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Effects of Grading on Student Learning and Alternative Assessment Strategies

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Abstract

The purpose of this study was to investigate what effect an alternative assessment strategy would have on students' engagement, motivation, and overall learning in an urban, private Montessori middle school program located in the Midwest. Two teachers and 13 students participated in two phases (one social studies and one science unit) over the course of six weeks. Teacher-assigned grades on class and homework were removed and replaced with student-determined final grades based on self-assessment using collaboratively created rubrics and individual portfolios. Students kept daily learning logs and completed a pre- and post-unit survey designed to measure their level of engagement, motivation, and learning preferences. The researcher kept daily observational notes as well as tallies of behavioral markers for engagement and disengagement. Students were also invited to give open-ended feedback about their experience at the end of the intervention. The results showed that while the alternative assessment model did not have a direct impact on students' daily engagement or intrinsic motivation, it did increase students' understanding of how their work correlated to a final grade in the unit, and it created opportunities for students to make connections to their learning and thus more actively plan their future work. Additionally, a direct correlation appeared between the level of student activity and student engagement in classes, indicating the importance of reducing passivity as much as possible in the daily learning process.

Keywords: grading, alternative assessment, learning, motivation, engagement, adolescent, middle school, Montessori

Grading has been a part of conventional teaching practices for so long that many people, educators and students alike, do not question its usefulness or validity. Using grades to mark proficiency, progress, and effort, to compare students to their peers, and to assess the success or failure of teachers and schools is commonplace – even expected – in the American education system. There are growing numbers of researchers and practitioners, however, who doubt the value of assigning grades to student work. Only a few years into teaching 7th and 8th grade at a Montessori adolescent program, I became one of them. The majority of students who enter our program come from our traditional Montessori elementary classrooms where they do not receive any grades on their work. Students get narrative feedback from teachers and are encouraged to self-assess their growth, but their work is not marked in any kind of ranking system. These students typically show a high level of interest in their learning and are driven largely by internal motivation to increase their knowledge and understanding. As they enter middle school, these same students often become entirely preoccupied with their newly-assigned grades. Suddenly their questions about an assignment turn from content-based to assessment-based. "How many points is that worth?" they ask. "How long does it need to be to be an A?"

As an educator, observing this shift in motivation and focus disturbed me. I would often answer those students' questions by encouraging them to focus on the work, the learning, and be less concerned with the grade. However, in a system that labels their overall work and sends those reports off to future high schools, the advice rang hollow. If I wanted my students to really focus on their learning process rather than the grade of the final project, I needed to find a way to reframe how my students thought about and interacted with grades. This motivated me to design a study in which I could test the effects of removing grades from the learning process with my small group of 13 mixed-age 7th and 8th graders.

Because our adolescent program currently sends grade transcripts to high school, we needed a way for students to earn a final grade while trying to mitigate the potential negative impacts of grading during their learning activities. In this study conducted via a 3-week Social Studies unit and a 3.5-week Science unit, students received only narrative feedback on their work and kept a daily learning log to record their developing understanding, questions, self-assessment, and learning plans. They identified two learning objectives set by the teacher and created one of their own to pursue independently. To ascertain a final grade, students used a collaboratively created rubric to assess their work and final level of understanding of those learning objectives. What effects would using this alternative assessment model have on the students' motivation, understanding, and overall engagement in our Montessori adolescent program?

Literature Review

The landscape of American education is rife with ever-increasing pressure for school accountability and elevated standards of learning. Quantitative standardized testing data is highly valued at the local, state, and federal levels where it is used to construct comparison models of classrooms, schools, districts, and even states. Labeling student learning with numbers and symbols and then sorting them accordingly into groups or levels has become routine practice in American education from the national to the classroom level. With increasing focus on assessment and accountability in our schools, the issue of effective grading is at the forefront of a controversial debate which begs the question: how does assessment of student learning affect the student's learning process? A review of the literature suggests that the practice of labeling and sorting student work – that is, grading – is more harmful to student learning than it is helpful. Realizing this, educators have spent years developing alternative assessment strategies, some of

which are more effective in facilitating authentic learning than others. Ultimately, any alternative assessment strategy that still results in a grade runs the risk of falling back into harmful practice; however, it does seem possible to minimize the negative effects of grading by maximizing student agency in the process of assessment.

History and Current Use of Grading

Grading has not always been synonymous with education, partly because the structure of American education has evolved over time. During the Enlightenment, American schools were arranged in a hierarchy which mirrored that of the American workforce, and grades were used as a sort of salary to help students ascertain their position (Roth, 2000). Grades were determined by competition, a practice which reflected the economic system of the time (Roth, 2000). As schools grew rapidly in size and number through the 19th and 20th centuries, grades became a primary mode of communication among institutions who needed a way to coordinate with each other (Schinske & Tanner, 2014). To accommodate that coordination meant that grades needed to have an objectively determined meaning that could be interpreted by any third party (Schinske & Tanner, 2014). This increased pressure for consistency and uniformity ultimately led to the development and study of a series of grading systems, including the letter grades (A-F) and 100-point scale grades that we see used most frequently in schools today (Schinske & Tanner, 2014; Docan, 2006). Both of these systems were developed and made popular in the early 1900s and have continued relatively unchanged in their use up to the modern day, excepting the now discouraged use of "grading on a curve." This method has been proven to be ineffective at accurately representing student achievement because it assumes that a classroom has a representative sample of the distribution of aptitude in the general population, which is often not the case (Schinske & Tanner, 2014). Even if it were, the curve should not predict student

achievement if the environment adequately supports diverse learners in appropriate ways (Schinske & Tanner, 2014).

Grading has come to be a pervasive and widely accepted feature of our education system. The primary academic purpose of grades is to measure student achievement of learning in a particular curriculum (Munzur, 2014). Some experts argue that grades also serve a specific social purpose in American culture, which values competition and requires social and economic inequality (Romanowski, 2004). Grading is most frequently used as a method of comparison: student vs. student, student vs. standard, effort vs. performance, past vs. present (Douglas & Smith, 2013; Grading, 2013). It is also used to compare the performance of teachers, schools, and districts. Grades serve as important tools in administrative decisions regarding graduation, retention, and program entrance (Munzur, 2014; Grading, 2013). Quantified assessment clearly plays a major role in the way we approach education; but should it?

Effects of Grading

What effect does grading have on student learning, and are there other methods of assessment that better support it? This question has been asked by educators and researchers alike for over two decades. Studies from the early 1990s identified multiple negative impacts of grading on students, and these results have been replicated in various contexts and time periods (Kohn, 1999; McClintic-Gilbert, Corpus, Wormington, & Haimovitz, 2013).

One of the most commonly identified issues with traditional grades is that they can be subjective (more or less so depending on the method of evaluation used) and influenced by (conscious or unconscious) teacher bias (Kohn, 1999; Malouff, 2008). Bias can be seen when samples of student work are graded differently by varying individuals despite using the same evaluation criteria (Kohn, 1999; Schinske & Tanner, 2014).

Similarly, grades can be considered arbitrary in the way that the same symbol is used to convey a multitude of different information about a student's learning (progress, competency/achievement, comparison with peers, effort) with no certain consistency across teachers, schools, or even districts (Hendrickson & Gable, 1997). Grades require either averaging or abstracting a great deal of information into a single symbol, and this is an ineffective way to communicate student learning (Guskey, 1994; Gillmore, 2015; Hendrickson & Gable, 1997).

Closely tied to the aforementioned issues of teacher bias and arbitrary grading practices is the fact that traditional grading practices shift the power of the classroom dynamics solidly to the teacher. Teachers create the learning objectives, design the learning activities, and choose which aspects of learning will be evaluated, and thus valued (Brilleslyper et al., 2012; Kohn, 1999). Additionally, the teacher is put in the position of being both an advocate for and judge of student learning, which can lead to ineffectiveness in one or both roles (Guskey, 1994).

Most troubling, perhaps, is the negative impact grading can have on student motivation and learning focus. Multiple studies of students at various levels of education, in various subjects, and across various time periods reveal that grading has the general effect of replacing internal motivation with external motivation (Docan, 2006; Kohn, 1999; Kohn, 2000; McClintic-Gilbert et al.,, 2013; Schinske & Tanner, 2014). When grades are introduced, students tend to lose focus on their personal interest in the material and shift their learning efforts to focus on just the elements of the course that will be graded (Kohn, 1999). This leads to reduced interest in and lack of effort toward low-point or ungraded work (Kohn, 1999) and a hyper-focus on graded elements of work (Brilleslyper et al., 2012). This shift in focus distracts students from the true value of the learning process and creates a distortion in learning priorities; it may even go so far as to retard the development of critical thinking and metacognition skills (Kohn, 1999;

Brilleslyper et al., 2012). Using grades as rewards has proven to have limited motivational value, while using grades as punishments has shown no value and, in fact, can be detrimental to student mindset (Guskey, 1994; Schinske & Tanner, 2014; Kohn, 2000; McClintic-Gilbert et al., 2013). Not only can grading cause some students to establish a "failure-expectation pattern" in which they avoid being held to higher standards which they find intimidating, it can even cause students to develop fixed perceptions of themselves as poor learners, resulting in low self-esteem and self-sabotaging behaviors (Edwards & Edwards, 1999).

There is a lack of recent research directly studying the effects of grading on student motivation and learning, with most of the noted studies being from the 1990s and earlier. However, a team of researchers in Switzerland more recently conducted a study that assessed the impact of graded, graded-with-comments, and comment-only feedback on student use of performance-approach or performance-avoidance goal adoption. Pulfrey, Buchs, and Butera explained that the "dependence of students in graded evaluation situations reduces student autonomy" (because the ultimate grade determination is out of their control) which then "consistently seem[s] to reduce intrinsic motivation" (2011, p. 684-5). Pulfrey et al.(2011) hypothesized that when students experience a lack of autonomous motivation, they adopt performance-avoidance goals (attempting to avoid incompetence) as opposed to performance-approach goals (attempting to achieve competence). Their study looked at the effects of the different types of aforementioned anticipated feedback on the performance-avoidance versus performance-approach goals of 115 students attending a Swiss professional school. Their results showed that "performance-avoidance goals are a result of a graded assessment in particular as opposed to assessment in general" (Pulfrey et al,, 2011, p. 690). They concluded that the increased adoption of performance-avoidance goals could be at least partly explained by the

reduction of autonomous motivation in graded assessment (Pulfrey et al., 2011). The results of this study seem to indicate that assigning grades reduces students' intrinsic motivation and encourages them to focus more on avoiding failure than achieving success.

Alternative Assessments

In an effort to combat the negative impact that traditional grading can have on the learning process, many educators have begun to turn to alternative methods of authentic student assessment. Alternative assessment is contextualized to both the classroom and the individual student and aims to put students in charge of their own learning and schema construction (Janisch et al., 2007). In contrast to traditional assessment, which is aligned with the transmission model of knowledge wherein students are empty vessels waiting to be filled by the teacher, alternative assessment takes its cue from the constructivist theory of knowledge which views students as creators of their own understanding and is aligned with current cognitive science research which indicates that meaningful learning is "reflective, constructive, and self-regulated" (Moon et al., 2005; Janisch, et al., 2007; Stefani, 1998). Alternative assessment, which is also often called performance-based assessment, is designed to engage students in meaningful, realistic tasks that encourage problem-solving and demonstrate their knowledge and skills in a multitude of open-ended ways (Moon et al., 2005). The underlying premise of alternative assessment is that teachers can collect richer, more contextually valid information about their students' knowledge and learning preferences and then modify instruction to be responsive to students' needs (Moon et al., 2005; Janisch et al., 2007).

Researchers have identified many benefits to alternative assessment. In a study by Moon et al., (2005), they found that when assessment is shifted to reflect individualized learning, students become more active and involved in the learning process. Their internal motivation is

better preserved, and thus their work habits tend to lead to deeper learning (Kohn, 1999; McClintic-Gilbert et al.,2013). The practice of being aware of one's own learning process leads students to develop increased higher-order thinking, self-assessment, and metacognition skills (Janisch et al., 2007; Stefani, 1998; Moon, et al., 2005). Alternative assessment helps students learn to set reasonable goals and monitor their progress toward achieving them, while also considering and revising their learning strategies and behaviors to overcome obstacles as they arise (Cruz & Zambo, 2013). These skills are critical to students' future success both in higher education and in the adult world, where they will be need to be disciplined and self-directed (Cruz & Zambo, 2013). These benefits are particularly applicable to middle school students, who are in the sensitive period of transition between childhood and adulthood. Alternative assessment promotes cooperative learning, allows for flexible groupings in heterogeneous classrooms, and creates space for both differentiated support and adequate challenge for students of different learning abilities (Moon et al., 2005). It helps teachers to create learning environments in which diverse groups of students can achieve success at their own levels and be assessed equitably (Hendrickson & Gable, 1997). The small, stable, respectful learning communities that can result from the practice of alternative assessment are particularly suited to the developing adolescent's social, emotional, and academic needs (Moon et al., 2005).

The list of alternative assessment strategies is long and varied, and includes individualized contracts between teachers and students, multiple grades (competency, effort, progress, etc.), weighted grading, collaborative grading, checklist evaluation, portfolio systems, narrative reports, conferences, pass/fail systems, rubric-based evaluation, performance tasks, and various methods of self-assessment (Hendrickson & Gable, 1997; Corcoran et al., 2004). However, not all methods of alternative assessment are equally effective in authentically

assessing student learning or negating the detriments of grading. In order to be considered authentic in the way it represents student learning, alternative assessment must be relevant and meaningful to students; it must be largely open-ended to allow for multiple approaches; and it should preserve the "integrated, complex nature of learning" (Moon et al., 2005). The following characteristics are considered hallmarks of exemplary alternative assessment: it is focused on content that is essential (big ideas or concepts); it fosters in-depth thinking that can lead to other questions and problems; it is feasible (can be done easily and safely); it allows for a variety of learning products and demonstrations instead of focusing on one right answer; it promotes students to develop and display their skill strengths and knowledge expertise; and it has clear criteria that has been pre-negotiated between the teacher and student (Moon et al., 2005).

A rubric is an evaluative document that lists the criteria for a piece of work and defines gradations of that criteria from excellent to poor (Goodrich, 1996/1997). Rubrics can improve student performance by clarifying expectations and showing various stages of accomplishment of those expectations (Goodrich, 1996/1997). These characteristics encourage more standardized evaluation of student work by both students and teachers, which can lead to constructive feedback and increased communication about the learning process. However, educators are warned that in order for rubrics to be used effectively in authentic assessment, students must be engaged in the process of determining their criterion (Kohn, 1999). Over-specification of teacher expectations can actually lead to diminished depth of thought and creativity (Ritchhart, 2015), and rubrics are only as helpful as the level to which students understand the evaluation criteria (Stefani, 1998; Kohn, 2006). There is also a degree of variance in how rubrics are used to inform grades. Some teachers use rubrics as formative self-assessment tools and suggest that student's self-scores should not be used in final grades (Goodrich, 1996/1997), whereas others suggest that

students' self-evaluations should be compared to instructors' evaluations, with the final grade being negotiated between the two (Stefani, 1998). Alfie Kohn indicated that rubrics can be useful for informing the learning process but should never be linked to a grade (1999) and warns that overuse of rubrics can actually shift student focus to the more superficial aspects of their work (2006). Despite this dissonance, there is an overall consensus that well-designed rubrics help students determine their current position in relation to their learning goals and plan their next steps and can thus serve to increase student autonomy.

Portfolios are another method of alternative assessment that have gained popularity over recent years. Portfolio assessment entails purposeful collection of student work in a variety of formats over time in order to display depth, breadth, and development of knowledge and skills, particularly related to specific learning goals (Cole et al., 1997). According to Cole, a key part of authentic portfolio assessment is that students are engaged in developing their portfolio as evidence of their learning and regularly reflect on their learning both in terms of content and development. Research by Bandura and Schunk (1981), Herbert (1992), Paulson and Paulson (1991), and Zimmerman et al. (1992) as cited by Cole, et al. (1997), has shown that when students self-determine the purpose of a learning experience, their intrinsic motivation, learning efficacy, and academic achievement are increased. Deciding what pieces of work to include in a portfolio and justifying their inclusion as part of the demonstrated curve of learning requires students to use higher-order thinking skills and metacognition, increasing their awareness of themselves as learners and their ability to self-advocate in the future (Cole, et al., 1997; Cruz & Zambo, 2013; Janisch et al., 2007). Portfolio-based assessment also opens the door for increased creativity in the way students demonstrate their learning. However, portfolio assessment can run into the same traps as rubric-based assessment: in order for portfolio assessment to be authentic,

students should be involved in the development of criteria. Likewise, portfolios can still allow students to fall prey to the negative impacts of grading if the method of evaluation is not collaborative and clearly defined. One additional potential drawback of portfolio work is that it requires a certain level of student "buy-in" to be effective as a metacognition tool, and even then some students will require substantial support in doing this higher-order self-reflection (Cole, et al., 1997).

Learning objective-based assessment is an interesting method of alternative assessment that can combine elements of both rubric and portfolio assessment. This type of evaluation is predicated on clear course objectives for learning and practical descriptions of the final evaluation based primarily on the learning objectives (Brilleslyper et al., 2012). According to Brilleslyper, learning objectives can be both content- and process-based and teacher-originated or collaboratively created; final evaluations can be graded or ungraded. In order to be effective, this method of evaluation requires both open and honest communication between students and teachers about the learning process, and meaningful, descriptive documentation of student performance by both students and instructors (Brilleslyper et al., 2012). In a learning objective-based assessment framework, students first orient themselves to the learning objectives of the class and then work toward achieving them via various assignments or self-selected work. They consistently check their learning against the course objectives to ascertain their current position and future goals, and they evaluate their final learning in terms of achieving the objectives (Brilleslyper et al., 2012). Within this process, students may use rubrics to help determine their current level of achievement, and they may collect evidence of their learning to support their self-evaluation in a portfolio system. As with these other assessment systems, learning objective-based assessment may result in a final grade, either assigned by the instructor or negotiated

between the instructor and student (Brilleslyper et al., 2012), or it may stand alone as a narrative evaluation of student learning in order to avoid the negative effects of grading (Kohn, 2000). It should also be noted that learning objective-based assessment can still fall into the pitfalls of teacher-directed learning if the course objectives are not collaboratively set and/or individualized by the student (Cottingham, 2004).

Prior Research on Alternative Assessment

A review of the literature yielded a small number of studies on the impact alternative assessment can have on student learning. In a study by Abadiano and Turner (2003) of a 2nd grade literacy teacher, the shift from traditional to alternative assessment was correlated with a shift from teacher-centered and directed learning to student-centered instruction. The change in assessment was also credited with increasing the teacher's knowledge of her students' learning, resulting in more time spent addressing the needs of individual students (Abadiano & Turner, 2003). Another case study by Cruz and Zambo (2013) followed the implementation of student data portfolios (SDPs) in a middle school in 2006 and showed overall agreement from students that SDPs motivated their success, helped them understand their own learning process, showed them how data can be useful in ascertaining learning and setting goals, and assisted them in raising their grades. However, not all students were equally motivated by the alternative assessment strategy. Students used worksheets with a generic drawing of a face and a floating thought bubble to record their feelings about the SDPs: they wrote their thoughts about the SDP process in the blank thought bubble and drew facial expressions to represent their states of mind when considering the SDPs. An analysis of these drawings showed that, on average, 58% of students reported a positive experience with SDPs, 21.5% of students reported a neutral experience, and 21% of students reported a negative experience (Cruz & Zambo, 2013).

In another study by Waters et al., (2004), a high school science teacher conducted action research to examine the student reaction to the shift from multiple-choice assessment to rubric-based, open-ended project assessment. Within this framework, students could choose their method of demonstrated knowledge and could choose to work either individually or with small groups. The results were generally favorable with students indicating that having the aforementioned choices made them work harder, feel more in control of their work, and learn more in the process (although it should be noted that a limitation of this study is that it did not collect any academic data regarding knowledge retention or improvement in skills). Many students reported that the alternative assessment was "fun, easier, produced less pressure, and led to increased learning" and also allowed for increased creativity (Waters et al., 2004, p.95). Teacher observations also indicated an increased enthusiasm for the learning work, as well as increased creativity and increased use of relevant technology. However, a large standard deviation for preference between the multiple-choice and performance-based assessment showed a pattern of student clusters at both ends of the scale. Students who reported a preference for the more traditional multiple-choice assessment indicated that they preferred how straightforward and detailed those assessments were, and some also noted that studying for those assessments "made them think" (Waters et al., 2004, p.96). However, some students who preferred the traditional assessments reported narrative comments that indicated acceptance of rote learning, such as, "All I have to do is know the answer and not even understand it" (Waters et al., 2004, p.98). This indicates that changing student mindset is not always as simple as changing student assessment.

There are a few common obstacles associated with implementing alternative assessment strategies. The most marked may be the difficulty involved in transforming students who have

become accustomed to working in a system based on teacher-directed learning objectives and activities (Janisch et al., 2007). It is critical to convince these students of the value of self-assessment and the long-term benefits it can provide to them. Another obstacle is the preoccupation with test scores and grades that is fostered by the current model of American education (Janisch et al., 2007). Convincing students, parents, and administrators that alternative assessment can be *more* valid as an evaluation tool can be a daunting task (Kohn, 1999). Not surprisingly, then, another often quoted obstacle to implementing alternative assessment is the perceived lack of support from others that teachers report feeling in their classrooms, schools, and districts (Janisch et al., 2007). There are also some potential pitfalls with all methods of alternative assessment if they are translated into final grades. Alfie Kohn, a leading researcher in the impact of grading on student learning, emphatically warns educators against using grades in student assessment at all (2000). According to Kohn, it is not enough to use alternative assessment if those assessments are simply translated into grades by the instructor at the of the course. If teachers must submit a final grade, Kohn strongly encourages them to allow students to grade themselves or, at the very least, to participate in negotiating their final grade (2000).

Conclusions

The research shows that student participation in learning assessment is critical to the practice's authenticity and utility; this includes both the development of the assessment tools and the implementation of them. In considering the alternative assessment strategies listed in the literature, those that most closely fit the requirements for authentic assessment and are best fit to a Montessori secondary classroom include rubrics, portfolios, and learning objective-based assessment. These strategies have in common that they allow for student input in learning criteria, they allow for various work products and demonstrations of skills, they are adaptive to

individual students' needs, and they facilitate communication about the learning process among students and faculty. They are all also fitted to a Montessori environment in that they can be used in a mixed-age classroom with students of various learning levels. After considering the preceding research, I concluded that the best method of alternative assessment to introduce to my Montessori class of 7th- and 8th-grade students is one based on clear learning objectives according to which the students both formatively and summatively self-assess using collaboratively created rubrics and portfolios of their work.

Methodology

The methodology described in this section was set up as an alternative to the standard practice of grading students' homework assignments, exams, projects, and participation and then turning the weighted compilation of these into a final grade. Instead, students received only narrative feedback on individual assignments and activities and then used collaboratively-created guidelines and rubrics to self-assess their work and learning, assigning themselves a final grade at the end of the unit. Two consecutive units were used for this study, one in social studies followed by one in science (as these two subjects alternate in our schedule). Each unit contained approximately 10-13 classes.

Student self-assessment was divided into two main categories: achievement of learning objectives and work habits. Each course had three learning objectives, two of which were set by the teacher and one of which was created by each student. Therefore each student had their own unique learning objectives. On the first day of the unit, the teacher introduced the two preset learning objectives in the form of broad questions, and the students individually translated these questions into their own words to ensure that they understood what was being asked. Following this translation, students each created their own question of personal interest to be answered over

the course of the unit. Students then answered each question as best they could with their current knowledge in order to establish a baseline understanding and to help them identify what areas of information they may need to explore in order to fully answer the questions by the end of the course. Students used daily learning logs (a homework assignment) to record what they were learning, how it connected to other concepts they knew or had learned, to reflect on their overall learning experience in the class, and to monitor their progress toward fully grasping the learning objectives. The students also collected all their work from the class into a portfolio to use in the process of final reflection and support of their self-assigned grade.

After establishing the learning objectives, students and teachers next addressed the levels of work habits and performance that would correlate to different grades. The group identified six areas of work: homework, classwork, discussions, group work, studying, and portfolio (Appendix A). Within these categories, the groups defined what "A" and "C" level work would look like, "A" level work being the most consistent and successful and "C" level work being a baseline level of accomplishment. The students agreed that "B" level work would fall in the middle of "A" and "C" level work (showing aspects of both levels in different areas or at different times), and that "D" level work would be work that was completed but which fell below "C" level. Students discussed and debated different elements of these descriptions, and each element was added only upon final consensus.

Finally, after the students had defined the learning objectives and the levels of achievement for specific aspects of the class, the teacher provided an overall definition of each grade level that encompassed both group-determined elements (Appendix B). Teacher and students reviewed these definitions to ensure that students understood and agreed with the parameters of evaluation.

The unit was taught with methods consistent with previous units in that course, the only change being the students' daily learning log reflection and the lack of quantitative grades on their work (teachers still supplied qualitative feedback). At the end of the unit, students completed a final written assignment in which they answered the questions posed in the learning objectives using information and examples from the unit and their own independent research as support. The teacher evaluated this assignment for markers of the levels of understanding determined at the start of the unit and provided detailed narrative feedback to the students, both naming the concepts that were demonstrated competently and prompting questions for further thought in areas that seemed less completely understood. Students used this assignment and the collection of their work over the unit to assess their final level of understanding and their overall work habits for the unit. This formed the basis for their self-assessment and final grade selection.

At the end of the unit, students reviewed their work and selected a final grade that they felt accurately reflected their achievement in the class using the rubric and grade profiles. They prepared their case, including the reasons why they felt they deserved that grade and selected pieces from their portfolio to use as evidence as needed. The teacher then sat down with each student individually for approximately 10-15 minutes for a grade conference. Prior to the grade conference, the teacher reviewed the work of the student in the class and his/her own notes regarding the student's habits and performance and selected the grade that seemed most fitting to that student's overall work. In the conference, the student addressed his or her demonstrated level of understanding of the learning objectives (shown through both the final assignment and their process work) and reviewed his or her work habits and performance, referring to the rubric as needed. The student presented his or her case, ending with the final self-determined grade, and then the teacher responded by either corroborating the student's self-assessment and final grade

or addressing areas of inconsistency between how the student and teacher assessed the student's performance. Therefore if the teacher and student evaluations of the work were not consistent, they discussed this before coming to a consensus on a final grade that both felt accurately reflected the different aspects of the student's work. All final grades were consensus-based. Teacher assessment did not override student assessment, or vice-versa.

Methods of data collection for the study included student and parent attitude scales (conducted at the start and end of each unit, four times total; Appendix C) intended to measure students' levels of interest, engagement, and motivation within each unit as well as their overall preferences for learning and assessment methods; student learning logs (daily; Appendix D); behavioral tallies to track observable indicators of engagement or disengagement in the subjects involved in the study (taken three times per class; Appendix E); an optional open-ended feedback form for students to report any additional comments about the assessment method (taken at the end of the unit; Appendix F); and observational field notes taken by the researcher. Field notes were taken at the end of the class when the researcher was also the teacher (social studies) and over the course the class when the researcher was observing another teacher implement the strategy (science) and were intended to provide narrative context for the behavioral tallies. Although originally the study was designed to collect data from observations and surveys, in retrospect further qualitative data collected from student reflections on the self-perceived efficacy of the alternative assessment strategy would have been valuable. Future studies will be designed to include this data source.

Analysis of Data

The research question asked what effect alternative assessment would have on students' engagement, motivation, and overall learning. I will discuss the results of my data analysis

according to these three categories with an additional discussion of students' experiences with the final self-assessment.

Engagement

During the study, tallies of behavioral markers indicating engagement (constructive conversation, responsive body language, focused word, active collaboration) and disengagement (detractive conversation, unresponsive body language, unfocused/confused work, resisting collaboration) were taken at three fixed times during each class for each unit. Baseline data was collected for two weeks (five social studies classes), while study data was collected for three weeks per unit (nine social studies classes and ten science classes) for a total of six weeks. As behavioral markers observed varied greatly depending on the activity at the time of data collection (lecture, review, group work, testing, etc.), daily tallies were totaled and used to create daily averages for each week. Looking at these averages, there was no significant pattern in the increase or decrease of the frequency of a particular behavioral marker over the course of the unit. However, when looking at the weekly averages of specific markers, some patterns seem to emerge (see Figure 1).

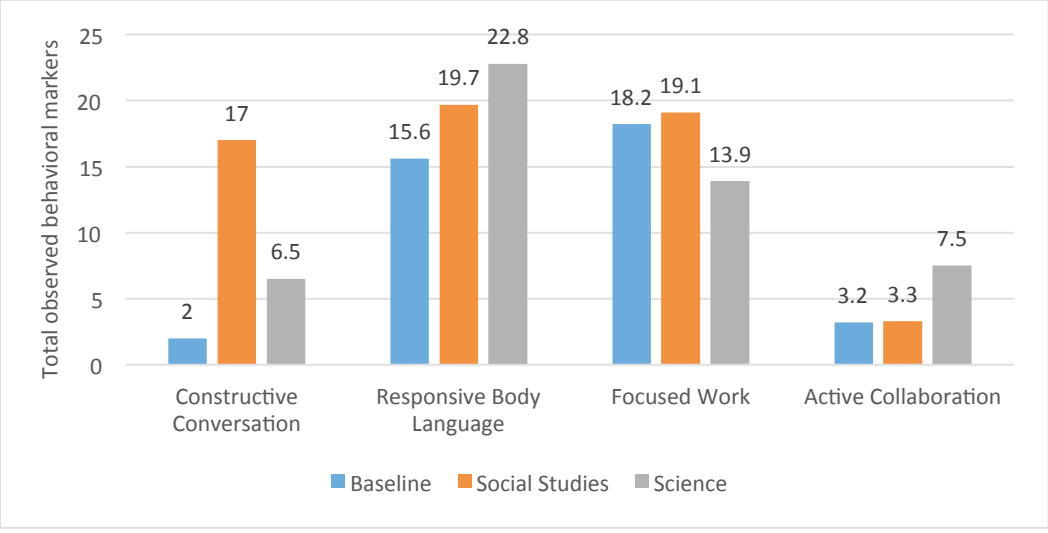

Figure 1. Weekly Averages of Observed Engagement Behavioral Markers

This data shows an overall increase in constructive conversation and responsive body language during the intervention as compared to the baseline data. The results for focused work and active collaboration are less consistent. There was a slight increase in focused work during the first intervention phase (social studies) but a decrease during the second (science). This may be explained by the fact that the science teacher regularly began his classes with a review of the previous day(s) and a preview of the class to come. During these 15-20 minute lectures, students were passive listeners and not engaged in any work. Thus, the data collected at the first set time (15 minutes into class) reflected this and may have contributed to the overall lower score in this area. Lastly, active collaboration increased only slightly in the first phase of the intervention as compared to the baseline data, while it nearly doubled in the second phase. This may be explained by the fact that the social studies unit included more independent work, while the science unit included a lot of group lab activities.

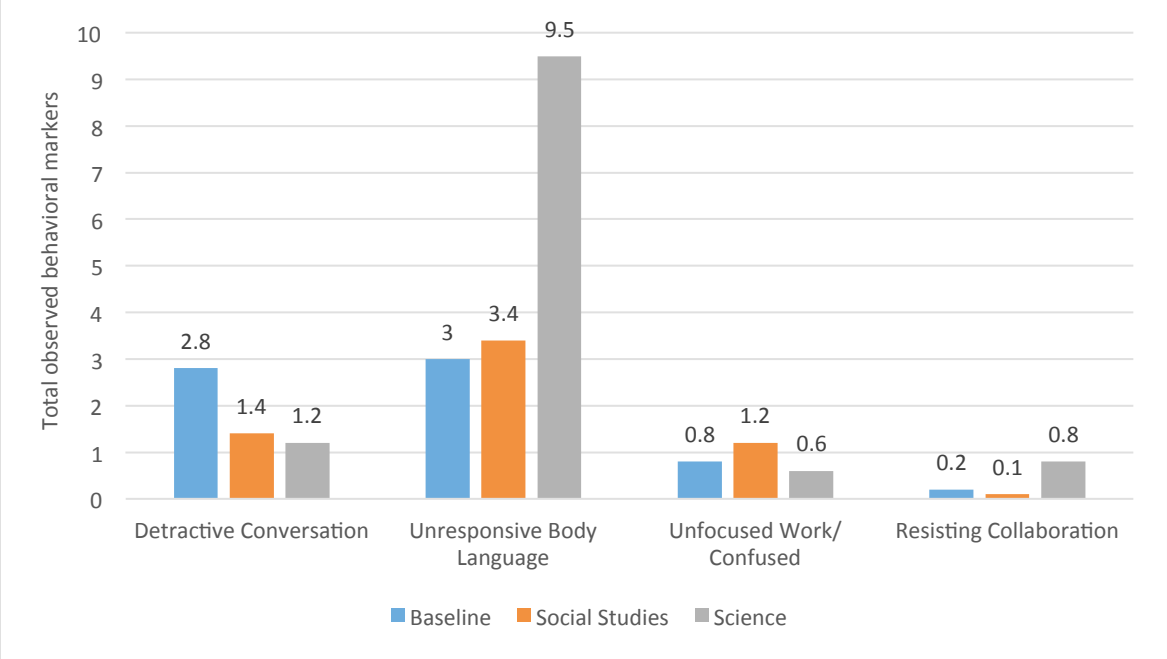

Figure 2. Weekly Averages of Observed Disengagement Behavioral Markers

Regarding the weekly averages of disengagement behavioral markers, detractive conversation was reduced in both intervention phases, which supports the observed increase in constructive conversation. Unresponsive body language increased slightly in the first phase, while it increased significantly in the second phase. Looking at the specific tallies from this unit, the numbers show the most prevalent unresponsive body language during the first 15 minutes of class (see Table 1), which correlates to observational notes that this time was regularly spent with students passively listening to the teacher recap past classes and preview the upcoming one. Observation notes regularly showed a significant decrease in student attention and overall engagement level during these times.

Table 1

Unresponsive Body Language Daily Tallies, Science

	1/30	1/31	2/2	2/3	2/6	2/8	2/9	2/13	2/14	2/16
10:15 AM	6	5	6	6	12	13	6	6	5	9
10:45 AM	3	0	0	2	0	8	0	3	0	2
11:15 AM	7	0	0	0	0	4	0	0	2	0

As such, it may be concluded that the increase in unresponsive body language was related more to the particular teaching style and class structure of one unit rather than the intervention strategy. Resisting collaboration showed no significant change in the first phase, but it did show a small increase in the second phase. This may be due to the fact that the science unit involved more group work and thus allowed for the opportunity for certain students to resist collaboration than in the social studies unit.

If the behavioral markers are aggregated into the two categories of engaged and disengaged, the total weekly averages show notable results (see Figure 3).

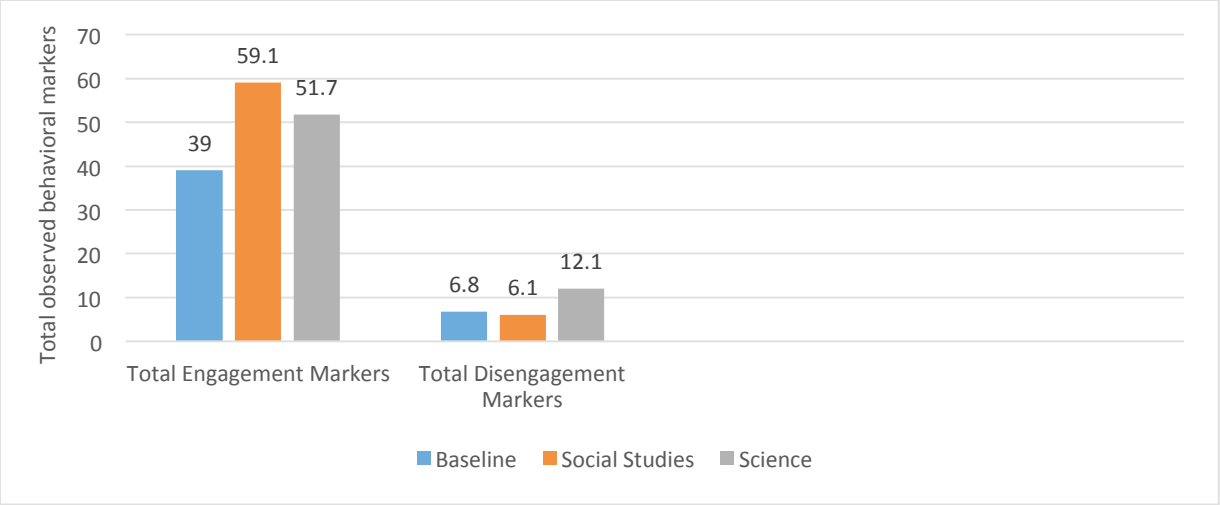

Figure 3. Weekly Averages of Total Observed Engagement and Disengagement Behavioral Markers

This data indicates that there was an overall increase in observed behaviors indicating engagement during both phases of the intervention. It shows that there was no significant change in observed behaviors indicating disengagement during the first phase of the intervention but an increase in the second phase. As stated previously, this may be explained by the difference in class structure and teacher instruction in science which led to more passivity among students in the beginning of class.

This data seems to indicate that there was an overall increase in student engagement during the intervention, specifically in the area of constructive conversation and responsive body language. However, it should also be noted that the period of baseline data was one week shorter than the period of per-unit data collection which may have affected the total averages.

Analysis of students' daily learning logs showed that several themes emerged related to self-reported engagement. Out of 221 total entries, students positively discussed interactive activities (such as labs and online platforms) 54 times and there were 0 mentions of negative experiences with these activities. This was by far the largest indicator of engagement shown via the learning logs. After this, there were six positive and no negative discussions of open-ended

projects, five positive and no negative discussions of teacher-led presentations, and five positive and one negative discussions of worksheets. Class discussions received 14 positive comments and 10 negative comments, with the majority of negative comments relating to the difficulty of getting fair time for everyone to speak in a large group setting. Lastly, readings received two positive and two negative mentions in relation to self-reported engagement. Grades were not mentioned in students' discussions of their engagement levels at all (see Figure 4).

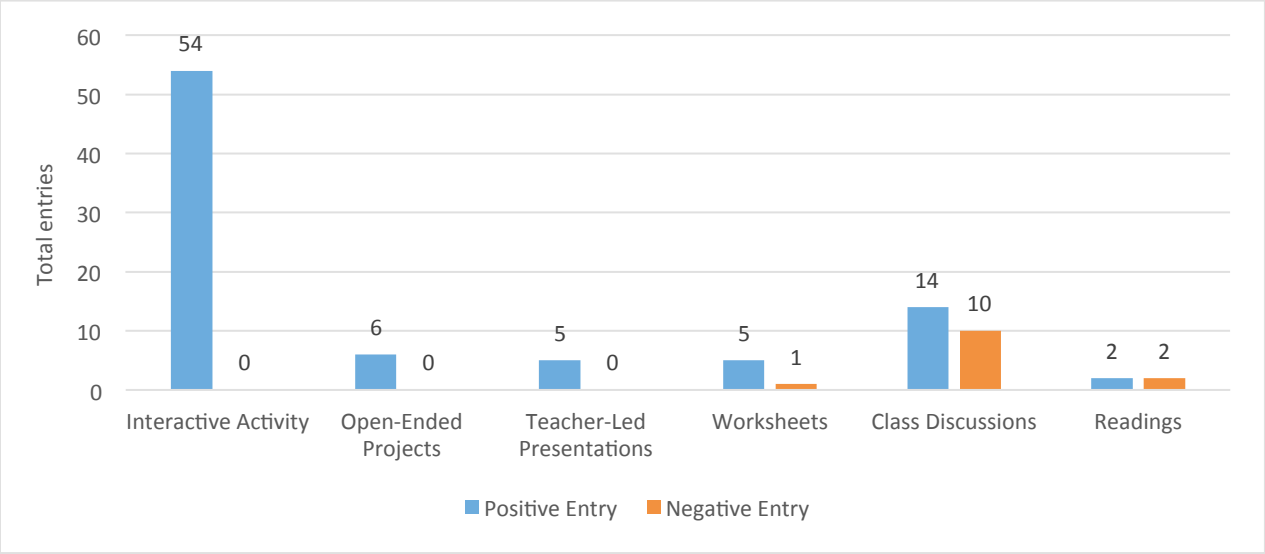

Figure 4. Learning Log Entries Referring to Student Engagement in Learning Activities

Student surveys showed no significant changes in self-reported level of interest or engagement for either phase of the intervention. (Parent surveys were not included in final data analysis due to inconsistency in total responses for each requested survey: 12 parents responded to the first survey while only 5 responded to the final survey. Future studies would include identifiers so that some data comparison could be made with the final surveys that were returned. In total, it appears increased student engagement was most directly correlated with interactive in-class activities. This conclusion was also supported by observational notes. The data shows no apparent correlation between changes in student engagement and assessment methods.

Motivation

Student motivation was difficult to measure. Student surveys showed no significant change in motivation from the beginning to end of each unit. In retrospect, I should have included a question about the students' overall perceived change in motivation from the beginning to the end of the intervention. In learning log entries, three students reported that having an ungraded learning process motivated them to work harder or study more, and no students reported that it reduced their motivation. However, three students also noted that they do feel motivated by traditional grades. In final feedback, two students indicated that the alternative assessment method motivated them to work hard, saying, "I enjoyed the process and thought it motivated me to do my best," and "I liked deciding on a grade because it motivated me to complete my work according to the grade I want." Knowing they would be self-assessing motivated some students to take a more active role in monitoring their work and learning, but it did not seem to encourage them to learn for learning's sake. It is possible that six weeks is an insufficient time to create such motivational shifts, particularly for the 8th graders who have had almost two years of graded work. However, it seems more likely that the alternative assessment model might be more successful in fostering intrinsic motivation if there were no final grades at all because it would allow students to focus solely on experience of their learning rather than on the evaluation of it.

Learning

With the data collected, there was no distinct way of measuring whether students retained more information with the intervention. However, student entries showed that using the learning logs created opportunities for students to reflect regularly on what they were learning, to consider how it connected to other concepts or skills they had learned, and to plan future work to

achieve their learning goals. Out of 221 total entries, 63 entries included reflections on and connections made between student learning and not just reports of content. Although some students used their learning logs for this purpose more frequently, every student had a reflection on his or her learning at least once during each unit.

Students' final answers to the essential questions (learning objectives) for both units showed an increase in the amount of information they could recall and synthesize as compared to the baseline unit. It cannot be determined whether this was the result of having an ungraded learning process or the increased emphasis placed on the learning objectives by the alternative assessment system. In addition, out of 30 entries relating directly to grades and the alternative assessment strategy, eight entries reported students feeling less stress in their learning as a result of having an ungraded process, whereas four reported feeling more stress due to the change in overall assessment structure. Three students indicated that having an ungraded learning process allowed them to focus more on their learning. Four students reported that there was no change in their learning process due to the absence of grades.

Overall, the alternative assessment strategy appears to have created more opportunities for students to reflect on and engage with their own learning. While for some students the strategy did not appear to affect their learning process, several students reported positive effects and no students reported negative effects. Therefore, it may be concluded that the intervention had an overall positive impact on some students' learning.

Self-Assessment Process

In final grade conferences, students and teachers overwhelmingly agreed on what final grade best represented students' work and overall understanding. Only 1 of 26 grade conferences included a student who advocated for a higher grade than the teacher felt was accurate. There

were several cases in which students felt they were in the middle of two grades. In these cases, the student and teacher further conferred on the student's work, and this detailed review consistently led to an agreement on the most appropriate final grade. Out of 26 conferences, 23 students displayed positive body language and were engaged during the discussion; three showed neutral or negative body language and were less engaged. Students showed a strong level of understanding of how their work correlated to their final grade, something that was observed as lacking prior to the intervention. Two students commented that they now understood exactly what they could do differently next time to achieve a higher grade. However, grade conferences were also a source of anxiety for some students. In the first unit, 4 out of 13 students' learning log entries reported that they were feeling higher stress because of having to determine their own grade in this new assessment structure. This decreased once students went through the process, with only 2 of 13 students displaying observable anxiety over the conferences for the second unit. It may be assumed that with repeated practice, students would become more comfortable with the process and less stressed by self-assessment. Overall, the grade conferences appeared to be a positive experience for students that provided the opportunity to assess their learning and work habits in a new way.

In the first phase of the intervention (the social studies unit), all five students who responded with optional open-ended feedback indicated that they enjoyed the alternative assessment model. One student explained, "I enjoyed self-grading because I felt like I knew why I got the grade I got when with the classic 1/100 percent grade I only know that I got the grade I got from my work, but I don't really get to see the details." However, by the end of the second phase (the science unit), three out of five of the open-ended responses indicated that students did not enjoy the assessment model (the other two did not reflect specifically on the intervention, but

rather on the content of the unit). Whether this change was due to the change in teacher and topic or the extended experience with the alternative assessment is difficult to tell, and, because the feedback was anonymous, it also cannot be determined whether the same students changed their minds by the end of the intervention or whether the students who did not prefer the assessment model had simply not volunteered feedback the first time. This was a design flaw in the data collection. In the future, I would solicit feedback from all students to get a more accurate representation. Student surveys showed that before starting the intervention, no students chose the alternative assessment method (collecting evidence of their work and arguing for a final grade) as their preferred mode of assessment, and following the intervention one student selected it. Overall, though some students seemed to benefit from self-assessing and enjoyed the process of grade conferences, they overwhelmingly selected other modes of assessment as their preference, the most popular being demonstrating their learning through open-ended projects.

Conclusion and Action Plan

The alternative assessment strategy had several positive outcomes: students regularly reflected on their own learning in a more meaningful way, they connected their work and understanding with their final grades with increased clarity, and some students found that the assessment strategy reduced overall stress. However, the strategy showed no measurable impact on shifting overall motivation from extrinsic to intrinsic, possibly because final grades were still assigned (albeit by the students themselves). It also showed no direct correlation with an increase or decrease in daily student engagement with learning activities. Instead, student engagement was observed to be more closely tied to the level of active participation and independent choice. It is also important to note that the assessment method was not universally enjoyed by students. While some found that the process of self-assessment reduced stress, others reported that having

to navigate this new structure increased their anxiety. Some students also reported that they enjoy having grades as a regular part of the class and homework process because it gave them a more measurable marker of their progress and demonstrated understanding. While some students informally reported that they would enjoy using this process to evaluate their future work, others were relieved to return to the more familiar system.

One portion of the strategy that seemed to have the most positive impact was the process of identifying what work habits and overall levels of understanding correlated to which final letter grades. I think it will be important to establish this mutually-created understanding of how grades reflect the learning process and product with new and returning students at the beginning of each year, as well as to review these criteria mid-year and revising appropriately (as needed) according to students' additional experience. Establishing a clear and collaborative rubric for what grades mean seems essential for students to develop healthy and productive relationships with grades, particularly as they enter this new mode of learning assessment coming from a previously ungraded Montessori environment and considering that they will continue to be assessed with grades for the foreseeable future of their academic careers.

The end-of-unit grade conferences seemed particularly helpful for the teachers in comparing students' self-perceptions and self-reported levels of understanding with their own. I would like to continue making space for these conversations in the future, even if it will not be the final determiner in overall grades. A hybrid model in which teachers keep track of regular grades but then compare these with students' self-assessments based on the letter-grade rubrics might prove illuminating as to how accurately the system of numeric grades (which, as was reported in the literature review, can be highly variable and even subjective) is reflecting student

work and understanding. This is an area for possible future investigation, as the exact system of our numeric grading is continually discussed and debated for their accuracy and efficacy.

Another aspect of the assessment strategy which seemed impactful was the daily student learning logs. The process of reflecting on their own learning process seemed to help students make connections in their understanding and take a more active role in planning and shaping their work. In the future, I will strive to include more regular opportunities for self-reflection in students' work over the course of units. The length and content of student learning logs was variable, with some student regularly putting more time and effort into the written work than others; therefore, the format of the reflection could change to more universally engage all students. As an alternative to written logs, students could participate in dialogue with partners or small groups or create visual diagrams or pictorial representations of their learning. Either way, it seems key that this reflection be built in as a regular daily or semi-weekly exercise so that students are regularly engaging with self-assessment and planning. Students who wrote their learning logs at the end of each class seemed to be more engaged with the process than students who saved it for homework. Therefore, I feel it would be more effective to create space for this at the end of class as opposed to requesting students do it as an additional assignment.

Lastly, the study data clearly indicated a correlation between active participation and increased student engagement in class. Students were regularly more engaged when they were involved in creating work, conducting research, and problem-solving. This is a critical point to consider in designing learning activities for future units. Alternately, students were most regularly disengaged when they were put in the passive position of listening to the teacher lecture or review previous classes or information. This is critical to future considerations of class structure and teacher-led activities. Though there will be times when students need to attend to a

lecture-style lesson or review information as a group, it seems essential that they still be actively involved as much as possible in order to maximize the opportunity for learning. For exercises based on lecture, students could engage by using a note guide or creating visual diagrams of their learning. Teachers could also break up the duration of passive listening with partner discussion and brief reflective activities. For periods of class review, students could be asked to collaboratively create a representation of previous learning instead of listening to the teacher recap past days' information.

I expect that giving students an increased sense of agency and personal investment in all aspects of the class (recalling past learning; reflecting on new understanding; engaging in active research, design, and problem-solving; and aspects of self-assessment) will increase students' sustained engagement and motivation for learning in all areas of our program. However, the assessment model studied in this research is but one of many possible iterations. I will continue to collect and analyze data on the implementation of alternative assessment strategies in an effort to find the model that best fosters deep learning for my students.

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Appendix A
Student-Created Self-Assessment Rubric

	Homework	**Classwork**	**Discussions**	**Group Work**	**Studying**	**Portfolio**
A	Always turned in on time (one oops); work is finished and done with high accuracy; work is neat and organized	Always asks for help as needed; puts full effort into doing thorough and thoughtful work; contributing to and engaged in activities; finished work in class; high accuracy	Focused and fully engaged; physically present, taking risks; contributing respectfully: participating consistently, sharing time with others, staying on topic	Doing your fair share (not letting others do your work, not doing others' work); work product shows contributions from everyone; actively engaged during class time; whole group reviews and approves final product	Check accuracy of study materials; study consistently and over time until you feel fully prepared; using multiple different study techniques OR using technique that you know works best for you	Collect every paper assignment in the portfolio, organized; collect all electronic work in a designated place, organized (one oops)
B						
C	Written work is basic, short, the minimum; not thorough; low or inconsistent level of accuracy; sometimes turned in on time; inconsistently complete	Sometimes asks for help when needed; puts some effort into work; sometimes contributes to and engages in activities; sometimes finishes work in class; low or inconsistent	Sometimes distracted, mentally or physically; participates minimally; may talk over others or monopolize the conversation; often strays from topic of conversation	Does some work, but lets others do more work; work product does not show an equal contribution; mostly does not engage in group discussion, but just follows what others	Does not check accuracy of study materials; puts minimal time into studying despite needing more, and does not try different techniques if struggling	Collect some paper assignments in portfolio, little organization; collects some electronic work in designated place, little organization

		level of accuracy		decide; "checks out" when done with own work OR takes over conversation, work plan, and restricts what others can do		
D						

Appendix B
Teacher-Created Grade Guide

A	Outstanding overall understanding of learning objectives; very strong grasp of material; consistently strong performer; errors are infrequent and work is polished and consistently timely
B	Good overall understanding of learning objectives; has a mix of "A" and "C" qualities over course
C	Adequate understanding of learning objectives; shows enough understanding to move forward but struggles to make deeper connections; work is more barebones and prone to errors; timeliness and/or quality of work is inconsistent
D	Poor overall understanding of learning objectives; not prepared to move forward in subject study; work is consistently late and poorly done

Appendix C
Student and Parent Attitude Scale

STUDENT ATTITUDE SCALE

My current unit of study is
- ☐ Social Studies
- ☐ Science

My level of interest is...
- ☐ 1 - Very low (I am not at all interested in the topic)
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 - Very high (I am very interested in the topic)

Comment (Optional)

I would describe my engagement with my learning as...
- ☐ 1 - Very low (I do not care about the information and am not interested in learning more)
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 - Very high (I care deeply about the information and am very interested in learning more)

Comment (Optional)

I would describe my motivation, as it relates to my learning, as...
- ☐ 1 - Very low (I have no motivation to further develop my knowledge and understanding)
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 - Very high (I am incredibly motivated to further develop my knowledge and understanding)

Comment (Optional)

I would describe my current stress level, as it relates to my learning, as...
- ☐ 1 - Very low (I am not at all stressed about learning)
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 - Very high (I am incredibly stressed about my learning)

Comment (Optional)

In the process of my learning, I most prefer...
- To be told what to learn and how to learn it
- To be told what to learn but to decide how to learn it
- To decide what to learn and how to learn it

Comment (Optional)

In the assessment of my learning, I most prefer...
- To be tested on my knowledge and skills with assessments from the teacher
- To collect evidence of my learning and self-assess using set guidelines
- To demonstrate my knowledge and skills through teacher-designed open-ended projects
- To demonstrate my knowledge and skills through projects of my own design
- Other:

Comment (Optional)

PARENT ATTITUDE SCALE

I am a parent of a student. I understand that completing this survey is voluntary, and I...
- choose to answer the following survey questions and am comfortable allowing my responses to be included anonymously in the study
- choose to answer the following survey questions but prefer not to have my responses included in the study
- choose NOT to answer the following questions and am finished with this survey

My child's current unit of study is
- Social Studies
- Science
- I do not know

My child's level of interest in this unit is...
- 1 - Very low (S/he is not at all interested in the topic)
- 2
- 3
- 4
- 5 - Very high (S/he is very interested in the topic)

Comment (Optional)

I would describe my child's engagement with her/his learning as...

- 1 - Very low (S/he does not care about the information and is not interested in learning more)
- 2
- 3
- 4
- 5 - Very high (S/he cares deeply about the information and is very interested in learning more)

Comment (Optional)

I would describe my child's motivation, as it relates to her/his learning, as...

- 1 - Very low (S/he has no motivation to further develop her/his knowledge and understanding)
- 2
- 3
- 4
- 5 - Very high (S/he is incredibly motivated to further develop her/his knowledge and understanding)

Comment (Optional)

I would describe my child's current stress level, as it relates to her/his learning, as...

- 1 - Very low (S/he is not at all stressed about her/his learning)
- 2
- 3
- 4
- 5 - Very high (S/he is incredibly stressed about her/his learning)

Comment (Optional)

In the process of my child's learning, I think s/he most prefers...

- To be told what to learn and how to learn it
- To be told what to learn but to decide how to learn it
- To decide what to learn and how to learn it

Comment (Optional)

In the assessment of my child's learning, I think s/he most prefers...

- To be tested on knowledge and skills with assessments from the teacher
- To collect evidence of learning and self-assess it using set guidelines
- To demonstrate knowledge and skills through teacher-designed open-ended projects
- To demonstrate knowledge and skills through projects of his/her own design
- Other:

Comment (Optional)

Appendix D
Student Learning Log

Student Name: Subject:

Date	**Observations of Your Learning** *Answer one, or several, of the questions below in your reflection.* • What did you learn today that you think is important? Why do you think it's important? • How does what you learned today connect to things you've learned earlier in the course? • How does what you learned today change the way you think about the topic? • Where are you in the process of achieving your learning goals? o What have you accomplished? What do you still want/need to do? • Are you feeling particularly successful or frustrated in one area of your learning? Why do you think that is? • What are the next steps you want or need to take in your learning for this course? • What else would you like to record/share about your learning experience in this course?

Appendix E
Daily Behavioral Tally Sheet

Date: ___ /___ /2017

Classroom Behavioral Tallies
Recorded 3x per class @ 10:15 am, 10:45 am, 11:15 am

Engagement Tally

# of students demonstrating...

	Constructive conversation	Responsive body language	Focused work	Active collaboration
10:15 am				
10:45 am				
11:15 am				

Disengagement Tally

students demonstrating…

	Detractive conversation	Unresponsive body language	Unfocused/ confused work	Resisting collaboration
10:15 am				
10:45 am				
11:15 am				

Appendix F
Final Feedback Form (Optional)

Please use this space to give any feedback about the alternative way we did grading this unit.