grades and indicates they share their grades with their parents often or regularly.

*Ex. Keep track of grades*

*A. Often, maybe every week*

3 – Participant keeps track of grades and indicates sharing their grades regularly with their parents, but elaborates in regards to information they share with their parents. The elaboration needs to indicate a sense of reflection or attempt at adjustment.

*Ex. Keep track of grades*

*A. I mostly keep track and tell my parents every time I get a really good grade or a really bad grade*

Question 8 (Apply Strategies and Monitor Performance):

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.*

- A. *Taking notes*
- B. *No because I forget to use them*

2 – Response with one strategy (or more) and a superficial understanding of the strategies listed. Part B will most likely be a repetition of the wording used in the question.

*Ex.*

- A. *Making study guides, taking notes*
- B. *I will get questions right on a quiz because I studied with notes and study guides*

*Ex.*

- A. *Taking notes*
- B. *It gives me a quick reference when I am doing work*

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.*

- A. *Making study guides, taking notes*
- B. *Having notes is helpful for the process of studying and study guides give me examples of what will be on the test.*

#### Question 9 (Reflect and Adjust):

0 – incomplete/blank/inappropriate response

1 – Partial or complete response with no elaborations or explanations. Examples in part A of the question have no elaborations or explanations.

*Ex.*

- A. *Yes*
- B. *Yes*
- C. *Preamble*

*Ex.*

- A. *I just stop trying*
- B. *No*
- C. *I don't*

2.3 (basic 2) – There is a reflection on their work, but the example(s) provided do not indicate a process understanding of why they reflected or made an adjustment.

*Ex.*

- A. *Yes, so I can learn from my mistakes*
- B. *Yes, because it will help me in the future*
- C. *I did poorly on an assignment and re-did it*

2.7 (rich 2) – The response shows the student's ability to reflect on their work and then their example(s) indicate the ability to reflect and adjust in order to improve for next time.

*Ex.*

- A. Yes, I try to get feedback from the teacher so I can learn what I did wrong*
- B. Yes, I do this a lot and try to fix my mistakes for the next time.*
- C. After getting a low grade on a practice test, I studied really hard and in new ways so I could do better.*

3 – The response shows everything in a rich two; however, the student provides specific strategies they used to apply the adjustment they indicated making.

*Ex.*

- A. Yes, I think about the things I did wrong and how to improve.*
- B. Yes, I think about better strategies I could use*
- C. I got a bad grade on a quiz and instead of using the same strategies the next time; I used new strategies like starting my studying earlier and making flash cards. I got a better grade on the next quiz because of this.*

Appendix G



Appendix H

***Directions:***

1. Each team has been given 18 marshmallows and 30 toothpicks
2. Your team's goal is to build the tallest tower possible!
3. The tower must be able to stand on its own without any helping hands or another object (freestanding). This means no holding the tower or leaning it against another object
4. Each team will be given 10 minutes to build their tower.



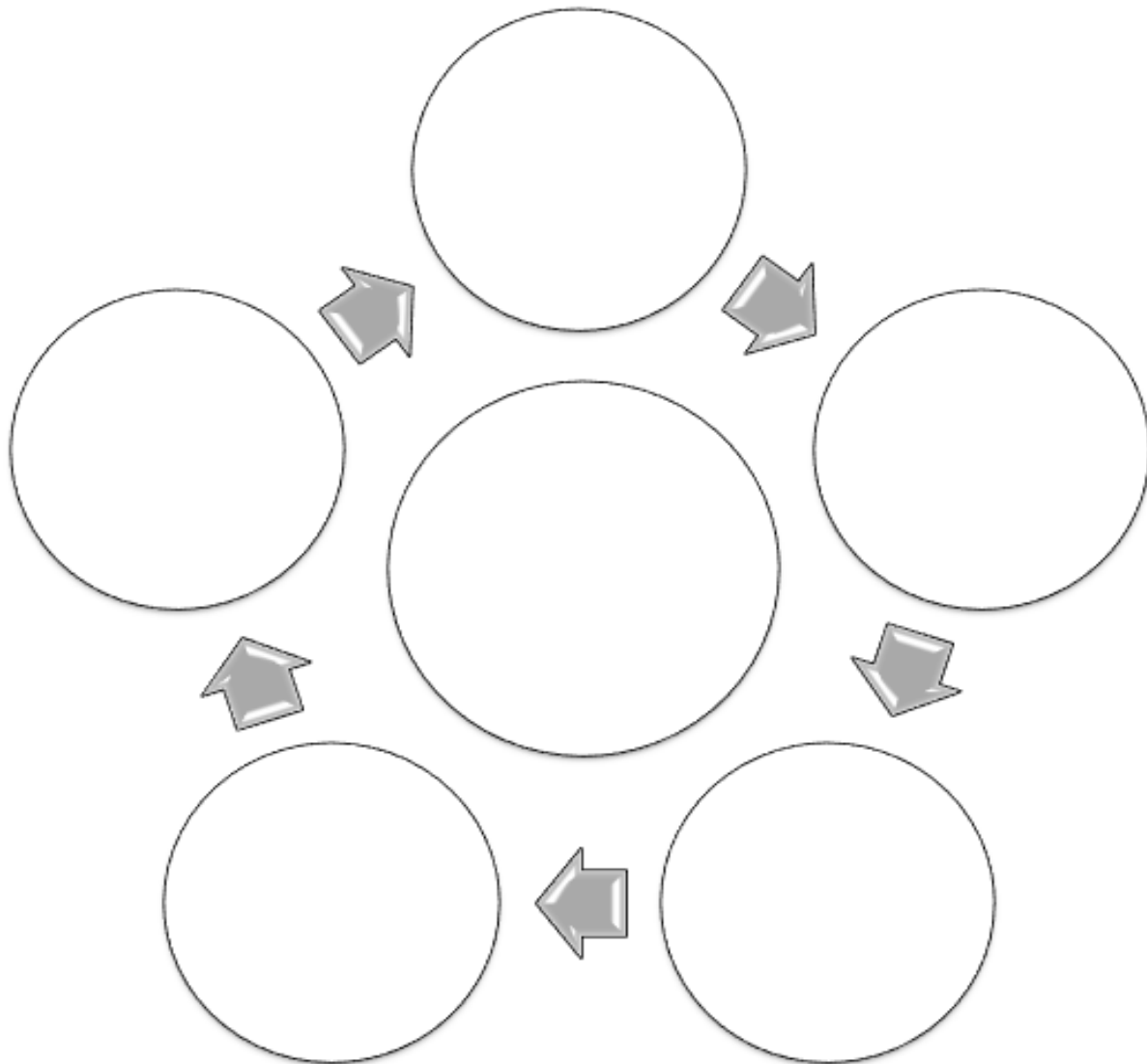
Appendix I

# LEARN 2 LEARN Steps: Building a Structure in Groups

Team Name: \_\_\_\_\_

Members : \_\_\_\_\_

After building the structure, discuss with your team what you did, thought of, or talked about as a group that would match each one of the *LEARN 2 LEARN Steps*. Make sure you write something for ALL the steps!



## Appendix J

Name: \_\_\_\_\_

Block: \_\_\_\_\_

## LEARN 2 LEARN QUIZ

**Directions:** Based on the activity we did in class and the steps we discussed with you – try your best to match the definitions on the right with the correct step on the left. Write the corresponding letter in the blank next to the step.

_____ Planning	a. Putting your plan into action and then checking your progress to see how you are doing
_____ Assess the Task	b. What makes you want to do something or not want to do something
_____ Monitor Performance and Apply Strategies	c. Thinking about what you are good at and what you struggle with when doing an assignment
_____ Evaluating Strength and Weaknesses	d. Developing a series of steps to tackle an assignment before you start
_____ Reflect and Adjust	e. Knowing what strategies work for me and if a strategy does not work for me, trying a different one
_____ Motivation	f. Reading directions and understanding the goal of an assignment

Appendix K

## LEARN 2 LEARN: Building a Structure that Supports Weight

**Next week we will be building another tower (so make sure to read the directions below carefully). Fill out the Learn 2 Learn steps based on this new task and bring them in by Monday.**

**Directions:** Each team will be given the same time and materials to complete the task. Your team's goal will be to build a tower strong enough to hold your empty Learn 2 Learn binder. Again, the tower must be able to stand on its own without any helping hands or another object (freestanding).

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Appendix L

Name: \_\_\_\_\_

Block: \_\_\_\_\_

## LEARN 2 LEARN: Applying the steps to your homework

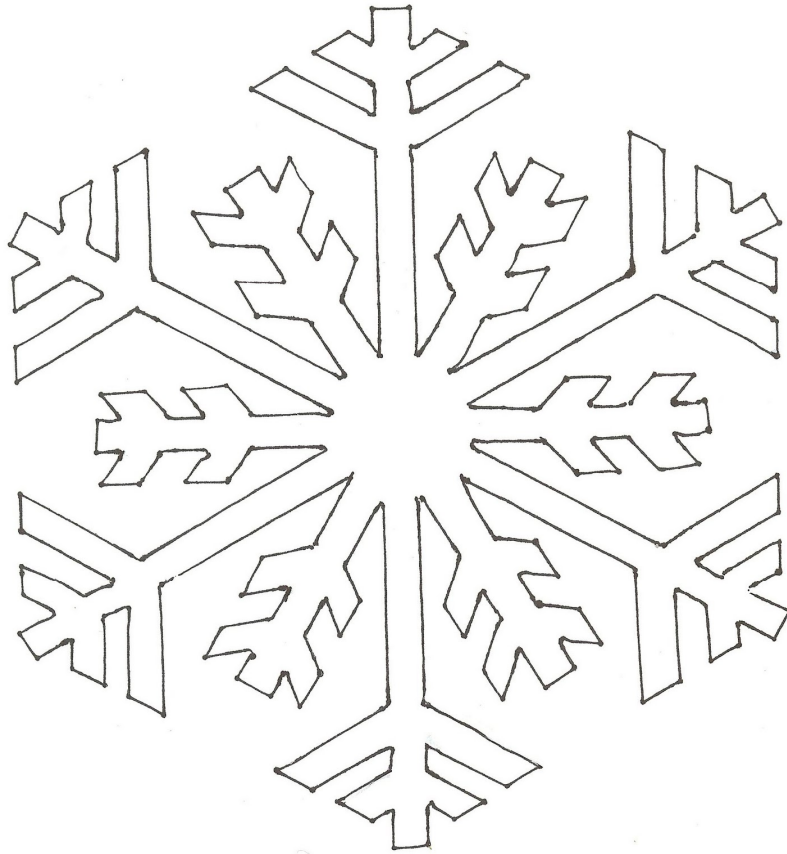
**Directions:** Explain how the 6 LEARN 2 LEARN steps apply to the homework assignment chosen by your history teacher. Assignment: \_\_\_\_\_. Due by Monday 11/02/2013.

	_____ _____ _____
	_____ _____ _____
	_____ _____ _____
	_____ _____ _____
	_____ _____ _____
	_____ _____ _____

Appendix M

# LEARN 2 LEARN

## Winter Booklet



**Name:** \_\_\_\_\_

**Block:** \_\_\_\_\_

Check the activities that you have completed:

- 1. "Thinking about Thinking"
- 2. Jesse's History Paper
- 3. Alex's History Paper
- 4. "Stepping in their shoes"

**Worth 40% of Total Points**

## ACTIVITY #1 THINKING ABOUT THINKING

### DIRECTIONS:

Please read the 6 scenes of Peter's story and answer ALL the questions.

### SCENE 1.

Peter crunches up a piece of paper, throws it, and misses the garbage can. The paper falls to the right.



### SCENE 2.

Okay, now I know that I have to adjust my shot. I'm thinking about it, and maybe I need to adjust to the left. I think I'd have a better chance if I threw it underhand, too, because it would have a higher arc



### SCENE 3.

Peter crunches-up another sheet of paper, throws it, and it lands just short, hitting the rim of the can.



### SCENE 4.



It looks like I'm getting closer. I think I'll just have to throw it a little harder and it should go in

**SCENE 5.** Peter gets another piece of paper, and throws it — bulls-eye!



**SCENE 6.**

Now, the next time I want to try to make a basket here. I'll know to throw it underhand and aim better!!



**QUESTIONS:**

1) What was Peter's mistake at the beginning?

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2) What did he do differently in order to make a basket?

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3) What is the main lesson of the story?

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## ACTIVITY #2

### JESSE'S HISTORY PAPER

#### **DIRECTIONS:**

*Please read Jesse's story and answer ALL 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 read directions and understand his assignment? (Circle one)

YES            NO

2) Did Jesse plan well for his paper? (Circle one)

YES            NO

**(See next page)**

3) Did Jesse check his progress to see how he was doing along the way? (Circle one)

YES            NO

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

YES

NO

If yes, explain what strategies he used...

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

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### 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 read directions and understand his assignment? (Circle one)

YES            NO

2) Did Alex plan well for his paper? (Circle one)

YES            NO

**(See next page)**

3) Did Alex check his progress to see how he was doing along the way? (Circle one)

YES            NO

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

YES

NO

If yes, explain what strategies he used...

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

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## ACTIVITY #4 STEPPING IN THEIR SHOES

**DIRECTIONS:**

*Imagine that you have to write the same paper as Alex and Jesse about the Civil War for your History class. Please re-read Alex & Jesse's stories and answer ALL the following questions.*

**QUESTIONS:**

1) What would you do differently than Alex?

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2) What would you do differently than Jesse?

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3) What would you do similarly to Alex?

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4) What would you do similarly to Jesse?

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5) Do you think Alex applied (most, if not all) the Learn 2 Learn steps when he was writing his paper? (Circle one)

YES            NO

If yes, give some examples:

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**(See next page)**

**6)** Do you think Jesse applied (most, if not all) the Learn 2 Learn steps when he was writing his paper? (Circle one)

YES            NO

If yes, give some examples:

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**7)** What are some things that might make it hard to apply the Learn 2 Learn steps to your schoolwork?

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Appendix N

For me, what makes learning the hardest is...

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Appendix O

# **MY *Learn 2 Learn* GOALS**

I ( \_\_\_\_\_ ) will make an effort to not be a distraction to my classmates, in order to make learning easier for everyone!

**My short-term goal is...**

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**My long-term goal is...**

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