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Self-Grading: A Commentary

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What is Self-Grading?

The self-grading method has been a very intriguing topic, particularly within the realm of higher-education (Falchikov & Boud, 1989). The term self-grading is commonly interchanged with the term self-evaluation or self-assessment, in that they all share similar theoretical foundations, methodologies and expected learning outcomes. Crowell (2015) defined self-grading as, "students judging the quality of their work based on evidence and explicit criteria, for the purpose of doing better work in the future (p. 450)". McMillian and Hearn (2006) defined self-evaluation as the process by which students monitor and evaluate the quality of their work and thinking processes, and identify strategies to improve their understanding and skills (p. 40). Crowell speaks to one of the advantages of self-grading by noting, "When … students … assess their own progress… against known and challenging quality standards, … there is a lot to gain (p. 450)."

The theoretical perspectives and the various ways for implementing the self-grading strategy have been extensively discussed in the literature. In this paper, we aim to synthesize pertinent information and resources to deepen our understanding around self-grading and demystify any uncertainties about this concept, if any.

How Self-Grading Works

McMillian and Hearn (2008) conceptualized self-assessment as being composed of three major elements: (a) self-monitoring, (b) self-evaluation, (c) and identification and implementation of instructional correctives. As shown in Figure 1, students identify learning strategies, provide feedback to themselves, and determine the next steps to increase their academic performance (McMillian & Hearn, 2008). Self-assessment involves various cognitive functions, with each function influencing the subsequent stage, all within a cycle. Specifically,

students learn to be cognizant of their own thinking patterns, identify the gap between their current status and the learning goals they'd like to achieve, and finally implement the strategies to correct any misconceptions to improve learning outcomes.

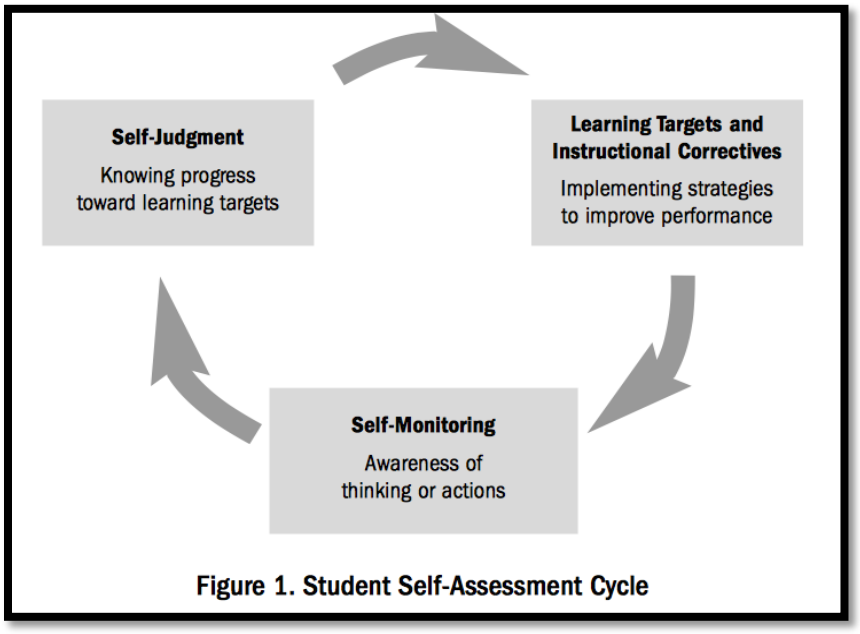

Figure 1. Graphical representation of the cyclic process conceptualizing self-assessment.

Self-Grading Implementation

In his self-grading study in an entry-level statistics course, Edwards (2007) described a simple yet effective technique. Edwards first provided his students with an answer key to a previously completed assignment. He then allowed the students to grade their own work based off the answer key. If an answer was incorrect, Edwards instructed the students to correct their mistakes with a different colored pencil, but also provide a written explanation emphasizing the reason they made a particular mistake. To ensure that students were objectively scoring their assignments, the grades they reported were compared alongside the teacher's assigned grade.

Theoretical Foundations

Cognitive and Constructivist Learning Theories

The concept of the self-grading method could be considered as a direct extension of cognitive and constructivist theories. These theories emphasize that learning is an active, ongoing process whereby learners construct new ideas or concepts based upon their current/past knowledge (Kearsley & Culatta, 2016). Correspondingly, Shepard (2001) explained that, student self-monitoring of learning and thinking is important in the knowledge construction that lies at the heart of such a theory. Self-grading is an innovative approach to learning which requires participants to systematically reflect on their existing knowledge and understanding by grading their own work.

Goal Theory

Motivation plays a vital role in one's ability to achieve goal(s). As one of the motivational theories, the goal theory defines two types of goals: mastery goal and performance goal. According to McMillian and Hearn (2008), students with mastery goals would focus on "…the task at hand and what needs to be done to improve knowledge, understanding and skill (p. 43)." In contrast, individuals with performance goals are primarily focused on the ultimate outcome; final grades or final scores are common performance goals seen within academia (p. 43). Self-grading is a process whereby individuals are essentially working towards mastery of a particular subject or assignment. The process of achieving a mastery goal requires students to utilize a number of cognitive skills, many of which are also used during the self-grading process, which encourages learners to become cognizant of their thoughts respective to the academic content, and eventually leads to a deeper understanding of the subject.

Metacognition

The theory of metacognition can be distilled down to the simple and commonly used phrase "thinking about thinking". The term, metacognition, encompasses the study of memory-

monitoring and self-regulation. Based on this theory, individuals are able to recognize mistakes in their own cognitive processes, allowing them to more effectively address similar issues in the future. According to Ibabe and Jauregizar (2009), metacognitive skills are generally divided into two types: (a) self-assessment and (b) self-management – the ability to manage one's further cognitive development. Based off their assumption, learners who are skilled in metacognitive self-assessment tend to be more aware of their abilities and perform better when compared to those who are unaware (Imel, 2002). Specifically, the metacognitive abilities, including being conscious of your understanding of subject, predicting potential outcomes and managing the time and the learning strategies can all be enhanced through self-grading (McMillian & Hearn, 2008).

Self-Efficacy

Self-efficacy is described as an individual's perception of their own ability to do well on a specific task and their perceived value of doing well (McMillian & Hearn, 2008; Pintrich & Schunk, 2002; Schunk, 2004). It involves "students estimating what they can do and the likelihood of successful performance (McMillian & Hearn, 2008, p. 44)" and plays a major role in improving individuals' motivation (Zimmerman, Bandura, & Martinez-Pons, 1992). Self-grading can be considered as an effective way that enhances learner's self-efficacy, because when a student takes the systematic steps to thoroughly understand why they made specific errors and applies what they've learned to new learning tasks, the understanding of their own abilities (i.e., self-efficacy) will be improved.

Implications for Teaching and Learning

Logistical

Self-grading one's own academic/professional work allows the individuals to quickly recognize his or her mistakes, which simultaneously removes the burden of grading an entire

class worth of assignments from the instructor. Essentially, this provides students with faster and more detailed feedback regarding their academic performance (Weaver & Cotrell, 1986). However, it must be mentioned that the timesaving scheme is only practical when the student's self-assigned grades are similar to that of the teacher's assigned grade (Weaver & Cotrell, 1986). If there is a large discrepancy between the two, the teacher would be obligated to re-grade the student's work.

Pedagogical

Self-grading offers many pedagogical advantages. It is considered as "an additional opportunity for students to deepen their understanding about a topic (Sadler & Good, 2006, p. 2)". It is also an effective mechanism that helps the learners change ideas or develop skills (Boud, 1989), which lead to higher learning outcomes. For example, according to Fontana and Fernandez's (1994) study, students aged 8-14 improved their mathematics achievement by implementing the self-assessment strategies.

Affective

Self-grading can also have a positive effect on individuals' emotions by alleviating student anxiety, demystifying the grading process to ease student-teacher conflict, and making students feel that they have control over their own evaluation (Edwards, 2007). Therefore, self-grading can be applied to implement affective changes among students, which make the learning environment more productive and friendlier (Crowell, 2015).

Measuring the Impact

Measuring Learner Experiences and Attitudes

An anonymous post-test self-assessment can be used to assess learners' experiences with and attitudes to the self-grading strategy. For example, in Edwards's (2007) study, students were

asked to answer whether or not they liked the self-grading method, and if so, why? Another example is Student Practice Attitude Questionnaire (PAQ) used in Hewitt's (2001) study. PAQ is a seven question, 4-point Likert scale, measuring student's feelings, beliefs and values with respect to the self-evaluation method.

Measuring Learning Outcomes

Learning outcomes are often assessed to determine the impact of the self-grading strategy. For example, administering an unannounced, identical second test shortly after the self-grading procedure could help identify whether students have improved their performance (Sadler & Good, 2006), since the second test provides an opportunity for students to apply the knowledge, if any, they gained from their self-grading experience. The studies summarized below provide empirical evidence about the effects of self-grading on learning outcomes.

Hewitt (2011) used the pre and post-tests to examine what effects self-evaluation had on the musical performance of students (N = 211) at a private middle school. Using Hewitt's MANOVA, Hewitt found a significant increase in student performance (F (126, 954) = 1.30, p = .02, η_{partial}^2= .15). In Ibabe and Jauregizar's (2009) study, the self-assessment strategy was implemented online. Their findings indicated better academic performance for students who used the online tool (t(80) = -1.86; p = 0.06), although the difference was not statistically significant.

Concerns about Self-Grading: Teacher-Student Grade Agreement

Determining if a student's grade is consistent with the teacher's assigned grade can be accomplished by a number of different statistical methods. A common statistical method is to calculate Cohen's Kappa. In its simplest definition, Cohen's Kappa is a measurement of percent agreement between two raters (i.e., student and teacher) (McHugh, 2012). Sadler and Good

(2006) also recommended a number of additional methods for measuring the consistency between the student grades and the teacher grades (p. 4):

1. rank and Pearson correlation,
2. *t* test comparing difference in mean grades,
3. effect sizes (difference in mean grades in units of standard deviation),
4. chi-square statistic (comparing grading categories).

Actually, many research studies have reported a high level of agreement between the grades assigned by teaching staff and the grades from their students, when students were able to understand the teacher's requirements for assignments and grading methods (Lopez-Pastor, Fernandez-Balboa, Pastor & Aranda, 2012; Sadler & Good, 2006). However, it must be noted that students tend to overestimate self-graded work when compared to peer-graded work (Ross, 2006; Sadler & Good, 2006). Specifically, Sadler and Good's (2006) found that students tended to assign lower grades to their peers than to themselves.

As previously stated, the efficacy of self-grading methods can be largely confounded by the lack of formal training or insufficient training procedures. Researchers suggested that students should be provided with a grading rubric or criteria, as well as the written information on how the self-evaluation procedure will occur (Lopez-Pastor et al., 2012). Training students on how to grade a test will ultimately result in a greater agreement with a teacher's final assigned grade (Boud, 1989; Weaver & Cotrell, 1986).

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