INCORPORATING PARTIAL STUDENT SELF-GRADING MODEL IN THE REMOTE LEARNING SYSTEM (POST COVID-19)

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ABSTRACT

Letter grading systems in education have been widely accepted as a strong medium to assess the educational performance of students across the world. It has been a successful system for many years because it can motivate students to achieve satisfactory grades in a course. However, recent studies indicate that grades can also foster anxiety and demotivate students to learn. This fact can be challenging because many investigators claim that motivation and student engagement are key to student success, especially in online education. This situation is even more problematic with the recent outbreak of COVID-19. There has been a major shift in the education sector from face-to- face instruction to online instruction. To mitigate the negative effects of the grading system, incorporating a partial student self-grading model in remote learning is proposed. The partial self- grading student model can potentially increase motivation, positive attitude and decrease the temptation to cheat on assignments. Another benefit of this system is that it can create a platform where students and instructors can discuss the grades given, thus creating a two-way learning system instead of a one-way learning system. The powerful impacts and benefits of the partial student self-grading model in online education are explored and discussed.

Keywords: *COVID-19, Remote Learning, Self-grading, Motivation*

On March 11, 2020, the World Health Organization declared the novel coronavirus (COVID-19), a contagious respiratory disease, a global pandemic, and called countries to take actions to contain and mitigate the disease (Alzueta & Perrin, 2021; Cucinotta & Vanelli, 2020). Even after the COVID-19 pandemic comes to an end, many experts believe that this crisis will permanently reshape our society—the way we travel, the way we communicate, the way we work. The widespread use of social distancing in the education sector has transformed face-to-face course delivery into a fully online design across nations (Seymour et al., 2020). This paradigm shift may be problematic in motivating students to learn in the online environment as it is difficult to focus on screens for an extended period, combined with the sense of isolation students experience due to the lack of physical interaction with peers. Many educators believe that the key to success for students in the online platform is to develop strong self-motivation and engagement in the class subject (Schunk & Usher, 2012; Heartnett, 2016; Rovai et al., 2007; Ryan & Deci, 2000).

Another challenge with remote learning is the prevalence of cheating on exams and assignments. Compared to face-to-face students, online students can cheat far more easily as they take the assessment in their own environment and cannot be directly proctored, making cheating detection for online students more complicated than traditional testing procedures (Mandela, 2019). Furthermore, in remote learning, instructors are vulnerable to adopting the "banking model" in their classrooms as it is difficult to incorporate class activities and

engage in a two-way learning. The banking concept of education was first proposed by Paulo Freire, where students are "containers" and instructors "deposit" knowledge into the container. Students are expected to be passive and unthinking followers who absorb and accurately recall the information provided by the instructor – therefore being oppressed by the instructor (Freire, 1970). One way to circumvent these challenges is to integrate a partial student self-grading system where students partially control their grading. This system can potentially benefit students for the following reasons: 1) contrary to popular belief, grades do not always motivate students to learn; instead, it can create anxiety and avoidance of challenging courses (Chamberlin et al., 2018); 2) Students will be grading their own work, so there is no need to cheat on the assignment; 3) Instructors and students can engage in a two-way learning system by engaging in a conversation about the grade given by the student.

IMPACT OF GRADES ON STUDENT MOTIVATION

Traditionally, multi-interval grades serve a purpose of providing feedback to the student and an external audience on how well the student understood the subject in the class. They also act as a motivator for students to work hard and earn better grades (Chamberlin et al., 2018; Stan, 2012). However, recent studies show that grades can be perceived as a punishment and not as a motivating factor (Stan, 2012), increase stress and anxiety (Bloodgood et al., 2009), and reduce critical thinking (Tannock, 2015). In response to such critiques, some universities have switched from traditional grading systems to pass/fail or summative narrative evaluations at the end of a course.

It can be argued that the impact of grading systems largely depends on the student's academic discipline. One might argue that students with lower GPAs (Grade Point Averages) may be more vulnerable to the negative impacts of the grading system, while students with higher GPAs will be motivated by the grading system. However, recent studies show that both students (higher or lower) are vulnerable to the negative impacts of grades (Chamberlin et al., 2018; Mouratidis et al., 2011; Black & Deci, 2000). These negative impacts of grades eventually disempower the overall education experience and demotivate students to learn.

As mentioned, motivation and engagement are crucial to student success, and these negative effects are amplified in online classes.

The multi-level grading system is ubiquitous in our education system, and it will be challenging to completely change the grading system; however, different pedagogical environments can lead students to have dissimilar perceptions about grades. One way to do this is to install a partial self-grading system where students can grade their own work without any involvement from the instructor. Self-grading can be a promising tool, especially in the remote learning environment, as it can enhance student self-esteem, increase positive attitude about the course, and motivate them to learn (McVarish & Solloway, 2002). Another advantage is that students will gain more profound learning opportunities. They will need to have a good understanding of the subject to realize why their answers are wrong and why alternative answers make sense (Sadler & Good, 2006).

SELF-GRADING SYSTEM AND ACADEMIC DISHONESTY

There are many different types of academic dishonesty. They can range from something as minor as using a false excuse to delay an assignment, to cheating on an exam by secretly collaborating with other students. Studies show that cheating in education is problematic, and it is prevalent in North America—out of 71,300 undergraduates surveyed, 68% admitted to cheating on a test or written assignment (McCabe et al., 2012; McCabe, 2014).

There is no single answer as to why students cheat. To name a few, studies show that students cheat for the following reasons: Particularly early in the college years, students fail to successfully prioritize their work due to extracurricular activities, sororities, fraternities, social events, etc. Poor time management leaves students with insufficient time to complete the assignment, and cheating seems like an easy way to avoid failure (Haines et al., 1986). In a very large class, students may feel anonymous and distant from the instructor. This gives students an excuse to cheat on their assignments, thinking that the instructor "does not care" about their performance or work (Eberly, n.d.). Academic pressures from peers, school stakeholders, and parents force students to cheat to achieve a target GPA, and may be another reason why students cheat. Students might have to maintain their

GPA to participate in athletic programs, receive merit-based financial support, and meet their parents' expectations. Cheating from academic pressure can be exacerbated for classes that are based on curves to turn to academic dishonesty to surpass their colleagues (Whitley, 2015).

As a result of their understanding that students desire to achieve target GPAs or avoid failure, most instructors would never seriously consider students grading their own work. One concern with a self-grading model is that students will not be able to accurately grade their own work and will give themselves higher grades than they deserve. However, studies show that the grades given by the students and the teaching assistant or the instructor were almost identical (Simkin, 2015; Edwards, 2007). In one experiment, students were asked to grade their own work with a grading rubric provided by the instructor. The instructor collected the assignment and asked a teaching assistant to grade them again using the same rubric. Out of 8 assignments tested (total possible points between 20-75), the average difference between students' grades and the teaching assistant grade was between 0.32 and 1.78 points (Simkin, 2015).

Although the self-grading model is not an all-in-one solution to academic dishonesty, it can help moderate the undesirable effects by changing the negative perceptions of the grading system. By grading their own work, students will naturally divert their attention away from grades and focus instead on their understanding of the subject. Another significant advantage of the self-grading model is that students can feel the shared sense of ownership of grades and the learning process (Strong et al., 2004; Edwards, 2007).

TWO-WAY LEARNING SYSTEM

Many educators point out that two-way learning is essential in all education and treat dialogue as a crucial part of a successful education (Rose, 2017). This might be even more important in remote learning, where students and instructors will have difficulty engaging in a dialogue or class activities. However, the self-grading system can create a platform where students and instructors can discuss the reasons for the student's given grade. This will also help to keep the grading consistent in the classroom. One student might be more strict or generous than other students when grading; however, by talking to each student about the grade given, instructors can modify the grade after reaching a consensus with the student. If time is the constraint, students can grade each other's work, which will be efficient and engaging to students. The purpose of the self-grading model is to enhance motivation among students by providing instant feedback and giving students opportunities to reflect on their work by engaging in a dialogue with each other. This will promote trust between students and instructors and cooperation among students.

PARTIAL STUDENT SELF-GRADING STUDY

The partial student self-grading model was implemented in the author's freshman engineering math course to experiment if students can accurately grade themselves. This is a mandatory freshman engineering math course aimed to give a comprehensive introduction to application of mathematics in engineering. The scope of materials in this course ranges from trigonometry to differential equations.

METHOD

For this study, students were asked to self-grade their own homework. Homework questions were selected by the instructor from the end-of-chapter problems from *Introductory Mathematics for Engineering Applications* (2015). There were total of 10 homework assignments and each homework was worth 30 points. Due to time constraints in class, students graded selected problems chosen by the instructor, and other ungraded questions were graded by the instructor.

Prior to self-grading the homework, students were given explicit instructions on how many points to award for partial credits and how many points to deduct for errors and wrong answers. The homework problems were solved in the beginning of the class, and students self-graded their own homework accordingly to the solutions presented in class. The instructor then collected the homework and regraded those questions.

RESULTS

As presented in Table 1, students were responsible for grading 10 points out of 30 points on each homework assignment (Assignments 1-9) and on the last homework assignment (Assignment 10), students were responsible of grading 20 out of 30 points. The number of students participated in

Table 1 Results of Partial Self-grading Activity from a Freshman Engineering Math Course

Homework Assignment	1	2	3	4	5	6	7	8	9	10
Points	10	10	10	10	10	10	10	10	10	20
Number of Students	19	22	23	21	19	22	17	16	15	17
Average Score Given by Student	8.11	8.34	8.18	8.62	7.86	9.61	8.59	9.22	7.77	18.62
Average Score Given by Instructor	8	8.2	8.03	8.43	7.53	9.64	8.24	9.25	7.67	18.18
Average Difference (Points)	0.11	0.14	0.15	0.19	0.33	-0.03	0.35	-0.03	0.1	0.44
Average Difference (Percent)	1.1	1.4	1.5	1.9	3.3	-0.3	3.5	-0.3	1	2.2

this activity declined throughout the semester due to students dropping the class or not all students completing every assignment. By the end of the semester, the number of students in class was 20. It can be noted that the score given by the students and instructor followed a similar trend. On homework questions that were relatively easy (Assignment 8), both the students and instructor gave high scores (9.22 vs. 9.25), respectively. On homework questions that were relatively challenging (Assignment 9), both the students and instructor gave relatively low scores (7.77 vs. 7.67), respectively. The average difference between the students' grades and instructor's grades ranged from -0.3% to 3.5%, and the average difference on 10 assignments was 1.53%. It is also interesting to note that on two assignments (Assignment 6 and Assignment 8) on average, students gave themselves lower grades compared to those of the instructor's grades (denoted by a negative sign).

At the end of the semester, students were given a survey that they were asked to complete honestly and anonymously. There were 6 questions in the survey regarding the self-grading activity and were asked to give a score of 1-5, with 1 being *strongly disagree* and 5 being *strongly agree.*

A total of 19 students participated in the survey, and their results are shown in Table 2.

It can be seen from Table 2 that the partial self-grading activity gave students a sense of ownership of their grades in the course (4.37), provided time to review previous lecture materials (4.16) and came to class with prepared questions to ask (4.11). On the other hand, students gave relatively low scores on if this activity alleviated stress level to get a good grade (3.53) and motivated themselves to learn (3.71).

Table 2 Student Reflection Results on the Self-Grading Activity

Question	Average Score
1. The partial self-grading activity on homework assignments gave me a sense of ownership of my own grade in the course	4.37
2. This activity alleviated my stress level in class to get a good grade in the course	3.53
3. This activity helped me to motivate myself to learn the material more than to focus on the grade	3.71
4. This activity was a good time in class to review previous materials	4.16
5. This activity gives me opportunity to come to class with prepared questions to ask in class	4.11
6. I would recommend this activity for future engineering math course or other engineering classes	4.05

DISCUSSION

The overall experience of the partial self-grading activity was positive. Students were responsible for 110 points out of 1000 points in the course, and the average difference between the students' grades and instructor's grades on 10 assignments was 1.53%. This discrepancy translates to an average of 1.68 points of 1000 points, which is only 0.17% of the total grade in the course. The discrepancy found in this study is negligible considering the benefits that resulted from this activity. As seen from Table 2, the students are

generally in agreement with the intentions of the activity. On questions 1, 4, 5, and 6, students agree that this activity gave them sense of ownership of their own grades in class, helped them to review previous materials, came to class with prepared questions, and would recommend this activity in future freshman engineering math courses or other engineering courses in the program. Despite getting a score of less than 4 on questions 2 and 3, it's implied that, generally, students partially agree that this activity helped them to alleviate the stress level to get a good grade and helped them to motivate themselves to learn the material rather than focusing on the grade.

The most noticeable positive outcomes observed from the instructor's perspective were that students came to class prepared with questions to ask, created an opportunity in class to review, and gained better understanding of the previous lecture. During this time in class, the instructor noticed a significant increase in participation and engagement from students, and the quality of questions asked were constructive and facilitate high-level thinking; thus, creating engaging and inquisitive culture in the classroom. Additionally, on returning the homework back to students, students had a chance to look at the grades given by the instructor and compare with their own grades. If the discrepancy between the student's grade and the instructor's grade was more than 10%, students came after class to ask about the discrepancy. This created a two-way dialogue and opportunity to engage in a conversation to discuss the homework or difficult concepts in the chapter. Simultaneously, the instructor was able to build meaningful relationships and trust between students. By creating these personal and meaningful relationships, the instructor perceived increased motivation during lectures and discouraged students from academic dishonesty, which are imperative criteria for a successful class in the remote learning environment.

CONCLUSION

Grades are a performance metric used to evaluate students' work and to give an indication to an outside audience of how well a student understood the concepts. Often, grades can act as an incentive for some students to motivate themselves to achieve their goals or dreams, but it can also create a disempowering educational experience. Grades can demotivate students to learn, increase anxiety and

stress, and increase vulnerability to cheating. By adopting a partial self-grading system, students are given opportunities to take control of their own grades and achieve ownership of their education. This will eventually alleviate stress and anxiety, thus increasing motivation and engagement in class, which are vital in online classes. Another benefit to the self-grading model is that it creates a platform for students and instructors to engage in meaningful dialogue that creates a two-way learning system.

The goal of the self-grading model is to create a pedagogical environment that creates different perceptions about grades. By doing so, we can create a powerful learning community where students do not feel oppressed by grades, experience enhanced self-esteem, have an increasingly positive attitude, and are more motivated to learn in the remote learning environment.

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