AN ANALYSIS OF THE RELATIONSHIP BETWEEN USE OF A SELF-
MONITORING SYSTEM FOR ACADEMIC PERFORMANCE AND
FINAL COURSE GRADES

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This study examined the impact of calculating one's grade throughout a class on the student's overall grade at the end of the semester. Students in the study calculated their grade on each assignment they completed in a World History or Health class and then factored that grade into all other assignments to calculate their current grade in the class. End of term grades were recorded from two World History classes and two health classes that did not self-monitor their grades. Grades from the classes that did not self-monitor were compared to grades of students from classes that did self-monitor. An Independent Samples t-test was used to analyze the data. Findings from this study indicated there was a statistically significant improvement in the end of the semester class grade for students who self-monitored while tracking their grades compared to students who did not self-monitor their grades.

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Rationale

Teachers have a desire to see students succeed and continually seek to find ways to improve student achievement. This study was designed to investigate whether a system requiring students to keep track of their own grades would produce improved academic performance. The goal was to gain insight on whether or not student academic performance could be changed through the use of a grade tracker system.

The purpose of this study was to determine whether students who self-monitor and calculate their own grades throughout a class are more likely to earn a higher grade. A grade tracker was implemented in the classroom setting. This helped students see their current grades without the use of the internet or their teacher. Students were able to check their current grades, missing assignments, and how they were able to improve their grades.

Self-monitoring has been found to be an efficient way to promote fitness (Anshel & Seipel, 2009). Monitoring the amount of food consumed has been found to be an effective way to help overweight children lose weight (Mockus et al., 2011), while the use of self-monitoring has also been shown to result in a decrease in worry of consequences of smoking for smokers who monitor their negative thoughts (Magnan, McCaul, Köblitz, & Dillard, 2013). Ganz (2008) found self-monitoring is highly effective in the classroom setting, while DiGangi, Maag, and Rutherford (1991) found students' work on classroom performance increased with the use of self-monitoring behavior and graphing. It is important to collect data when self-monitoring (Ganz, 2008). Using data confirms whether self-monitoring is improving behavior and can help one

identify what changes need to be made in self-monitoring. People of all ages and capabilities

have been able to self-monitor effectively (Ganz, 2008).

Student grades were the emphasis in some of the earliest educational studies. Educational

research and grading research have become more sophisticated and rigorous over time

(Brookhart, Guskey, Bowers, McMillan, & Smith, 2016). Grades have been viewed as a valuable

multi-dimensional assessment that measures both non-academic behaviors and academic

knowledge (Bowers, 2011). One of the most fundamental characteristics of American education

is a grade (Schneider & Hutt, 2013). Grades have become so important throughout school that

short-hand references such as grade point average have been created so a student's academic

record can be shown with the precision of a number and seen at a glance (Schneider & Hutt,

2013).

Grades are an important part of education. To help students succeed in school they need

to be properly motivated to perform to their best ability. For people to be motivated, they must

be moved to do something. People have different types and different amounts of motivation. The

orientation of motivation shows the underlying goals and attitudes that make an action happen

(Ryan & Deci, 2000). Self-Determination Theory identifies two different types of motivation:

intrinsic and extrinsic. Intrinsic motivation involves doing something because it is naturally

intriguing or gratifying and extrinsic motivation involves doing something because it leads to a

specific result (Ryan & Deci, 2000).

According to Ryan and Deci (2000), Self-Determination Theory proposes there are

multiple types of extrinsic motivation. Students may perform extrinsically motivated tasks with

animosity, defiance, indifference or, alternatively, with a willingness that shows they accept the

importance of the task. The most classical form of extrinsic motivation occurs when one feels

externally forced to perform an action. Another form of extrinsic motivation occurs when the goal is self-approved and adopted with a sense of purpose. Being able to understand the different types of extrinsic motivation is important for educators because they may not always be able to rely on intrinsic motivation to facilitate learning. Given that some tasks educators require of students are not innately intriguing or enjoyable, knowing how to foster more active and desired forms of extrinsic motivation becomes an important strategy for educators to use. One potential way to enhance extrinsic motivation among students is to encourage their self-monitoring through use of a grade tracking procedure.

Hypothesis

It was hypothesized that students who calculated and tracked their own grades throughout a course would have higher overall course grades than students who did not use the grade tracker; thus, the Null Hypothesis was that there would be no difference in overall grades depending on use of the grade tracker system.

CHAPTER 2
REVIEW OF LITERATURE

Student success is of the utmost importance in schools. In this review of the literature, self-monitoring will be offered as a means by which student success may be enhanced. To understand whether student success is achieved or not, a section on how learning is measured will be provided. A review of student information systems will follow. Finally, enhancing the ability to learn through increasing motivation will be discussed.

Self-Monitoring

Self-monitoring is a technique that can be used to improve various aspects of life. The use of self-monitoring has been found to be an effective strategy to change behaviors and enhance performance in various health and bodily process domains (Anshel & Seipel, 2009). While some students are highly skilled at self-monitoring their behavior or are highly motivated to succeed in school, others are not. For those students who are less motivated, the use of self-monitoring techniques might prove useful in improving their scholastic ability and success.

Self-monitoring theory states there are two main sources of information that are available to individuals to help guide their behavioral choices in social contexts. The first includes information about their own attitudes, dispositions and inner states. The second is information about situational and interpersonal factors (Snyder & Gangestad, 1982). Individuals differ in the extent to which they rely on each of the two sources of information to help guide their behaviors in social settings (Snyder & Gangestad, 1982).

The characteristic behavioral orientations of low self-monitoring individuals and high self-monitoring individuals seem to be distinctly defined (Snyder & Gangestad, 1982). According to self-monitoring theory, there are two classes of self-monitors. One of the classes includes high self-monitors. These skilled people control and observe their expressive behavior

and how they present themselves and are sensitive to certain social cues for situationally proper behavior (Larkin, 1991). High self-monitoring individuals seek to be the type of people called for by the specific situation in which they find themselves (Snyder & Gangestad, 1982). The other class includes low self-monitors who lack the motivation or ability to control how they present themselves and behave more in response to their own inclinations than out of concern for the appearance of their behavior (Larkin, 1991). Low self-monitoring individuals seek to be the type of people who can display their own attitudes and inherent qualities in each situation they find themselves (Snyder & Gangestad, 1982). Individuals usually have a great amount of freedom to choose where they want to be, when they will get there, and who will be there with them. Self-monitoring theory states that individuals choose to be in specific situations that are useful to the enactment of the typical behavioral orientations related with their self-monitoring tendencies (Snyder & Gangestad, 1982).

Lennox (1984) suggested that self-monitoring theory shows high self-monitors are skillful at controlling and changing their social behavior to meet the demands of the present social situation. Situational cues are important for these individuals to give them information regarding how they should act. Lennox further noted that individuals who are high in self-monitoring use self-presentation and others' expression for purposes of impression management; their behaviors should reflect the expectations and values of the current social setting. Individuals who are low in self-monitoring are less likely to control expression and self-presentation than those high in high self-monitoring. Low self-monitoring individuals are thought to be regulated more by internal factors such as attitudes or beliefs and less by the immediate situation. People who are low in self-monitoring see their behaviors as a true view of what they believe. They are more likely to misbehave and less likely to use social cues to change

their behavior (Lennox, 1984). If social cues cannot change the behavior of these people, it may

be useful to have an external system that will require them to monitor their behavior. Students

who are low in self-monitoring may need guidance on how to monitor their behaviors so they

can perform more appropriately.

Zimmerman (2002) found that self-regulated learners monitor their actions based on their

goals and reflect on their performance. By monitoring their behavior, they feel satisfied and are

motivated to enhance their learning. Students who self-regulate are more likely to excel

academically because of exceptional motivation. A key component of self-regulators is

monitoring their work for signs of improvement. Motivation can come from the use of self-

monitoring (Zimmerman, 2002). When socially acceptable learning techniques are used as goals

to model self-monitoring, students will likely experience an increase in intrinsic motivation to

seek the action desired (Zimmerman, & Kitsantas, 1997).

The use of self-monitoring techniques has been used to affect exercise behavior (Anshel

& Seipel, 2009). Mockus et al. (2011) conducted a study to evaluate how self-monitoring

affected the weight loss of overweight children. Part of the intervention was made up of

increased physical activity, dietary changes, and self-monitoring. Participants in the study were

given training in self-monitoring so they could thoroughly record the food they ate. The use of

self-monitoring of food consumption resulted in a dramatic increase in weight loss in the

participants in the study. It was concluded the use of self-monitoring should be an important part

of weight loss intervention for children who are overweight.

Another effective use of self-monitoring involves smokers. In one study, smokers self-

monitored their negative thoughts via Ecological Momentary Assessment (EMA) to determine

whether there were differences between them and the negative thoughts of smokers who did not

self-monitor. Magnan, McCaul, Köblitz, and Dillard (2013) concluded that EMA techniques for

self-monitoring by smokers could have an impact on smoking behavior.

Ganz (2008) found self-monitoring to be an effective tool in the classroom by changing

the behaviors of students. It is often easy for teachers to implement self-monitoring in the

classroom because resources are readily available. Students who are able to self-monitor do not

need as much monitoring from their teachers, which allows the teacher more time to teach

(Ganz, 2008).

Ganz (2008) offered seven steps for implementing a self-monitoring system in the

classroom. In the first step, a target behavior must be selected by the teacher. The behavior may

be a social behavior, attention to task, or an academic behavior. In the second step, the teacher

should speak to the student about why it is important to self-monitor, including how other

students have made improvements, benefits the students may receive by self-monitoring, and

praise the students could receive as a result of improved targeted behavior. In the third step, the

teacher chooses how to measure the target behavior, records baseline data on target behavior, and

graphs the behavior. The student's behavior on a target behavior needs to be recorded by the

teacher before self-monitoring has been implemented. During the fourth step, the teacher needs

to choose a method of self-monitoring that is fitting for the student's age and ability level. The

teacher needs to determine the first criterion for earning reinforcement that is based on the given

baseline data. During the fifth step, the teacher needs to teach the student how to self-monitor.

The teacher may use role playing and modeling inappropriate and appropriate examples of the

target behavior. While using the different techniques to show examples and non-examples of the

target behavior, the teacher should use the self-monitoring system with the student until the

student is able to self-monitor independently. For the sixth step, the student and teacher start to

self-monitor. First, the teacher monitors the student's behavior every day to confirm the certainty

of the student's behavior counts. If an error is made by the student, the teacher needs to return to

Step 5 to practice self-monitoring and self-observation of the behavior. In the final step, the

teacher begins to lessen his or her monitoring of student behavior once the student is proficient at

monitoring his or her own behavior. The teacher may check student behavior periodically. Once

a target behavior has been improved by using self-monitoring, a new target behavior may be

implemented.

These steps could be used while implementing a grade tracker system so students can

self-monitor. In this case, the instructor chooses academic performance as the objective for

students to monitor. The instructor speaks with the students about why it is important to keep

track of academic performance. The instructor shows students how to record their grade on

assignments and how to monitor their overall class grade by calculating scores. The instructor

works with the students to make sure they can properly monitor their grades. Once students are

able to properly monitor their grades, the teacher can periodically check to make sure monitoring

is being used correctly. While using self-monitoring techniques with students, teachers, parents,

and administrators should keep in mind the suggestions made in the following paragraphs.

At the implementation of self-monitoring, Ganz (2008) proposes the teacher should

monitor the behavior with the student, then monitor student behavior periodically. It is

appropriate to discuss self-monitoring with the student and what type of motivation the student

will need to use and to maintain access to students' progress on the target behavior. Teachers

should not discontinue self-monitoring if it is not working, as self-monitoring is likely to work

with most students if adjustments are made (Ganz, 2008).

Ganz (2008) also suggested that collecting data is important when implementing self-monitoring, just as it is for all educational strategies. Data may be useful in determining whether a strategy results in improvements in the student's behavior. Data may also help to determine whether adjustments should be made in self-monitoring, as well as help demonstrate to the student, teachers, parents, and administrators that a student is making progress in the desired behavior. Data are also vital for curricular or instructional decisions. Specific aspects of self-monitoring can be accomplished fairly easily through the use of certain data collection procedures (Ganz, 2008). Rafferty (2010) believed a graphing element should be added when self-monitoring is implemented by teachers. A record keeping sheet in association with a different self-monitoring sheet can be used for graphing purposes. DiGange, Maag, and Rutherford (1991) found that academic work rate and on-task performance were greatly increased by self-graphing and self-monitoring. When self-graphing is added to self-monitoring there is a significant increase in academic work rate and grade percentage. Ganz (2008) found self-monitoring is effective with students of all abilities and ages. However, self-monitoring is not likely to change a behavior if a student does not understand the behavior is environmentally or socially inappropriate (Rafferty, 2010).

In the classroom, self-monitoring has been found to be useful for students as well as teachers. An effective teaching strategy, using praise, can help support the use of self-monitoring by teachers. Teacher behaviors may even be monitored and modified in the classroom by the use of self-monitoring. The effectiveness of self-monitoring on teacher behaviors shows promise in different aspects of schooling and teaching. Self-monitoring is simple, easy to put into effect, permits prompt response, and can be successful when adjusting behavior (Kalis, Vannest, & Parker, 2007).

How is Learning Measured?

There is no pure measure of student learning, but attempts have been made to help educators assess learning. The use of grades, pretests and posttests, and the use of standardized tests are tools that can help in attempts to measure student learning. Grading refers to the symbols that are allocated to individual assignments of student work or the composite measures of student performance on student grade cards. Student grades were the emphasis of some of the earliest educational studies. Educational research and grading research have become more sophisticated and rigorous over time (Brookhart, Guskey, Bowers, McMillan, & Smith, 2016).

Students learn many things while in the classroom, but the main reason students are in the classroom is to learn content knowledge of a certain subject. For teachers to see if their students are acquiring the content knowledge, they must be able to assess their students' knowledge in a particular way and translate the assessment into a numerical or letter grade, also known as a summative evaluation (Allen, 2005).

Bowers (2011) suggested grades have sometimes been criticized as a poor measure of content knowledge, but the connection between grades and school outcomes shows there may be an important aspect of grades. Grades assigned by teachers are not consistently used for decision-making by administration or policymaking industries because of their subjectivity, but grades have been highly associated with schooling outcomes. Grades have been explored as valuable multi-dimensional assessment data that measures both non-academic behaviors and academic knowledge. Even though there has been a strong association observed between grades and schooling outcomes, teachers have been urged to align grading practices with standardized curricula and grading practices to show students' grades as a more accurate calculation of students' academic knowledge. Bowers further found that many teachers are reluctant to make

changes in their classrooms as they have reported awarding grades for various behaviors, such as academic knowledge, participation, attendance, effort, and positive behaviors.

Price and Randall (2008) pointed out that schools that want to earn and keep accreditation must comply with state and federal rules and must depend on the assessment of students. Assessment is one way to show that learning is happening inside the classroom. Students can demonstrate their mastery of topics or abilities through their performance on assessments such as pretests and posttests. Using posttest assessments can alert a teacher to the areas in which students are weak, so teachers can then use that information to revise course content. Pretest assessments can show teachers which areas students are proficient in and thus teachers can choose to spend less time on those subjects. In short, teachers should use assessment to strengthen their classes.

Scores on standardized tests have been used to evaluate students' scholastic growth and achievement (Lloyd, 2016). In addition, standardized test scores can be used to communicate school performance to various people (Hadjicharalambou, 2014). There are specific standards that students need to meet and standardized test scores help show whether or not students meet those standards. Hadjicharalambou further suggested that results on test scores may be beneficial to incoming students, parents, supervisors, federal agencies, and accrediting bodies. The use of test scores can help highlight program improvements, while scores in specific fields can show educators where improvement needs to be made.

Student Information Systems

With the availability of technology, a variety of computer programs have been developed to help schools manage school data. These programs are known as Student Information Systems (SIS) and can perform a wide array of tasks involving budgeting, monitoring student attendance,

and providing a means of communication between faculty and students, to name a few. Also included in most data management systems is a component for managing student grades. These systems allow parents and students instant access to the teacher's electronic gradebook, providing parents and students the ability to monitor student progress by viewing current grades and missing assignments. As Student Information Systems have become more prevalent devices used in schools, districts must decide how beneficial they are to student achievement. While many schools are choosing to adopt Student Information Systems, there is little cited evidence on whether the use of these programs can help improve student achievement (Ngoma, 2009). The current study examined whether students who are motivated to self-monitor their grades through the use of Student Information Systems would see an improvement in their grades.

Enhancing the Ability to Learn

As noted previously, Zimmerman (2002) found that students who self-regulate are more likely to excel in their studies because of exceptional motivation. Zimmerman further suggested that, because of self-monitoring and self-regulating, such students are more likely to become more motivated and, thus, tend to show academic improvement. For this reason, motivation will be discussed in this section with the hope that through the encouragement of self-regulation and self-monitoring, students will become more motivated, therefore leading to enhanced academic achievement.

According to Ryan and Deci (2000), motivation is defined as being moved to do something. An unmotivated person would be someone who does not feel inspiration to act. Every person has a different amount of and different types of motivation. People will vary in their level and orientation of motivation. Orientation of motivation deals with the causal goals and attitudes that create an action. For example, a student may be highly motivated to gain the

approval of a parent or a teacher by doing well on a homework assignment or, conversely,

because he or she is interested or curious about the information (Ryan & Deci, 2000). A student

may be motivated by learning a new skill set because it will produce a good grade or he/she

may understand the value of learning the new skill. In the examples given, the amount of

motivation given does not necessarily change; however, cause and focus of the motivation do

(Ryan & Deci, 2000).

The two types of motivation that will be discussed in the following sections are intrinsic

motivation and extrinsic motivation. Intrinsic motivation refers to performing an action because

it is innately enjoyable or interesting, and extrinsic motivation refers to performing an action

because it leads to a separate outcome (Ryan & Deci, 2000).

Intrinsic Motivation

Intrinsic motivation is defined by Ryan and Deci (2000) as the doing of an action for its

innate gratifications rather than for some separate consequence. When a person is intrinsically

motivated, that person is moved to perform an action for enjoyment or challenge rather than

because of external factors such as pressures from different forces or external rewards. In

humans, intrinsic motivation is one form of motivation and it is a universal and significant one.

From birth and on through life, humans are energetic, inquisitive, and lively creatures,

exhibiting a universal readiness to study and discover, and they do not always require extrinsic

incentives to do so (Ryan & Deci, 2000).

Intrinsic motivation is a very important type of motivation; however, people are not

intrinsically motivated to perform most tasks. After childhood, it is more difficult to be

intrinsically motivated due to increasing amounts of social demands and roles that require an

individual to have more responsibility for non-intrinsically interesting tasks. In many schools it

seems that, with each advancing grade level, students become less intrinsically motivated

(Ryan & Deci, 2000).

Extrinsic Motivation

Students are able to perform extrinsically motivated activities with dislike, struggle, and

apathy or, alternatively, with an attitude of readiness that shows an inner acceptance of the

worth or value of a task. In the former instance—the characteristic case of extrinsic

motivation—a person feels externally driven to act; in the latter case, the extrinsic goal is self-

authorized and is adopted with a sense of desire (Ryan & Deci, 2000).

Extrinsic motivation is a concept that relates whenever an activity is performed in order

to achieve some separable result. Extrinsic motivation is the opposite of intrinsic motivation,

which refers to performing a task for the pure satisfaction of the task itself, rather than its

outcome (Ryan & Deci, 2000). Extrinsic motivation occurs when there is a distinct outcome or

assumed gain (Kusurkar et al., 2013). Some viewpoints see extrinsically motivated behavior as

being a single reason to act; however, extrinsic motivation can differ significantly in terms of

what extrinsically motivates a person. For example, a student who only studies for a test

because she fears punishment by her parents for doing badly on a test is extrinsically motivated

because she is studying to achieve a separable result of avoiding punishments. Similarly, a

student who studies for a test because he personally thinks it will be beneficial for his chosen

vocation is also extrinsically motivated because he is also studying for its value rather that

studying because it is innately satisfying. The examples given involve an outside source of

motivation, but the last example gives personal confirmation and a sense of choice, whereas the

first example involves obedience with an external factor. Both of the examples show

intentional behavior, but the different types of extrinsic motivation differ in their autonomy

(Ryan & Deci, 2000).

Several educational tasks assigned in schools are not intended to be intrinsically

stimulating. A main question concerns how to inspire students to value and self-regulate their

completion of such tasks and, without outside pressure, to perform them on their own (Ryan &

Deci, 2000). Kusurkar et al. (2013) suggest there are four different types of extrinsic

motivation: integrated regulation, identified regulation, introjected regulation, and external

regulation. External regulation is a form of extrinsic motivation that is represented as the least

autonomous form of extrinsic motivation. Behaviors are only performed to gratify an external

request or to receive an externally obligatory reward (Ryan & Deci, 2000). Introjected

regulation is another type of extrinsic motivation. Actions are performed because there is a

feeling of pressure to avoid guilt or anxiety or to gain a sense of pride. Identification is a more

autonomous form of extrinsic motivation. With identification, a person identifies with the

personal importance of a behavior and accepts it as his or her own (Ryan & Deci, 2000).

Kusurkar et al. (2013) noticed that autonomous motivation is a combination of intrinsic

motivation and identified regulation. Autonomous motivation has been shown to be positively

related to academic performance through higher study effort.

Ryan and Deci (2000) suggested that integrated regulation is the most autonomous type

of extrinsic motivation. Integration happens when guidelines have been entirely adjusted to the

self and brought into equivalence with a person's needs and values. The more a person

internalizes the motives for an action and relates them to the self, the more a person's

extrinsically motivated behaviors can become self-determined. Forms of motivation that are

integrated have some of the same qualities as intrinsic motivation because they are

autonomous. Extrinsically motivated actions are not innately fascinating and, therefore, must primarily be externally provoked. In these cases, the main reason people are likely to perform their actions is because they are appreciated by significant others to whom they feel connected, such as society, peers, or family members. The first step enabling internalization is giving a sense of belonging and connecting to a person's group goal. For students in a classroom, it means they need to feel cared and respected for by the teacher so they are more willing to accept classroom values. For people to adopt their own extrinsic goal they must feel the usefulness of it and respect it. If students understand a goal and have the applicable skills to succeed at it, then they are more likely to adopt and internalize that goal (Ryan & Deci, 2000).

Motivation in the Classroom

School leaders have an increased responsibility to implement school enhancement actions that resulted in improvement in school performance of all students (Emmett & McGee, 2013). Kusurkar et al. (2013) found that the quality of motivation helps determine good performance among students through encouraging high effort and effective study strategies. Extrinsic and intrinsic reasons may motivate a student's achievement behavior in the classroom. Doing work in the classroom to comply with a teacher's demands and receiving help from the teacher to learn new material may coincide with a student's interest and curiosity. It has been suggested that the desire to attain good grades in the classroom should be included in a scale of intrinsic motivation rather than extrinsic motivation (Lemos & Verissimo, 2013). Extrinsic and intrinsic motivation can and do exist in the classroom. Paying attention to only extrinsic rewards can greatly weaken the joy that can result from learning (Lepper, Corpus, & Iyengar, 2005). Extrinsic motivation for students could be linked to school improvement efforts and levels of achievement within high schools (Emmett & McGee, 2013). It appears children

are losing their enjoyment in the process of learning and the extrinsic rewards that schools have

in place to keep students on track are not compensating for the decline in intrinsic motivation

(Lepper et al., 2005). It is important to identify the different factors that affect extrinsic and

intrinsic motivation within education and the various psychological processes behind these

(Gillet, Vallerand, & Lafreniere, 2011). Being able to enhance both intrinsic motivation and

internalization of extrinsic motivation may help educators to maximize children's motivation to

learn (Lepper et al., 2005). While students need both intrinsic and extrinsic motivation, it

appears schools might rely too much on extrinsic motivation and the development of more

intrinsic motivation might encourage students to achieve more.

Educators usually rely on two forms of assessment: formative and summative.

Summative assessments test the students' knowledge and understanding of a subject at the

conclusion of a unit or a full course, usually by a test. Formative assessments frequently test

learning progress students make throughout a unit by their instructors. Results from tests can

help guide the way instructors teach their classes and the way students study. It is possible that

tests can also serve as a form of formative assessment. There is not always a clear distinction

between formative and summative assessments (Smith, 2007). Reliable, motivated students

may attain greater scores on summative and formative assessments because they may have

good study habits and academic ability. There are relationships between test grades and

formative assessments; however, they must be interpreted with careful thought of what

cognitive abilities and outcomes are assessed via each assessment. It is hard to say if formative

assessment, effort and motivation, or student ability are the stronger determinants of test grades

(Smith, 2007).

In his 2007 study, Smith compared the scores his Earth History and Environmental

Geology students received on exams and assignments in an effort to gain insight into the

workings of active learning and assessment. Exams, online quizzes, in-class assignments, and

laboratory exercises were the assessments used in the Earth History class, while exams, online

quizzes, in-class assignments, research problems, topic summaries, and read-think-write were

assessments used in Environmental Geology. All assignments were graded and scores from

formative assessments were compared with scores from exams. Earth History class laboratory

assignment scores ($R^2 = 0.017$) and in-class assignment scores ($R^2 = 0.067$) did not show a

correlation with exam scores. Online quiz scores ($R^2 = 0.86$) correlated strongly with exam

scores. Smith also noted that students who frequently checked graded quizzes for feedback and

then answered the questions again when they did not receive full credit demonstrated higher

performance than students who had not checked feedback or answered questions again. In the

Environmental Geology class, in-class assignment grades ($R^2 = 0.41$) and online quiz grades

($R^2 = 0.45$) were slightly correlated with exam grades. All students who received an average

score of 80% or higher on exams reviewed online quizzes and answered quiz questions again

for those questions they had previously answered incorrectly. There were very strong

correlations between various infrequent written assignments and exam grades, with R^2 values

ranging between 0.93 and 0.99. Smith concluded that group assignments may not fully assess

every student in the group equally. Use of online assignments that are given frequently and

assess individual learning was correlated with exam success. Student learning on exams was

enhanced by formative assessments when students utilized all feedback and learning

opportunities. Smith concluded that students who are motivated may receive higher scores on

summative and formative assessments because of their study habits and scholarly ability.

Conclusion

In summary, self-monitoring can be used to improve a variety of issues such as changing health-related behaviors (Anshel & Seipel, 2009), smoking cessation (Magnan, McCaul, Köblitz, & Dillard, 2013) and student classroom behavior (Ganz, 2008). Research has indicated that students may be intrinsically or extrinsically motivated to learn, or they may be motivated by a variety of classroom techniques. Student learning can be measured in a variety of ways, including grades. Zimmerman (2002) suggested that self-regulated learners monitor their actions and reflect on their performance. While the usefulness of students self-monitoring their behavior and grades in the classroom has been discussed in the literature, little research has been conducted to examine the effect of self-monitoring on final course grades of students who track and calculate their own grades. Therefore, the researcher sought to understand if students would be more intrinsically motivated to improve their academic performance by self-monitoring and the use of a grade tracking system.

CHAPTER 3
METHODOLOGY

Participants

The setting for this study was a small, rural high school in the midwest. The researcher

has been a teacher in the school district since 2013. The high school has a student population of

approximately 160 in grades 9-12.

The sample consisted of students who were enrolled in World History and Health classes

during the years 2013-2014, 2014-2015, and 2015-2016. A total of 241 grades were examined.

Of those, 99 grades were for students who used the Grade Tracker Sheet and 142 grades were for

students who did not use the Grade Tracker Sheet. Of the 99 who used the Grade Tracker Sheet,

46 (46.46%) were males and 53 (53.53%) were females, while the 142 grades for students who

did not use the Grade Tracker Sheet included 68 (47.88%) males and 74 (42.11%) females.

Students enrolled in the World History classes were enrolled for two semesters, and their grades

were entered at the end of each semester. It should be noted that some students were enrolled in

both World History and Health at the same time. Additionally, most students were enrolled in the

World History class for both semesters. This is important because it is possible that one student

could have up to three grades in the data set. The researcher used fall and spring semester grades

for each student enrolled in the World History classes, as each semester grade was independent

from the others. The specific breakdowns of student grade levels and their ages were not

available to the researcher. Age differences could be a factor if older students have a larger

knowledge base than younger students. Permission to use the student scores was attained from

UCM's Office of Human Subjects and the study was deemed to not involve Human Subjects, as

only the archived achievement scores were used. Table 1 provides information on the number

and gender of students within the classes studied.

Table 1. *Participants in the Two Grade Tracking Conditions*

			Used Grade Tracker Sheet		Did Not Use Grade Tracker Sheet	
Semester	Year	Class	Male	Female	Male	Female
Fall	2013	World History			20	25
Fall	2014	Health			12	11
Spring	2014	World History			21	26
Spring	2015	Health			15	12
Fall	2015	World History	13	17		
Fall	2015	Health	10	7		
Spring	2016	World History	15	17		
Spring	2016	Health	8	12		

Materials

Grade Tracking Sheet. At the beginning of the 2015-2016 school year, the researcher created the Grade Tracking Sheet with various columns. The sheets were given to the students to organize their grade data. The columns included the following categories: Date, Assignment, Points Earned, Total Points, Percentage, Letter Grade, Make Up/Extra Credit Assignments, Class Earned Points, Class Total Points, Class Percentage, and Class Letter Grade. (See Appendix A).

Assignments. Students received their graded class assignments and tests frequently so they could see the individual grades they received and keep them in a folder with their Grade Tracking Sheet. Assignments included book work, worksheets, quizzes, projects, and tests.

Design

The study used a between subjects quasi-experimental design with two groups. The first group consisted of students who took a World History course or a Health course and did not track their grades. The second group consisted of students who took the same courses but did track their grades. Students were enrolled in the specific courses by the High School Guidance Counselor to meet their individual course requirements and were not randomly assigned to the groups by the teacher.

Both groups were taught the same material, by the same teacher, and had the same assignments. The Grade Tracking Sheet was completed by the students in the second group during the 2015-2016 school year. The classes, World History and Health, were both freshman level courses. The classes were both held in a classroom setting. All World History classes had the same assignments, as did all the Health classes. One difference between the groups was that the World History classes lasted the entire year, while the Health classes were semester-long classes. For the purpose of this study, final grades for all classes were calculated on a semester basis. However, the difference was that one group did not use the Grade Tracking Sheet, while students in the other group tracked their own grades on the grade tracking sheet.

The dependent variable was the overall grade in the course while the independent variable was whether or not the student used the Grade Tracking Sheet. To calculate the overall grade in the course, each student's total number of points earned in the year was divided by the total number of points possible.

Procedure

During the 2013-2014 and 2014-2015 school years the researcher recorded grades in Student Information System (SIS) and returned assignments to the students. Students and

parents had the option of accessing the student's grades. However, in the 2015-2016 school year the researcher encouraged the students to track their own grades by mathematically figuring their grades. It should be noted that not all 2015-2016 students tracked their grades. The data from the students who did not track their grades were not included in the data analysis. The researcher continued to enter grades into the district's Student Information System.

At various times throughout the semester, assignments were returned to students in the group that tracked grades and they were given time to record all the information. Once assignments were returned to students, the teacher explained the procedure. The students were told to record the date the assignments were due and then record the name of the assignment next to it. The assignments were recorded in order, based on the due date. Once the assignments were recorded, the students then listed how many points they received in the "Earned Points" column and then recorded how many points the assignment was worth in the "Total Points" column.

Students were then instructed to calculate their percentage by dividing the number in the "Earned Points" column by the "Total Points" column and record that number in the column marked "Percentage." Once they did that, they were instructed to record the letter grade they earned based on the percentage in the "Letter Grade" column. They were told what their grade was on each individual assignment.

Students were then told to keep track of how many points they earned in the "Class Earned" column and then add up the number of points available in the class in the "Class Total" column. After that, they were told to divide the number in the "Class Earned" column by the number in the "Class Total" column to calculate their class percentage. Once they found

their class percentage, they were told to record that in the "Class Percentage" column and then record their letter grade based on their class percentage in the "Class Letter" column. Students were also instructed to place any extra credit or test correction points they had earned in the "Extra Credit" column. Students completed this task approximately six times throughout the semester. To monitor that everyone in the grade tracking condition recorded their grades, the researcher walked around the classroom while students were entering their grades on the grade tracker sheet and noted which students completed the grade tracking sheet and those who did not. The researcher entered all grades for both groups into SIS and the students and parents had continual access to the grades via the Internet.

CHAPTER 4
RESULTS

An independent samples *t*-test was performed to test the hypothesis that students who tracked grades and students who did not track grades had statistically significantly different end of course grades, The interval/ratio level dependent variable was the class percentage grade. The assumption of normality or a large sample size was met because the sample was greater than 30. The assumption of homogeneity of variances was tested and found to be violated via Levene's *F* test, $F(239) = 37.87$, $p < .001$. Therefore, the corrected values for the *t*-test are reported. The independent samples *t*-test revealed a statistically significant effect of the grade tracking procedure, $t(227.23) = 5.45$, $p = .001$, indicating higher mean end of semester course grades in the grade tracking group ($M = 86.17$, $SD = 9.94$) than the non-grade tracking group $M = 76.20$, ($SD = 18.27$). Thus, the grade trackers earned significantly higher end of the course grades than students who did not track grades. Cohen's *d* was estimated at .68 which suggests a moderate to large effect size.

It is important to note that there were 40 students enrolled in classes during the 2015-2016 school year who did not complete the Grade Tracker Sheet process. The mean grades for these students was 53.30 ($SD = 22.48$). The grades for these students were not included in the independent samples *t*-test due to not completing the Grade Tracker Sheet process, as it was not a course requirement.

Voyer and Voyer (2014) found that female students generally achieve at a higher rate than their male counterparts in required schooling. For this reason, a Chi-squared test was performed to determine if a significant relationship existed between the end of semester grades for males and females in the current study. Results indicated that there was not a significant relationship between the sex of students and whether or not they tracked their

grades $\chi^2 (1) = .05$, $p > .05$. This finding indicates there was not a significant difference between the proportions of males and females who tracked their grades and the proportions of males and females who did not track their grades.

CHAPTER 5
DISCUSSION

The purpose of this study was to determine whether students who calculated and self-monitored their own grades throughout a class would be more likely to earn higher grades than students who did not calculate and self-monitor their own grades. Results of the current study indicated that student achievement improved significantly following the use of self-monitoring grade sheets. Considering the findings of Ryan and Deci (2000), and Kusurkar, Ten Cate, Vos, Westers, and Croiset (2013), it is not surprising that the use of self-monitoring grade sheets by students was linked to significantly improved grades.

Researchers have concluded that self-monitoring can improve various aspects of life. Anshel and Seipel (2009) found that self-monitoring was effective in changing behaviors, enhancing performance in a variety of health and bodily process domains, including exercise behavior. Mockus et al. (2011) found self-monitoring affected weight loss in overweight children. Magnan, McCaul, Köblitz, and Dillard (2013) concluded that self-monitoring by smokers could have an impact on smoking behavior. Ganz (2008) suggested self-monitoring was an effective classroom tool, and teachers found it to be relatively easy to implement self-monitoring techniques with their students. Rutherford's (1991) study found an increase in academic work rate and grade percentage when self-graphing and self-monitoring were implemented. Considering the findings from the literature, it was hypothesized that individuals who tracked their own grades throughout their class would earn a higher overall class grade than students who did not track their own grades. The present study adds to the previous literature by extending work on behaviors that may be impacted by the use of self-monitoring to the academic performance of high school students. The researcher's hypothesis was supported by the results of the present study by the significant difference observed in grades

between two groups such that those who tracked their grades earned significantly higher

grades.

Schools are responsible for educating the students in their care. While there is no

universally accepted way to measure student learning, teachers use grades, pretests, posttests,

and standardized tests to help them measure learning (Brookhart, Buskey, Bowers, McMillan,

& Smith, 2016). Additionally, schools must deal with accreditation issues. Price and Randall

(2008) noted that schools must comply with state and federal regulations to do so. Many of

those regulations are tied to student achievement, giving school leaders an increased

responsibility to implement actions and programs that lead to academic improvement by

students (Emmett & McGee, 2013). The use of self-monitoring and calculating grades are tools

educators can implement to improve student achievement.

Research has shown that self-monitoring can improve student achievement and

motivation. Therefore, it was with the goal of understanding whether or not student

achievement would improve with the use of student self-monitoring grade tracking sheets that

the current study was undertaken. Motivation, according to Ryan and Deci (2000), is defined

as being moved to do something. While people may vary in their level of motivation and the

type of motivation that moves them to improve, Kusurkar, Ten Cate, Vos, Westers, and Croiset

(2013) suggested motivation helps students perform better through high effort and good study

strategies. Ryan and Deci found students may be motivated to learn because they earn higher

grades and they understand the value of the new skill.

Additionally, Kusurkar, Ten Cate, Vos, Westers, and Croiset (2013) found that the

quality of motivation helps determine good performance with students through high effort and

the use of good study strategies. People will, however, vary in their level of motivation and the

orientation of motivation. A student may be motivated by learning a new skill set because it

will produce a good grade or he/she may understand the value of learning the new skill. In the

examples given, the amount of motivation given does not necessarily change; however, cause

and focus of the motivation do (Ryan & Deci, 2000). According to Zimmerman (2002),

students who self-regulate are more likely to have higher motivation, which then results in

academic improvement. When students self-monitor their grades they may become more likely

to be motivated to improve their grades.

Limitations

One limitation of the present study is the level of teaching experience of the teacher for

the courses involved. The researcher had one year of teaching experience in World History and

Health when the Grade Tracking Sheet was not used. When the Grade Tracking Sheet was

implemented, the researcher had two years of experience teaching the content areas. Further

experience in teaching could have given the researcher a better understanding of how to teach

students and how to explain the material in an easier way for the students to understand.

Considering this, the teacher may have been more effective when teaching the classes in the

grade tracking condition since the teacher had more experience teaching. If a teacher has more

experience it could be possible that part of the difference between conditions was a result of

teacher experience instead of the grade tracking sheet. The difference in teacher experience

could have been a confounding variable in this study, potentially accounting for the difference

in grades between the two groups.

Another limitation of the study was that not all of the students in the grade tracking

condition completed the grade tracking sheet. At the time of the implementation of the grade

tracking sheet, the researcher did not require every student to complete it because it was not

part of the assigned curriculum for the class. The researcher walked around the classroom while students were completing the Grade Tracker Sheet and noted which students completed it and which students did not. Data from students who did not complete the grade tracking sheet were not included in the study. Students who did not complete the grade tracking had a low mean on grades which could be due to them not being skilled at following directions. Comparing the grades of students who did not track their grades with the students who did track their grades could provide information on the usefulness of the Grade Tracking Sheet.

The researcher did not randomly assign students to the different conditions, creating yet another limitation. Since students were placed in their classes by the Guidance Counselor and not the researcher, cause and effect cannot clearly be established. Random assignment would help ensure that there were no systematic differences between the conditions.

A final limitation was the amount of information about the participants that was not available to the researcher. The participants' ages, grade levels, and overall GPAs would have been useful in evaluating the results. Further personal information about the participants could potentially help the researcher explain the difference between the conditions.

Implications for Practice

The results of this study have a variety of implications for practice. The use of the Grade Tracking Sheet was associated with increased grades for students who used it compared to the students who did not use it. If teachers start to implement grade tracking sheets, then grades in many different classes might be improved. The self-monitoring of grades could potentially motivate students because they can see how their grades are improving.

Once students have been trained on how to self-monitor their grades, it is easy to administer a self-monitoring program. At implementation, it may take some time for students

to learn how to self-monitor, but after they understand how to do it then they can do it on their

own at a quick pace. With the use of a grade tracking sheet, students can easily see whether

they are (or are not) making improvement in class. Students can see how much impact

individual assignments have on their overall grade in a class. It is easy for students to quickly

do the math to see how much a specific grade could improve their overall class grade. The

Grade Tracker Sheet allows the students to see what they need to do to improve their grade.

Since some teachers will offer the chance to do extra-credit assignments or re-do a test or

assignment, students can easily see how much an extra credit assignment or assignment re-do

would improve a grade.

When students see their grades improving, integrated extrinsic motivation can be a

factor in the improvement of their grades. The students may recognize the importance of their

grades and be motivated to perform better for that reason and not because they are intrinsically

motivated to learn the material for their own pleasure.

While many teachers and students may find a benefit with the use of grade-tracking

sheets, not all subject areas lend themselves to the use of grade tracking sheets. For example,

physical education classes are mainly activity-oriented and the use of written classroom

assignments is not typical.

While not discussed in the literature review, teachers strive to integrate cross-

curricular learning, such as applying math skills in World History and Health courses. The use

of cross-curricular teaching methods in the classroom can be effective in helping students learn

how to build group and individual motivation, determining ethical solutions to problems, and

sustaining interest in school work (Barnes, 2011). The use of math in grade tracking is an easy

way to achieve the goal of cross-curricular learning. A secondary benefit is the students are getting extra practice in math skills as they calculate their grades.

In many classrooms, missing assignments become equal to a grade of "0". These "0" grades can have a tremendous impact on a student's overall grade. With the use of the Grade Tracking Sheets, it becomes obvious to the student what assignments they are missing and allows them the opportunity to complete those assignments and replace the "0" grade with a score.

A final implication for practice is that students always have access to their grades while in the classroom. Students have access to their class grades via Student Information Systems; however, many teachers do not allow students to access various forms of technology so they can check their grades while in the classroom. With the use of the Grade Tracking Sheets, students have access to a paper copy of their current grade for that class.

Implications for Future Research

Future researchers might want to consider expanding upon this study to learn more about the impact of student self-monitoring of grades. The following are ideas for consideration.

Future research should be performed using true experimental design with random assignment to groups. It would be beneficial for all students in a class to be given the Grade Tracking Sheet and be required to complete it. This would allow the researcher to gather data from all the students in the class and not just the students who willfully completed the Grade Tracking Sheet. The number of assignments and number of times students track their grades should be studied. The frequency of calculating grades could affect a student's overall class grade.

Students could be interviewed or surveyed about their reaction to the self-monitoring process. Student opinion could give further insight as to why self-monitoring worked for them and why it might be a beneficial tool to enhance student performance. If students believe self-monitoring is a useful tool to help in academic achievement, then it could help explain why overall class grades increased with the use of self-monitoring and calculating grades. In addition, students could be asked what other teaching methods would help them to be more motivated to learn.

Future researchers should randomly assign students into tracking and non-grade tracking groups. Students in both conditions could complete measures to assess their motivation for studying, completing grades, and completing assignments to assess if using the Grade Tracker Sheet encourages more integrated extrinsic motivation.

Teachers could receive professional development training on the use of the Grade Tracking Sheets. Once teachers learn how to use them, they can be surveyed about their opinions on the use of the tracking sheets after a year of implementation, including their perceptions of the impact of the Grade Tracking Sheet on student achievement.

The amount of class time students spend in the process of tracking grades should be studied. It should be determined whether if it is more beneficial to spend time on tracking student grades versus learning more material or spending further time on classwork.

If these changes were completed and comparable findings were found, the data would support current interpretations that the use of self-monitoring in the classroom could help students achieve a higher-grade percentage in their classes.

Summary

The purpose of this study was to compare the overall grade percentages of students who self-monitored by the use of a Grade Tracking Sheet with students who did not use a Grade Tracking Sheet. The researcher sought to increase the understanding of the possible benefits of the use of self-monitoring in a classroom setting. Data were collected from students who used the Grade Tracking Sheet and students who did not use the Grade Tracking Sheet. When reviewing the data, it was found there were improved class percentages for the students who used the Grade Tracking Sheet. Future research should explore whether the use of the Grade Tracking Sheet would increase class percentages under more tightly controlled conditions, such as an experimental design.

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APPENDIX A
GRADE TRACKING SHEET

Date	Assignment	Earned	Total	%	Letter	MU/EC	Class Earned	Class Total	Class %	Class Grade

APPENDIX B
HUMAN SUBJECTS APPROVAL

Not Human Subjects Review
5/16/2016

Dear Sean Hutchinson:

Your research project, 'Thesis', was approved by the Institutional Animal Care and Use Committee on 5/14/2016.

Please note that you are required to notify the committee in writing of any changes in your research project and that you may not implement changes without prior approval of the committee. You must also notify the committee in writing of any change in the nature or the status of the risks of participating in this research project.

Should any adverse events occur in the course of your research (such as harm to a research animal), you must notify the committee in writing immediately. In the case of any adverse event, you are required to stop the research immediately unless stopping the research would cause more harm to the animals than continuing with it.

At the conclusion of your project, you will need to submit a completed Final/Renewal Report to this office via Blackboard. You must also submit the Final/Renewal Report if you wish to continue your research project beyond its initial expiration date.

Sincerely,

Deborah J. Turnbow
Director, Sponsored Programs
University of Central Missouri

cc: kreiner@ucmo.edu
Protocol Number: 504