

# STUDENT SELF-GRADING IN SOCIAL STATISTICS

Nelta M. Edwards

**Abstract.** This article analyzes a social statistics class that engaged in self-grading. Students liked self-grading because they identified their own mistakes, it reinforced what they learned, and they received immediate feedback. Some students worried that others would cheat, but this assertion was not confirmed in the data and the possibility of cheating can be controlled in various ways. Self-grading may also reduce student-teacher conflict and student anxiety.

**Keywords:** *math anxiety, self-grading, social statistics*

University teachers have been experimenting with student self-grading in various contexts with some positive results. Strong, Davis, and Hawks (2003) found that student self-assessment in a large general-education class strongly increased individual student motivation and feelings of responsibility for learning. Students also reported greater understanding of material, more willingness to try different ways of learning, enhanced enjoyment in the class itself, better effort put in to assignments and readings, increased openness in class, and

more thoughtfulness put into assignments. McVarish and Solloway (2002) found that self-evaluation among education students increased cognitive skills (such as critical reflection and critical thinking), interpersonal skills (such as listening, seeking, and giving helpful feedback), self-esteem, self-acceptance, and confidence. Davis and Rand (2001) found that students in sections of introductory educational psychology who used self-grading reported more satisfaction with the course and generally indicated that coming to class was more "profitable." Stallings and Tascione (1996) found that using self-assessment in mathematics courses improved students' confidence in their abilities, encouraged them to become more independent learn-

ers, developed their communication skills, increased their mathematics vocabulary, and provided them an opportunity to reflect on their understanding of and ability to learn mathematics. Lowman (1990) also noted that giving students choices and reducing instructors' external control increase students' intrinsic desire to learn the material.

My own foray into student self-grading stems from an inclination to shorten the turnaround time on homework and tests for a weekly three-hour social statistics class. I believed the delay between collecting homework and handing it back graded the next week hampered student learning. By the time a week had passed, students had forgotten how and what they were thinking when they worked on the homework. I also wanted to use homework to reinforce student learning rather than just collect scores for a grade. Grading homework during class seemed like a good way to solve the delay problem and reinforce learning.

In this article, I describe how I set up self-grading in a social statistics class. I then report on student satisfaction with this method, followed by a discussion about cheating. I also observe two additional pedagogical advantages of the method and conclude with suggestions for further research.

## Implementation

At the beginning of the semester and in the course syllabus, I explain to students that they will grade their own work

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because I believe they will learn statistics more easily if they can identify when and where they make mistakes. I note that this tactic may appear to give students an opportunity to cheat but that those caught cheating will face consequences such as receiving a zero on the assignment, getting kicked out of the class, and possibly being expelled from the university.

At the start of each class for which homework is due, I hand out a key for the assigned problems. I print each key on different colored paper, as far as paper choices permit. I walk the class through each homework problem as students compare their own work with the key. I ask them to correct mistakes on their work with different colored writing utensils. Students score each problem on scale from 0 to 4 (0 for no attempt; 1, 2, and 3 for an answer in between; and 4 for perfect). For each problem with a score of less than 4, I ask students to write a note about what they missed, such as “math error” or “wrong test statistic.” Students write their scores next to each problem and the score for the whole assignment at the top of the front page. Self-grading the homework usually takes between ten and twenty minutes, depending on the number of questions students ask during the process and the number of problems assigned. I collect the student-graded work and spend the rest of the class period on the next topic. I use the transition between grading homework and beginning new material to show students how the past (and presumably mastered) material relates to the new material. For example, after grading homework problems on mean, median, and mode, I might say, “Now that we have looked at measures of central tendency—that is, how to look at the middle of a distribution of scores—we will move on to measures of dispersion, or how a group of scores are distributed.”

The keys offer a useful form of feedback. Before using self-grading, I wrote comments, additional explanations, and warnings on students’ work only to realize—usually at the end of the semester—that students never bothered to collect their graded work. Students recognize the usefulness of the homework keys in terms of studying for the exams and are more likely to retrieve them. Writing out the keys is a better use of the instructor’s time

over the long run than grading homework problems or tests, corroborating Ulmer’s (2000) finding that student self-grading decreases instructor time spent grading while providing quality and timely feedback. The keys have an additional benefit of keeping the instructor clear and consistent about how points are earned.

Because I give out the key the day homework is due, I do not accept late homework. Students who miss class must arrange to turn in their work before class meets. Before the next class, I recheck the self-graded homework. For the first several weeks, I recheck all of the homework very carefully until I think that students have a firm grasp of the grading scale. Later in the semester, I check the homework less thoroughly; in my experience, an overwhelming majority of students grade homework problems either exactly or very closely to how I would have graded them. I remind students often that they will probably not do well on exams if they have not done the homework carefully.

For the first few semesters I used the self-grading method, I handed out a typed key for the exam, as I had done for the homework. This often led to an exasperating grading session, as nervous students neglected to listen to my explanations to other students and often repeated the same questions. Rather than handing out a key, I found it more efficient to put the solution for one problem at a time on an overhead projector. This tactic keeps students on the problem at hand rather than moving back and forth through the exam, only half-listening to the discussion. Because I allow partial credit, I have all of the points assigned on the overhead test key. This way, students see not only the correct answer but also the concept being tested at each step, which is important because arithmetic is only part of statistics. More important is that students learn the procedure (for example, hypothesis testing) rather than a particular answer to a particular kind of test question.

I collect the exams after the grading period and recheck the student grading. The majority of scores do not change with my rechecking. Sometimes I take off one or two more points than a student did in one place but one or two fewer points than the student did in another, resulting in the same overall exam score. About

20 percent of scores change two or three points in either direction, and only about 10 percent change more than five points in either direction. This 10 percent includes students who are confused about partial credit and fail to give themselves points where they should have, students who are not careful graders (perhaps because they are nervous), and students who are trying to cheat. The first group of the 10 percent usually receives a higher score when I regrade, the second group’s scores vary, and the third group usually receives a lower score. I find fewer drastic score changes (more than five points) after the first exam, suggesting that students improve in their grading ability and that those who might inflate their scores realize I catch them when rechecking the exams.

Two or three students in every class are not initially able to evaluate themselves correctly, especially on tests. These students will mark themselves entirely wrong on problems where they actually earned partial credit. The scores of these students usually improve when I regrade, but the benefits of self-grading in terms of reinforcement are initially lost on them. However, these students do improve on their ability to evaluate their own work as the class progresses, especially if they come see me to go over the exam and key one on one. In my experience, all of these students can learn self-grading after one out-of-class meeting.

### **Student Response to Self-Grading**

Student response to self-grading has been overwhelmingly favorable. Among the students surveyed with an end-of-semester questionnaire, nearly 86 percent said self-grading is a “good” or a “great” teaching method, 10.4 percent said it was “neither good nor bad,” and only 4.3 percent—five students—thought self-grading was a “bad” teaching method.

Not surprisingly, the most common response students give for liking self-grading is that they get to identify their own mistakes. They learn as they correct—literally learning from their mistakes. If I were a student, I would want to know exactly what and how I missed so I could go back and study those problem and examples. Students found self-grading reinforcing:

• “You get to follow along and reinforce in your mind what you did.”

• “You learn more when you find out what you did right or wrong. If the instructor grades and passes back next week, you will likely not even look at anything other than your grade.”

The second most common reason students like self-grading involves the timeliness of the feedback:

• “I learned immediately where I went wrong.”

• “I could see what I had done wrong while it was still fresh in my mind.”

• “It was nice to know your grade right away and not torture yourself over a bad exam for a whole weekend.”

In addition, students mentioned that they liked the method because the keys showed exactly what was expected of them, they could use the keys to study from, and they were entrusted with the responsibility to monitor themselves.

Students found little to dislike about self-grading. Thirty-two percent of the students surveyed said they disliked “nothing” about self-grading—the most common response. The next most common response, made by 22 percent of the students, was that classmates might not be honest graders. Commented one student: “A lot of people cheat or are real easy on themselves or other people are too hard on themselves.”

The third most common response, made by 13.3 percent of the students, dealt with the perceived ambiguity of the grading

process itself. A student remarked, “[I was] not always sure how many points should be taken off . . .” Students also reported that they did not enjoy the process of marking themselves wrong or assigning their own score, specifically “seeing my silly mistakes” and “giving me my grade.”

A few students mentioned that their classmates annoyed or confused them with questions and that other people in the class asked too many questions about how to score work. A few students also mentioned that they did not like “staying honest” when grading themselves.

#### Staying Honest

After a few semesters of collecting data about the usefulness of self-grading, I began to also collect information specifically about “staying honest.” Responses are broken down by classes to track changes in class size. Students were asked:

• “How often have you heard of other people cheating?”

• “How often have you actually seen other people cheating?”

• “How often have you been tempted to cheat?”

• “How often have you actually cheated?”

The response categories were *never*, *rarely*, *some of the time*, *rather often*, and *a lot* (see table 1).

No one in any of the classes admitted to cheating more than “rarely.” The percent of students who admitted to

cheating declined over the semesters, corresponding with a decrease in class size. Smaller class sizes increased my ability, as well as students’ perception of my ability, to monitor them during self-grading. In addition, spatial arrangements may have made a difference. The largest class ( $N = 46$ ) met in a room with graduated seating, so I could not see the desktop beyond the first and second rows. All of the other classes met in rooms with tables and chairs on a single level. Finally, the number of self-identified cheaters may be inflated, because I explicitly equated “fudging” with cheating in the syllabus.

To get a sense of students’ perceptions about the relationship between cheating and grade distortion, I also asked, “What is your sense of how much cheating occurred in this class?” The large majority, 88 percent, reported that there was “none” or “not enough to worry about.” Among the fifteen students over four classes who responded that there was “enough so that people who cheated got better grades,” ten were in the first class of forty-six with the graduated seating.

When I asked students what they thought I could do to curtail cheating, the most common response was that I could do nothing more or that what I did was enough:

• “I think that grading our own work and tests along with you checking tests and homework help to discourage anyone from cheating . . .”

**TABLE 1. Students Answering “Never” or “Rarely” to Questions about Cheating**

	First class		Second class		Third class		Fourth class		
	Never	Rarely	Never	Rarely	Never	Rarely	Never	Rarely	
How often have you heard of other people cheating?	26% (12)	40% (17)	45% (15)	33% (11)	59% (13)	32% (7)	38% (11)	38% (11)	
How often have you actually seen other people cheating?	54% (25)	26% (12)	42% (14)	39% (13)	68% (15)	27% (6)	55% (16)	28% (8)	
How often have you been tempted to cheat?	28% (13)	43% (20)	52% (17)	27% (9)	59% (13)	41% (9)	59% (17)	34% (10)	
How often have you actually cheated?	70% (32)	30% (14)	79% (26)	21% (7)	95% (21)	5% (1)	93% (27)	7% (2)	
Totals	$N = 46$		$N = 33$		$N = 22$		$N = 29$		130

• “I think that you did enough to scare us all at the beginning of the semester.”

Some students took an ideological stance to dismiss cheating as an issue of concern, as one commented: “Ideally, the instructor is teaching to adults who are paying good money to obtain an education. Cheaters are only cheating themselves.”

A few students suggested that cheating could be curtailed by having students swap homework/tests with their classmates. I do not endorse this solution because it violates students’ privacy and, more important, would negate the intent of the method—to reinforce learning by having each student discover if and where he or she “went wrong.”

Because this method is liked by students and has many positive pedagogical advantages, I think the possibility of a few students attempting to cheat is worth the risk. Moreover, the opportunity to cheat can be controlled by having smaller classes, requesting classrooms with single-level seating, rechecking student-graded work, and impressing on students the consequences of cheating. Although teachers owe it to students to maintain an honest atmosphere, teaching should not focus on policing students, especially when it precludes the use of other methods. Rather, teaching should focus on developing honest citizens—in this case, by trusting students to maintain ethical behavior.

#### *Anecdotal Pedagogical Advantages*

Beyond student satisfaction, two other pedagogical advantages of self-grading in social statistics are untested at this point. My impression is that self-grading alleviates student anxiety and, subsequently, eases student-teacher conflict by demystifying the grading process and making students feel that they have control over their own evaluation.

Student anxiety, and the degree to which it hinders students coming into social statistics classes, has been confirmed among social statistics teachers (Bessant 1992; Blalock 1987; Potter 1995; Schacht and Stewart 1990). In recognition of this situation, Blalock called for social statistics teachers to develop ways to help students address individual math anxieties. To

that end, teachers have employed various strategies, including the use of humorous cartoons, gimmicks (Schacht and Stewart 1992), collaborative testing (Helmericks 1993), call and response in the classroom, student-centered problem solving, and small group work (Potter).

I have found that social statistics students are generally more tense and argumentative than students in other classes, especially when getting back their exams. Many students are tense for good reason—for example, if they took themselves out of math and the natural sciences because they believe they are not good at math. Thus, they often put off taking a required statistics class until their last semester. When graduation hinges on passing, students feel tremendous pressure on students to perform well at something that many of them fear.

Traditional grading inevitably leads to student-teacher conflicts (Placier 1995), which may be exacerbated in social statistics classes because of math anxiety and the class being the last hurdle on the way to graduation. Students may perceive the instructor as a statistics grinch, out to strip them of their deserved points. Anxious students can quickly imagine a domino effect of losing points, failing the class, not graduating, and jeopardizing their future. With self-grading, if students have to take points off, they must do it themselves, against an objective measure that they can see, and are thus less likely to imagine themselves at odds with their instructor. Students find that the keys communicate clearly the correct answer and, on exams, the way that points are assigned. Students who did not make any mistakes know why they got a problem right. When comparing self-grading with instructor-graded exams, I have noticed that most of the questions involve students confirming how many points they should take off for certain mistakes rather than grousing about the test questions or complaining about “hard grading.” Finally, students who are given the opportunity to grade themselves may feel a sense of control over their own assessment, which may also ease their anxiety and decrease student-teacher tension.

#### **Summary and Conclusion**

Students overwhelmingly say they like this implementation of self-grading in

social statistics. Students like the method because it gives them a chance to reflect on their own work, analyze their work in relation to the correct answers on the key, and review what they have already learned. I found that cheating can be controlled in this context by various means. Other teacher reports on self-grading noted the problem of grade inflation (Strong, Davis, and Hawks 2003; Liu, Lin, and Yuan 2002), although this finding is not consistent (Davis and Rand 2001) and was not an issue with my implementation of self-grading. Self-grading may also reduce student anxiety and alleviate student-teacher animosity. Further research is needed to establish these last two possibilities; additional research might also determine whether self-grading improves student understanding of social statistics. Even if self-grading does not prove to reduce student anxiety, improve student-teacher relations, or make students learn statistics better, it is still an attractive method because students like it. Finding something that students enjoy in a social statistics course is valuable in and of itself.

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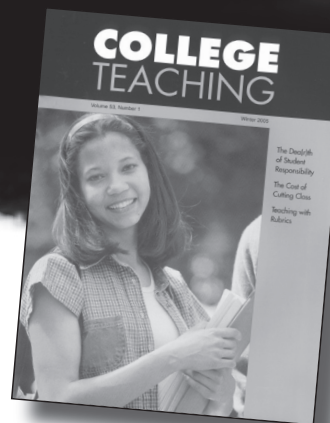
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