

The Impact of Online Graduate Students' Motivation and Self-Regulation on Academic Procrastination

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Abstract

With the rapid growth in online programs come concerns about how best to support student learning in this segment of the university population. The purpose of this study was to investigate the impact of effort regulation, a self-regulatory skill, and intrinsic motivation on online graduate students' levels of academic procrastination, behavior that can adversely affect both the quality and quantity of student work. This research was guided by one primary question: Are online graduate students' intrinsic motivation and use of effort regulation strategies predictive of procrastination? Results indicated that as intrinsic motivation to learn and effort regulation decrease, procrastination increases. Specific strategies for encouraging effort regulation and intrinsic motivation in online graduate students are presented.

Introduction

Enrollments in online courses at universities in the United States have grown substantially faster than enrollments in traditional courses over the past several years. For example, in 2008, there was a 12.9% increase in students taking at least one online course over the previous year. That growth greatly exceeds the increase of 1.2% in the overall higher education population during the same time period (Allen & Seaman, 2008). With this rapid growth come concerns about how best to support student learning in this segment of the university population.

Interest in the role student self-regulation and motivation play in the online learning environment has increased along with this dramatic growth in online learning opportunities. Schunk and Zimmerman (1998) assert that self-regulated learning strategies may be increasingly important as more students participate in distance learning environments because instructors are not physically present. Thus, students need to be more autonomous. Maintaining motivation may be more difficult for online students as

they face problems related to social isolation and technical issues that cause frustration not as frequently experienced by students in face-to-face classes.

Research on the effects of academic self-regulation and motivation on learning has demonstrated important links between the two constructs (Schunk, 2005). Students with more developed self-regulatory cognitive skills tend to be more academically motivated and learn more than others (Pintrich, 2003). The purpose of this study was to investigate the impact of effort regulation, a self-regulatory skill, and intrinsic motivation on online graduate students' levels of academic procrastination. The results of this study can provide online instructors with valuable insight into two malleable student characteristics that may decrease student procrastination and increase student learning.

Motivation

Motivation is described as a process through which individuals instigate and sustain goal-directed activity. Motivation is generally viewed as a process through which an individual's needs and desires are set in motion (Alexander & Murphy, 1998; Pintrich, Marx, & Boyle, 1993). Academic motivation reflects students' levels of persistence, interest in the subject matter, and academic effort (DiPerna & Elliot, 1999); it is viewed as a contributor to academic success (Alexander, 2006; Ames & Ames, 1985; Dweck & Legget, 1988; Wylie, 1989).

While motivation is critically important to student learning (Pintrich & Schunk, 2002), lack of motivation is a frequent problem with students at all levels. All learning environments present challenges, but the online environment presents unique challenges because students bear more responsibility for their own learning than in many traditional classes. Because of these challenges, students' ability to influence their own motivation is important (Wolters, Pintrich, & Karabenick, 2005).

One specific aspect of motivation is intrinsic motivation. It may be defined as the performance of a task for the inherent satisfaction it brings an individual rather than for some separate consequence (Ryan & Deci, 2000). Intrinsic motivation appears to combine elements of Weiner's (1974; 1980; 1986) attribution theory, Bandura's (1977; 1993) work on self-efficacy, and other studies related to goal orientation (Pintrich, 2001). Important to the present study is the fact that intrinsic motivation can be influenced within the educational context (Deci & Ryan, 2004).

Intrinsic motivation increases when individuals attribute educational results to internal factors they can control (attribution theory) (Weiner, 1980). Intrinsic motivation is further increased when individuals believe they are capable of reaching desired goals (self-efficacy) (Bandura, 1977; Lent, Brown & Larkin, 1986; Marsh, Walker, & Debus, 1991). Intrinsic motivation also increases when individuals are interested in mastering a subject, rather than simply earning good grades (goal orientation) (Dweck, 1986; Nicholls, 1984). When these factors converge and result in high levels of intrinsic motivation, students are more likely to be successful learners (Alexander, 2006).

Self-Regulation

Self-regulated learning is described as an active process whereby learners construct goals for learning. Learners monitor, regulate, and control their cognition, motivation, and behavior. They are guided and constrained by their own goals and the individual characteristics of a particular learning environment (Wolters, Pintrich, &

Karabenick (2005). Zimmerman (1989) described self-regulated learners as “metacognitively, motivationally, and behaviorally active participants in their own learning process” (p. 329). Self-regulatory activities impact individual students, their level of achievement, and the learning context (Wolters, Pintrich, & Karabenick, 2005). It is important for students to learn *how* to learn and take control of their efforts (effort regulation).

One self-regulatory resource management strategy described by Pintrich, Smith, Garcia, and McKeachie (1991) is effort regulation. Also referred to as volition (Corno, 1993), effort regulation refers to a learner’s ability to control his or her attention and efforts even in situations that present distractions that may be perceived to be interesting.

Effort management is self-management, and reflects a commitment to completing one’s study goals, even when there are difficulties or distractions. Effort management is important to academic success because it not only signifies goal commitment, but also regulates the continued use of learning strategies (Garcia & McKeachie, 1991, p. 27).

Academic Procrastination

Shraw, Watkins, and Olafson (2007) define academic procrastination as “intentionally delaying or deferring work that must be completed” (p. 12). Procrastination is actually the opposite of motivation – the lack of intention or willingness to take action (Ryan & Deci, 2000). Research indicates that procrastination adversely affects academic progress because it limits both the quality and quantity of student work. Procrastination leads to a number of negative results, including lower goal commitment, lower amount of time allotted towards work (Morford, 2008), a decrease in course achievement (Akinsola, Tella, & Tella, 2007), and a decrease in long-term learning (Schouwenburg, 1995). Procrastination has also been correlated with lower levels of self-esteem (Harrington, 2005) and lower grades (Tuckman, 2002a; Tuckman, 2002b).

It is important to note that not all forms of procrastination lead to negative consequences. Chu and Choi (2005) differentiate between passive procrastination and active procrastination. While passive procrastinators allow the negative, indecisive behavior to paralyze them, active procrastinators make deliberate decisions to procrastinate because they prefer to work under pressure. In essence, active procrastinators use procrastination as a positive academic strategy. They do not tend to suffer the same negative academic consequences as passive procrastinators.

Steel (2007) also discusses the occasional use of the term procrastination to describe positive behavior. He describes such use of the term by some researchers as “functional delay” (p. 66). However, in his meta-analysis of the procrastination literature, Steel asserts that such usage is secondary to the use of the term in the traditional, negative sense. The use of the term procrastination in the present study refers to the primary, passive, negative form of procrastination.

Factors Related to Procrastination

In a meta-analysis of procrastination research, Steel (2007) examined 691 previously examined correlates of procrastination. Most of the studies reviewed used young undergraduate university students in traditional course settings. He found that strong, consistent predictors of procrastination included task aversion, task delay, self-

efficacy, and impulsiveness. Additionally, he found that conscientiousness as demonstrated by achievement motivation, organization, and self-control were also strong predictors of procrastination behaviors. Steel's results echo that of Solomon and Rothblum (1994) who studied college students' reasons for procrastination. They found that procrastination involved a complex interaction of behavioral, affective, and cognitive components, not simply a deficit in time management or poor study habits.

Both Onwuegbuzie and Jiao (2000) who studied graduate students in face-to-face classes and Solomon and Rothblum (1984) who studied undergraduates in traditional classes found that procrastination is strongly influenced by two factors: fear of failure and task aversion, with fear of failure accounting for most of the procrastination behaviors. In a related study, Flet et al. (1992) found that academic procrastination in undergraduate students stems, in part, from anticipation of disapproval from those holding perfectionistic standards for others. They also found that the fear of failure component of procrastination was associated broadly with all the perfectionism dimensions.

Tuckman (2002b) studied procrastination in undergraduate students enrolled in a Web-based course. He found that procrastinators used rationalization rather than self-regulation, which resulted in lower course grades. This phenomenon occurred in spite of the fact that the course was highly structured and enforced frequent deadlines throughout the duration of the course. In another study, Tuckman compared high, moderate, and low procrastinators in undergraduate students on their reported degree of self-regulation. He found that the more self-regulation was used, the less procrastination resulted (Tuckman, 2002a).

Howell and Watson (2007) examined the relationships between procrastination, goal orientation, and learning strategies among undergraduate students. They found that disorganization and lower use of cognitive/metacognitive learning strategies were positively related to procrastination. Morford (2008) found that low procrastinators among undergraduates in traditional classes demonstrated higher commitments to goals than high procrastinators. Tan, Ang, Klassen, Yeo, Wong, Huan, & Chong, (2008) examined procrastination in undergraduate students and discovered that self-efficacy for self-regulated learning was negatively related to procrastination.

Senecal, Koestner, and Vallerand (1995) found that junior college students who were intrinsically motivated to perform well on academic tasks tended to procrastinate less than students who are more extrinsically motivated to perform the same tasks. The results led the researchers to the belief that procrastination is more of a motivational problem rather than a problem of poor time management skills or simple laziness. Steel (2007) also found that achievement motivation was a strong predictor of academic procrastination.

Consequences of Academic Procrastination

Despite the obvious negative consequences of passive procrastination behaviors, over 70% of undergraduate students in one study reported academic procrastination, with about 20% reporting habitual procrastination (Schouwenburg, 1995). Graduate students in another study demonstrated an even greater tendency to procrastinate on academic tasks at a rate of up to 3.5 times that of a comparison group of undergraduate students (Onwuegbuzie, 2004).

For many students, the tendency to procrastinate increases in the online learning

environment. In traditional classes, the requirement to attend lectures forces students to focus on class materials on a regular basis. At least part of their study time is distributed equally across the semester (Elvers, Polzella, & Graetz, 2003). Online students do not participate in regular class meetings, so there is an increased tendency to procrastinate and “cram” more study into less time, often resulting in poorer learning outcomes. Elvers, Polzella, and Graetz (2003) examined the differences between procrastination in undergraduate students enrolled in online and face-to-face course sections of the same course. Procrastination in the online sections was negatively correlated with exam scores, but not in face-to-face sections.

If procrastination is prevalent in the online environment and detrimental to student learning and performance, it is important for online faculty to identify factors that may reduce students' tendency to procrastinate. Because procrastination can lead to decreased academic performance, it is important to better understand the influence students' self-regulated learning strategies and motivation have on procrastination. Procrastination, Self-regulated Learning Strategies, and Motivation

More specifically, it is important to understand this relationship because students' self-regulated learning strategies and motivation are characteristics that can be addressed and improved. Given the highly autonomous environment that is online education, the need for highly developed levels of self-regulation is important (Artino & Stephens, 2007).

Self-regulated learning strategies can be addressed through instructional design, direct instruction, and modeling (Paris & Winograd, 2001; Perels, Gurtler, & Schmitz, 2005). “Motivation to learn is alterable; it can be positively or negatively affected by the task, the environment, the teacher and the learner” (Angelo, 1993, p. 7). Academic motivation can be enhanced through the use of certain instructional strategies and through course design (Komarraju, 2008), social interaction with other students and faculty (Yang, Tsai, Kim, Cho, & Laffey, 2006), and by positively influencing student belief in the value of academic tasks and in their ability to successfully complete them (Angelo, 1993).

Researchers have just begun to fully explore the issue of procrastination in online courses with undergraduate students. Little research appears in the literature regarding procrastination behavior in graduate students, particularly in the online environment. If cognitive self-regulated learning strategies and academic motivation influence online students' tendency to procrastinate, online faculty could avail themselves of means to impact the tendency to procrastinate by specifically addressing self-regulated learning strategies and motivation through the use of particular instructional strategies and through course design.

The Present Study

Specific relationships should be identified between cognitive self-regulated learning strategies, academic motivation, and procrastination, a particularly problematic behavior among online students. This research was guided by one primary question: Are online graduate students' intrinsic motivation and use of effort regulation strategies predictive of procrastination?

Intrinsic motivation and effort regulation, a specific cognitive self-regulated learning strategy, were selected as predictors of procrastination because both were

expected to be inversely related to procrastination (DiPerna & Elliott, 1999), and because both are malleable student characteristics. Thus, if procrastination is identified in student behavior, concerted faculty effort can be focused to address issues of intrinsic motivation and effort regulation and yield positive impacts on student performance. Furthermore, if intrinsic motivation and effort regulation are found to be predictive of procrastination, online courses can be designed to take pre-emptive action against procrastination by facilitating intrinsic motivation and increasing guidance for effort regulation.

Methodology

Sample

The convenience sample for this study consisted of 81 fully admitted graduate students enrolled in an online masters program in education. The university from which the sample was taken is an accredited mid-southern university that grants bachelors and masters degrees. Respondent's ages ranged from 21 to 57 with a mean age of 33. Eighty-five percent (n=69) of the participants were female; 15% were male (n=12).

Measures

In order to measure self-regulated learning strategies, motivation, and procrastination, participants completed the Motivated Strategies for Learning Questionnaire (MSLQ) and the Procrastination Assessment Scale-Students (PASS).

Motivated Strategies for Learning Questionnaire. Intrinsic motivation and the self-regulated learning strategy of effort regulation were assessed using appropriate sections of the Motivated Strategies for Learning Questionnaire (MSLQ), a scale that was developed from a social-cognitive perspective of motivation and self-regulated learning (Pintrich et al., 1991). The MSLQ was designed to measure students' motivation and self-regulated learning strategies relative to a specific course.

Students rate themselves on a scale of 1-7 from "Not at all true of me now." to "Very true of me." Scales are constructed by taking the mean of the items that comprise that scale. Sample items from the intrinsic motivation scale include, "In a class like this, I prefer course material that really challenges me so I can learn new things." and "In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn." Sample items from the effort regulation scale include, "I often feel so lazy or bored when I study for this class that I quit before I finish what I planned to do." and "When course work is difficult, I give up or only study the easy parts." Originally validated on a sample (N=356) of undergraduate college students, Cronbach's alpha measured the internal consistency of items in the scales. Coefficient alphas are reported for intrinsic goal orientation (.74) and effort regulation (.69) (Pintrich et al., 1991). The reliability alpha for the intrinsic motivation scale for this sample was .73. The reliability alpha for the effort regulation scale for this sample was .58. Although the reliability alpha for effort regulation was low, it closely approached .60. Therefore, in light of the small sample size, the scale was retained.

Procrastination Assessment Scale-Students. The Procrastination Assessment Scale-Students (PASS) is the most widely used scale to measure academic procrastination (Ferrari, Johnson, & McCown, 1995). It is a 44-item instrument that was designed to measure the frequency of cognitive and behavioral aspects of procrastination. Specifically, it measures the prevalence of academic procrastination and the reasons for

procrastination. The authors (Solomon & Rothblum, 1984) define procrastination as a passive act of procrastination, specifically as “the act of needlessly delaying tasks to the point of experiencing subjective discomfort” (p. 503).

For purposes of the present study, the prevalence of academic procrastination section was used. Respondents were asked to describe their behavior for specific academic tasks such as writing a term paper, studying for exams, and weekly reading assignments. Respondents answer the questions for each academic task using a 5-point Likert scale for two questions: “To what degree do you procrastinate on this task?” (1 = “Never Procrastinate” to 5 = “Always Procrastinate”) and “To what degree is procrastination on this task a problem for you?” (1 = “Not at all a problem” to 5 = “Always a problem.”) The sum of the two questions (prevalence and problem) of each procrastination area was computed for a total score. A higher score is more indicative of self-reported procrastination.

PASS was originally investigated on a sample of 323 undergraduate university students. Cronbach’s alpha measured the internal consistency of items in the scales used in this study. The individual coefficients for the different procrastination prevalence areas were moderately high (e.g., for the essay questions the coefficient was .81). The procrastination prevalence scale had a test/retest reliability of .74 for frequency (Ferrari, Johnson, & McCown, 1995; Solomon & Rothblum, 1994). The reliability alpha for the PASS for this sample was .61.

Procedures

All instruments were prepared for presentation on the Internet using Dragon, survey software that is a companion to the FileMaker Pro database software. No personal information was collected. All responses were voluntary and anonymous. Participants were invited to participate via email and were asked to complete the questionnaire.

Results

In order to examine the relationship between the total score (frequency of procrastination) on the PASS and the scores on the MSLQ motivation (intrinsic goal orientation) and cognitive learning strategies (effort regulation) scale, the data were analyzed using multiple regression to determine whether intrinsic motivation and effort regulation were predictive of student procrastination. The PASS total prevalence of procrastination score was entered as the dependent variable and MSLQ scores (intrinsic goal orientation and effort regulation) were entered as the independent or predictor variables. The sample size for the analyses was 81. The means, standard deviations, and correlations among all the variables are shown in Table 1 below.

Table 1

Means, Standard Deviations, and Correlations for Regression of Procrastination, Intrinsic Motivation, and Effort Regulation (N = 81)

	1	2	3
1. Procrastination	1.00		
2. Intrinsic Motivation	-.36	1.00	
3. Effort Regulation	-.38	.36	1.00
Mean	55.68	4.84	5.41
Standard Deviation	16.83	1.12	1.05

Preliminary examination of the results indicated there was no extreme multicollinearity in the data (all variance inflation factors were less than 2). Exploratory analysis also indicated that the assumptions underlying the application of multiple linear regression (independence, normality, heteroschedasticity, and linearity) were met. The regression results indicated that the set of independent variables significantly influenced 19.8% of the variance in the model ($F(2, 78) = 2.751; p < .001$) (see Table 2) with an effect size of .25, which was particularly large for this sample.

Both of the independent variables had a significant unique influence on procrastination. In order of importance, they were effort regulation ($t = -2.63, p < .01$) and intrinsic motivation ($t = -2.34, p < .05$). The negative correlations between intrinsic motivation and effort regulation as they relate to procrastination (-.36 and -.38, respectively) indicate that as intrinsic motivation to learn and effort regulation decrease, procrastination increases. Beta weights and partial correlations are presented in Table 2 below.

Table 2

Regression Analysis of Procrastination on Intrinsic Motivation and Effort Regulation

Variable	<i>b</i>	<i>Beta</i>	<i>Partial</i>	<i>t</i>
Intrinsic Motivation	-3.82	-.25	-.24	-2.34**
Effort Regulation	-4.56	-.29	-.27	-2.63*

Note. * $p < .01$. ** $p < .05$. $R^2 = .198$. R^2 change = .178.

Discussion

Both effort regulation and intrinsic motivation among online graduate students in this study had a significant unique influence on procrastination. Results indicated that as intrinsic motivation to learn and effort regulation decrease, procrastination increases. Since procrastination has a negative influence on student performance, the findings provide important information for online teachers trying to develop strategies that will improve student achievement in online courses.

Individually, both effort regulation and intrinsic motivation influence procrastination behavior are characteristics that can be influenced by online instructors in an effort to reduce procrastination. The results of this study indicate that together, these two factors powerfully influence procrastination.

Implications for Practice: Encouraging Effort Regulation

Effort regulation involves the ability to continue to work in the face of distractions. Five strategies for encouraging effort regulation in students are of particular interest to online instructors.

Use peer modeling. Bandura (1986) asserts that students learn by observing others, not simply by doing tasks themselves. Peer modeling can, therefore, increase student learning. Peer models allow students to compare themselves to similar individuals and learn new skills, to perform previously held skills prompted by the observation of others' behavior, and to facilitate self-regulation.

Students who lack self-regulatory skills such as effort regulation can experience difficulty, particularly in the online environment in which they are expected to manage their own learning. "College students who have not learned to be self-regulated learners can learn self-regulation strategies through peer modeling" (Orange, 1999, p. 24). Student interactions in chat rooms and in discussion boards can have the effect of peer modeling, even if that effect is unintentional. When providing feedback on such communications, instructors can highlight particularly good student messages so other students are made aware of what the instructor considers a good model for other students (Roberts, 2006). Tools such as blogs and Wikis can also facilitate online peer modeling as students share their work with others as they complete projects. With proper instructor feedback, peer models can encourage students to perform at higher levels.

Minimize distractions. Two suggestions for helping students manage interference that can lower effort regulation involve encouraging students to minimize distractions, both physical and mental, from the work environment. “It therefore seems likely that successful volitional training will require the kind of naturalistic, guided or participant modeling and evidence of utility that has come to characterize more effective forms of cognitive strategy training as well” (Corno, 1989, p. 119).

Steel (2007) suggests that “Management of distracting cues could facilitate the prevention of procrastination so that one either fails to encode these cues or limits their processing so that they are not fully valued” (p. 70). For example, if one is distracted by an open Web browser page that makes it easy to participate in email conversations, then an act as simple as closing that Web browser while working on a course assignment can reduce procrastination.

Kuhl (1985) also suggests that putting away certain mental distractions can also reduce procrastination. In particular, students should be encouraged to avoid repeatedly contemplating past mistakes or failures that are related to a current course task. For example, a student may hesitate to complete a research project that involves statistical analysis because repeated thoughts about past problems with such an assignment prevent progress and result in procrastination. With both types of distractions, simply making students self-aware through individual communication or group informational materials can diminish procrastination behaviors.

Create strict deadlines. Silver (1974 as cited in Steel, 2007) asserts that one factor that predicts procrastination is the number of choices that a student must make while pursuing a task. The more choices students have, the more likely it is that they will become distracted and procrastinate. Reducing the number of choice points can help establish productive habits and reduce the tendency to procrastinate. Creating strict schedules for assignment deadlines with checkpoints along that time frame helps to reduce poor choices that can cause students to postpone completion of assignments. Waiting until the last minute to complete assignments tends to reduce both the quality of the learning experience and the grade received for that work.

Sequence tasks appropriately. The pace and sequencing of course tasks may positively influence effort regulation. Instructors can alternate more difficult tasks with less difficult tasks. There is some research to suggest that current effort regulation can be affected by the effort exerted in the immediate past. In Wright, Martin, and Bland’s (2003) experiment, effort regulation for a subsequent task was reduced in individuals who were given an initial task they found to be difficult. Depleted participants exerted less effort on a second task as compared to participants in the control group that had not been depleted by a previous task. Allowing students sufficient time to recover from demanding tasks before presenting a subsequent difficult task may encourage consistent, strong effort regulation throughout a course.

Implications for Practice: Encouraging Intrinsic Motivation

There is a large body of research concerning instructor behaviors that can enhance intrinsic motivation in students. Five of these factors are particularly relevant to students in online courses.

Create a sense of community. Yang, et al. (2006) asserts that when students perceive the social availability and presence of other students and the instructor, intrinsic

motivation increases. Particularly in online courses in which there is physical distance between the instructor and students, it is important for instructors to find ways to demonstrate an openness to communication from students and to encourage student participation. Online environments such as Blackboard make it simple to create student home pages that include photographs and personal introductions that can create a sense of belonging to a class (Bennett & Monds, 2008). Email addresses and ungraded chat rooms can be provided for students and thereby encourage communication among class members.

Project a supportive instructional style. A supportive teaching style can increase intrinsic motivation in students. Research by Deci, Spiegel, Ryan, Koestner, and Kauffman (1982) shows that when teachers are controlling, students display lowered intrinsic motivation than when teachers support autonomy in their students. Additionally, Noels, Clement, and Pelletier (1999) found that perceptions of teachers' style of communicating with students were related to students' intrinsic motivation. As teacher behavior became more controlling and less informative, students' intrinsic motivation was lowered. More learner-centered teacher behaviors such as providing encouragement and showing interest in students' questions and accomplishments will enhance intrinsic motivation.

Because of the lack of face-to-face feedback in online classes, instructors should intentionally demonstrate their support for students in written communications with students. One method for providing this support is through frequent, positive feedback concerning students' progress in the online course. Deci and Ryan (1985) assert that individuals tend to be successful and more intrinsically motivated when they receive positive, verbal feedback.

Encourage a perception of competence. Online courses require not only typical academic skills, but also require a level of mastery of technological skills as well. A student's belief that he or she can perform successfully is important to the development and maintenance of intrinsic motivation (Reeve & Deci, 1996). Students are encouraged by positive comments from instructors regarding their ability to successfully complete a technology-based task.

Instructors can diminish technology-related fears by providing multiple sources from which students can receive assistance with technology issues. Such resources can include the instructor, another student, a university technology center's help desk, or Web-based tutorials. Overcoming such difficulties can contribute to a feeling of success and reinforce intrinsic motivation.

Present challenges. Critical to maintaining intrinsic motivation is the presentation of tasks in a course that make students feel that they are performing at capacity. Otherwise, students tend to become bored and lose motivation for the course. Instructors must be careful to avoid creating tasks that are too difficult because doing so can create anxiety and reduce intrinsic motivation. When there is balance between opportunity and skill, students are motivated to act (Deci & Ryan, 1985).

Encourage autonomy. Research has demonstrated that providing people with choices as to how they pursue activities increases intrinsic motivation; externally controlling influences can have the opposite effect (Enzle, Wright, & Redondo, 1996). When possible, instructors should allow students some freedom to approach assignments from the perspective of their own goals and specific interests.

Future Research

Procrastination can be harmful to student achievement, and may be particularly harmful in the online environment. Because the sample in the present study was small, further research with larger samples of online graduate students is needed to examine motivational and self-regulatory variables and the influence of intrinsic motivation and effort regulation on procrastination in particular. Such additional research would confirm the extent to which this convenience sample actually represents the population of graduate students enrolled in online programs.

More research is needed to test the influence of specific instructional strategies on intrinsic motivation and effort regulation. Specifically, there is a need to measure the effects of these strategies on the reduction of procrastination behavior in online students.

The present study used a self-reported measure of procrastination. Future research might employ observation of actual procrastination behavior as an additional, confirmatory measure of student procrastination. The incorporation of such data would strengthen the results of future investigations of procrastination and self-regulatory behaviors.

In spite of the limitations of the present study, the results provide additional support for the existence and importance of the relationship between procrastination and motivation and self-regulated learning. Problems caused by procrastination in online classes can be explained in part by students' use of specific learning strategies and their motivation for participating in the program. Graduate students' motivational orientation and use of learning strategies can be positively influenced by teachers, thus mitigating some of these problems resulting from procrastination in online classes.

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