Sixth Grade Student Self-Regulation in Science

by

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ABSTRACT

The positive relationship between self-regulation and student achievement has been repeatedly supported through research. Key considerations that have resulted from prior research include instructor feedback and explicit expectations, student perception of their control of their progress, accurate self-calibration, reflection, goal-setting, age, and methods by which a cycle which integrates all of these can be put in place. While research provides evidence for that fact that it is possible to support student success in several of these areas, many questions are left as to how guided, active self-regulation impacts students perception of their control over their performance, their ability to accurately assess and act upon their strengths and weaknesses, and, ultimately, their overall progress at different developmental stages. This study intended to provide a better understanding of how guidance in the self-regulation strategies of sixth grade science students can impact their attitudes toward learning. Specifically, this study investigated the question, "What is the effect of active reflection, graphing of grades, and goal setting on sixth-grade students' locus of control and ability to self-regulate?"

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Chapter 1

INTRODUCTION

Many teachers, parents and others have interacted with a child who has received a low grade. When the student is asked why they received that grade, the response is frequently, “My teacher doesn’t like me,” “I thought I did well,” or some other attributive comment. Other students will see an overall grade and, in spite of having received work back over the course of a term which repeatedly shows underperformance, will be surprised and ask at the end of the marking period, “Is there anything I can do to improve my grade?” It seems as though many students often do not realize that they are responsible for their own learning process and ultimate success, and that the efforts they put forth are related to their progress.

The amount to which students are able to relate their progress to the effort they have invested is interesting. What does it take to help them discover this relationship? One suggested method to help students take responsibility for and become actively involved in their learning process is to help them with the development and fostering of their self-regulation strategies. These have been defined as, “students’ self-generated thoughts, feelings and actions used to achieve academic goals” (Dembo & Eaton, 2000, p. 464).

Proponents of Social-Cognitive theory have conducted a vast amount of research which supports the idea that self-regulation is directly related to academic achievement (Cleary & Chen, 2009; Cleary & Zimmerman, 2004;

Dembo & Eaton, 2000; Eilam, Zeidner, & Aharon, 2009; Pintrich & De Groot, 1990; Schunk, 2008; Shores & Shannon, 2007; Vukman & Likardo, 2010; Zuckerman, 2004). While this relationship seems abundantly clear, the means by which to promote it does not. In addition, based on the available research it appears that there are conflicting views regarding the age at which students become cognitively able to self-regulate, as well as how their tendency to do so changes over time (Cleary & Chen, 2009; Eilam et al., 2009; Shores & Shannon, 2007; Vukman & Licardo, 2010; Zuckerman, 2004).

Although the way in which to help students self-regulate is unclear and can vary within each student, teachers have the ability to create differentiated environments for children, which will support their engagement and in turn, their achievement in school (Wang & Holcombe, 2010). "Academic independence occurs when students learn how to regulate their own behaviors so that they can control the outcome of their performance" (Dembo & Eaton, 2010, p.484). Given the impact of these strategies, especially during the Middle School years, attention to this topic is highly important and can be a vital pre-determinant of future success and so effective guidance in self-regulation strategies is essential (Cleary & Chen, 2009; Dembo & Eaton, 2000).

Chapter 2

PAST RESEARCH

Much research has been conducted regarding how self-regulation occurs within students. For example, Vikman and Lukardo (2010) reference Pintrich's (2000) model of self-regulatory development, which has four phases including planning, monitoring, regulation and reflection. They also reference Zimmerman (2000) who identifies self-regulation as cyclical and inclusive of three phases; forethought, a self-control phase, and self-reflection. Within these phases there are 6 identified behaviors which include, "motivation, methods of learning, use of time, control of one's physical and social environment, and performance" (Dembo & Eaton, 2010, p. 473). Dembo and Eaton (2010) introduced a slightly altered version of Zimmerman's (2000) model, which includes an additional step. The steps involved in this altered version include 1) a self-observation and evaluation phase in which students review and evaluate their performance, 2) goal setting and strategic planning, which involves setting goals and making a plan to achieve those goals, 3) strategy implementation and monitoring, which involves students reflecting on the effectiveness of their strategy, and 4) strategic outcome monitoring in which the student ascertains whether or not they achieved their goal and if their strategic plan was effective. With respect to all of these, Cleary and Chen (2009) state that "self-regulation strategies facilitate students' planning and goal-setting prior to learning (forethought), enhance their attention-focusing and self-monitoring processes during learning or task performance (performance

control), and enable them to evaluate the effectiveness of their learning methods after task performance (self-evaluation).” This demonstrates that behaviors involved with self-regulation include highly interrelated affective and cognitive elements.

Research conducted by Malmivuori, (2006) provides further support for this hypothesis as well as support for the idea that self-regulation enhances performance. Beyond providing statistically significant evidence for his findings, he states,

> “The essential difference between automatic affective regulation and active regulation of affective responses is connected to the level of self-awareness and reflectively directed activity within students’ self-system processes. Affective regulation represents automatic or habitual regulation with weak self-reflection or personal agency, while active regulation of affective responses is involved with high-agency, high self-awareness and efficient self-regulatory processes” (p. 153).

That being said, it seems that students need to be both emotionally and actively involved in monitoring and reflecting upon their progress in order for a response to occur. Amongst a multitude of other factors, the affective elements of student self-regulation largely relate to student locus of control and self-efficacy, while the cognitive aspects relate to motivation (Sink, Barnett, & Hixon, 1991).

Locus of Control

Locus of control has been defined as “a generalized belief that certain factors control the events of one’s life. The construct has been conceptualized as a bipolar continuum ranging from a belief in an external locus of control to an

internal locus of control" (Brown, 1980) and has been found to be significantly related to school achievement (Koprera-Frye, Saltz, Jones, & Dixon, 1991).

Eshel and Kohafi (2003) investigated the perception of classroom control, self-regulation strategies and academic achievement in fifth and sixth grade classrooms. Perceived classroom control was divided into three categories including "Powerful other," "Internal," and "Unknown." Prior research has indicated that students' perception of having control in the classroom influences their learning in that they feel self-directed and, as a result, will perform better. Other research has suggested that students' perception that the classroom is controlled by the teacher is beneficial in that teaching is organized and expectations are clear. While student perception of their control over their learning process appears to positively benefit them, clear reasons as to why and how, have not been supported. However, research conducted by Nowicki and Strickland (1973) points out that student motivation and ultimate achievement will be impacted by whether or not they recognize a causal relationship between their behavior and the result of that behavior.

An extension of their findings is supported by research conducted by Shores and Shannon (2007) who defined attribution as, "an individual's perception of the causes of his or her own success or failure" (p.226). This research demonstrated a significant positive relationship between student perceived control and achievement on tests. Interestingly, results of their study indicate that attribution has much less of an influence on sixth-grade students

when compared to the effect that it has on fifth grade students. One hypothesis that was derived from this data is that when students are in sixth grade, they are more aware that intrinsic factors impact their learning. More details regarding why sixth grade may be a critical year for addressing this are included in later discussion.

Self-Efficacy

Aspects of the above mentioned research are further supported by research conducted by Labuhn, Zimmerman, and Hasselhorn (2010) which indicated that promoting skills which help students self-regulate their learning process aids them in finding an individual sense of responsibility toward it. One key aspect that is directly related to this is the quality of explicit expectations and feedback offered to students by their teachers. Labuhn et al. (2010) found that, while feedback does not instruct students how to self-regulate, it does initiate the thinking process related to self-regulation in that it makes students aware of how they are progressing, and, as a result, may stimulate a response related to satisfaction, or dissatisfaction, as well as legitimize their confidence related to their capability.

Pintrich and De Groot (1990) conducted research and arrived at similar significant evidence which, "implies that teaching students about different cognitive and self-regulatory strategies may be more important for improving actual performance on classroom academic tasks, but that improving students' self-efficacy beliefs may lead to more use of these cognitive strategies" (p.37).

Additionally, Cleary and Chen (2009) note that when students have performance based intentions which are related to comparison of themselves to their peers, they are more likely to feel less able to control their progress and as a result will demonstrate decreased effort, motivation and commitment toward completing academic tasks.

Interestingly, while lacking self-efficacy can contribute to issues with self-regulation and achievement, overconfidence can as well. Labuhn et al. (2010) have found that most students are not able to accurately assess their performance, and they most often overestimate how they are doing. Further, they reference research, which suggests that overconfidence is directly related to underachievement. This is as a result of the fact that students who feel as though they are doing well, most often will not invest the time, effort and strategies necessary to exceed their current standing.

When comparing the affective aspects of locus of control and self-efficacy as they relate to student-self regulation student perception of their ability was found to be most significant (Sink et al., 1991).

Motivation

Pintrich and De Groot (1990) state that there are three "motivational components" which relate to student self-regulation. These include a belief that they are able and a belief that there is a causal relationship between their behavior and their performance, an understanding of why they are performing the task, and an emotional response to performing the task. Related to all of these is the fact

that if control, efficacy, interest and purpose are not present, students will not be motivated to engage themselves (Cleary & Chen, 2009). Given these components, educators need to put themselves in the position to understand that students are ultimately considering the following questions "Is my grade in my control?" (Locus of Control and Efficacy), "Am I motivated?" (If so, why do I care about this task? If I do, is it for a grade (performance) or because I want to know more about what I am learning? (mastery)) and, "Am I taking the steps necessary to reach my goals?" (self-regulatory behavior).

Largely related to the value component of motivation is the idea of performance versus mastery goals, with performance goals having the intention to "demonstrate competence and outperform others" and mastery goals having the intention to truly understand content (Harackiewicz & Linnenbrinck, 2005, p. 76). With respect to this, it was found that students with mastery goals are more likely to utilize self-regulatory behaviors, but that utilization of them did not necessarily translate into high achievement (Cleary & Chen, 2009; Pintrich & De Groot, 1990). Conversely, Pintrich and De Groot (1990) conducted research which suggests that students with performance goals often utilize "superficial strategies" which may not lead to mastery but also do not hinder performance due to the fact that, "many classroom tasks require superficial rather than deep processing" (Harackiewicz & Linnenbrinck, 2005, p. 77). However, Pintrich and De Groot (1990) found that students with performance goals and low mastery were motivated to utilize self-regulation strategies. Overall, students with both mastery

and performance goals were found to make the greatest use of self-regulation strategies (Harackiewicz & Linnenbrinck, 2005).

Self-Regulation Strategies

Having considered locus of control, self-efficacy and motivation, it is important to discuss how various self-regulation strategies relate to each. Based upon this research, an important strategy included within the cyclical model of self-regulation is student goal setting and reflection upon the progress and achievement of those goals. "Students who set challenging self-standards of performance will typically be more motivated than those who exhibit lower evaluative standards or even students who make social comparative judgments" (Cleary & Chen, 2009, p. 293).

Another essential aspect of the planning and forethought phase of self-regulation from the perspective of an educator includes thinking about how students think about their learning because, when students feel as though they have some control over their learning process and ultimate success, they are more likely to feel empowered and want to participate in it (Zimmerman, 2000). As previously mentioned, explicit expectations and feedback can facilitate student sense of control as well as self-efficacy (Labuhn et al., 2010).

One method suggested to improve motivation during the planning phase of the self-regulation cycle is both short and long term goal-setting because, students who participate in the process of goal setting and attainment are more likely to

pay attention in class, work harder and gain confidence as they realize the causal relationship between their efforts and their progress (Dembo & Eaton, 2000).

Labuhn et al. (2010) noted that students are only able to integrate effective self-regulatory behaviors if they can accurately monitor and assess their progress and make relevant adjustments based on true evaluation and understanding of their work. Further, Dembo and Eaton (2010) point out that having the students monitor their own performance shifts the dynamic of the classroom from one that is "teacher-directed" to one that is more "student managed" (p. 484). One suggested method that allows for students to track their progress and improve calibration accuracy is graphing. This process allows for students to see visually how they are progressing over time and may ultimately allow for them to increase their ability to monitor and self-regulate their progress (Labuhn et al., 2010).

Zuckerman (2004) points out that regardless of age, reflection is not a skill that is generally highly developed in people. Given that it is a skill which offers personal empowerment and is much more difficult to influence in later years, Zuckerman argues that the related tools and strategies ought to be taught early on. Overall, Zuckerman's research provided support for the idea that the development of the self-regulation strategy of reflection through learning provided a great advantage to elementary students in a math classroom.

Implementation

Programs and interventions have been developed to help students to implement strategies, which support the phases involved with their self-regulation cycle. For example, Juniewicz (2003) investigated the potential of portfolios as a means to support self-regulated learning. Through her research, she found that portfolios have the capability to ”redirect responsibility to the students” (p.73), and that the process related to portfolios if effectively administered is highly beneficial in that it actively involves students in their learning and also provides transferrable life skills. However, from her research, Juniewicz (2003) also discovered that the type and use of portfolios varied drastically from classroom to classroom. What she observed was that portfolios influenced students in that they began to be more self-directed, making “decisions about their own learning” (p. 74). At the same time, she observed that some teachers and students found the portfolio process to be a “hassle” that was difficult to manage. Overall, Juniewicz (2003) found that when teachers approached the portfolio process with the intention of teaching life skills such as goal setting, reflection, and self-monitoring, they, and their students found it to be valuable. Furthermore, Gillett, Temple, Mathews and Young (1994) identified a number of different purposes related to the process of portfolio assessment. Some of these include,

> “Portfolio assessment captures some measures that other assessments miss,” “Portfolio assessment opens for us a window into the students’ feelings and attitudes,” “Portfolio assessment is an excellent way to show parents and other teachers how a student or group of students are doing,” “Portfolio assessment invites the teacher to become a researcher,” “Portfolio assessment motivates

> students" and, "Portfolio assessment invites students to become purposeful and strategic in their learning" (p.162-163).

Cleary and Zimmerman (2004) introduced a program, which was intended to train students in acquiring self-regulation skills. This Self-Regulation Empowerment Program (SREP), utilizes a teacher as a Self-Regulated Learning Coach (SRC) who works with students to help them integrate skills related to goal setting, self-monitoring and reflection. With respect to this, Cleary and Zimmerman (2004) state that, "the first step in training individuals to become self-regulated is to cultivate the belief that academic success is under student control" (p.542).

In order to do this, within the SREP program, the SRC is intended to help students to see how their strategies for learning are directly related to their failures and successes. This is under the assumption that helping students to become aware of the link between their strategies and successes/failures makes it apparent to them they are in control their learning, and that failure is not due to factors that are out of their control (i.e. perceived ability or issues with a teacher).

Within this program, self-recording forms were found to be to be an effective way to assist students in the development of self-monitoring. Graphing progress was another referenced strategy. It was recommended that when students record their scores, they also record the learning strategy that they used to earn those scores so that they could see patterns. This model for self-regulated learning instruction was presented as a result of the researchers experience with prior intervention strategies.

Age

Cleary and Chen (2009) conducted research to investigate their hypothesis that 7th grade students would demonstrate decreased motivation and, in turn, less utilization of self-regulation strategies than their 6th grade peers and that students in less advanced math classes would as well when compared with those in more advanced classes. This is due to the fact that although the ability to self-regulate is expected to improve with age, the motivation to do so tends to decrease (Cleary & Chen, 2009).

Cleary and Chen's (2009) study showed that 7th graders did, in fact, show a small but significant increase in the amount of maladaptive self-regulatory behaviors when compared to their 6th grade peers. They also found that within the seventh grade the varying implementation of self-regulation strategies between achievement groups was found to be significant with higher achieving students implementing self-regulation strategies more than their lower or moderate achieving peers. The difference in implementation of self-regulatory strategies between achievement groups in the 6th grade was not found to be significant. With regard to that, they state,

> "The current study examined and found support for the general premise that student motivation and use of self-regulation strategies vary across grade level and math course type, but the importance of these processes, relative to math achievement will increase in settings which involve greater regulatory demands or course expectations" (Cleary & Chen, 2009, p. 306).

Students in the seventh grade reported less frequent use of regulatory strategies and more frequent displays of maladaptive behaviors than their younger peers.

They were also less interested in math activities and actually perceived math to be less valuable to their future academic pursuits than the sixth-grade cohort. These results are highly consistent with reports by developmental researchers which show that students often will exhibit declines in their self-directedness and intrinsic desire to engage in learning during the early middle school years (Cleary & Chen, 2009).

Cleary and Zimmerman (2004) observed the tendency of motivation, self-esteem and intrinsic interest to decrease as student's progress from elementary school into middle school. They hypothesized that this may be due to the fact that students are not equipped with the skills necessary to reflect upon their progress and adjust their learning strategies, and thus, may not feel as though they are in control of their learning process. Furthermore, they hypothesized that students who feel as though they are in control of their learning process have self-regulatory strategies, which are cyclical in that they are able to use feedback and reflection from previous tasks to help guide them in planning how they will approach new tasks. The research conducted by Cleary and Zimmerman (2004) in this area found significant support for their hypotheses.

"If an important goal of education is to produce individuals who are capable of educating themselves, then students must learn to manage their lives by setting their own goals, evaluating their progress, and making the necessary changes to attain these goals" (Dembo & Eaton, 2000, p. 484). Given that self-regulation is significantly related to student achievement, instructors should guide

students in developing related strategies. This is of greatest importance during the middle school years when students are in a transitional period, which often involves decreases in motivation, self-perception, and relationships with others. This is in addition to the fact that students assume greater responsibility for managing these facets of their life as well as the fact that goals within their academic expectations shift from high mastery to performance. All of these considerations can be a challenge for students as they are expected to become more independent (Cleary & Chen, 2009).

Conclusions

The positive relationship between self-regulation and student achievement has been repeatedly supported through research. Key considerations that have resulted from prior research include instructor feedback and explicit expectations, student perception of their control of their progress, accurate self-calibration, reflection, goal-setting, age, and methods by which a cycle which integrates all of these can be put in place. While research provides evidence for that fact that it is possible to support student success in several of these areas, many questions are left as to how guided, active self-regulation impacts students perception of their control over their performance, their ability to accurately assess and act upon their strengths and weaknesses, and, ultimately, their overall progress at different developmental stages.

Chapter 3

METHODS

This study intended to provide a better understanding of how guidance in the self-regulation strategies of sixth grade science students can impact their attitudes toward learning. Specifically, this study investigated the question, "What is the effect of active reflection, graphing of grades, and goal setting on sixth-grade students' locus of control and ability to self-regulate?"

This study integrated aspects of methods suggested by Cleary and Chen (2009), Cleary and Zimmerman (2004), Gillett et al. (1994), Dembo and Eaton (2010), Juniewicz (2003), Labuhn et al. (2010), and Pintrich (2000), and was performed with the following hypotheses in mind:

a) Sixth-grade science students' perception of the control that they have over their academic success in science will improve as a result of active, guided self-regulation.

b) Sixth-grade science students' ability to assess their strengths and weaknesses and act upon them with appropriate responsive self-regulation strategies will improve as a result of guided goal setting, monitoring and reflection.

This study is important because it provides insight into the impact of guided self-regulation specifically as it relates to the developmental stage of a sixth grader as well as domain specifically in science. In addition, as discussed

above, accurate self-assessment is directly related to student achievement, and, even though feedback may be offered, students may not actively involve themselves in the self-regulation strategies necessary for improvement. An intervention, which guides students through this process, may be a key factor in supporting their success.

Participants

This study was conducted at an upper middle class, predominantly White, Private, K-12 school over the course of two trimesters during the 2011-2012 school year. The study began in August of 2011 and ended in February of 2012. The study included four classes of sixth-grade students, all of which I taught. The total number of students in these classes was 65, including 32 boys and 33 girls. The students were divided into class sections, which ranged in size from 15-18. Two class sections were designated as the comparison group and the remaining two sections were designated as the intervention group.

The deciding factor for which sections would be included in the intervention group and which would be in the comparison group was the fact that there were two sets of twins within the grade. In order to avoid discussion between them about the intervention, or lack thereof, I decided that two sections that had one set of twins would be designated the comparison group and the remaining two sections with the other set of twins would be designated the intervention group. It should be noted that, the school at which this research took place tracks math progress and the placement of students in advanced math

classes drove much of the remaining schedule and resulted in a greater number of high achieving students in one of the comparison group sections.

Instruments

During the first week of the school year a parental letter of permission was sent home. Students were asked to have their parents review the letter and sign it if they gave their consent. The permission letters were returned within the week. All parents gave consent for their students to participate in the study. Following, students were given a child assent form. The expectations related to their voluntary involvement were explained to them as well as the fact that their decision whether to participate would not impact their grade in the course in any way. All students offered consent. All students were then given two pre-tests in order to evaluate their self-regulation strategies as well as their locus of control. These included the Self-Regulation Strategy Inventory-Self Report (Cleary, 2006), and the Nowicki-Strickland Locus of Control (Nowicki & Strickland, 1973).

The Self-Regulation Strategy Inventory-Self Report (SRSI-SR) was used to assess student self-regulation strategies. This assessment includes 28 likert scale items, which measure student utilization of strategies such as planning, organization, goal-setting, keeping records, attentiveness to appropriate environmental factors as they relate to homework, test-taking and overall progress. Students respond to the 28 items by circling numbers 1-7 for each with 1 representing “always” and 7 representing “never.” The assessment was

originally designed to assess science students specifically because science was the subject in which students were underperforming at the school where the initial study and development of the instrument took place. In addition, this assessment was designed to be administered to middle and high school students (Cleary, 2006). This assessment includes items which address three separate aspects of self-regulatory behavior including environment and behavior management (α = .88), seeking and learning information (α = .84), and maladaptive regulatory behaviors (α = .72). The SRSI-SR is scored by adding the values of responses, which demonstrate positive self-regulatory behavior together, and then subtracting the values of responses, which demonstrate maladaptive self-regulatory behavior (Cleary, 2006).

The Nowicki-Strickland Locus of Control Scale for Children was used to assess student Locus of Control. This assessment includes 40 questions which measure the degree to which students feel as though their circumstances are of their own making as opposed to simply being a result of "luck, chance, fate, as under the control of others, or as unpredictable because of the great complexity of the forces surrounding them" (Nowicki & Strickland, 1973, p. 148). Students respond to the 40 questions by circling "yes" or "no". Attention to reading comprehension was given during the development of this assessment and it was determined to be appropriate to administer to students in the fifth grade, and older (Nowicki & Strickland, 1973). The Nowicki-Strickland Locus of Control Scale for Children was scored by assigning a point to each response, which

demonstrated external versus internal locus of control (Nowicki & Strickland, 1973). Test validity for the 8-11 age group was measured at α=.67 and, for the 12-15 age group α=.75. Utilization of the Nowicki-Strickland Locus of Control Scale for Children has demonstrated that Locus of Control becomes more internal over time (Nowicki & Strickland, 1973). This data is interesting, because it seems that although student realization of their ability to control their situation improves over time, their motivation to put that control in place has a tendency to decrease.

Intervention Design

Following completion of the pre-tests, I introduced the students to the intervention. The time allotted for the intervention was approximately 15 minutes for each class every two weeks. During this 15 minutes in the comparison group, I returned graded homework assignments and students would complete a "bellwork" assignment. During the 15 minutes in the intervention group, I led students through a five-step portfolio based reflection protocol, which included, retrieval of their individual progress binder, review of their progress and feedback on their most recent work, written responses to reflective prompts that were provided for them in their binders each session, review of their most recent progress report and graphing of their current grade on their graphing sheet (which was included in the portfolio).

Specifically, within the intervention group, at the start of class I would ask students to retrieve their binders and return to their seats. I would then ask them to take a few minutes to review their most recent homework assignments and pay

special attention to the feedback that was provided for them on each. I would then direct them to the reflective response form which I had placed in their binder (see Appendix A) and ask them to take a few minutes to thoughtfully respond to the written prompts that were provided for them. Following that, I would direct their attention to an updated progress report, which I had placed in their binder. This progress report showed a listing of all of the assignments that the students had completed over the course of the trimester, a grade for each assignment, a breakdown of student performance on tests and quizzes, labs and projects and, homework assignments as well as an overall grade. After reviewing their progress reports, students were asked to fill in a corresponding bar graph to record their current overall grade average. This was intended to provide students with a visual perspective of their progress over time. When students were done graphing I asked them to put their binders away and return to their seats so that we could get class underway.

The methods included in this intervention were intended to support student active involvement in all three phases of the self-regulation cycle, including forethought, self-control and self-reflection (Malmivuori, 2006). I selected portfolios as the means for this intervention because they have been shown to involve students in their learning, motivate students and help students to see that they have control over their progress (Gillett et al., 1994; Juniewicz, 2003). Explicit expectations were defined on assignments and once they were completed, I provided clear, thorough feedback in order to help initiate reflection and

forethought (Labuhn et al., 2010). Graphing was integrated as a means of promoting accurate monitoring as well as self-reflection (Cleary & Zimmerman, 2004; Labuhn et al., 2010). Self-reflection forms with reflection prompts were integrated into the intervention in order to help assist students with self-monitoring, reflection and goal setting (Cleary & Zimmerman, 2004; Gillett et al., 1994).

Self-reflection forms included varied reflection questions to avoid repetitive responses and to help students to think about different aspects of their learning. Several questions were selected from the book *Understanding Reading Problems: Assessment and Instruction* (Gillett et al., 1994, p. 167) and from suggestions made by my committee member, Dr. Josephine Marsh. Many were utilized directly or modified slightly. I developed other questions independently, based on the experiences and specific assignments that were related to my class. My selection and development of the questions intended to prompt learning related responses as opposed to only grade driven responses. In addition, the selected questions were intended to prompt identification of areas of improvement and success, goal setting and specific ideas as to how to achieve those goals. Items included within the portfolios were reading outlines, research papers, tests, quizzes, hands-on reinforcement activities, projects and lab write-ups. After 5 sessions of the intervention, I gave all of the students a post-test for Self-Regulation and Locus of Control.

Chapter 4

RESULTS

Quantitative

A mixed between-within subject's analysis of variance (ANOVA) was conducted to evaluate the impact of the intervention on students' locus of control scores over time. No significant interaction between intervention group and time was found (F (1, 40) = .237, p = .629, partial eta squared = .006). The main effect of intervention group (F (1, 40) = .200, p = .657, partial eta squared = .005) and time (F (1, 40) = .737, p = .396, partial eta squared = .018) were also not significant. There was no difference in mean locus of control scores depending on group (mean = 28.125 and 27.614 for control and intervention, respectively) or time (mean = 27.502 and 28.236 for pre and post, respectively). Descriptive statistics for the variables included in the ANOVA are provided in Table 1. The model summary for the ANOVA is provided in Table 2. A graph of the mean difference in locus of control scores depending on group is provided in Figure 1. Given that one section of the comparison group had already been noted as being higher achieving than the other three sections, an analysis of covariance was not performed.

A mixed between-within subject's analysis of variance (ANOVA) was conducted to evaluate the impact of the intervention (intervention vs. comparison) on participants' self-regulation scores across two time periods (pre and post). No significant interaction between intervention group and time was found (F (1, 16) = .301, p = .591, partial eta squared = .018). The main effect of intervention group

Table 1

Descriptive Statistics for Impact of Intervention on Locus of Control

Treatment		Mean	Std. Deviation	*n*
Pre	Comparison	27.55	3.940	20
	Intervention	27.45	5.226	22
	Total	27.50	4.602	42
Post	Comparison	28.70	4.207	20
	Intervention	27.77	4.898	22
	Total	28.21	4.551	42

Table 2

ANOVA Results for Impact of Intervention on Locus of Control

Source	SS	df	MS	*F*	Sig.	Partial Eta Squared
Time Point	11.29	1	11.29	0.74	0.40	0.02
Intervention	5.48	1	5.48	0.20	0.66	0.00
Interaction	3.62	1	3.62	0.24	0.63	0.01
Error	612.66	40	15.32			

Note. $N = 42$, DV = Locus of Control, Time point = pre and post, intervention = intervention and comparison. Only Huynh-Feldt results are included in the table for the within-subject effects.

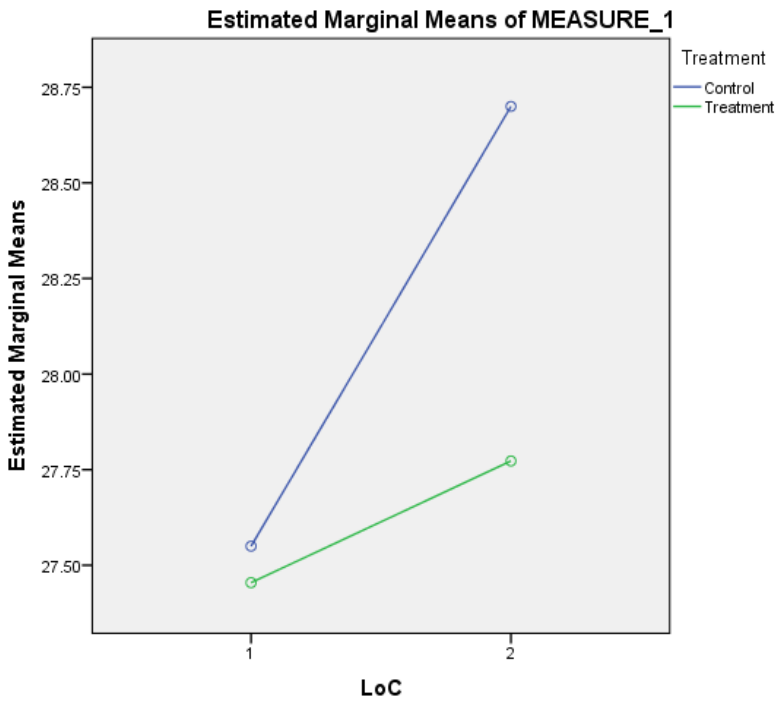

Figure 1. Plot of mean differences in locus of control scores depending on group. 1 = pre, 2= post, DV = locus of control.

(*F* (1, 16) = .12.363, *p* = .003, partial eta squared = .436) and time (*F* (1, 16) = 5.717, *p* = .029, partial eta squared = .263) were both significant. There was a significant difference in mean self-regulation scores depending on group (mean = 101.813 and 75.650 for comparison and intervention, respectively) and time (mean = 84.513 and 92.950 for pre and post, respectively). Approximately 4% of the variance in self-regulation scores was explained by intervention group and approximately 3% of the variance in self-regulation scores was explained by time (partial eta squared = .436 and .263, for group and time point, respectively). Descriptive statistics for the variables included in the ANOVA are provided in Table 3. The model summary for the ANOVA is provided in Table 4. A graph of

Table 3

Descriptive Statistics for Impact of Intervention on Self-Regulation

Treatment		Mean	Std. Deviation	*n*
Pre	Comparison	96.63	12.420	8
	Intervention	72.40	20.983	10
	Total	83.17	21.214	18
Post	Comparison	107.00	13.480	8
	Intervention	78.90	19.238	10
	Total	91.39	21.845	18

Table 4

ANOVA Results for Impact of Intervention on Locus of Control

Source	SS	df	MS	*F*	Sig.	Partial Eta Squared
Self-Regulation	632.81	1	632.81	5.72	0.03	0.26
Intervention	6084.23	1	6084.23	12.36	0.00	0.44
Interaction	33.37	1	33.37	0.30	0.59	0.02
Error	1771.19	16	110.70			

Note. $n = 18$, DV = Self-Regulation, Time point = pre and post, intervention = intervention and comparison. Only Huynh-Feldt results are included in the table for the within-subject effects.

the mean difference in locus of control scores depending on treatment group is provided in Figure 2.

Correlations

To evaluate the relationship between locus of control scores and self-regulation scores at both time points (pre and post) a bivariate correlation matrix was computed. The four variables included in the matrix were pre locus of control scores, post locus of control scores, pre self-regulation scores and post self-

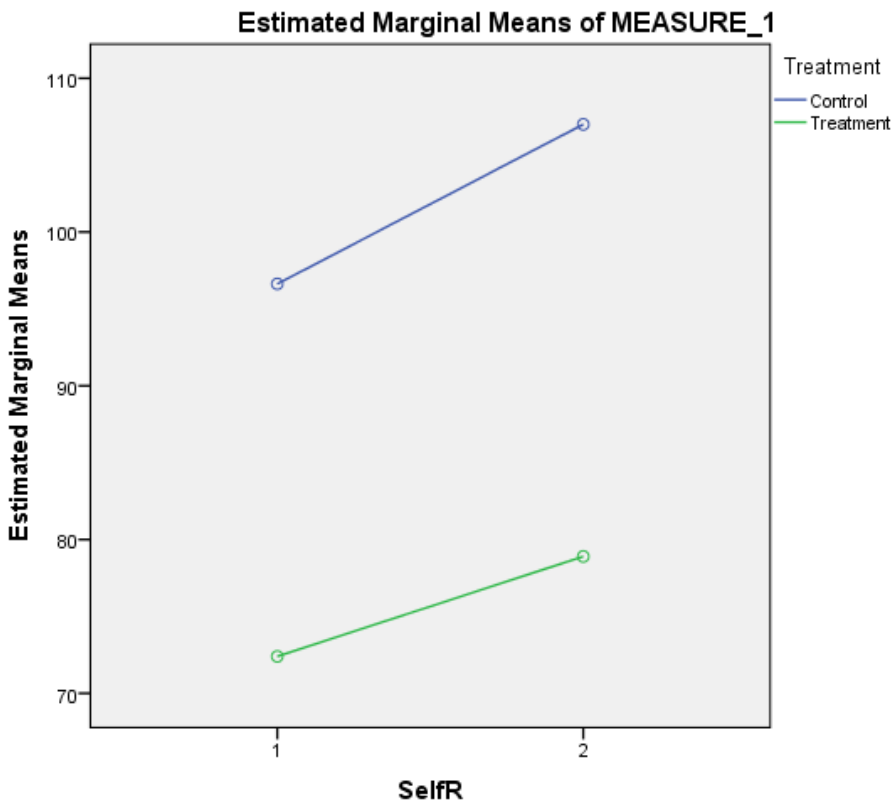

Figure 2. Plot of mean differences in self-regulation scores depending on group. 1 = pre, 2= post, DV = self-regulation.

regulation scores. Post self-regulation scores had significant, moderate-to-large correlations with the other three variables, pre locus of control scores (r = .423, r^2 = .179, p = .01), post locus of control scores (r = .354, r^2 = .125, p = .037), and pre self-regulation scores (r = .771, r^2 = .594, p = .001). No other correlations were statistically significant. Approximately 59% of the variance in pre and post self-regulation scores was shared (r^2 = .594), approximately 18% of the variance in post self-regulation and pre-locus of control scores was shared (r^2 = .179), and approximately 13% of the variance in post self-regulation and post locus of

control was shared (r^2 = .125). The correlation matrix is provided in Table 5. A scatter plot of this data is provided in Figure 3.

Table 5

Correlation Matrix for Study Variables

	1	2	3	4
Pre Locus of Control	1	0.282	0.285	.423*
Post Locus of Control	—	1	0.071	.354*
Pre Self-Regulation	—	—	1	.771*
Post Self-regulation	—	—	—	1

Note. N = 18-42, Asterisks (*) indicate correlation is significant at $p < .05$

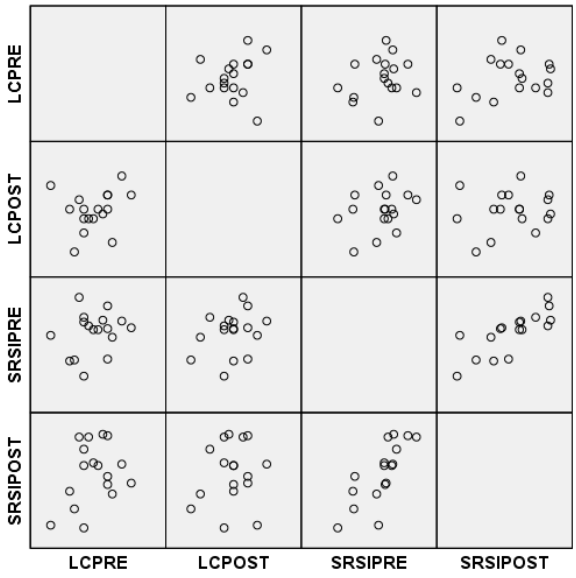

Figure 3. Scatterplots of data.

Summary

Two mixed-design 2x2 ANOVAs were used to test whether the intervention resulted in a significant mean difference in locus of control and self-regulation scores over time. The main effect was significant for self-regulation, but not for locus of control. There was not a significant mean difference in locus

of control scores between groups, but there was a significant mean difference in self-regulation scores with the mean being higher for the comparison group. Although Cleary and Chen (2009) did not find variability within self-regulation strategies between achievement groups in the 6th grade, the fact that the comparison group within this current study had a higher achieving group of students may explain the variability in self-regulation between the intervention group and the comparison group.

In accordance with IRB protocol, prior to taking the SRSI and LC assessments students were informed that they had the option to skip questions. Due the personal nature of some of the questions as well as the fact that students were unsure how to respond to some of them, several opted out of responding to many. This resulted in several tests, which could not be accurately scored due to missing data. That said, I opted to only use complete raw data and so these statistical findings may have been impacted due to a small resulting small sample size. It was interesting to see that although the students in the comparison group demonstrated greater use of self-regulation strategies when compared to the intervention group, this did not translate into a higher locus of control.

Pre and post-tests for locus of control and SRSI indicated that there was not a significant response to the intervention. The one factor within the quantitative analysis that demonstrated significant change for both groups was time as it related to SRSI. These results are congruent with the idea that as students mature, especially during the sixth-grade, they become more aware of

their ability to self-regulate (Cleary & Chen, 2009). The fact that SRSI seems to improve without the expected relationship to locus of control may provide further insight into the hypothesis that although students may know of the necessary strategies required to be successful as they progress through middle school, they may increasingly be less inclined to utilize them (Cleary & Chen, 2009; Pintrich & De Groot, 1990).

Qualitative Analysis of Student Responses

Qualitative analysis of the reflective responses given by the intervention group offered insight into students' thoughts related to self-regulation. Upon review of student responses to reflective prompts, several themes emerged. These included mastery (M) and performance goals (P), task interest (TI), control (C), self-regulatory behavior (SR) and a lack of student relation of behavior toward progress (DNR). Qualitative analysis involved coding student reflective responses according to these themes. Following coding, analysis of the relationship between these themes was conducted. This qualitative analysis section includes a description of how themes were coded, results of coding, and a discussion of the relationship between themes that emerged.

Coding

Mastery and Performance goals were coded according to student response to questions regarding the importance and benefit of assignments. Students who expressed value related to learning were coded as having mastery goals, while students who expressed value related to a grade were coded as having

performance goals. Some examples of student reflective responses, which represented mastery goals include, “I think the most important assignment was the division drawings because it taught me how to compare cell division to things we see every day” and, “I think that the Photosynthesis project was the most important so far. I thought that it was the most important because it taught us to work in a group. I also learned the most.” Some examples of student reflective responses, which represented performance goals include, “I think that my quiz on cells was most important because I got a 10/10” and, “I benefitted from this assignment because I got a 100%.”

Self-Efficacy was coded according to student responses, which expressed feelings regarding confidence. Examples of this type of response include, “I would like to improve the way I think about tests and quizzes. I always think I am going to fail” and, “I don’t tell answers because I think they are wrong.”

Task Interest was coded according to student responses, which demonstrated student engagement, understanding of the purpose of the assignment and enthusiasm related to the process of completing their work. Examples of this include, “I thought the cell picture was most important because I learned while having fun” and, “I learned the most from the squirrel assignment because it was fun and let me be creative.”

Self-regulating behavior was coded according to responses to questions such as, “Please review your progress and graph your current grade in the class. What things have you done well/not so well to contribute to that average?”

Examples of positive self-regulating responses include, “My homework grade was bad because there were a lot of assignments I didn’t turn in” and, “I could have done better if I put more detail in my outlines.” Student responses, which did not relate their performance with their progress, were coded as “Did not Relate.” An example of this type of response is, “My homework average wasn’t good, so that lowered my grade.” Student incomplete responses to questions which asked for a comment regarding progress and behaviors which caused that progress, such as, “I did better” were also included in this category.

Control was coded according to student responses which expressed feelings related to their ability to control the outcome of their efforts. Some examples of student reflective responses, which represented control, or lack thereof, included, “I like working alone because I know that everything is getting done and getting done right” and, “I don’t like group projects. Not everyone listens to my ideas and if someone messes up it hurts everyone’s grade.”

Questions which did not provide data related to the above themes were not included in this discussion but can be referenced in the self-reporting forms in the Appendix A.

Coding Results

Data from September 21

“You have just had a chance to review some of the work that you have completed over the last couple of weeks. Please put a star on the assignment that you feel was most important and describe below why you think so.”

Themes that emerged from this question were performance, task-interest and mastery oriented. Forty-eight percent of student responses to this question were performance goal oriented, fourteen percent of student responses were task interest oriented, thirty-eight percent of student responses were mastery oriented.

"What are your strengths as a science student?" Answers to this question were coded according to what students attributed their strengths to. The themes that emerged from this question were task-interest, self-regulation, and lack of correlation between behavior and progress. Twenty-five percent attributed their strength to task interest; twenty-five percent attributed their strength to a grade and did not relate their strength with a behavior and fifty percent attributed their strength to self-regulation.

"Describe one thing that you would like to improve about your participation in science class (in class or outside). Why do you want to change this?" The themes that emerged from this question were Mastery, Lack of correlation between behavior and progress, Self-efficacy and a relationship between self-regulation and performance goals. Eight percent of students expressed a desire to change their behavior to achieve mastery goals, fifty-five percent did not relate the change of behavior to a result, twenty-three percent expressed a desire to change their behavior to improve their self-efficacy, and fourteen percent expressed a desire to change their behavior to achieve a performance goal. It is interesting to note that the desire to change behavior to improve self-efficacy

greatly outweighed the desire to change behavior in order to impact either mastery or performance goals.

Data from November 10, 2011

"Please name the assignment that you feel that you learned the most from and describe why you think you benefitted from it." The themes that emerged from this question were Mastery and Performance. Sixty-three percent of the responses were Mastery oriented, twenty-one percent were Performance oriented and sixteen percent were task interest oriented.

"What is your vision of a good student?" The themes that emerged from this question were Performance, Self-Regulation, and a relationship between performance and self-regulation. Nine percent of students' referenced performance only, fifty-four percent referenced self-regulatory behaviors, and thirty seven percent referenced self-regulation as it related to performance. Not surprising, one hundred percent of students whose vision of a good student was performance based also answered the question regarding the benefit of an assignment as being due to the grade they earned. Task interest was observed to relate to both self-regulation and benefit, but not attributed to mastery or performance goals. Of the students who felt as though task interest was the benefit on an assignment, fifty percent described self-regulation in isolation, twenty-five percent referenced performance and twenty-five percent referenced both.

"Please review your current grade in the class. What things have you done well/not so well to contribute to your grade average?" The themes that

emerged from the response to this question included a lack of correlation between behavior and progress and self-regulation. Seventy-three percent of students asked did not relate progress; twenty-seven percent answered the question and described a behavior change.

Data from November 28, 2011

"What is one goal that you have for yourself in science class this trimester?" The themes that emerged from the response to this question included self-regulation and performance. Forty-eight percent of the responses to question indicated a goal to improve a self-regulatory behavior. Fifty-two percent indicated a performance goal.

"What action(s) are you going to take to achieve that goal?" The themes that emerged from the response to this question included lack of correlation between behavior and progress, and self-regulation. Student responses were coded according to whether students described a specific behavior change, which demonstrated self-regulation versus saying something like "Work harder" which did not demonstrate an awareness of specific things that could be changed. Twenty-eight percent of students responded with statements, which did not relate their behavior with their progress. Seventy-two percent provided self-regulating responses stating specific things they planned to change in order to improve their progress, for example, "I will make sure to write down my assignments in my planner every day."

Data from January 9, 2012

"Last time we checked in you wrote about how you were contributing to your group Genetic Disorder project. Do you feel as though you met your goals for the project? Why or why not?" The themes that emerged from the response to this question were self-regulation and a lack of correlation between behavior and progress. Fifty-six percent attributed their progress to self-regulatory behavior. Forty-four percent did not relate their progress with a behavior.

"Last time we checked in, you stated one goal that you have for yourself in science this trimester, Do you feel as though you have been doing what you need to in order to achieve that goal? Why or why not?" The themes that emerged from this question were lacking correlation between behavior and progress and self-regulating behavior. Fifty-two percent of students offered responses, which did not relate their progress to their behavior. Forty-eight percent referenced self-regulating behavior in relation to their progress.

"Please take a minute to look at your progress report and graph your most recent grade. Has your grade average changed since the last time we checked in? It is lower or higher? What do you think you have done to influence that change?" The themes that emerged from this question were lacking correlation between behavior and progress and self-regulation. Sixty-five percent of students offered responses, which did not relate their progress to their behavior. Thirty-five percent referenced self-regulatory behavior.

Data from January 25, 2012

"You recently wrote a paper about the skeletal system. Do you think that this paper was better or worse than the paper you wrote about genetic disorders? Aside from the grade that you received, what do you think you did to cause the difference?" The themes that emerged from this question included self-regulatory behavior and a lack of correlation between behavior and progress. Fifty percent of the responses to this question included mention of specific self-regulatory behaviors while other. Fifty percent either did not relate their progress with their behavior. A table outlining the percent record of student responses to reflection questions can be found in Table 6.

Discussion of Student Qualitative Responses

While it was necessary to change the reflection questions each session in order to avoid repetitive responses, doing so made qualitative analysis of the change in student attitudes over time difficult due to the fact that different questions prompted responses related to varied aspects of self-regulatory behavior. I was surprised to see that although the general theme of all of the questions remained constant, wording changes resulted in highly different responses. While the basic initial intent of these questions was not met, I found the resulting responses to actually be more beneficial because that they offered deeper insights into student thoughts and feelings, which would not have otherwise presented themselves.

Table 6

Percent Record of Student Responses to Reflection Questions

Date	Mastery	Performance	Task Interest	Self-Regulation	Performance and Self-Regulation	Did not Correlate	Self-Efficacy
21-Sept	48	38	14				
			25	50		25	
	8	14			14	55	23
10-Nov	63	21	14	48			
		9		54	37		
				27		73	
28-Nov				72		28	
		52		48			
9-Jan				56		44	
				48		52	
				35		65	
25-Jan				50		50	

An example of this includes the information gathered which demonstrated that self-efficacy more than goals is more frequently the driving factor behind students' decisions to integrate self-regulating behaviors. With respect to this, it was interesting to see that many students indicated a desire to change a behavior not to improve their grade or learning but to adjust to a fear of failure or appearing incapable. Examples of comments, which demonstrated this include, "I would like to improve the way I think about tests and quizzes. I always feel like I am going to fail. I am going to stop thinking that" and, "I would like to improve participation. I think that because I don't like to tell answers because I think they are wrong." Further, review of the reflective responses provided a vast new perspective for me regarding students' feelings about working in groups. Some students enjoyed working in groups, but the majority did not, and through their responses, I learned that their poor experience with groups was largely due to lack of coaching on my part as far as how students should approach planning, organization and delegation.

The strongest insight, which emerged consistently throughout the course of the study, was that even when very specifically prompted, students would report their progress but would not relate the behavior that produced that progress. This is in spite of the fact that when goal setting and identifying the traits of a good student, students largely referenced self-regulation strategies. Knowing of the strategies did not translate into using or referencing to how they specifically related to progress. Review of reflective responses indicated that students are highly grade driven and, in spite of feedback, often do not fully interpret the relationship between their efforts and learning strategies, and their average.

Student Response to Portfolios

Toward the end of the data collection process, students were asked to provide a written response to the question, “Do you feel that keeping a portfolio has impacted your progress in science class in any way, either positively or negatively? If so, please explain how.” Seven percent of the students who responded reported that they did not feel that portfolios impacted them. Ninety-three percent of the students responded positively with explanations such as, “Yes! I love keeping one, I get to see how I am doing. That way I can keep trying to improve,” “Positively, because it gives me a chance to list goals and reflect on how I am doing,” “Yes, because it gives me time to realize that I need to stop slacking,” “Yes, it helps me understand what I have trouble with and what I have to fix” and, “Yes, it has helped me to see my difficulties.” Throughout the course of the study I witnessed that kids take great pride in reviewing the work that they have completed and that they celebrate a job well done, often reminiscing and actually referring back to and reviewing former content.

Further, over the course of the study, once the intervention group students caught on to the process they increasingly approached me to see when the next reflection and update session would be happening. There were two students after the second session, the same two students and two additional after the third increasing to approximately nine prior to the last session. Repeatedly, these students would visit to ask about this during recess. From the start of the year, not one student from the comparison group asked for an additional report on progress.

Teacher Experience with Portfolios

Positive

As a teacher, I have found that it is hugely beneficial to have portfolios to refer to when having discussions with students and families, preparing grade reports, discussions with my work

team and simply working toward understanding the learning pattern that a student is experiencing. In addition, I have experienced a drastic difference in the experience of passing papers back within a class with respect to the huge amount of time and distracted kids who are either off task or comparing grades while that happens. Related to that, is the fact that research has shown that comparison of grades can contribute to the deterioration of motivation that occurs during the Middle Grade years (Dembo & Eaton, 2000). With the portfolio experience, I witnessed kids engrossed in looking over past assignments, responding to reflection prompts, graphing their progress filing their binders and then moving on to our class activity without comparative discussion.

A record from my journal shows how helpful this process was for me in helping a student to understand his own progress:

> "Today, the students reviewed their portfolios and had their first experience with graphing. Following class, I was visited by a student who was very upset. He could not understand why he was earning a C. He and I accessed his portfolio together. We looked over and discussed each piece of work he had completed. Although this student had performed well on several assignments, he had a tendency to rush through his work. With his portfolio available, I was able to show him instances where he had moved so quickly that he had forgotten to complete sentences, had illegible responses and had not given full effort. We compared work that he had completed well, with the work that he had rushed through. Throughout the process, he identified specifically that he could change even just a few things and do much better in the class. We discussed what he had done well and where he could improve and it was extremely helpful to be able to visually identify pieces of his work, which represented both rather than simply referencing a list of grades and offering a verbal opinion. After reviewing his work, he said, "okay, I get it, I rush and I need to try harder." The response was not immediate, but, shortly after that his performance improved drastically and I witness him working diligently during study hall. To me this suggests that students are grade driven, but, if they do not understand the relationship between their behaviors and efforts and their grade, a grade is pointless and can actually be deflating. To see what went wrong and be able to respond to specific areas in need of improvement appeared to be very a very empowering experience for this student. As testimony to that, is that within the remaining two months of the study that student sought me out during recess to check out his portfolio and asked when we would

> have our next update 5 separate times. Each time we did review his portfolio, he demonstrated excitement about his progress."

In addition to benefitting teacher-student communication, I have found the portfolio process to be very helpful with regard to communication with parents whether that be during unexpected conferences, or regular communication home through report card comments. When issues arose with a student having difficulty in the class, parents would frequently request a meeting to discuss the areas in need of improvement. During these meetings, I found it extremely helpful to be able to present a body of work to show specifically what was going well and what needed improvement. At times, it was helpful to also be able to (anonymously) offer comparative work so that parents could understand the expectations that existed in the class. In addition, within my school, the protocol for trimester grade reports involves writing extensive comments regarding how each student has progressed throughout each trimester. The ability to reference student portfolios has allowed for me to offer far more detailed insight regarding the individual interests, strengths, exceptional achievements, and areas of improvement for each student. I realized that not having this information available was a great hindrance during the preparation of comments for the comparison group.

With respect to my grade level team, I found the portfolios to be highly beneficial when it came to interaction regarding students. Within my school, grade level teachers and a counselor take a "team approach" toward educating the students. Each week, we meet to discuss student progress. During these meetings, students who are having issues in several classes are discussed and, frequently, the question of whether the problems the students are running into involves effort, or some specific learning issue. Single artifacts and verbal discussion make it difficult to

ascertain this, but we have found the ability to review the body of work that these portfolios provided be extremely informative in that they offer great insights into patterns. Furthermore, portfolios have made it possible for each member of our team to review the work of the students from our content area perspective and offer feedback. Insights into areas such as reading comprehension, ability to follow directions and math skills have offered enormous perspective regarding how we can work together to support the improved progress of the students we discuss.

Challenges

I understood from the start that the young age of the students included in my study would impact the depth of the responses that they offered as well as the level to which they took their responses seriously. Although it appeared that students did, in fact, take the time to respond thoughtfully, their responses were quite brief and so they offered limited insights. In addition, this year, the school that I work for transitioned from forty-minute classes, which meet every day to a block schedule in which I see the students four out of every seven days for seventy-five minutes each session. When planning this study I did not realize the implication that the schedule would have on the type and frequency of work I assigned. Whereas last year I would have normally assigned 3-4 small assignments within a week, this year I saw the students less frequently and transitioned to more project based learning in response to the longer time periods. As a result, there were fewer, but more in depth artifacts for the students to review. In addition, given that, it took more time to accumulate enough artifacts for there to be a valuable review.

Ideally, reflection sessions would have been more frequent. In addition, the way that this process was set up, students did not receive feedback on their work as promptly as they

otherwise would have and so that is a tradeoff. Another tradeoff that resulted from this process was the inability of intervention students to be able to review their work at home. Much of what initiated this study was my observation that more often than not, when work was returned to students it ended up at the bottom of their locker or in the trash. However, for those students who did save their work and use it to review, not having access to it was troubling.

Another challenge was that it was important to have record of major projects, tests and quizzes both in their portfolios and also sent home, and so once these assessments were completed and graded, I would make copies of all of them. This was highly time consuming and inconvenient.

Finally, my experience with introducing this process to the students helped me to understand that while I anticipated that I would need to give explicit directions to help the kids through this process, I underestimated the inordinate amount of time, modeling and delicate thought involved with shaping questions and supporting full responses. While I considered providing example responses for students during this process, my concern was that they would mimic them, and so I did not.

Discussion and Implications of the Data

Data collected from this information included quantitative data in the form of pre and post test scores on the SRSI and Nowicki-Strickland Locus of Control assessments, a survey of student qualitative responses to reflection prompts and my observations and experiences throughout the course of the study.

Quantitative results indicated that this intervention did not impact the self-regulation and locus of control of the students. However, they did indicate that overall student-self regulation

did improve over time, without accompanying increased locus of control. My qualitative survey of student responses did not indicate any change in self-regulation over time. In addition, throughout the entire course of the study there was a high consistent frequency of students whom did not relate their progress to their behavior within their reflective responses, even with specific prompting. These incongruent findings may be due to the fact that students are self-regulating but are not metacognitively mature enough to reflect upon their behavior. In addition, given the young age of the students, their responses tended to be quite brief and as a result often did not provide a wealth of information. This suggests that students may be reflecting and acting upon their thoughts, but not getting those thoughts on paper. This idea is supported by the fact that over time I witnessed the majority of all of my students implementing more self-regulatory behaviors such as using their planners, improving responsibility for turning work in on time and thoughtful preparation of homework assignments. Although they changed these behaviors, and improved as a result, they did not always relate these changes to their progress within their reflections.

Review of the qualitative data made it apparent that in order for reflective prompts to be effective in helping students to set goals, students need to be coached in not simply setting goals but also outlining the specific actions that they will take to achieve them. That said, in order to get a full response regarding student thoughts, it may be necessary to refine reflective response questions or verbally interview students rather than having them complete a pen to paper reflection. Further, it may be helpful to model proper responses in order to help students understand this process further, but, careful thought needs to be put toward how to model those

examples without shifting student thoughts from their own position to one that mimics the provided example.

Initially, my intention was to see how this intervention would impact student self-regulation and locus of control over time. Although the intervention did not produce the results I expected, I found it to be beneficial for a number of reasons. This intervention has provided great insight toward the complicated nature involved with getting students to self-regulate. Far greater was the benefit I gained with respect to understanding students' thoughts and feelings about their work and being able to communicate with them, their families and my colleagues.

I recognize that in spite of historic research and my own experience, the way in which to approach this issue remains to be a challenge. I also realize that the process involved with this intervention provided a vast amount of information, which has put me in a place to more specifically support my students and understand and communicate clearly about their progress with them, their parents and their teachers. As well, I have found the classroom management and "comparison" control that resulted from this process to be highly valuable. Furthermore, this experience has demonstrated that although students may not be able to metacognitively understand the full benefit of the portfolio process, they do value the opportunity to review their work and are motivated by regular updated information regarding their progress.

Chapter 5

CONCLUSION

The initial goal of this study was to investigate how teacher intervention can promote student self-regulation and locus of control. The means by which to promote this was a portfolio based goal setting, monitoring and reflection processes. While the intention behind this study was intended to improve student performance in these areas, overall, at the recording level, quantitatively and qualitatively very little change was seen over time. Conversely, at the individual level and from my perspective I have seen great change in student attentiveness toward self-regulating behavior and an enormous benefit from having a body of artifacts to reference which have informed my teaching and have allowed me to be more able to accurately assess patterns of progress and communicate that to students, families and my teaching team.

As discussed by Dembo and Eaton (2010) the time it takes for students to change their self-regulatory behavior can vary drastically from student to student. "Some students change their learning and study habits immediately, others take weeks, and still others never change." This may be in part why the results that were expected did not occur during the course of the study. The length of the study may have needed to be extended. As well, the amount of time that students spent actively involved in self-regulatory activities may have needed to been increased or occurred on a more frequent basis. Furthermore, at this age, although students may actually be self-regulating, they may not have the metacognitive maturity to realize that they are.

Review of reflective responses related to this allowed for the opportunity for me to consider the feelings and attitudes of the students and adjust course if needed in order to enact

practices which may provide students a greater sense of control over their experience in the classroom.

I was prepared for a simple intervention and based on prior research, expected results that were not found. This may be due to time, maturity, brevity of responses, wording of questions or teacher involvement. Although the hypotheses within this study were not fully supported by the data, many unexpected insights into student thoughts, feelings and progress were gained. Furthermore, the ability to communicate regarding student work was supported and, I was able to see students became increasingly motivated to follow their progress.

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Chapter 6

IMPLICATIONS FOR FURTHER RESEARCH

Based on my experience with this study, I have arrived at several recommendations for further research.

I have found portfolio's to be highly helpful with regard to my teaching, but management and the ability to provide immediate feedback in the way I designed this intervention were a struggle. That said, further research regarding how to efficiently administer this process with Middle School students' who need very explicit directions and coaching is needed and development of a process which will attend to this while allowing students to more frequently review their progress will be helpful.

In addition, this study was conducted to assess the progress of a group as it related to the intervention. Given the great gains I witnessed with one student, further studies, which include case based scenarios may be beneficial.

Further, given the incongruent findings between what I witnessed within my classroom and what the students recorded both quantitatively and qualitatively it may be beneficial to involve student interviews as opposed to pen to paper result recording.

Students indicate that they know what to do to be successful, but do not always implement those strategies as a result of a fear of failure, or a lack of motivation. Therefore, further investigation regarding age, feelings of self-efficacy and motivation need to be further researched.

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APPENDIX A

REFLECTIVE RESPONSE FORMS

Check In #1

Check In Time

Name:_____ Date:_____
Section:_____

This is time for YOU to think about how you are progressing in science class. This information will **not** be shared with anyone else. It is simply meant to give you a chance to review your work and set some goals.

1. You have just had a chance to review some of the work that you have completed over the last couple of weeks. Please put a star on the assignment that you feel was most important and describe below why you think so.

2. What are your strengths as a science student? Why do you believe this?

3. Describe one thing that you would like to improve about your participation in science class (in class or outside). Why do you want to change this?

Please evaluate your commitment to the class in the following categories. The scale is 1-5. 1 – lowest, 5 – highest.

Beginning work immediately: 1 2 3 4 5

Staying on task; working for the full class period: 1 2 3 4 5

Not disrupting others work: 1 2 3 4 5

Taking responsibility for my own learning: 1 2 3 4 5

Giving thoughtful well written responses on assignments: 1 2 3 4 5

Completing outside work on a regular basis: 1 2 3 4 5

Check In #2

Name:_____Date:_____

Check In Time

Please take a few minutes to look over the work in your portfolio. Then, please answer the questions below.

1. Please name the assignment that you feel that you learned the most from and describe why you think you benefitted from it.

2. Please describe what you like about how you participate in a group discussion or activity. Tell why you like the way you participate.

3. What is your vision of a good student?

4. Why do you think we complete reading outlines?

5. Please review your progress report and graph your current grade in the class. What things have you done well/not so well to contribute to that grade average?

Check In #3

Name:_____
Date:_____

Check In Time

Please review the current work in your portfolio and then evaluate your commitment to the class in the following categories. The scale is 1-5, with 1 lowest and 5 highest.

1. Regular Attendance 1 2 3 4 5

2. Starting Work Immediately 1 2 3 4 5

3. Staying on Task; Working for the full period 1 2 3 4 5

4. Challenging myself 1 2 3 4 5

5. Not disrupting others work 1 2 3 4 5

6. Taking responsibility for my own learning 1 2 3 4 5

7. Completing outside work on a regular basis 1 2 3 4 5

8. Always giving my best effort 1 2 3 4 5

Please answer the following questions (use the back of this sheet if you need more room):

A. What are you contributing to your group to help make your Genetic Disorder Project a success?

B. What is one goal that you have for yourself in science class this trimester?

C. What action(s) are you going to take to achieve that goal?

D. Please look at your progress report and graph your overall current grade in the class on you're My Progress in Science form.

Check In #4

Name:_____
Date:_____

Check In Time

Please review the current work in your portfolio and then take a few minutes to answer the following questions.

1. Last time we checked in, you wrote about how you were contributing to your group Genetic Disorders project. Do you feel as though you met your goals for the project? Why or why not?

2. Last time we checked in, you stated one goal that you have for yourself in science this trimester. Do you feel as though you have been doing what you need to in order to achieve that goal? Why or why not?

3. Please take a minute to look at your progress report and graph your most recent grade. Has your grade average changed since the last time we checked in? Is it lower or higher? What do you think you have done to influence that change?

Check in #5

Name:_____Date:_____

Check in time!

1. You recently wrote a paper about the skeletal system. Do you think that this paper was better or worse than then paper you wrote about genetic disorders? Aside from the grade that you received, what do you think you did to cause this difference?

2. What do you think the purpose of these papers and presentations is?

3. Do you feel you work better independently or in a group? Why?

4. Please list three things that you are doing to help you be successful in science class.

5. Do you feel that keeping a portfolio has impacted your progress in science class in any way, either positively or negatively? If so, please explain how.

6. Please take a minute to review your most recent work and graph your progress.

APPENDIX B

IRB APPROVAL LETTER

To:	Dale Baker EDB
From:	Mark Roosa, Chair Soc Beh IRB
Date:	08/19/2011
Committee Action:	**Exemption Granted**
IRB Action Date:	08/19/2011
IRB Protocol #:	1108006739
Study Title:	Sixth-Grade Student Self-Regulation and Attitudes toward Learning and Achievement in Science