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An Examination of the Influence of Formative Self-Assessment on College Student Mastery Orientation in College Courses

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An Examination of the Influence of Formative Self-Assessment on College Student Mastery Orientation in College Courses

By

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Abstract

This study examined the hypothesis that mastery orientation would increase for college students enrolled in courses that incorporated self-assessment. Early in the spring 2013 semester, 216 community college students enrolled in 16 different general education and developmental courses volunteered to participate and completed a demographic/goal orientation questionnaire. During the semester, 10 of the courses implemented self-assessment and 6 did not. At the conclusion of the semester, 143 of the original sample completed the Motivated Strategies for Learning Questionnaire (MSLQ) which provided post-test goal orientation scores along with measures of additional motivational and self-regulatory variables. Results indicated a trend in the direction hypothesized only for students enrolled in general education, not developmental courses. Further, retention was significantly higher for students enrolled in self-assessment courses. Additional motivational and self-regulatory variables were correlated with achievement outcomes such as final grades.

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Chapter I

Introduction

This research study will examine the influence student learning assessment methods in general education college courses have on student mastery orientation (i.e. motivation to learn). The relevance of this topic within the climate of 21st century higher education cannot be ignored. Student learning is the primary purpose of higher education and effective measures of learning must be incorporated into classroom instruction as a way to validate student learning. In the market-driven climate of higher education, accountability to both internal (e.g. students and instructional faculty) and external (e.g. public funding sources and accreditation bodies) stakeholders requires institutions to effectively demonstrate student learning outcomes as a means to secure ever-dwindling resources.

Background of the Problem

A number of issues have surfaced in recent years making it clear that improving educational experiences in higher education classrooms is critical for the United States to remain competitive in the global marketplace (Wagner, 2008). High achieving American students do well on standardized tests, but do not possess the skills necessary for success in 21st century workplaces (Wagner, 2008). Developing 21st century competencies like critical thinking, analytical reasoning, written communication, and problem solving is crucial and can be achieved in the liberal arts curriculum by increasing academic rigor (Carey, 2011) and incorporating these competencies into learning assessments (Wagner, 2008).

Learning, although intangible and perishable by nature (Voss, Gruber, & Reppel, 2010) is one primary purpose of higher education. However, many students report that they exert little effort on their academics, in part due to the limited demands placed on them academically (Arum & Roksa, 2011). Lacking motivation to learn is troubling as institutions are increasingly asked to assess student learning from external funding and accrediting bodies. Of utmost importance is what college instructors can do in general education classrooms that will increase student motivation to learn.

The accountability expectations placed on institutions of higher education by students, sources of public funding, and accrediting organizations are not always consistent, but are uniformly connected to student learning. A demonstrable dedication to evaluating student learning will satisfy some of the conflicting demands placed on institutions of higher education from the variety of stakeholder groups. Committing to student learning can also generate opportunities for professional development allowing instructors to improve their professional practice.

Accountability

Mission statements at many institutions of higher education identify the importance of improving student learning. Students attend college to learn new knowledge and skills, but many college students are learning "little to nothing" (Carey, 2011). Arum and Roksa (2011) used the essay-based, open-ended Collegiate Learning Assessment (CLA) to measure college level critical thinking and written communication skills and found that 45% of college students did not make any significant improvement on the CLA in their first two years in college. In four years of college, thirty-six percent of students did not make any significant improvement on the CLA (Arum & Roksa,

2011). Further, the gains were only modest (less than half a standard deviation improvement) for those that did improve their CLA scores during their four years of college. Sadly, this has emerged as a new trend in higher education evidenced by research from the 1980s which found that college seniors were significantly outperforming college freshmen in critical thinking performance (Pascarella & Terenzini, 2005).

Accountability to Students. Students expect higher education to prepare them to enter the workforce, but they lack 21st century skills such as critical thinking, written communication, and problem solving (Jones, 2010). Although student participation and accountability are necessary for a student's success in achieving their outcomes (Svensson & Wood, 2007), institutions are facing greater demands to deliver education to students who increasingly view themselves as "customers" (Kaye, Bickel, & Birtwistle, 2006). Freshmen students list academic-related factors such as grades, motivation, and educational aspirations as highly influential on their expectations of college (Kuh, Gonyea, & Williams, 2005) suggesting that academic rigor and learning are expected.

While students enter college with high expectations, their motivation to learn decreases during the first year of studies (Kowalski, 2007). College students struggle with both academic and non-academic issues that reduce satisfaction (Feldt, 2012), but classroom experiences may undermine the high expectations students have at the outset of their college careers. Of these experiences, the most commonly cited classroom interactions that impact overall student satisfaction relate to the quality of the instructor's teaching (Sander, Stevenson, King, & Coates, 2000; Voss, et al., 2010). Students consistently identify approachability, friendliness, consistency, reliability, knowledge,

helpfulness, enthusiasm, organization, and empathy as primary indicators of satisfactory college instructors (Voss, et al., 2010). While these qualities are certainly necessary for satisfaction, they do not necessarily speak to the quality of the learning environment each instructor creates. Students may not be aware of the classroom methods that enhance learning, particularly those of course design and assessment.

Interactions with instructors emerges as one of the most significant factors influencing a student's satisfaction at college (Marzo-Navarro, Pedraja-Iglesias, & Rivera-Torres, 2005) suggesting that classroom experiences and the relationships students build with instructors keeps them happy and engaged in their learning (Voss, et al., 2010). In general, responsive and enthusiastic instructors promoted greater student satisfaction than rigid and rude instructors (Voss, et al., 2010). Student/instructor interactions were viewed as "important" or "very important" and unsatisfactory interactions were more often reported to administrators than satisfactory interactions (Voss, et al, 2010). In short, positive interactions with caring instructors appear to be a critical variable in student satisfaction at institutions of higher education. Although not all students will agree on the specific classroom experiences that are most satisfying, Kass, Vodanovic, and Khosravi (2011) found significant positive correlations between five characteristics of a work/classroom environment (skill variety, task production, task significance, autonomy, and feedback) and overall school satisfaction. It follows that designing classrooms that incorporate these characteristics may produce better retention and graduation rates by alleviating boredom and promoting the psychological states of meaningfulness, responsibility, and knowledge (Kass, Vodanovich, & Khosravi, 2012).

While interpersonal interactions are critical for student satisfaction, meeting students' learning goals is also necessary to graduate students capable of securing employment. New college students identify learning as a primary goal, but there is little evidence to suggest that students can identify what quality instruction for learning is. Students place greater value on the interpersonal qualities of instructors than on classroom experiences that promote learning. However, when prompted to identify preferred classroom assessment methods, students prefer performance based assessments like essays, projects, and problems/exercises over the sole reliance on examinations (Sander, et al., 2000). Students likely identify assessments they are most familiar with, not those that necessarily enhance learning. Therefore, higher education has taken an "inside-out" approach to designing quality classroom experiences allowing those on the "inside" to determine the types of experiences that promote learning, not merely satisfaction or familiarity (Sander, et al., 2000).

The types of classroom environments that enhance student learning and the techniques instructors use to enhance student learning have received ample research attention concluding that the use of formative assessments (assessment tasks where teachers provide feedback to students as a means to improve performance) within carefully designed outcomes-based and engaging classes will enhance student learning (Black & Wiliam, 1998; Cassady & Gridley, 2005). However, very little research has focused specifically on the role student-focused variables play in the relationship between assessment and learning. Cauley and McMillan (2010) argue that student mastery orientation (motivation for mastering course content or "motivation to learn") is an

important intervening variable between the learning environment prepared for students and what they eventually learn from participating in those environments.

Accountability to Public Funding Sources. Higher education is no longer considered the domain of the elite, and all citizens of a free society have an opportunity to receive a higher education (Kaye, et al., 2006). Public institutions are not only expected to accommodate increasing numbers of students, but to provide them with quality and efficiency while pursuing their degrees. Students are one important consumer group, but federal, state, and other public funding sources (e.g. local sales tax referendums, capital bonding, etc…) remain crucial to the financial health of public institutions. Efficiency measures, like the average operating cost per student, the amount of financial aid provided to each student, and the efforts in place to control costs are important to these sources of revenue (Delta Project, 2008). Many institutions employ transparent "dashboard" reporting mechanisms to communicate these institutional efficiency variables to the public (Butler, 2007).

While these measures of efficiency are required by accrediting and funding agencies, they are not necessarily driven by student learning. The increasing focus on non-academic (i.e. "service") measures of institutional success (e.g. enrollment, retention, financial aid, etc…) overlooks the academic mission of a liberal college education (Carey, 2011) emphasizing the development of personal freedom and growth in students (Cronon, 1998). Students who enter college with unrealistic social and academic expectations become dissatisfied and fail to graduate (Smith & Wertlieb, 2005). Because quality classroom experiences is one major contributor to student satisfaction (Crisp, et

al., 2009), Carey (2011) argues that federal and state funding should depend on student learning outcomes, not enrollment figures.

Accountability to Accrediting Organizations. The federal government does not directly regulate higher education, but delegates this responsibility to a limited number of regional accrediting agencies like the North Central Association (Carey, 2011). Institutions of higher education are required to maintain accreditation to receive federal student aid support (Carey, 2011; Gillen, Bennett, & Vedder, 2010) and diverse processes are in place for institutions to become accredited. Beginning in the 1980s, accrediting agencies introduced the accountability movement by identifying assessment of learning as a marker of institutional success (Gillen, Bennett, & Vedder, 2010) forcing institutions to provide evidence of such learning in order to maintain accreditation.

Enhancing Professional Practice

Finland has become the highest achieving nation on the Programme for International Student Assessment (PISA) (Sahlberg, 2011). The PISA assesses academic knowledge and skills of 15-year-olds across a three-year period and is used as a measure of educational effectiveness in industrialized nations. Despite dwindling financial investment in Finnish schools, variables related specifically to teacher skill, like the use of innovative pedagogy (Valijarvi, et al., 2002) and the quality of university teacher education programs (Rautalin & Alasuutari, 2007), represent some of the primary reasons for Finnish student success. A primary influence on Finland's success on the PISA may stem from its focus on recruiting, training, and retaining excellent teachers (Sahlberg, 2011) suggesting that providing educators opportunities to develop their professional skills can improve student learning. In fact, Karimi (2011) found that structured

professional development can significantly increase teachers' feelings of efficacy in their teaching leading to improved student achievement (Zambo & Zambo, 2008). Confident teachers adopt innovative classroom strategies that include improved assessment methods (Midgley, Feldlaufer, & Eccles, 1989) and professional development benefits college instructors when used to promote autonomy in the classroom and their ability to interact with students (Davidson, 2004).

Likely as a result of the emphasis accrediting agencies place on student learning assessment, opportunities for assessment-focused faculty development have become standard offerings for many federal, state, and local institutions (see Grierson, 2011 and U.S. Department of Education, 2010). The federal government developed a number of assessment-driven initiatives after the approval of "Race to the Top" legislation (Achieve, Inc, 2010). State university systems, like the Minnesota State Colleges and Universities (MnSCU) have mandated that newly appointed faculty complete rigorous teaching and learning training emphasizing assessment and evaluation of student learning (Minnesota State Colleges and Universities, 2011).

Students, funding sources, accrediting agencies, and faculty members can all benefit from effectively measuring student learning. When students can recognize benefits of their investment in tuition, public funding sources may be satisfied through improved retention and graduation rates. Accrediting bodies grant accreditation to institutions that validate student learning, and faculty members can enhance their practice through innovative classroom practices. In short, all stakeholders in higher education can benefit from the effective assessment of engaged student learning.

Research Purpose Statement

The purpose of this research is to examine the influence formative self-assessments have on mastery orientation in general education and developmental college courses. Specifically, the question of whether college students enrolled in these courses are more mastery oriented in courses when formative self-assessments are incorporated into the grading will be examined. It is hypothesized that mastery orientation will be higher when formative self-assessments are used to assess learning in general education courses.

Significance of the Research

This study will contribute to the understanding of how self-assessment in general education courses impacts mastery orientation. While the direct measurement of learning is elusive, mastery orientation serves as an important intervening variable between what happens to students in the classroom and what they learn (Cauley & McMillan, 2010). Identifying practices that enhance student learning satisfy a number of accountability demands placed on institutions of higher education. Engaged students remain enrolled at institutions longer and will more likely graduate than disengaged students (Voss, et al., 2010). Retaining students is critical for the financial viability of institutions of higher education and can be achieved by enhancing the academic experiences of students.

Limitations

One limitation of this study will be the potential lack of generalizability to the broader audience in higher education. All data will be collected from a large public two-year community college and any significant results informing pedagogy will most specifically apply to the same or similar setting. While uniformity will be strived for, not

all instructors incorporating self-assessments in their classes will do so in a uniform way. The assessments themselves may differ as is relevant to the content of each individual course. The grade weight given to the self-assessment may also differ from instructor to instructor. Additionally, mitigating effects of effort and cognitive strategies on mastery orientation will be measured, but not be specifically addressed due to the nature and scope of this project.

Definition of Key Terms

Formative Assessment. First introduced to drive curriculum improvements (Scriven, 1966), formative assessment was formally presented as a way for students, teachers, and curriculum developers to "improve what they wish to do" (Bloom, Hastings, & Madaus, 1971, pg. 117). In this capacity, formative assessment is an outcome, not a tool. Assessments are considered formative if they provide clear expectations, instructive feedback, and opportunities for improvement. Formative assessment occurs over a longer period of time and allows students to improve upon their knowledge and skills throughout the semester as continuous feedback is provided in response to student work. Similar to behavioral shaping, formative assessment is used to develop a progression of learning toward acquisition of a distant skill comprised of smaller units of learning (Popham, 2008). Formative assessment is considered the opposite of summative assessment which assigns a grade on a single performance.

Formative Self-Assessment. Student-centered learning assessment requires that students reflect on their learning and assign themselves a grade. Self-assessment takes several forms, such as *self-testing, self-rating,* or the use of *reflective questions* (Boud & Brew, 1995). Self-testing requires students to compare their responses with pre-defined

correct responses; self-rating requires students to assign value to their current level of performance; and the use of reflective questions requires students to critically reflect on their learning. With formative self-assessment, students reflect on their performance, their assessment of that performance, and use their ratings to improve future performance. Taras (2002) cautions against assigning grades to self-assessments prior to the demonstration of learning, so self-assessments used in the current study will serve only the self-rating and reflective functions of self-assessment. The grade each student receives for the self-assessment task is the grade assigned by the student him or herself in some form. To ensure accurate self-assessment ratings, students will be provided with detailed guidance (see Nulty, 2011) and will self-assess multiple times throughout the semester.

Performance-Based Assessment. Performance assessment, often used as an assessment method in project-based learning (PBL) environments, requires students to "create something original, use higher-order thinking and 21st century skills, demonstrate thinking processes, and evaluate real-world situations" (Tung & Stazesky, 2010, pg. 2). Performance-based assessments often require the development of knowledge and skills that extend beyond the classroom environment (Ananda, 2000) by requiring students to demonstrate mastery of both the content and the application of the content to relevant scenarios (Schwartz & Burgett, 1997). Grounded in experiential learning theory, performance-based assessment encourages students to take an active role in their learning (Ananda, 2000). Performance assessment measures take a variety of forms (e.g. essays, portfolios, projects, exhibitions, etc...) but require students to demonstrate more than a fixed response to a question (Tung & Stazesky, 2010).

Traditional Assessment. For the purposes of this study, traditional assessment will be defined as learning assessments where teachers create the questions, provide the criteria for correct responses, and return graded assignments back to each student with little or no formative feedback guiding future performance. The grade each student receives is the grade assigned by the teacher. This type of assessment is summative, not formative (described above) and does not involve student reflection in the process of grading. To ensure effective manipulation of the independent variable, self-assessment will not be used in traditionally assessed classrooms.

Mastery Goal Orientation. Motivational factors like goal orientation, self-efficacy, task relevance, and personal interest, influence student success in college (Pintrich & Zusho, 2007). Students' motivational processes are critical to success in college and adopting a goal orientation (mastery or performance) is a crucial step in the planning stage leading to academic success (Pintrich & Zusho, 2007). In contrast to a performance goal orientation placing value on out-performing one's peers on an assessment task (Church, Elliot, & Gable, 2001), a mastery goal orientation places value on learning the material and mastering learning tasks (Meece & Holt, 1993). Students with a mastery orientation believe that effort is necessary for success and engage in behaviors that enhance learning (Ames, 1992; Pintrich, 2000).

Chapter II

Review of the Literature

This chapter will review the literature on student assessments with special consideration given to formative self-assessment. Student mastery orientation is hypothesized to be influenced by formative self-assessment, so this chapter will also review research related to student mastery orientation. In addition, a theoretical link between mastery orientation and learning assessment will be discussed.

Conceptual Framework

One assumption in this study is that assessment is a valuable tool that promotes student learning (Gibbs, 1999). Contemporary models for designing effective learning environments in higher education encourage the development of meaningful student learning assessments (Daugherty, Black, Ecclestone, James, & Newton, 2008; Fink, 2003; Maki, 2004). A common model of course design requires teachers to establish feedback and assessment procedures during the initial stage of course development (Fink, 2003). Other models of instructional design place the identification of learning outcomes and the development of assessments to measure attainment of those outcomes at the beginning of the course design process (Jones, Vermette, & Jones, 2009; Wiggins & McTigue, 1998). Assessments that are meaningfully aligned to learning objectives should lead to increased learning (Biggs, 1996).

A second assumption identifies mastery orientation (i.e. motivation to learn) as a necessary condition for learning. Variables of efficacy (Bandura, 1986), interest (Hidi & Renninger, 2006), and goal orientation (Dweck, 2000; Meece, Anderman, & Anderman, 2006; Pintrich, 2000) have been researched when examining the relationship between

motivation and learning. Of these three variables, goal orientation has emerged as the most important in fully capturing the relationship between student motivation and its effect on student learning (Anderman & Wolters, 2006). Goal theorists believe that student effort is critical in predicting student learning (Dweck, 1986; Meece, Anderman, & Anderman, 2006). Students with low mastery orientation, but high performance orientation (i.e. not motivated by learning, but motivated by out-performing their peers) show patterns of decreased effort, decreased efficacy, decreased interest, and decreased positive affect (e.g. happiness and pride) (Pintrich, 2000). The loss of these secondary mechanisms negatively influences learning.

The final assumption acknowledges that mastery orientation can be manipulated by features of the classroom environment (Brookhart, 1997). One such feature that can influence mastery orientation and learning is assessment. Conceptual models consistently identify assessment as one feature that both directly and indirectly influences student learning and achievement (Pintrich & Zusho, 2007). Classroom experiences that encourage student mastery orientation lead to enhanced achievement when students use that orientation to regulate their behavior toward learning. Self-regulatory processes, such as the ability to monitor and adjust one's motivation and behavior are necessary for students to achieve academic goals (Pintrich & Zusho, 2007). Teachers can manipulate assessment goals in their classroom and in turn manipulate student mastery orientation.

Gagne (1985) identified learning outcomes, learning conditions required to achieve those outcomes, and the "Nine Events of Instruction" as necessary prerequisites for a classroom environment to create learning. The development of measureable outcomes is crucial, suggesting that assessment tasks must be considered during the

initial development of learning outcomes (Gagne, 1985). Classroom conditions must promote learning outcomes and can be accomplished using the Nine Events of Instruction: (a) gaining attention, (b) informing learners of objectives, (c) stimulating recall of prior learning, (d) presenting content, (e) providing "learning guidance," (f) eliciting performance, (g) providing feedback, (h) assessing performance, and (i) enhancing retention and transfer. Classroom experiences that incorporate these nine events promote learning by encouraging students to transform information through the activation of internal cognitive executive control processes (Driscoll, 2005). The latter half of the list, beginning with the provision of learning guidance, explicitly represent assessment tasks and drive the development of the first events.

Pintrich and Zusho (2007) developed a model outlining the relationship between the many variables that contribute to student achievement, including those of motivation (Figure 1).

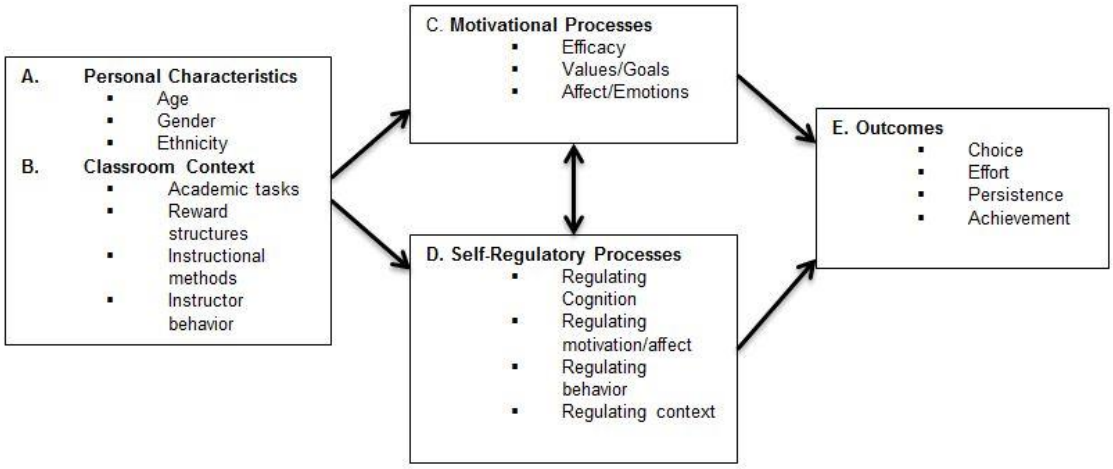

Figure 1. Conceptual model linking student and classroom variables to student achievement.

A college classroom is a place where dynamic relationships develop between students and the environment. This model provides a framework instructors can use to

design classroom environments that promote motivation and self-regulation as a means to increase learning. The model proposes that student (A) and classroom (B) characteristics directly influence motivation (C) and self-regulated behaviors (D). The combination of these factors directly influences outcomes necessary for learning (E). The interaction of individual student characteristics (e.g. age, gender, interest) and classroom characteristics (e.g. assessment, instructional methods, instructor behavior) will influence the choices students make as they move toward their learning goals. Modifying a classroom characteristic (B) may, theoretically, alter a student's interest (A) in the subject producing an increase in self-regulatory behavior (E). This increase in self-regulation may lead to increased learning (E). These relationships are important because students who adopted a mastery orientation demonstrated increased use of self-regulated learning strategies than performance-oriented students (Kolic-Vehovec, Roncevic, & Bajsanski, 2008).

These assumptions connect variables of the classroom environment to those of student achievement. It is hypothesized that manipulation of the types of assessments used in the classroom (B) will influence student mastery orientation (C). Specifically, students will show increased mastery orientation in classes where formative self-assessments are incorporated into the overall grading of the course. The conclusion that increased mastery orientation benefits student learning is well documented, likely due to the reasons theorized in Pintrich and Zusho's model of self-regulatory learning. Thus, the goal of the current study is to examine assessment types and their effects on mastery orientation.

Formative Assessment

Formative assessment is a process of assessing student learning by clearly identifying expectations, providing feedback to guide performance, and implementing pedagogical or curricular change based on student performance (Popham, 2008). Ramaprasad (1983) argued that formative assessment uses feedback to close the gap between actual and expected performance. In contrast to the goal of summative assessment, formative assessment provides feedback to both student and teacher as a means to improve both learning and performance (Black & Wiliam, 1998; Buchanan, 2000; Cassady & Gridley, 2005). Starting from the assumption that teaching and learning are intimately connected, Black and Wiliam (1998) analyzed the work of several authors to conclude that formative assessment raises standards and leads to increased learning. Using effect sizes, they concluded that groups of students exposed to formative assessment interventions learned more than groups of students exposed to other types of classroom interventions. Examining the prediction that formative assessment increases learning in college classes, Cassady and Gridley (2005) provided formative opportunities (practice tests with immediate feedback) to undergraduate students enrolled in an introductory educational psychology course and found a significant positive correlation between a student's use of formative practice tests and their score on an online exam.

Buchanan (1998) developed an online formative assessment tool called Psychology Computer Assisted Learning (PsyCAL) using multiple-choice questions and instant feedback for college students in psychology courses. Incorrect responses were followed by reference information, not the correct answer. In one study, students were required to access PsyCAL exercises as they prepared for the final course assessment.

Scores on the final assessment were significantly and positively correlated with the number of times the student accessed the PsyCAL exercises. A small sample of students did not provide documentation of use and a comparison of "nonusers" to "users" identified a modest effect of use on final assessment scores with users scoring higher than nonusers. Similar findings were found in a second study, which made the use of PsyCAL optional. One obvious confounding variable likely present in both studies was motivation, which may have contributed to both the increased use of the PsyCAL exercises and overall performance (Buchanan, 2000).

Also described as "assessment for learning" (Black, Harrison, Lee, Marshall, & Wiliam, 2004), assessments designed to promote student learning (i.e. formative in nature) led to increased achievement. In 1999, Black et al. initiated the King's-Medway-Oxfordshire Formative Assessment Project (KMOFAP) and recruited teachers in two school districts who incorporated enhanced formative assessment into their classrooms. Synthesizing KMOFAP findings and follow-up conversations with participating teachers and students, Black, et al. (2004) concluded that improved formative assessment practices in classrooms increased student performance. The features of formative assessment that teachers identified as most significantly contributing to student success were (a) improvements to in-class questioning practices; (b) the increased use of feedback; (c) the use of peer and self-assessment; and (d) formative uses for existing summative assessments. These four trends can be described as assessment for learning inasmuch as they encouraged active participation by both teachers and students and led to increased learning.

Effective formative assessment follows Wiliam and Black's (1996) assessment cycle and promotes learning by encouraging self-regulation and reducing anxiety. The first step of the cycle requires teachers to elicit evidence of their students' level of knowledge or performance. There are many ways to elicit evidence of student performance, but the most effective ways are those that rely on assessments with a high degree of *disclosure,* or validity. A valid assessment is one with an ability to detect the presence of knowledge (Wiliam & Black, 1996). To do this, assessments must overcome the influences of stress and anxiety (Ioannou & Artino, 2010). Next, teachers must interpret assessment evidence to determine the size of the gap between students' existing knowledge and the expected level of knowledge. Again, the validity of the initial assessment is necessary to detect real gaps between existing and expected knowledge. Finally, action must be taken to close this gap. In classroom settings, action often takes the form of feedback and/or learning activities that work to move students toward stated learning outcomes (Wiliam & Black, 1996).

Mastery Goal Orientation

Motivation is a construct with multiple definitions. For some, motivation is an internal state driving individuals toward action; yet for others, motivation resides in an external goal giving meaning and purpose to action. In his chapter on motivation in higher education, Covington (2007) described motivated students as individuals who willingly persist on learning tasks that move them toward learning goals. In this goal-oriented approach, teachers have the ability to manipulate goals in the classroom that draw students toward them. Of the goals that are most inclined to this manipulation, self-mastery has been identified as an important goal that promotes learning. Students

persisting toward mastery goals desire to do their best, improve themselves, and learn (Covington, 2007).

Examination of motivational factors that influenced learning emerged out of the cognitive revolution in psychology. In an early review of the literature on motivation, Dweck (1986) outlined two achievement goals: learning and performance. One or the other of these goals emerges from a student's understanding of the nature of intelligence. Students who believe that intelligence is a fixed and stable trait adopt a *performance* goal orientation and seek validation of their ability; while students who believe that intelligence is malleable adopt a *learning* goal orientation and exert effort to increase their skill. Mastery orientation, defined as a "pattern characterized by challenge seeking and high, effective persistence in the face of obstacles" (Dweck, 1986, p. 1040), reliably emerges from learning goal oriented students with both high and low levels of confidence. In other words, a belief that persistent effort will pay off motivates students with either high or limited confidence in their current ability. Dweck's (1986) model is presented as an overview of this relationship between goal orientation and learning (Figure 2). Thus, promoting a learning orientation in a classroom should motivate all students, regardless of perceived ability.

Theory of Intelligence →	Goal Orientation →	Confidence →	Behavior Pattern
Fixed	Performance	High	Mastery
		Low	Helpless
Malleable	Learning	High *or* Low	Mastery

Figure 2. Dweck (1986) model of achievement goals and learning behaviors.

Using the model from Figure 2 to formulate hypotheses, Elliott and Dweck (1988) manipulated elementary school aged participants' beliefs about their current level of ability (high or low) and highlighted either a performance goal or learning goal as

instructions were provided on two possible tasks, a performance-oriented task (no new learning; demonstrate competence) or a learning-oriented task (new learning; will make mistakes). Students were then given the opportunity to select one of the tasks. Supportive of the model's predictions, children who received learning oriented instructions more often selected the learning oriented task, regardless of beliefs about ability. As task performance was monitored across several trials, the only group to significantly deteriorate in their performance was the performance goal-low ability group. In other words, children with low ability/low confidence struggled on learning tasks when the environment encouraged performance goals. These findings suggest that manipulations of the learning environment not only affect student goal orientation and performance, but may also lead to increased equality for students with varying levels of ability.

Meece, Blumenfeld, and Hoyle (1988) used structural equation modeling to develop a model of goal-orientation and cognitive engagement by examining several science activities in fifth grade classrooms. To measure goal orientation, three subscales of the Science Activity Questionnaire (SAQ) were developed using factor analysis: Task Mastery, Ego/Social, and Work-Avoidant. Items loading on the task mastery scale measured orientation toward learning and understanding, ego/social scale items measured orientation toward pleasing the teacher and out-performing other students, and the work avoidance scale measured interest in doing as little work as possible. To assess cognitive engagement, two additional scales were created from the SAQ to identify active engagement and superficial engagement. Actively engaged students used self-regulatory strategies whereas superficially engaged students exerted minimal effort toward the completion of learning tasks. Supportive of the prediction that goal orientation would

mediate classroom engagement strategies; Meece et al. modeled a causal relationship between task-mastery and active cognitive engagement.

Using the same data from Meece et al. (1988), Meece and Holt (1993) further examined whether mastery oriented students performed better on academic tasks. The original sample of elementary aged students was classified into three categories: high mastery orientation, combined mastery-ego orientation, and low mastery orientation. Replicating the previous finding, the new analyses found that students with at least some identified mastery orientation (high mastery and combined-ego) engaged more often in active learning strategies than low mastery students. Additionally, high mastery oriented children received higher grades and standardized test scores than both combined-ego and low-mastery oriented children.

Emerging from the work of early cognitive psychologists, theories describing how cognitive processes and environmental events work together to produce behavior (see Bandura, 1977) replaced purely stimulus-response explanations of behavior (see Skinner 1948; 1987). Thus, mastery orientation may not directly influence student learning, but by moderating the influences of effort, self-efficacy, and self-regulation has been found to consistently lead to improved student outcomes. As described by Garcia and Pintrich (1991), mastery orientation is a necessary prerequisite that focuses effort, increases self-efficacy, and determines the use of self-regulatory cognitive processes. Specifically, students who adopted a mastery orientation early in a college semester demonstrated increased use of self-regulatory strategies such as monitoring, elaboration, and flexibility.

Mastery oriented students exert effort toward completion of tasks and believe that effort is necessary for success. Success and failure in achievement tasks can be attributed

to either internal (e.g. effort) or external (task difficulty) causes. Dweck (2000) and her colleagues have consistently found that mastery-oriented students of all ages persist more on academic tasks despite their difficulty or perceived failure; students with the helpless orientation viewed failure as an affront to their intelligence and ability and quit. Supporting the conclusion that effort is crucial for confidence and achievement, Weiner, Heckhausen, Meyer, and Cook (1972) found that students who viewed effort as the cause of a success or failure had more confidence in their ability to perform successfully on a task, even after a failure.

Self-efficacy, defined as "the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1977, pg. 193) is another variable that increases with mastery orientation. Supporting the link between mastery orientation and self-efficacy, Phillips and Gully (1997) found that self-efficacy emerged as the most important moderator between college students' goal orientation and performance. Specifically, an orientation toward learning was positively related to self-efficacy and performance whereas an orientation toward performance was negatively related to both outcome variables. Efficacy and feelings of having control over outcomes are intimately related. In academic settings, Caprara et al. (2008) found that feelings of autonomy and control are necessary for self-efficacy to emerge. Results from a meta-analysis of college intervention strategies found that interventions that increased feelings of control positively influenced both academic performance and retention (Robbins, Oh, Le, & Button, 2009). Garcia and Pintrich (1996) used path analysis to conclude that early semester motivation (i.e. mastery orientation, task value, self-efficacy, and test anxiety)

served to predict feelings of autonomy in the classroom which then later served to predict the final grade received in the course in a sample of 365 college students.

Self-regulated learning is the ability to "modulate affective, cognitive, and behavioral processes throughout a learning experience to reach a desired level of achievement" (Sitzmann & Ely, 2011, pg. 421). Pintrich and De Groot (1990) found that middle school students who engaged in self-regulatory cognitive strategies out-performed students who did not use self-regulation on several classroom assessments. Additionally, students who placed value on learning (mastery oriented) demonstrated increased use of self-regulatory strategies. Zimmerman and Bandura (1994) extended these findings to college students and found that as students' efficacy for self-regulation in an academic domain improved, achievement on academic tasks also improved. Specifically, adopting mastery oriented goals led college students to identify self-regulatory strategies that promoted the attainment of their goals (Wolters, 1998). Unfortunately, longitudinal studies have found that feelings of efficacy in self-regulated learning not only decline systematically during the school-age years of 12-18 (Caprara et al., 2008), but also over the course of a semester in college classes (Zusho, Pintrich, & Coppola, 2003).

The relationship between mastery goal orientation and self-regulated learning will be crucial to understand the promise of self-assessment for promoting mastery goals in the college classroom. Self-regulation involves assessing one's performance on learning tasks and taking steps to modify future performance using internal cognitive, affective, and behavioral regulatory strategies (Sitzmann & Ely, 2011). It is reasoned that teachers who assign self-assessments encourage such self-regulation in students. Self-assessment is expected to make self-regulatory variables (e.g. cognitive, affective, and

behavioral) salient to students *during* the process of learning thus promoting the strategies that mastery-oriented students possess.

Because mastery orientation leads to increased effort, efficacy, and self-regulation; mastery oriented students learn more than performance oriented students. Mastery oriented students persist longer on academic tasks, feel confident in their ability to learn, and use strategies to regulate their own learning. In short, mastery oriented students are motivated by learning. This type of motivation might be especially necessary for students to be successful in general education courses. If general education instructors promoted mastery orientation in their classrooms, students might learn more in those classes. The current study will examine formative self-assessment, one tool that is hypothesized to promote mastery orientation. Self-assessment has the potential to develop self-regulatory skills in the classroom and enhance learning. By incorporating self-assessment throughout a semester, instructors can encourage students to reflect on their own performance and develop skills to enhance it.

Assessment to Promote Mastery Goal Orientation

Not all classrooms promote mastery goals. Brophy (2008) identified key characteristics of learning environments that promote mastery. The *social milieu* of a learning environment requires that the classroom be a place where students feel welcome, autonomous, and mastery goal oriented. Research into an *expectancy* dimension suggests that learning tasks must challenge students at an appropriate level such that they maintain confidence in their ability to perform (Brophy, 2008). The *value* dimension, representing a student's beliefs about the content and the effort required to learn that content has been woefully neglected. As a key student-centered variable, the value dimension might also

be referred to as a *motivation to learn* which has been described as "engaging purposefully in curricular activities by adopting their goals and thus trying to learn the concepts or master the skills that they were designed to develop" (Brophy, 2008, p. 133). Students with motivation to learn need not find each learning activity fun or exciting as long as they can find meaning in it (Brophy, 2008).

Classrooms like those described above utilize mastery-goal oriented tools to promote mastery orientation in students. To do this, teachers must develop engaging assessments that hold attention and challenge students to reach their potential (Covington, 2007). The relationship between mastery orientation and learning is evident. A focus on purely summative evaluation has been found to limit students' motivation to learn and this limitation leads to decreased learning (Meece, Anderman & Anderman, 2006). Unfortunately, college students shift away from a mastery orientation toward a performance orientation during the first year of college (Kowalski, 2007). This decrease in mastery orientation may be the result of decreased efficacy for self-regulated learning (see Zusho, Pintrich, & Coppola, 2003). The question remains whether college instructors can employ formative assessments and encourage mastery orientation in their classrooms.

Instructors can influence student mastery orientation when assessments are tied to progress toward goals, encourage active participation, and provide opportunities for feedback (Ames, 1992). In addition to promoting mastery, assessments like these encourage student interest, effort, and learning goal setting. Stiggins and Chappuis' (2006) notion of "assessment for learning" encourages instructors to use assessments that promote student involvement in the process of assessment. Developed from some best

practices in course design, Brookhart (1997) identified a model of classroom assessment arguing that assessment influences achievement because of the assessment's influence on student self-efficacy and effort; both of which contribute to mastery orientation (Ames, 1992; Phillips & Gully, 1997). While goal orientation has been defined as an internal and relatively stable trait unique to each student, teachers do play a role in regulating the motivations of their students. Using qualitative methods, Kember, Ho, and Hong (2010) found that students identified assessment as one variable that influenced their motivation in college courses.

The conclusion that formative assessments promote mastery orientation is well established. Formative assessment/feedback that is frequent, immediate, and specific promoted mastery orientation by focusing attention on learning and encouraged students to set goals for themselves (Cauley & McMillan, 2010). In a qualitative analysis of student perceptions of classroom feedback, Poulos and Mahony (2008) discovered that students preferred specific feedback to guide performance and that such feedback was missing from their first year of university study. This finding provides additional insight into the decrease of mastery orientation during the first year of college. As long as the feedback was specific, the tone of the feedback was less important. Students oriented toward learning viewed both positive and negative feedback as an opportunity to improve. VandeWalle, Cron, and Slocum (2001) assessed college student goal orientation and performance on two exams, providing feedback on performance between the two and found that mastery-oriented students improved performance post-feedback whereas performance-oriented students showed no gains in performance.

To manipulate mastery goals, instructors can rely on *success-oriented assessments* to provide feedback to guide student performance (Covington, 2007). Such assessments allow students to become critical of their own performance and use formative guidance toward improving that performance (Levin, 1990). Following directly from Pintrich and Zusho's (2007) model, assessments that promote learner autonomy, efficacy, and motivation will promote learning. Thus, the current study is especially interested in examining formative assessments that involve students in the assessment of their own progress toward stated learning outcomes. With training and practice, students become confident in their ability to self-assess and become increasingly skilled at making accurate autonomous critiques of their performance (van Hattum-Janssen, Pacheco, & Vasconcelos, 2004).

A necessary skill for the 21st century workplace is the ability to use self-reflection to guide progress (Sluijsmans, Dochy, & Moerkerke, 1999). A relatively recent development in the formative assessment literature is the inclusion of student self-assessment as a viable option for assessing learning. Self-assessment is a process through which students self-monitor, self-evaluate, and identify ways to improve learning (McMillian & Hearn, 2008). Incorporating student self-assessment in traditional classrooms has allowed for enhanced metacognition, self-direction, and social interactions within the learning environment in which they are used (Black et al., 2006). Using the important relationship between mastery orientation and self-regulated learning, it follows that assessments that promote self-regulatory variables would enhance mastery orientation and achievement.

Self-assessment requires that students judge their own performance through the understanding of clearly communicated assessment criteria (Taras, 2010). Teachers can incorporate this type of assessment in a number of ways, though Taras (2010) outlines several models of self-assessment, each with its own benefits and challenges. All models include students in the process of assessment and work best if students receive training on the process and purpose of self-assessment. The strongest models are those that involve students in the establishment of grading criteria and/or assessment tools. In order of strongest to weakest, the models of self-assessment are:

1. The *self-marking* approach requires students to compare their work with a pre-determined (and teacher-defined) set of criteria or a model response.
2. The *sound-standard* approach requires students review an "average" piece of work and then discuss whether two additional pieces of work fall above or below that average. Students then use their understanding of expectations to assess their own work.
3. The *standard model* approach requires students to provide feedback on their own work using established criteria prior to submission for teacher grading.
4. The *self-assessment with integrated tutor feedback* approach requires teachers to provide minimal feedback, but no grade on submitted student work. Students receive this feedback and work with peers to discuss additional areas for improvement or concern and assign a grade to the work.
5. The *learning contract design (LCD)* approach requires students to take an active role in the development of assessment criteria. When assessing their own work,

students summarize the criteria, describe their performance, and judge their performance against the criteria.

The practice of self-assessment activates self-regulatory variables that promote mastery orientation. McMillan and Hearn (2008) developed the student self-assessment cycle (see Figure 3) and proposed a theoretical rationale for the increased use of student self-assessment. Self-assessments encourage students to identify their own learning and performance strategies, reflect on feedback using clear criteria, and determine the steps that must be taken to improve performance. Self-assessment promotes mastery orientation because it requires reflection on one's own abilities, encourages self-efficacy, and assists in the identification of methods that can be used to enhance ability (McMillan & Hearn, 2008).

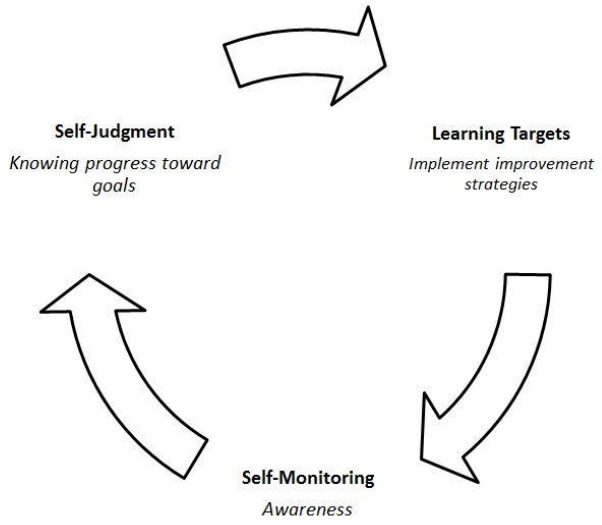

Figure 3. McMillan and Hearn's (2008) Student Self-Assessment Cycle

Self-assessment is an active and formative process that encourages student participation in the learning process. Students begin by monitoring their performance on an assessment task. This self-monitoring requires that students "pay deliberate attention

to what they are doing" (McMillan & Hearn, 2008, pg. 41). Only after students have engaged in self-monitoring can they use established criteria, often determined by the teacher, to judge their performance. This judgment allows students to determine the gaps in their knowledge. Finally, students set learning goals to improve their current performance. This process promotes self-regulatory learning strategies such as mastery goal orientation by forcing students to focus on learning goals and self-efficacy by requiring that students focus their abilities and develop ways to improve them.

Although not universal, concerns about the accuracy of students as assessors, especially in the first year of college have emerged (Nulty, 2011). Examining a multi-modal approach to assessment using teacher, peer, and self-assessments on a single assessment task, Fallows and Chandramohan (2001) found no clear relationship between the marks given by the students, their peers, or the teacher. Some students marked higher than the teacher; some marked lower. Kirby and Downs (2007) found that disadvantaged university students in South Africa were significantly more generous in assigning grades on their own written work than staff. Van Hattum-Janssen, Pacheco, and Vasconcelos (2004) discovered that already high-achieving students were the most accurate self-assessors. There is also some evidence that females tend to under-score themselves when compared to males (Langan, et al., 2008). In a review of the literature on self-assessment, Boud and Falchikov (1989) found no clear pattern in the scores assigned to work by students versus those assigned by teachers and caution against relying too heavily on concordance between student and teacher scores. To overcome these potential obstacles of inaccuracy, it is necessary to ensure that self-grading criteria are explicit and that students are given opportunities to practice self-assessing (Miller, 2003).

Students may struggle with self-assessment because the scoring criteria are too vague making it difficult to distinguish between various levels of performance (Miller, 2003). It could be predicted that increased specificity would lead to improved accuracy. Miller (2003) revised the specificity of scoring criteria on a self-assessment tool for a graduate-level oral presentation and compared student scores using the two different tools. The initial tool consisted of five open-ended questions addressing criteria such as "clarity," "completeness," and "accuracy (Miller, 2003, p. 393). Peer and self-assessors were asked to assign a score of 0 (unsatisfactory) to 4 (excellent) to each criterion. The revised tool used the same scoring scale (0-4), but explicitly described each criterion and embedded the scoring scale next to each description. Miller concluded that students were less generous in their scoring and assigned a larger range of scores when using the revised assessment tool suggesting that the explicit criteria allowed assessors to focus on specific aspects of the presentations.

Measuring Mastery Orientation in the College Classroom

The measurement of mastery orientation has evolved from the early adaptation of existing measures (see Meece, Blumenfeld, & Holt, 1988) to the development of reliable and valid stand-alone measures like the Academic Motivation Scale (AMS) (Vallerand et al., 1992), the Patterns of Adaptive Learning Survey (PALS) (Midgley et al., 1998), and the Motivated Strategies for Learning Scale (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1991). These inventories differ in the underlying theoretical basis of the measurement of student motivation, but all include scales measuring the location of motivation (internal or external) for academic pursuits. The Academic Motivation Scale (AMS) was first developed to measure French students' motivation for attending college

using self-determination theory as a framework (Vallerand et al., 1992) and is the least relevant of the three options to the current study.

The Patterns of Adapted Learning Scale (PALS) was developed using goal orientation theory (Dweck & Leggett, 1988) and explicitly measures mastery and performance goals toward academic tasks (Midgley et al., 1998). The PALS was designed for and validated in elementary and middle-school settings asking questions such as, "I like school work that I'll learn from, even if I make a lot of mistakes." Although the PALS explicitly measures goal orientation, students are asked to reflect generally on their motivation for "school" and not a specific course or assessment approach. In addition, individual items would require modification for relevance in college classrooms.

The Motivated Strategies for Learning Questionnaire (MSLQ) was designed using self-regulatory learning theory and moves toward measuring goal orientation in specific contexts, rather than generally (Garcia & Pintrich, 1995). The MSLQ was developed to be administered in college classrooms to assess goal orientation of college students for a single course (Pintrich et al., 1991). Using a 7-point scale where 1 is *not at all true of me* and 7 is *very true of me,* students respond to items such as, "In a class like this, I prefer course material that really challenges me so I can learn new things," that explicitly measure their goal orientation. The full-scale MSLQ consists of 81 items across fifteen sub-scales including those of Goal Orientation, Self-Regulated Learning Strategies, and Self-Efficacy. The scales can be used together or independently per the needs of individual researchers (Pintrich et al., 1991). The MSLQ is both a valid and reliable measure of goal orientation. Confirmatory factor analysis demonstrated that the scales of

the MSLQ are statistically sound and reliability coefficients within the scales were consistently above .80 (Garcia & Pintrich, 1995). Finally, the MSLQ has demonstrated predictive validity suggesting that scores on the MSLQ are correlated with academic performance (Pintrich et al., 1991).

Because of its underlying focus on self-regulated learning and its relevance to measuring college student motivation in individual college courses, the MSLQ has been selected for use in the current study. No tool exists that can measure the presence of learning across general education disciplines, so the relationship between mastery orientation and enhanced learning provides a means to measure a single construct across disciplines. Mastery oriented students are likely to learn more in algebra, chemistry, composition, and psychology. The current study will examine changes in mastery orientation across a semester that is hypothesized to result from differences in the use of formative self-assessment. Because mastery orientation has been shown to lead to enhanced learning, it is theorized that by examining mastery orientation, the presence of learning can be assumed.

Summary

Students enter college to learn (Kuh, Gonyea, & Williams, 2005) and learning is dynamically influenced by motivation (Pintrich & Zusho, 2007). Students with a motivational orientation toward mastery goals are more successful in college than students without such an orientation because they possess skills that direct their efforts toward learning. While some students enter college already mastery oriented, many do not. For these students, teachers can encourage the development of mastery orientation by using classroom methods that encourage persistence, confidence, and self-regulatory

skills. One method teachers can readily manipulate in their classrooms is the use of assessment. Formative assessment encourages mastery orientation through its use of feedback allowing students to change their strategies as a means to improve learning (Black et al., 2004).

Mastery oriented students are more successful in college, likely because they are more persistent, are more confident, and employ more effective self-regulatory strategies than non-mastery oriented students. Self-assessment is expected to activate self-regulatory mechanisms because it requires that students reflect on their own performance and make adjustments to improve performance. Following from the success of formative assessment in general, the purpose of this study is to examine whether formative *self-assessments* promote mastery orientation in college students. Using the MSLQ to measure mastery orientation, efficacy, and self-regulation, it is hypothesized that students enrolled in general education courses will demonstrate increased mastery orientation at the end of the semester in classes where formative self-assessment is used.

Chapter III

Methodology

The purpose of this study was to examine whether the use of formative self-assessment in general education and developmental college courses increased student mastery orientation. The hypothesis under investigation was that mastery orientation would be higher when formative self-assessments were used to assess learning in general education and developmental college courses. If this hypothesis is true, institutions of higher education might support the use of formative self-assessments.

Sample Subjects

Participants were recruited from Rochester Community and Technical College (RCTC) in Rochester, Minnesota. Permission was granted from the office of the President at RCTC to conduct this research on campus and approval was granted from Minnesota State University Mankato's Institutional Review Board (IRB). Undergraduate students who were 18 years old or older enrolled in selected (see below) general education and developmental courses at RCTC were recruited for participation. Prior to the start of the semester, an email was sent to all RCTC faculty members soliciting cooperation in this research. From this initial communication, ten faculty members responded indicating their willingness to include their class(es) for participation. Of these ten, three included both a self-assessment section and a traditional assessment section, three provided two self-assessment sections, and the remaining four included a single section, either self-assessment or traditional assessment. Once all participating sections were identified, a researcher visited each class early in the semester to recruit student participants. Two hundred sixteen students enrolled in 16 different classes representing 8

disciplines completed the initial Goal Orientation/Demographic Questionnaire. Of these, 70.4% were enrolled in a general education course and the remaining 29.6% were enrolled in a developmental course. General education courses are those courses that count toward a student's degree, program, or transfer goals and often require "college level reading and writing" as a pre-requisite. Developmental courses are those in which students are placed based on pre-registration standardized test scores to receive remediation in reading, writing, or math. Developmental credits do not count toward a student's degree, program, or transfer goals and are pre-requisites for some students to begin working on their college-level coursework.

This sample represents the diversity of the RCTC student population (Comprehensive Overview, 2012) with 56% of the sample being female and 25% of the sample being students of color. The mean age for this sample was 23.77 years, *SD* =). Of the initial 216 participants, 143 (66.5%) completed the post-test at the end of the semester. There were no significant differences in the mean age, $F(1, 214) = .507$, *ns*, gender $\chi^2 = .091$, *ns*, or ethnic representation $\chi^2 = 9.36$, *ns* of the remaining sample.

Data Collection Procedures

Data were collected from sixteen general education and developmental courses during the spring 2013 semester. Instructors from ten of the courses expressed interested in using self-assessment and incorporated formative self-assessment where students (n = 142) assessed their own learning. In these sections, self-assessments were developed by each instructor for relevance to their course content and the scores were incorporated into each student's course grade. Fallows and Chandramohan (2001) distinguish between *assessment tasks* and *assessment approaches.* An assessment task is the specific item of

work each student produces, whereas an assessment approach relies on the mechanism through which a grade is assigned (e.g. self, peer, or teacher graded). Using this framework, the instructors teaching in the self assessment courses implemented different assessment tasks; however the underlying assessment approach was the same. For the current study, instructors developed self-assessments that required student self-reflection on specific course assignments, self-assessment of their progress toward learning outcomes, and self-assessment of their class participation. Self-assessment tasks were provided to the researcher for review and all were appropriate for the study, but the tasks varied only minimally in their strength of self-assessment (see Taras, 2010).

Each of the self-assessments developed by the instructors required students to utilize teacher-created grading scales to assess their own written work or classroom performance/participation. A photography instructor provided a detailed self-assessment rubric asking students to grade their work on a scale of 0 (unacceptable) to 5 (excellent) using categories relevant to each assignment (e.g. quality of work, aesthetics, and workflow) in addition to a narrative self-assessment form asking questions like, "How did you use light, aperture and/or shutter speed in making the compositional choices for your images?" A reading instructor provided students with a self-assessment form after each timed reading assignment where students recorded their performance and reflected on their improvements/struggles with questions like, "Are you able to read between the lines to understand what the author is talking about?" A communication, psychology, English, and math instructor used self-assessments that required students to assign themselves a score after reflecting on items such as, "I contributed meaningfully to every classroom discussion by sharing examples and observations," "Does my conclusion very

briefly summarize what I wrote," "I read the assigned chapters in the textbook," and "I completed all of the assignments included in the 'A' assignments." Self-assessments were provided in class at least 4 times, but not more than 7 times during the semester and were incorporated into the course grade for each student in all but one English class. Students were aware of the incorporation of the self-assessment as part of their final course grade either as a directly transferred score or as a part of their participation for the week's class.

Instructors from the remaining six courses used only traditional assessment methods to determine each student's (n = 74) course grade. Instructors using only traditional assessment methods did not use self-assessment, but assessed student performance using multiple-choice and short answer tests, teacher-driven feedback on written work, and/or teacher-driven participation grades.

To examine changes in mastery orientation over the course of one semester, all students (n = 216) completed the Goal Orientation scales of the Motivated Strategies for Learning Questionnaire (MSLQ) as part of the initial Goal Orientation/Demographic Questionnaire (Appendix A) at the beginning of the course to establish early semester baseline mastery orientation. Students who remained enrolled and attended the class session late in the semester (n = 142) also completed the full-scale MSLQ (Appendix B) at the end of the course. The Goal Orientation/Demographic Questionnaire and the full-scale MSLQ were administered by the researcher during a class session and students completed it using a paper/pencil format. The paper/pencil format of administration was preferred over an online administration as a means to ensure that students were specifically imagining the course under investigation while they completed the measures.

The researcher visited each class during the second and third week of the spring 2013 semester to inform students of the nature of the study and provided the option to participate in the study. Students were informed that there was minimal risk involved in their participation and that their participation was fully voluntary. All participating students provided their student identification number which was used to associate each participant with the course, their Goal Orientation/Demographic Questionnaire responses, their full-scale MSLQ scores, and their final letter grade. During the initial visit, participants completed the Goal Orientation/Demographic Questionnaire that included questions about demographics, interest in the content of the course, and the two Goal Orientation scales of the MSLQ. Ten sections incorporated formative self-assessment into the course grade and six sections did not. During a class session near the end of the semester, all participants completed the full-scale MSLQ. Once the semester had concluded and final grades had been calculated, instructors provided the researcher with each participant's final course grade. Early semester baseline mastery orientation from the Goal Orientation/Demographic Questionnaire was subtracted from the full MSLQ questionnaire to determine each student's change in mastery orientation over the semester.

Variables. As hypothesized, it was expected that formative self-assessment (independent variable) would increase mastery orientation (dependent variable) in college students enrolled in general education and developmental courses. Formative self-assessments were developed by individual instructors and included the use of rubrics that students used to reflect on their own performance in a course. Scores assigned by the student were incorporated into the overall course grade for 9 of the 10 self-assessment

courses either as a stand-alone self-assessment grade or a component of a broader participation grade. Mastery orientation is defined as a "pattern characterized by challenge seeking and high, effective persistence in the face of obstacles" (Dweck, 1986, p. 1040) and was measured using the Goal Orientation scales of the MSLQ. Mastery orientation also includes components of self-regulated learning (Pintrich & Zusho, 2007) which were measured using the Learning Strategies scales of the MSLQ.

Instrumentation. Two instruments were used in the current study, a Goal Orientation/Demographic Questionnaire and the full-scale MSLQ. The Goal Orientation/Demographic Questionnaire included questions about demographics, interest in the course, and questions about mastery and performance goal orientation. Items used to measure interest and goal orientation were taken directly from the Goal Orientation scales of the MSLQ. Demographic questions included things like year in school, college major, age, sex, and ethnicity. Also included in the questionnaire were items to determine the level of interest participants had in the content of the class and their reason(s) for enrolling in the class.

The full scale MSLQ was used because it is a validated and reliable inventory designed to examine college students' motivational orientations in college courses (Pintrich, Smith, Garcia, & McKeachie, 1991). The MSLQ is comprised of 15 sub-scales that ask participants to self-report attitudes and behaviors consistent with self-regulatory learning (see Pintrich & Zusho, 2007). Two motivation sub-scales, Intrinsic Goal Orientation and Extrinsic Goal Orientation scales directly assess participants' goal orientation by asking questions that "refer to the student's perception of the reasons why she is engaging in a learning task" (Pintrich, et al., 1991, pg. 9). The remaining

motivation sub-scales ask questions relevant to interest in the content of the course, learning beliefs, self-efficacy, and test anxiety. An additional scale measures learning strategies with sub-scales focusing on a variety of cognitive and behavioral strategies such as rehearsal, elaboration, organization, critical thinking, self-regulation, time management, effort, collaboration, and help-seeking.

Once collected, all data were kept in a locked faculty office and were only accessible to the researcher. Data will be kept for three years after the conclusion of the study and will be shredded after that time.

Data Analysis

Overall differences in end of semester mastery orientation between the self-assessment group and traditional assessment group will be examined using an independent samples t-test. This analysis calculates whether there are significant differences in mean mastery orientation scores between the self-assessment and traditional assessment groups. Mastery goal orientation for students in self-assessment and traditional assessment courses is not expected to differ at the beginning of the course, however the use of formative self-assessment during the course is hypothesized to increase mastery orientation in students enrolled in those courses. Changes in mastery goal orientation can be calculated by subtracting early semester baseline mastery orientation from end semester mastery orientation. This change can be analyzed using an independent samples t-test to determine if the two groups differ in their mean change in mastery orientation. An additional test of the hypothesis would be to calculate an ANCOVA and control for (i.e. hold constant or partial out) early semester mastery

orientation when calculating differences between the self-assessment and traditional assessment groups in end of semester mastery orientation.

Self-assessments can vary significantly in the involvement of students in their development, from simple self-marking of teacher-derived rubrics to the most complex learning contracts that require students take an active role in developing the assessment criteria themselves (Taras, 2010). A numerical value can be assigned to these self-assessment types according to their involvement of students from least involved (e.g. self-marking) to most involved (learning contract) and correlation analysis will be used to determine whether the strength of the self-assessment is related to changes in mastery orientation. Specifically, it might be expected that increased student involvement in the development of the assessment task would predict increased end-semester mastery orientation. However, all self-assessments used in the current study were developed by the instructor for use as self-marking rubrics.

It might also be expected that student interest in the content of a course serves as a mediating variable between assessment and goal orientation. As such, a factorial ANOVA will be calculated to determine whether there is an interaction between assessment type and early semester interest when measuring student goal orientation. In addition to this general test of the hypothesis, a factorial ANOVA will be calculated to determine if there is an interaction between assessment type and instructor. Additional analyses may be run as trends in the data become apparent.

Chapter IV

Results

Mastery orientation was reported using a 7-point scale where 1 represented very low mastery and 7 represented very high mastery.

Hypothesis Tests

Overall differences in early semester and late semester mastery orientation were calculated using independent samples t-tests. It was predicted that students enrolled in classes using self-assessment would demonstrate a larger increase in mastery orientation across the semester than students enrolled in traditional assessment classes. As expected, early semester mastery did not differ between the self-assessment and traditional assessment groups, $t(210) = .136$, *ns*. Interestingly, late semester mastery also did not differ between the self-assessment and traditional assessment groups, $t(141) = .434$, *ns*. As supported by previous research, college student performance orientation ($M = 5.59$, $SD = 1.08$) was significantly higher than mastery orientation ($M = 4.92$, $SD = 1.19$) for all students, $t(209) = 6.98$, $p < .01$ at the beginning of the semester.

Using the mastery scale scores provided by each student at the beginning and end of the semester, change in mastery orientation across the semester for the self-assessment and traditional assessment groups was examined using a repeated measures ANOVA. The ANOVA was calculated to determine if the mean change in mastery differed for the students in self-assessment courses (n = 96) from the students in traditional assessment courses (n = 46). Change in mastery did not differ, $F(1, 139) = 2.28$, $p = .13$, $\eta^2 = .02$, $d = .32$ between the self-assessment and traditional assessment groups. A trend in the direction hypothesized was found only for those students enrolled in college-level general

education courses. Mastery orientation increased marginally more in the self-assessment classes than in the traditional assessment classes, $F(1, 105) = 3.26$, $p = .075$, $\eta^2 = .03$, $d = .43$. Means with standard deviations for these variables are presented in Table 1.

Table 1
Descriptive Statistics for Mastery Orientation Between Groups

	Early Semester		Late Semester	
Variable	Mean	SD	Mean	SD
Overall	4.90	1.89	5.23	1.06
Self-Assessment	4.90	1.21	5.25	.99
Trad. Assessment	4.92	1.16	5.17	1.20
General Education	4.85	1.14	5.23	1.00
Developmental	5.02	1.30	5.22	1.24

It might be expected that early semester mastery and/or early semester interest might influence semester-long change in mastery. An analysis of covariance (ANCOVA) was calculated to control for the effects of early semester mastery and interest. Removing these effects did not reveal an effect of assessment, $F(1, 138) = 1.48$; *ns,* $\eta^2 = .01$, $d = .23$.

Mastery orientation represents only a single motivational process that can be regulated alongside self-regulatory processes (Pintrich & Zusho, 2007). These self-regulatory processes (SRP) include the regulation of cognition and behavior (e.g. changing study strategies, engaging in class, focusing on comprehension, etc…). So, although mastery did not significantly improve as a function of assessment type, cognitive/behavioral regulation toward learning tasks did differ between assessment groups. Students in self-assessment courses reported employing significantly more cognitive/behavioral regulation at the end of the semester than students in traditional

assessment courses, $F(1, 140) = .389$; $p = .05$, $\eta^2 = .03$, $d = .50$. There was no difference between these two groups on the remaining component measures of motivation (efficacy and interest) or effort. Means and standard deviations for these variables are presented in Table 2.

Table 2
Descriptive Statistics for Motivational and Self-Regulatory Variables Between Groups

	Self-Assessment (n = 96)		Traditional Assessment (n = 47)	
Variable	Mean	SD	Mean	SD
Cog./Beh. Regulation	4.64	1.00	4.30	.96
Efficacy	5.75	.96	5.63	.83
Interest	5.59	1.21	5.49	1.29
Effort	5.31	1.18	5.19	1.09

Additional Variables of Interest

Pintrich and Zusho's (2007) model identifies mastery orientation as only one motivational process that, combined with self-regulatory processes leads to achievement. Thus, goal orientation (both mastery and performance) might be expected to correlate with additional variables associated with motivation such as efficacy and interest as well as outcome variables associated with effort, persistence (retention), and achievement (grades). All scale scores were calculated using a 7-point scale where 1 represented that the trait was not at all like the student and 7 represented that the trait was very true of the student. Table 3 (next page) displays correlations between these motivational and self-regulatory variables. Calculated using the Pearson r, a number of significant and positive correlations were found within the data. To illustrate, students who reported increased early semester mastery (#1) also reported increased late semester mastery (#2), $r = .68$, $p < .01$; increased early semester performance orientation (#3), $r = .25$, $p < .01$; increased

efficacy (#5), $r = .41$, $p < .01$; increased interest in the course (#6), $r = .84$, $p < .01$; increased effort (#7), $r = .38$, $p < .01$; and increased self-regulation (#8), $r = .50$, $p < .01$.

Table 3
Correlations Among Motivational and Self-Regulated Learning (SRL) Variables

Variable	1	2	3	4	5	6	7	8
Motivational Processes								
1. Pre Mastery	--	.68**	.25**	.07	.41**	.84*	.38**	.50**
2. Post Mastery	.68**	--	.18*	.23	.56**	.82*	.43**	.64**
3. Pre Perform	.25**	.18*	--	.58**	.24**	.28*	.10	.18*
4. Post Perform	.07	.23**	.58**	--	.38**	.18*	.17	.25**
5. Efficacy	.41**	.56**	.24**	.38**	--	.45**	.58**	.53**
6. Interest	.84**	.70**	.28**	.18*	.45**	--	.37**	.54**
Self-Regulatory Processes								
7. Effort	.38**	.43**	.10	.17	.58**	.37**	--	.56**
8. Self-Regulation	.50**	.64**	.18*	.25**	.53**	.54**	.56**	--

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

Pintrich's (2000) assertion that mastery oriented students tend to persist on tasks whereas performance oriented students do not was supported by a significant positive correlation between early semester mastery orientation and effort, $r = .38$, $p < .01$ and no correlation between early semester performance orientation and effort, $r = .10$; *ns*. Interestingly, effort in the classroom did not translate into increased effort outside the classroom. Students did not differ in effort whether they had or had not visited with faculty outside of class, $F(4, 140) = .98$, *ns*, $\eta^2 = .03$, $d = .30$; utilized the writing center, $F(3, 140) = 1.90$, *ns*, $\eta^2 = .05$, $d = .48$; or took advantage of tutoring resources, $F(3, 140) = 1.03$; *ns*, $\eta^2 = .05$, $d = .47$. In support of Bandura's (1986) predictions of the importance of efficacy for achievement, there was a significant and positive correlation between efficacy and early semester mastery, $r = .41$, $p < .01$; early semester performance, $r = .24$, $p < .01$; and effort, $r = .58$, $p < .01$.

Persistence/Retention. Retention was determined by whether the student received a final letter grade (A-F) in the course (i.e. remained on the class roster). Students who did not receive a letter grade (i.e. did not remain on the class roster) or received a grade of "W" were coded as not retained. More students were retained in self-assessment (95%) courses than traditional assessment (80%) courses, $\chi^2 = 11.11$, $p < .01$. An ANOVA was calculated to determine if early semester interest, mastery orientation, and/or performance orientation differed between the retained/not retained groups. Interestingly, there were no significant differences in early semester interest, $F(1, 207) = .42$, $\eta^2 = .02$, $d = .09$; mastery, $F(1, 207) = 2.50$, $\eta^2 = .01$, $d = .35$; or performance orientation, $F(1, 207) = .92$, $\eta^2 = .00$, $d = .16$ between the retained students and not retained students suggesting the cause of attrition is more complex than goal orientation alone. Additionally, there was no difference in retention between general education and developmental courses, $\chi^2 = 1.91$, *ns*.

Achievement/Final Grades. There was no difference in final course grades between the self-assessment and traditional assessment groups, $F(1, 179) = 2.54$, *ns*, $\eta^2 = .01$, $d = .35$. It might however be expected that goal orientation would correlate with student's overall performance in a course as measured by their final points percentage earned in the course. No correlation was found between final percentage grade and early semester mastery, $r = .12$; *ns*; late semester mastery, $r = .13$; *ns;* early semester performance, $r = -.04$; *ns*; or late semester performance, $r = .07$; *ns*. When variables relevant to other motivational factors were included to the analysis, significant and positive correlations were found between final percentage grade and late semester interest, $r = .20$, $p = .02$; efficacy, $r = .48$, $p < .01$; and effort, $r = .35$, $p < .01$.

Interestingly, no correlation was found between course grades and self-regulation, r = .14; *ns*.

Instructor Variability. Individual instructors may promote mastery and self-regulation regardless of the types of classroom assessments they develop. It might be expected that individual differences in the personalities of instructors might influence student outcomes more so than the more subtle effects likely produced by individual assessment tasks. To test this, an ANOVA was calculated to determine whether there were differences on key outcome variables (e.g. mastery and self-regulation) as a function of the instructor. Motivational variables were not influenced by instructor, however there were significant and meaningful differences in self-regulation, $F(9, 140) = 3.05$; $p < .01$; $\eta^2 = .13$, $d = .97$; effort, $F(9, 140) = 2.05$; $p < .05$; $\eta^2 = .13$, $d = .85$; and efficacy, $F(9, 140) = 1.89$; $p = .06$; $\eta^2 = .12$, $d = .81$. The Bonferroni post hoc analysis was conducted and indicated, for example that self-regulation was significantly higher for one instructor ($M = 4.75$, $SD = .93$) than for another instructor ($M = 3.38$, $SD = .87$).

It was hypothesized that the use of self-assessment would increase student mastery orientation. Overall, this was not found, however when developmental students were removed from the analysis, a trend in the direction hypothesized was found for the remaining students enrolled in college-level general education courses. In addition to this trend, students exposed to self-assessment in their classes reported using significantly more self-regulatory processes such as coming to class prepared, setting goals, reflecting on learning objectives, and modifying study strategies to increase understanding than students exposed only to traditional assessment. Retention was significantly higher in self-assessment courses. Correlational results indicated that mastery orientation was

significantly and positively related to the effort a student put forth in a class whereas performance orientation was not related to effort. Assessment type and goal orientation were not related to final course grades, however additional motivational variables were significantly and positively correlated with final course grades. Finally, individual differences in instructor accounted for the most variance on key self-regulatory variables, but not motivational variables. In sum, although the primary hypothesis of the study was not supported, relevant variables emerged to guide discussion and further research.

Chapter V

Discussion

Mastery orientation declines over the course of the first year of college and becomes less motivating than performance orientation over a student's college career (Kowalski, 2007). Because mastery orientation has been shown to promote success in college, methods to prevent this decline must be explored. Formative self-assessment is one such method that was hypothesized to increase college student mastery orientation. When examining the entire sample in this study, mastery orientation did not increase as a function of the type of assessment used in college courses suggesting that the relationship between mastery and assessment is complex. Further, the subtle effects of differences in classroom assessment may not have reached beyond the immediate time-frame of the individual tasks. Thus, measuring shifts in mastery across the entire semester may have allowed additional variables to exert their influence on these outcomes. Interestingly, when the students enrolled in developmental courses were removed from analysis, a trend in the direction hypothesized was found with the remaining students enrolled in college-level general education courses. This demonstrates a greater increase in mastery when enrolled in a self-assessment rather than traditional assessment course.

Developmental students are underprepared for success in college and may differ in non-random ways from students entering college with the skills necessary to immediately enroll in college-level general education courses. Developmental students may lack necessary self-regulatory skills that are not enhanced by the use of self-assessment. Specifically, students may lack the ability to implicitly translate the skills learned through self-assessment to their out-of-class learning habits. Developmental

students may also not see the relationship between their personal strategies and college success. In sum, developmental students may lack fundamental *metacognition,* defined by White (1998) as the knowledge, awareness, and control of one's own learning. In cases where developmental students have chronically underperformed in academic settings, they may not have developed the metacognitive skills necessary to believe in their success and translate the skills learned through self-reflection into positive outcomes.

Developmental courses do not count toward a student's degree, so the students may be less motivated to put forth the effort and time associated with self-regulation. Perhaps the content of the courses is so basic that individual self-regulation and motivation is not necessary to achieve their goals in the class, which, often is simply to pass with a "C" so they can move into college-level coursework. Instructors of developmental courses may not place as much value on developing developmental students' metacognition. Because of preconceived notions about the ability of developmental students, they may be less motivated to teach in engaging ways in developmental courses. Further research will be necessary to examine the influence developmental courses have on both students and instructors. It may be that different pedagogical approaches should be considered for developmental and general education courses.

Although the component variables of motivational processes (goal orientation, efficacy, and interest) did not differ between the self-assessment and traditional assessment groups, cognitive/behavioral self-regulation did differ with the self-assessment group reporting significantly higher self-regulation than the traditional

assessment group. This result suggests that the incorporation of self-assessment forces students to develop cognitive/behavioral skills that enhance their ability to engage in course material, modify their study strategies, and focus on learning objectives as they work toward course goals. Self-assessment may encourage self-regulation in other ways. For example, incorporating self-regulation into a course grade through the use of assessment may encourage students to apply these principles outside of class. Practicing self-regulation in class teaches students the expectations of self-regulation allowing them opportunities to employ these strategies on their own. This practice might make students feel more confident in their ability to take control of their learning and they will begin to employ SRL on their own. Additional research will be necessary to examine the specific benefits self-assessment has on cognitive/behavioral regulation and metacognition.

Specific outcome variables were correlated with mastery orientation. Specifically, late semester effort was significantly and positively correlated with both early and late semester mastery orientation, but not correlated with either early or late semester performance orientation. Two additional variables examined in the current study related to motivational processes, efficacy and interest, were significantly and positively correlated with both mastery and performance orientation. This suggests that students can be interested and feel confident in classes with both mastery and performance goals. The results of this study also suggest that classroom effort and outside-of-classroom effort may be viewed differently by students. Students that put forth effort in classes did not increase their effort outside the classroom by seeking resources such as tutoring or writing center help.

Retention was found to be significantly higher in the self-assessment classes than in the traditional assessment classes. It might be argued that requiring students to reflect on their performance in a class allows expectations to remain salient in their thinking across a semester. This constant reminder of expectations may activate metacognitive strategies that promote retention. Research exploring these relationships will be necessary to fully understand whether manipulation of self-regulatory variables through the use of assessment tasks might lead to increased retention on a larger scale.

It is puzzling that no correlations were found between mastery, self-regulation and course grades. This demonstrates that these variables alone may not contribute to achievement in a class although both were present to a greater degree in classes that employed self-assessment. However, final percentage grades were significantly and positively correlated with other motivational variables such as efficacy and interest as well as with effort. It is these relationships that might be most appropriate to explore further and are more direct measurements of success than mastery orientation alone. What is it about self-assessment that improves mastery and self-regulation, but does not translate into higher grades?

Instructors using self-assessment were only required to use the self-assessment four times during the semester. This "small dose" might not have been sufficient practice for students to translate mastery/SRP into improved achievement. It might be that the skills learned through self-assessment take longer than a single semester to apply in ways that improve grades. Additionally, there may be a disconnect between the remaining assessment tasks and learning. Traditional assessments may not promote learning inasmuch as mastery oriented students perform less well on assessments such as exams

where performance goals are activated. Finally, instructors may implicitly discourage both self-regulatory and mastery skills in the developmental courses they teach. They may have less enthusiasm for the developmental course content and this may translate into less effective assessment.

Small effect sizes for both motivational and self-regulatory results may suggest that such effects are too subtle to detect across an entire semester. Their effects may be more appropriately examined immediately after administration of the task. Because of this limitation, individual differences in instructor delivery and personality demonstrated a significant and meaningful account of the variability of student self-regulation, effort, and efficacy. In fact, on each measure 1-2 instructors out-performed their peers on these outcome variables although it was not the same instructor for each variable. The most self-regulation and efficacy was developed in a single speech instructor's courses while the most effort was promoted in a single developmental math instructor's courses. These results support further examination into the traits exhibited by effective teachers in college classrooms beyond the pedagogical decisions they make.

Implications

The results of this research show that classroom instructors can influence student outcomes, but certainly not in as subtle a way as was hypothesized. Motivational processes that include goal orientation, efficacy, and interest must be nurtured alongside self-regulatory processes to produce student achievement and retention. As Pintrich and Zusho's (2007) model suggests and these data confirm, student achievement must be nurtured through the use of innovative pedagogies that promote mastery goals while developing self-regulatory skills in students.

Retention in self-assessment courses was significantly higher than in traditional assessment courses. This finding alone should encourage faculty to develop classroom self-assessment as a viable retention tool. Activating metacognitive strategies by expecting students to reflect on their own performance is emerging as a low/no cost strategy to increase retention. As institutions of higher education continue to see reductions in public funding alongside increased demands of accountability, self-assessment seems to be a promising and simple method to minimize attrition in a student's early college career.

As expected, variables of efficacy and effort were consistently found to relate to success outcomes (i.e. higher grades) and mastery. Mastery orientation is a variable comprised of several self-regulatory components, thus, teachers might focus specifically on promoting their student's confidence and require that they put forth effort in their courses as a means to indirectly influence mastery and higher achievement. Self-reflection on these variables might also be necessary for their effects to be realized. A student who puts significant effort into a course may not be aware of such effort until she is encouraged to reflect on that effort through self-assessment.

Pedagogical and personnel decisions should be informed by relevant research. Instructors of general education and developmental students must consider the influence their assessment methods have on variables that influence student success. While the activation of some motivational and self-regulatory mechanisms (i.e. efficacy, effort, and interest) through the use of self-assessment may have increased mastery in general education courses, the connection between self-regulation and motivation was not as robust when developmental courses were also considered. Additional exploration into the

relationship between these metacognitive strategies and student success across skill levels within higher education will be necessary to accurately inform classroom practice. Additionally, instructors and administrators must also realize that personality and/or other individual characteristics of instructors influences their success in the classroom. The implications these results have for career planning, hiring, and performance appraisal may reach far beyond the scope of the current discussion.

Motivational and self-regulatory variables can be manipulated through the use of self-assessment in college classrooms. Instructors should be encouraged that their efforts developing thoughtful assessment tasks do influence student outcomes. Administrators should be encouraged that easily implemented self-assessments improve retention. As expected, additional variables of motivation and self-regulation were correlated with student outcomes. Significant and positive correlations were found between mastery, effort, efficacy, interest, and self-regulation, but not between mastery and final grades. These findings suggest that the influence of assessment on mastery may be mediated through the development of these related variables and may not immediately translate into increased achievement.

Limitations and Recommendations for Further Research

The small late semester sample size for the traditional assessment group (n = 47) may have limited statistical power (*d* =.323). Power of at least .80 is recommended in social science research (Cohen, 1988) suggesting that a larger sample size may have been necessary in order to detect the effect of assessment on mastery. Estimates of effect size indicated that the effect of assessment was modest (η^2 = .02), thus recruitment early in

the semester of a larger sample may have increased the ability of the method to detect an effect if one was present.

Instructors were free to implement a self-assessment as they typically used in their classes. As such, most of the self-assessments used were simple teacher-produced rubrics which were used by students to self-rate their performance on specific assignments or activities. Relying on previously developed self-assessments may have limited the impact the self-assessment had in each course. In future studies, more robust and controlled manipulation of assessment tools used by each instructor might provide a less subtle effect. While mastery and SRP improved with the use of self-assessment, these improvements did not translate into higher grades. These findings suggest that there may be a disconnect between assessment and learning, so further research examining the self-regulatory and metacognitive skills necessary to achieve in courses must be explored. Future studies might focus on more intensive use of self-assessment to examine whether increased use of self-assessment improves achievement within a single semester. Future research might also focus on in-class practice of self-regulatory skills and the influence of such practice on metacognition and achievement.

Continued examination of variables associated with goal orientation and self-regulation will allow for increased focus on the classroom interventions that lead to increased student learning and student success. For example, early semester effort (not examined in this sample) might be predicted to influence retention. Thus, future studies might examine the relationship between these variables to determine their role in the development of mastery orientation in college students. Self-assessment was able to promote self-regulation and enhance retention which leads to exciting new research

directions. Additional research must explore whether these two variables are causally related or a function of a third variable. Finally, the influence of individual instructor delivery and/or personality factors must not be overlooked. Pursuing a career as a community college instructor must not solely be influenced by one's content knowledge, but also by whether one can build engaging relationships with students.

This research examined the influence self-assessment had on mastery orientation in general education and developmental college classes. While the main hypothesis that mastery would increase in self-assessment courses was not confirmed, additional trends emerged that suggest self-assessment may be a useful tool for educators in promoting self-regulated learning and retention. In the changing climate of higher education, low-cost strategies that teachers can use in their own classrooms to promote student success and retention should continue to receive research attention and administrative support.

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Appendix A

Goal Orientation/Demographic Questionnaire

1. Sex:
    a. Male
    b. Female
    c. Transgender

2. Age (in years): _____

3. In what year did you graduate from high school? _____

4. Class level in college (circle one):
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior

5. If declared, what is your major area of study?
   _____

6. Which of the following categories best describes your racial/ethnic group?
    a. Black, non-Hispanic
    b. American Indian/Alaska Native
    c. Asian/Pacific Islander
    d. Hispanic
    e. White, non-Hispanic
    f. Other

7. Was English the primary language spoken in your home when you were growing up?
    a. Yes
    b. No

8. About how many hours per week do you work for pay? _____

9. How many college credits are you taking this semester? _____

10. During the previous semester (Fall 2012), how many times did you (please indicate using the number categories below):

0 1-2 3-4 5-6 More than 6

a. Meet with a faculty member outside of class: _____
b. Discussed course selection and program requirements with faculty/staff: _____
c. Worked with faculty members on activities other than coursework: _____
d. Went to the writing center: _____
e. Met with a tutor: _____

11. What are your reasons for taking THIS class?
    a. Fulfills a transfer/general education requirement
    b. Content seemed interesting
    c. Is required of all students at this college
    d. Will be useful to me in other courses
    e. Is an easy elective
    f. Will help improve my academic skills
    g. Is required for my major/program
    h. Was recommended by a friend
    i. Was recommended by a counselor or advisor
    j. Will improve career prospects
    k. Fit into my schedule

*The following questions ask about your motivation for and attitudes about **this class**. There are no right or wrong answers, just answer as accurately as possible. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.*

12. In a class like this, I prefer course material that really challenges me so I can learn new things.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

13. I think I will be able to use what I learn in this course in other courses.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

14. Getting a good grade in this class is the most satisfying thing for me right now.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

15. It is important for me to learn the material covered in this class.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

16. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

17. If I can, I want to get better grades in this class than most of the other students.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

18. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

19. I am very interested in the content area of this class.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

20. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

21. I think the material covered in this class will be useful for me to learn.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

22. When I have the opportunity in this class, I will choose course assignments that I can learn from even if they don't guarantee a good grade.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

23. I like the subject matter of this course.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

24. Understanding the subject matter of this course is very important to me.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

25. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

Appendix B

Full Scale Motivated Strategies for Learning Questionnaire

Part A: Motivation

The following questions ask about your motivation for and attitudes about this class. Remember there are no right or wrong answers, just answer as accurately as possible. Use the scale below to answer the questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

1.	In a class like this, I prefer course material that really challenges me so I can learn new things.	1	2	3	4	5	6	7
2.	If I study in appropriate ways, then I will be able to learn the material in this course.	1	2	3	4	5	6	7
3.	When I take a test I think about how poorly I am doing compared with other students.	1	2	3	4	5	6	7
4.	I think I will be able to use what I learn in this course in other courses.	1	2	3	4	5	6	7
5.	I believe I will receive an excellent grade in this class.	1	2	3	4	5	6	7
6.	I'm certain I can understand the most difficult material presented in the readings for this course.	1	2	3	4	5	6	7

7. Getting a good grade in this class is the most satisfying thing for me right now	1	2	3	4	5	6	7
8. When I take a test I think about items on other parts of the test I can't answer.	1	2	3	4	5	6	7
9. It is my own fault if I don't learn the material in this course.	1	2	3	4	5	6	7
10. It is important for me to learn the course material in this class.	1	2	3	4	5	6	7
11. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.	1	2	3	4	5	6	7
12. I'm confident I can learn the basic concepts taught in this course.	1	2	3	4	5	6	7
13. If I can, I want to get better grades in this class than most of the other students.	1	2	3	4	5	6	7
14. When I take tests I think of the consequences of failing.	1	2	3	4	5	6	7
15. I'm confident I can understand the most complex material presented by the instructor in this course.	1	2	3	4	5	6	7
16. In a class like this, I prefer course material that arouses my	1	2	3	4	5	6	7

17. I am very interested in the content area of this course.	1	2	3	4	5	6	7
18. If I try hard enough, then I will understand the course material.	1	2	3	4	5	6	7
19. I have an uneasy, upset feeling when I take an exam.	1	2	3	4	5	6	7
20. I'm confident I can do an excellent job on the assignments and tests in this course.	1	2	3	4	5	6	7
21. I expect to do well in this class.	1	2	3	4	5	6	7
22. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.	1	2	3	4	5	6	7
23. I think the course material in this class is useful for me to learn.	1	2	3	4	5	6	7
24. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.	1	2	3	4	5	6	7
25. If I don't understand the course material, it is because I didn't try hard enough.	1	2	3	4	5	6	7
26. I like the subject matter of this course.	1	2	3	4	5	6	7
27. Understanding the subject matter of this course is very important to me.	1	2	3	4	5	6	7

28. I feel my heart beating fast when I take an exam.	1	2	3	4	5	6	7
29. I'm certain I can master the skills being taught in this class.	1	2	3	4	5	6	7
30. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.	1	2	3	4	5	6	7
31. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	1	2	3	4	5	6	7

Part B: Learning Strategies

The following questions ask about your learning strategies and study skills for this class. Again, there are no right or wrong answers. Answer the questions about how you study in this class as accurately as possible. Use the same scale to answer the remaining questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

32. When I study the readings for this course, I outline the material to help me organize my thoughts.	1	2	3	4	5	6	7
33. During class time, I often miss important points because I'm thinking of other things.	1	2	3	4	5	6	7
34. When studying for this course, I often try to explain the material to a classmate or friend.	1	2	3	4	5	6	7

35. I usually study in a place where I can concentrate on my course work.	1	2	3	4	5	6	7
36. When reading for this course, I make up questions to help focus my reading	1	2	3	4	5	6	7
37. I often feel so lazy or bored when I study for this class that I quit before I finish what I planned to do.	1	2	3	4	5	6	7
38. I often find myself questioning things I hear or read in this course to decide if I find them convincing.	1	2	3	4	5	6	7
39. When I study for this class, I practice saying the material to myself over and over.	1	2	3	4	5	6	7
40. Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone.	1	2	3	4	5	6	7
41. When I become confused about something I'm reading for this class, I go back and try to figure it out.	1	2	3	4	5	6	7
42. When I study for this course, I go through the readings and my class notes and try to find the most important ideas.	1	2	3	4	5	6	7
43. I make good use of my study time for this course.	1	2	3	4	5	6	7

44. If course readings are difficult to understand, I change the way I read the material.	1	2	3	4	5	6	7
45. I try to work with other students from this class to complete the course assignments.	1	2	3	4	5	6	7
46. When studying for this course, I read my class notes and the course readings over and over again.	1	2	3	4	5	6	7
47. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.	1	2	3	4	5	6	7
48. I work hard to do well in this class even if I don't like what we are doing.	1	2	3	4	5	6	7
49. I make simple charts, diagrams, or tables to help me organize course material.	1	2	3	4	5	6	7
50. When studying for this course, I often set aside time to discuss course material with a group of students from the class.	1	2	3	4	5	6	7
51. I treat the course material as a starting point and try to develop my own ideas about it.	1	2	3	4	5	6	7
52. I find it hard to stick to a study schedule.	1	2	3	4	5	6	7

53. When I study for this class, I pull together information from different sources, such as lectures, readings, and discussions.	1	2	3	4	5	6	7
54. Before I study new course material thoroughly, I often skim it to see how it is organized.	1	2	3	4	5	6	7
55. I ask myself questions to make sure I understand the material I have been studying in this class.	1	2	3	4	5	6	7
56. I try to change the way I study in order to fit the course requirements and the instructor's teaching style.	1	2	3	4	5	6	7
57. I often find that I have been reading for this class but don't know what it was all about.	1	2	3	4	5	6	7
58. I ask the instructor to clarify concepts I don't understand well.	1	2	3	4	5	6	7
59. I memorize key words to remind me of important concepts in this class.	1	2	3	4	5	6	7
60. When course work is difficult, I either give up or only study the easy parts.	1	2	3	4	5	6	7
61. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for this course.	1	2	3	4	5	6	7

62. I try to relate ideas in this subject to those in other courses whenever possible.	1	2	3	4	5	6	7
63. When I study for this course, I go over my class notes and make an outline of important concepts.	1	2	3	4	5	6	7
64. When reading for this class, I try to relate the material to what I already know.	1	2	3	4	5	6	7
65. I have a regular place set aside for studying.	1	2	3	4	5	6	7
66. I try to play around with ideas of my own related to what I am learning in this course.	1	2	3	4	5	6	7
67. When I study for this course, I write brief summaries of the main ideas from the readings and my class notes.	1	2	3	4	5	6	7
68. When I can't understand the material in this course, I ask another student in this class for help.	1	2	3	4	5	6	7
69. I try to understand the material in this class by making connections between the readings and the concepts from the lectures.	1	2	3	4	5	6	7
70. I make sure that I keep up with the weekly readings and assignments for this course.	1	2	3	4	5	6	7

71. Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.	1	2	3	4	5	6	7
72. I make lists of important items for this course and memorize the lists.	1	2	3	4	5	6	7
73. I attend this class regularly.	1	2	3	4	5	6	7
74. Even when course materials are dull and uninteresting, I manage to keep working until I finish.	1	2	3	4	5	6	7
75. I try to identify students in this class whom I can ask for help if necessary.	1	2	3	4	5	6	7
76. When studying for this course I try to determine which concepts I don't understand well.	1	2	3	4	5	6	7
77. I often find that I don't spend very much time on this course because of other activities.	1	2	3	4	5	6	7
78. When I study for this class, I set goals for myself in order to direct my activities in each study period.	1	2	3	4	5	6	7
79. If I get confused taking notes in class, I make sure I sort it out afterwards.	1	2	3	4	5	6	7
80. I rarely find time to review my notes or readings before an exam.	1	2	3	4	5	6	7

81. I try to apply ideas from course readings in other class activities such as lecture and discussion.	1 2 3 4 5 6 7