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## The Effects of Standards-Based Grading on Stakeholders Understanding of Student Mastery in Middle School Math

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The Effects of Standards-Based Grading on Stakeholders Understanding of Student Mastery in

Middle School Math

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### **Abstract**

Standards-based grading reports on student's mastery of standards. Grading in this way allows students multiple opportunities to demonstrate mastery of a standard; whereas, traditional grading practices assign grades to assessments and generally that grade cannot be changed even if the student later shows mastery of that set of skills. This action research study examines the effectiveness of standards-based grading and traditional grading practices in providing understanding of student mastery to students and teachers. In addition, the research addresses how well students can identify learning targets during each grading system.

To examine the effectiveness of each grading practice, the study included student journals, teacher reflection data, and student self-assessments. Student journals were used to identify learning targets each day. The research shows that students identified the learning target correctly about the same frequency during each grading system.

The researcher reflected on student mastery for each grading system by rating students on a proficiency scale twice for each system. The research reveals that during the traditional grading unit the researcher was unsure of the proficiency levels of students just based on assessments scores. However, during the standards-based unit, the teacher knew exactly how proficient each student was by looking at the assessment scores.

Traditional grading practices have been around for over a hundred years. For decades, students have attended classes; and, to varying degrees, they have completed homework, participated in class, and taken assessments, all to receive a single grade at the end. This final grade can encompass anything from test scores, to participation points, to extra credit points for bringing supplies in for the class. Marzano and Heflebower (2011) pointed out that in a traditional grading system, students may receive good grades because they were well behaved in class and not because they knew the content. Similarly, a student could be assigned a D because of disruptive behavior rather than a lack of understanding.

With traditional grading, teachers may pull a small group of students who all did poorly on a test and review all of the skills with them. This wastes time because it is likely that not every student in the group needed reteaching of every skill. Students, parents, and teachers would all benefit from a system of grading that accurately represents what a student knows and can do. Using a system like this, teachers could focus their efforts on reteaching specific skills with specific students. To this end, standards-based grading is intended to reveal the specific areas students have mastered and provides clear direction for areas in which students need further practice.

Some schools already have implemented, or are in the process of implementing, standards-based grading with the end goal of increasing student achievement. That will happen if stakeholders are indeed better able to determine student's needs as well as distinguish what skills they have already mastered. However, little is known about the effects of standards-based grading on student and teacher understandings of what skills students have mastered. Without this information, it is difficult to create buy-in for teachers to increase their motivation to learn a new grading system. Therefore, the research questions guiding this study were:

1. *In what ways, if any, does standards-based grading provide students with a better understanding of each day's learning target than traditional grading?*
2. *In what ways do standards-based grading and traditional grading provide clear evidence of student mastery of skills?*

### **Theoretical Framework**

Vygotsky's Social Constructivist theory contains two main principles (McLeod, 2018). First, is the principle of the more knowledgeable other (MKO), an individual who has greater knowledge in a given topic than the student. The MKO can include teachers, parents, peers and even children. The second part of Vygotsky's theory, the zone of proximal development, is at the center of standards-based grading. This concept addresses the difference between what a child can do independently and what they can do with help. The teacher supports a student within the zone of proximal development, providing scaffolding activities until the student can achieve success alone.

Standards-based grading is based on the idea that every student has different levels of knowledge and skills. Students should have the opportunity to work through content from their starting point with access to continual support as they work towards mastery. As Hardegree (2012) explains:

This idea of noting what students can do independently and with help, and then structuring instruction to address any gaps in learning is the very idea behind standards-based instruction and assessment. Rather than averaging grades that may or may not show mastery, standards-based grading seeks to communicate what students know, understand, and are able to do. (p.19)

With Vygotsky's zone of proximal development in mind, lesson plans in this study were created to provide support to students on their way to mastery of content.

Standards-based grading works to give students opportunities to achieve success in their own time. It leaves behind the idea that every student should be able to master a specific learning target in one or two days and then perform well on an assessment. Ideally, standards-based grades end up reflecting what students know and can do, rather than one overall grade for everything they have done during a grading period.

### **Review of Literature**

This literature review highlights the importance of standards-based grading and how schools can implement it successfully. First, the pros and cons of standards-based grading and traditional grading will be discussed. Then, practical methods to implement standards-based grading will be presented. Lastly, the effect of standards-based grading on assessments and student mindset will be examined.

### **Standards-Based Grading vs. Traditional Grading**

Marzano and Heflebower (2011) define traditional grading as the process in which "... students acquire points for various activities, assignments, and behaviors which accrue throughout a grading period. The teacher adds up the points and assigns a letter grade" (p. 34). Standards-based grading is the practice of assessing students on specific objectives, standards, or learning goals. Factors such as work habits, attendance, and behavior are calculated separately in standards-based grading (Brookhart, et al., 2016; Miller, 2013).

One benefit of traditional grading is that teachers spend less time preparing report cards. However, many teachers agree that the additional time it takes to assess students with the standards-based model is worth it (Swan, Guskey, & Jung, 2014). One downfall of traditional

grades is that they can be extremely subjective. Reeves (2008) conducted an experiment which illustrates the inconsistency in traditional grading. Reeves gave administrators and teachers several scores which represented a student's individual grades throughout a grading period. When they were asked to calculate a final grade for that student, the students' grades ranged anywhere from A-F. This study demonstrated the subjectivity that comes with traditional grading.

Marzano and Heflebower (2011) argue that traditional grading practices give us little insight into student's understandings. Since factors such as behavior, participation, effort, timeliness, and attendance can be included in the traditional grade, the letter or percentage grade often tell us little about a student's true academic achievement (Marzano & Heflebower, 2011; Swan, Guskey, & Jung, 2014). Additionally, students often don't understand what their grades mean. Reeves (2001) discovered that students were at a loss when asked to explain what a particular numeric grade meant in regards to achievement.

When comparing standards-based grading to traditional grading, there is some concern that standards-based grading could have the same misinterpretations as other grading scales and therefore may be no better than other systems of reporting (Cizek, 2000). However, many researchers suggest that moving towards a standards-based reporting system is necessary to give more accurate and informational feedback to students, parents, and teachers (Guskey & Jung, 2012; Marzano & Heflebower, 2011; Miller, 2013; Swan, Guskey, & Jung, 2014). Standards-based grading accomplishes this by assessing students' progress towards mastery of individual skills rather than lumping such things as content knowledge, participation, behavior, and attendance all in one grade (Miller, 2013). In standards-based grading, students receive scores for

each learning target, which allows students, teachers, and parents to determine students' strengths and growth areas.

### **Implementing Standards-Based Grading Effectively**

The literature agrees that implementing standards-based grading is complex; however, there are a few strategies that make implementation more effective. First, researchers found setting a clear purpose for grades and report cards is essential before starting implementation (Cicmanec, 2001; Guskey & Jung, 2012). Cicmanec (2001) and Guskey (2012) also agree that the primary purpose of grades should be academic achievement. However, with traditional grading practices, grades are about how many points students earn as opposed to what they learn. Researchers also suggest that report cards should include multiple grades for each subject, based on specific objectives, using proficiency scales (Guskey & Jung, 2012; Marzano & Heflebower, 2011). These proficiency scales can also include objectives related to homework completion, participation, and behavior.

Another strategy for implementing standards-based grading effectively is allowing students to turn in assignments throughout the year, even if the grading period has already finished (Marzano & Heflebower, 2011). Miller (2013) suggests that "Students need to receive the clear message that evaluation is a partnership between themselves and their teacher. They also need to know that the teacher respects and acknowledges what they have already accomplished" (p.113-114). Miller (2013) uses an additional strategy: having no hard deadlines. She believes that students can produce the best work if they can have periods of work interspersed with periods of discussion with the teacher. To keep grading manageable, Miller (2013) tells her students when she would like to start collecting an individual assignment, and then has conversations with students who are not able to make the suggested turn-in window.

Marzano and Heflebower (2011) and Miller (2013) suggest that teachers broaden the options for assessments. Students should be allowed to show their knowledge in different ways. Marzano and Heflebower (2011) give three examples of different assessment types. The first includes probing discussions which involve the teacher meeting with students individually to ask probing questions. The second is unobtrusive assessments, in which the student being observed may not even know they are being assessed. The third is student-generated assessments where the student devises a plan to demonstrate a specific skill level on the proficiency scale. According to Marzano and Heflebower (2011), student-generated assessments are the most powerful type of assessment teachers can make available to students. These assessments require students to use high order thinking skills such as analyzing and creating in order to devise with their own assessment.

### **Effects of Standards-Based Grading on Assessments and Student Mindset**

With the introduction of any new initiative in schools, stakeholders hope to see results. Two areas in which researchers have looked at the effects of standards-based grading are assessment scores and student mindset. Studies around student scores on assessments after standards-based implementation have produced mixed results. Brookhart et al. (2016) found that standards-based grading and scores on high-stakes tests are only moderately related. Olson (2005) found no significant increase in grades after standards-based grading was implemented. Olson (2005) believes that the lack of correlation between introducing standards-based grading and improved test scores is that teachers did not had the time or training to have fully implemented standards-based assessments in their classrooms.

Contrary to those two studies, a study by Erickson (2011) indicated there is value in standards-based grading. Erickson (2011) performed a case study of 2,900 high school students whose high school had just implemented a grading system in which final grades were based on summative and formative assessments; non-cognitive factors were not included. Erickson discovered:

...the results included an increase in achievement indicators from 2006 to 2010. The ACT composite scores increased 1.6 points. The school also indicated an increase in the number of students enrolling in Advanced Placement classes. Additionally, the number of students passing the Minnesota Comprehensive Reading exam went from 85.5% to 92.3%. (p. 41)

An important aspect of standards-based grading to consider is its effects on student mindset. According Clymer and William (2007), eighth-grade students who had taken a science class based on mastery of concepts shifted from being more grade focused to recognizing the importance of learning and understanding the material. In another example, Miller (2013) demonstrated what one of her former students thought about standards-based grading:

I used to write for other people. I used to write for the grade. It's sad to say but I did it often; my writing had become such a constricted and construed mess from staying within the confines of way I believed to be an A. It was not me; it was an attempt to please... Instead of fearing the rejection associated with a B-, I have stepped off the precipice and taken risks. From daily read alouds to essential question workshops, I've learned to step out of my comfort zone and voice topics that speak to me. (p. 118)

This student's comments illuminate the power that standards-based grading can have on mindset.

## **Discussion of the Literature**

While there are pros and cons to any grading system, most researchers agree that standards-based grading is more informative than traditional grading when implemented using the effective methods described above (Cicmanec, 2001; Guskey & Jung, 2012; Marzano & Heflebower, 2011; Miller, 2013; Swan, Guskey, & Jung, 2014). It is crucial for teachers to be properly trained in standards-based grading so they can implement this grading system effectively. The goal of implementing standards-based grading is to provide better feedback for teachers, parents, and students related to students' academic achievement. Parents and educators mostly agree that standards-based grades are more informative than the antiquated traditional system (Cicmanec, 2001; Guskey & Jung, 2012; Marzano & Heflebower, 2011; Miller, 2013; Swan, Guskey, & Jung, 2014). Cox (2011) found that teachers do not follow the same guidelines when implementing standards-based grading. Teachers vary in implementing the following practices: using common assessments, accepting late work with no penalty, and replacing students' poor test scores with retest scores.

One gap in the literature is related to student and teacher understanding of student mastery. Ideally students and teachers would be able to identify strengths and growth areas of each student at any given time. Therefore, the research question that guided this study was, *In what ways do standards-based grading and traditional grading provide students with a better understanding of each day's learning target and provide clear evidence of student mastery of skills?*

## **Methodology**

This study used a combination of qualitative and quantitative data including student journals, teacher reflection data, and student self-assessments. Use of these various data sources

ensured triangulation of the data. The population for this research study was eighth grade students enrolled at a middle school in a mid-sized, Midwestern town (N = 365). The sample included 60 eighth graders enrolled in Algebra during first trimester. The sample included 36 females and 24 males. Algebra was a required course and the sample was representative of the middle school's eighth grade population.

Several data tools were used to gather information related to the effectiveness of two grading systems used to inform stakeholders of students' mastery of content. Student journals were used to gather data about how well students understood the learning target each day. Students were asked to write a journal entry each class period identifying the learning target. Self-assessments were given to students twice throughout the study: once after conducting a unit scored using traditional grading practices, and the other after implementation of a unit scored using standards-based grading. This tool asked students to rate how well they felt they had mastered each learning target for that unit. Students answered questions such as, "How well do you feel you have mastered this learning target: I can solve equations with absolute value." Their response choices were: 'Don't know' (0), 'Not at all' (1), 'Somewhat' (2), 'Met it completely' (3). More specifically, after the traditional grading unit, students looked at their scores from the unit test and then filled out the self-assessment. This tool measured students' ability to judge their level of mastery on specific learning targets by comparing their responses to the level of mastery they actually demonstrated. Students' actual level of mastery was determined based on the results from assessment questions and their work. With standards-based grading, students looked at their scores on assessments for individual learning targets and then completed the self-assessment form.

The teacher reflection form followed the same schedule and format as the student self-assessments, but the teacher only assessed three students: one student who generally performed low in math, one average-performing student, and one high-achieving math student. The teacher rated the students twice for each grading system. They were first rated on how well the teacher thought they had mastered each learning target by looking at assessment scores. Then the teacher looked at individual assessment questions and homework to again determine how well each student actually met the learning targets. Comparison of these ratings allowed the teacher to analyze whether each assessment method was effective.

At the start of this study, the teacher gave students their journals and explained how to write in them each day, including their perceptions of the daily learning target. The teacher taught the first unit using traditional grading practices. Students received homework each day and, if it was completed with all work shown, they received credit and earned points for their grade. At the end of the unit, there was a test in which students were given a final grade. If students did poorly on the test, they were able to retake the test and both scores were averaged in the gradebook. After the test, students took the self-assessment and the teacher filled out the teacher reflection form.

Following this unit, a unit scored using standards-based grading was implemented. Students continued filling out their journals each day, writing what learning target they thought they were working on. For this unit, the teacher assigned homework each day, but it wasn't worth points. Instead, students earned points by demonstrating mastery of a learning target such as 'I can solve equations with variables on both sides.' There were four learning targets for this unit and each one had its own assessment created through Schoology. The assessments were four questions long and created by using test banks of 20-30 questions. This format allowed students

to take the tests multiple times, each time being given different questions selected at random from the test bank. Students were able to take an assessment up to five times to demonstrate mastery. Each time a student took a test, their grade was updated with the most current score, even if it was lower than a previous attempt. The teacher suggested a timeline for taking these assessments, but students had the freedom to take the assessments at their own pace. During tests, students were required to write all of their work on scratch paper and turn it in so the teacher could assess their work for misconceptions. Each night, the teacher looked through the papers, created groups of students with similar misconceptions, and pulled those students out for small groups the next day. At the conclusion of the unit, students filled out the self-reflection form and the teacher filled out the teacher reflection form.

### **Analysis of Data**

The data gathered from this study came from student journals, student self-assessments, and a teacher reflection form. Students wrote journal entries each day detailing what they thought the learning target had been. Entries made in student journals were cross-referenced with the teacher's log of the learning targets. The number of correct and incorrect responses were calculated and recorded. These responses were compared between the traditional grading unit and the standards-based grading unit.

After each grading system had been implemented, students completed a self-assessment in which they answered how they felt they had met each learning target. Three students' self-assessments were examined and compared to the teacher's rating of how well they met each learning target. Lastly, the researcher compiled data from the teacher reflection form. This data helps answer the research question that addresses the teacher's understanding of student mastery. The difference between what the researcher *thought* students had mastered and what they

*actually* mastered was recorded. These differences were compared between the traditional grading unit and the standards-based grading unit.

## Findings

### Identifying Learning Targets

The first research question was related to students' ability to identify the learning target each day. To answer this question, the researcher had students write an entry in their journal at the end of each math class, instructing them to write down what the learning target had been that day. The researcher looked at the data entries from students to calculate how many entries correctly identified the learning target and how many did not. In both the traditional grading unit and the standards-based unit (Figure 1), students correctly identified the learning target roughly 80% of the time. That means about 20% of the time, students did not correctly identify the learning target.

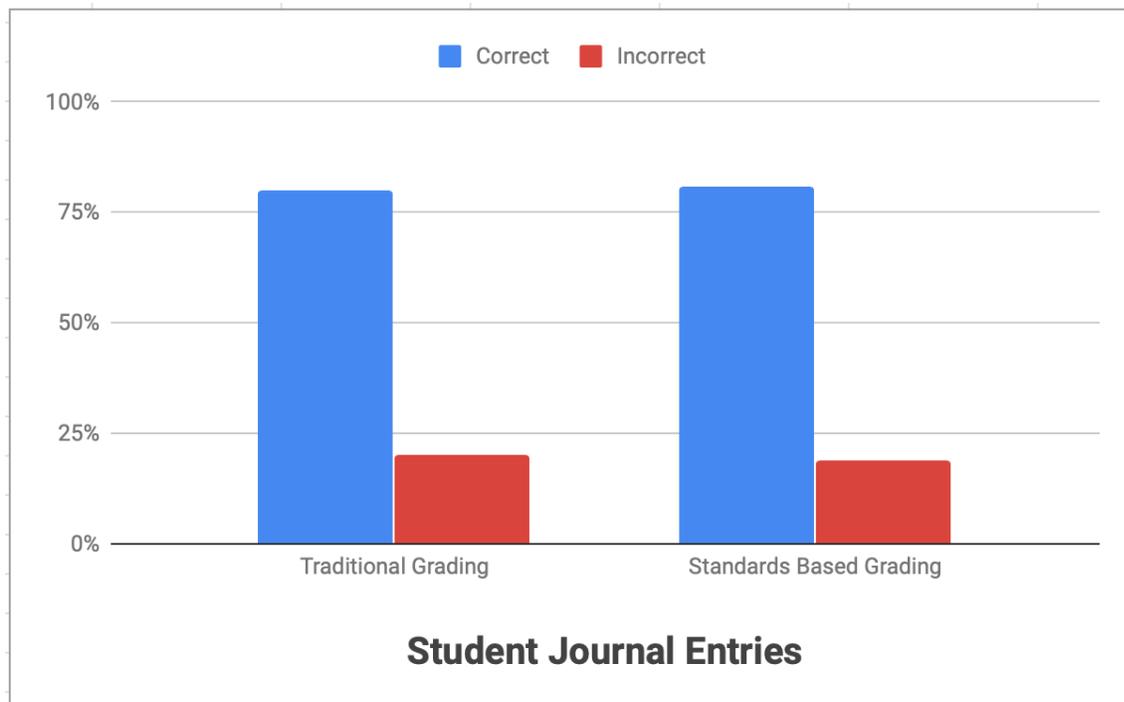


Figure 1. Student journal entries for traditional grading and standards-based grading

## Evidence of Mastery

The second research question addressed how effective each grading system was at measuring student mastery. To answer this question, the researcher had students take a self-assessment after each unit. Three students' scores from each assessment question were compared to determine how well they actually met the learning targets (Tables 1 & 2). The traditionally scored unit had a total of four difference points and the standards-based grading unit had a total of six difference points. The difference points for the traditionally scored unit were spread among Students A & B, while in the standards-based unit, all the difference points came from Student B's self-evaluation. Student C had no difference points from either the traditionally scored unit or the standards-based grading unit.

Table 1

*Self-assessment scores versus actual mastery scores of Students A, B, and C during the traditional grading unit*

Traditional Grading Unit Learning Targets	How well the student felt they met the learning target	How well the student actually met the learning target	Difference (absolute value)
<b>Student A</b>			
Writing sentences as algebraic equations	1	2	1
Writing algebraic equations as sentences	1	1	0
Solving one-step equations	2	3	1
Solving two-step equations	1	1	0
Solving multi-step equations	1	1	0
<b>Student B</b>			
Writing sentences as algebraic equations	3	3	0
Writing algebraic equations as sentences	3	3	0

Solving one-step equations	3	3	0
Solving two-step equations	2	3	1
Solving multi-step equations	2	3	1
<hr/>			
Student C			
Writing sentences as algebraic equations	3	3	0
Writing algebraic equations as sentences	3	3	0
Solving one-step equations	3	3	0
Solving two-step equations	3	3	0
Solving multi-step equations	3	3	0
Total Difference:			4

Table 2

*Self-assessment scores versus actual mastery scores of Students A, B, and C during the standards-based grading unit*

Standards-Based Grading Unit Learning Targets	How well the student felt they met the learning target	How well the student actually met the learning target	Difference (absolute value)
<hr/>			
Student A			
Evaluate absolute value expressions	3	3	0
Solve absolute value equations	3	3	0
Solve equations with a variable on both sides	1	1	0
Write absolute value equations	1	1	0
<hr/>			
Student B			
Evaluate absolute value expressions	2	3	1
Solve absolute value equations	3	2	1

Solve equations with a variable on both sides	3	1	2
Write absolute value equations	3	1	2
<hr/>			
Student C			
Evaluate absolute value expressions	3	3	0
Solve absolute value equations	3	3	0
Solve equations with a variable on both sides	3	3	0
Write absolute value equations	3	3	0
<hr/>			
Total Difference:			6

The teacher reflection form was also used to determine the effectiveness of the grading systems at measuring student mastery (Tables 3 & 4).

Table 3

*Teacher evaluation of student mastery during the traditional grading unit*

Traditional Grading Unit Learning Targets	How well the researcher felt the student met the learning target	How well the student actually met the learning target	Difference (absolute value)
<hr/>			
Student A			
Writing sentences as algebraic equations	2	2	0
Writing algebraic equations as sentences	2	1	1
Solving one-step equations	3	3	0
Solving two-step equations	2	1	1
Solving multi-step equations	1	1	0
<hr/>			
Student B			
Writing sentences as algebraic equations	2	3	1

Writing algebraic equations as sentences	2	3	1
Solving one-step equations	3	3	0
Solving two-step equations	2	3	1
Solving multi-step equations	2	3	1
<hr/>			
Student C			
<hr/>			
Writing sentences as algebraic equations	3	3	0
Writing algebraic equations as sentences	3	3	0
Solving one-step equations	3	3	0
Solving two-step equations	3	3	0
Solving multi-step equations	3	3	0
Total Difference:			6

Table 4

*Teacher evaluation of student mastery during the Standards-Based Grading Unit*

Standards-Based Grading Unit Learning Targets	How well the researcher felt the student met the learning target	How well the student actually met the learning target	Difference (absolute value)
<hr/>			
Student A			
Evaluate absolute value expressions	3	3	0
Solve absolute value equations	3	3	0
Solve equations with a variable on both sides	1	1	0
Write absolute value equations	1	1	0
<hr/>			
Student B			

Evaluate absolute value expressions	3	3	0
Solve absolute value equations	2	2	0
Solve equations with a variable on both sides	1	1	0
Write absolute value equations	1	1	0
<hr/>			
Student C			
Evaluate absolute value expressions	3	3	0
Solve absolute value equations	3	3	0
Solve equations with a variable on both sides	3	3	0
Write absolute value equations	3	3	0
Total Difference:			0

The traditionally scored unit resulted in nine difference points, while the standards-based grading unit resulted in none.

### **Action Plan**

The purpose of this action research project was to determine the effects of two different grading systems on both students' and the teacher's understanding of student mastery of learning targets. If specific areas of growth and strength for each student are understood, teachers will be better equipped to guide students in their growth areas. In addition, this study examined how well students could identify the daily learning targets in each grading system. If students are able to identify the daily learning targets, they are more likely to focus their energy into learning the specific skill or skills needed to master the learning targets.

The student journal data analysis showed that students understood the learning targets equally for each grading system. However, students were asked to write in their journals at the

end of each day, which contributed to the data being collected inconsistently. Due to vague and unclear responses, absences or apathy, the data may not reflect students' knowledge of learning targets accurately. The standards-based grading unit only lasted two weeks and since the logistics of the standards-based grading system were all new for students, it took a while to understand the new system and procedures. More time to explore standards-based grading would likely affect the results of this study.

The student self-assessment scores also indicated that the difference between what students felt they knew and what they actually knew was nearly the same for both traditional grading and standards-based grading. However, only three students were compared for this part of the study and it is hard to draw conclusions about which grading system allowed for better understanding of mastery by students. After the standards-based grading unit, Students 1 and 3 showed that they knew their own level of mastery for each learning target, while Student 2 was off by one or two points for each one. In future studies, researchers should investigate a larger sample of students to get more accurate data.

The results from the teacher reflection form indicate that standards-based grading helped the teacher be well-informed on what students knew and did not know. The reflection form from traditional grading indicated that there were inconsistencies between researcher's thoughts about what students knew and what they actually knew. However, with standards-based grading the researcher could tell exactly where students' level of mastery was. Understanding student mastery allowed for better differentiation of learning opportunities.

Considering all data collected and observations made throughout the study, the researcher plans to implement standards-based grading more frequently in the coming year. Student buy-in is an area the researcher will focus on. Almost every student at the researcher's school has only

ever been exposed to traditional grading. Students need to understand the changes that a new grading system brings, and more importantly the ‘why’ behind it. The researcher will take time to teach students and parents about the new grading system before implementing it in the future. As the results from this study show, the researcher had a clear idea about the level of student mastery when utilizing standards-based grading, but it is unclear whether students had a better idea of their own mastery. To ensure students are aware of their own strength areas and growth areas, the researcher will teach students how to use the mastery section of Schoology. This will allow students to check on their mastery daily, and therefore students will know what skills they need to practice. With resources and guidance from the teacher, it is hoped that students will increase their efficiency in mastering learning targets.

Standards-based grading provided the researcher with a better understanding of student mastery than traditional grading methods. However, students’ understanding of learning targets and their own mastery was similar for both grading systems. This study contributes to the literature by demonstrating that teachers can have increased understanding of student mastery when using standards-based grading. When teachers have a clear understanding of the strengths and growth areas of each student, they are able to direct students towards growth in the most efficient way. Future research related to standards-based grading could focus on the effects of standards-based grading on student achievement, the effects of standards-based grading on student engagement, methods of standards-based implementation, or methods of communicating standards-based grading to students and parents.

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