Success in Online Learning: Does Faculty Intercession via E-mail Messages Alter Student Procrastination Behavior and Enhance Learning?

D. Roberto Morales*, and Jonathan P. Mathews*

Energy and Geo-Environmental Engineering Department and
John A. Dutton e-Education Institute
College of Earth & Mineral Sciences
* Schreyer Institute for Teaching Excellence
The Pennsylvania State University
University Park, PA 16802
drm218@psu.edu | jmathews@psu.edu

One of the greatest assets of campus based online learning: greater flexibility may promote greater procrastination with concurrent negative consequences. Procrastination is especially prevalent among novice online learners, specifically the male traditional campus-based undergraduate student. This paper investigates the relationship between performance and procrastination for campus-based “traditional” students enrolled in a fully online, large enrollment (300+ students a semester), general education class. Procrastination was rampant with 40% of students typically starting the weekly lesson(s) on the due date(s). Procrastinators had reduced grades (6% lower or an average “A” to “B+/A-” transition) for weekly reflection activities. Males were more susceptible to negative consequences in comparison to their counterparts who procrastinated much less (7% difference in submissions on the due date), and were not as susceptible to lower score(s) on average when they did procrastinate. An e-mail intercession late in the semester failed to change submission habits.

Learning within the online environment is becoming increasingly popular and accessible to on-campus students. The Penn State University Registrars schedule of courses [1] lists a total of 33 WEB courses (spring 2005 semester) available to University Park campus students. A “WEB” class being defined as all instruction taking place online. The majority of these classes meet the general education requirements: 21 out of 33 classes. With 9 courses (7 of which are general education) being nascent spring online offerings [2]. For comparison, the fall 2004 semester had 25 (16 general education) WEB courses. Most of the general education WEB courses being at enrollment capacity (96% overall) at the start of the semester. Online enrollment for University Park students being 2,670 for the spring 2005 semester, or approximately 12% of the undergraduate population will be enrolled in an online course in 2005 (assuming no students are enrolled in multiple WEB courses). Seventy six percent of students in the class studied indicated that it was their first WEB class experience at Penn State (survey result).
Procrastination is the delay or avoidance of a task \[3,4\]. Procrastination within face-to-face courses has been linked to lower grades \[5\]. Procrastinators within an online environment had reduced exam scores and were less satisfied with the course \[6\]. Both these studies \[5-6\] used self-reporting measures to identify procrastinators. Within the online course studied, students who initiated weekly lessons on the date the assignment was due earned a lower grade than students who initiated the weekly lesson before the due date \[7\]. This finding was based on an analysis of student activity using timestamps accompanying assignments submitted via the course management system (ANGEL). Course management systems can provide instructors with the opportunity to track behavior.

Timestamps were used in this study to identify procrastinators. Procrastination was quantified by weekday and time. It was further quantified and categorized for students who initiated the weekly lessons on due date into (1) early morning, (2) afternoon, (3) early evening, and (4) late evening to further explore the relationship between procrastination and achievement.

Students that initiated the introductory weekly activity on Thursday or Friday (assignment being due Friday) earned lower scores than students starting before Thursday. Weekly lessons consist of multiple web pages and short assignments that help a student learn specific concepts and how they relate to his or her personal life. Student activity was tracked through a series of sequenced lesson activities. The entry assignments unlocked lesson content and lesson termination assignments concluded the weekly activity. There were 10 weekly lessons completed during the semester. Students can work ahead of schedule on lessons, but may not access the assignment after the due date (11:59 PM the Friday of each week). Timestamps on the introductory activities of 6 lessons were analyzed for the spring 2004 semester to determine the day students started the lesson. The number of lessons analyzed was limited to 6 of the 10 as 2 lessons were before the late drop/add period, and 2 lessons had an exam that week. Specifically, this analysis used student activity data collected on lessons 3-7, and lesson 9. Figure 1 shows the weekday that the 315 students unlocked the introductory activities during the six lessons studied during the spring 2004 semester.

There is little activity on the weekend, and a gradual increase in activity during the week. Most of the activity is on Friday, which is the day that the lesson is due. Thus, the student attempts one weeks worth of material during one day, often in a rushed single sitting. The average numeric score for the penultimate weekly activity was determined for each weekday (Saturday – Friday). The average grades (based on the 6 lessons) decreased each subsequent day of submission. Grades declined from the low 90’s for submissions early in the week to the mid 80’s on Friday. Note that all the submissions were graded together, after the deadline, often being sorted by student identifier rather than by submission order. Procrastination was rampant (40% of lesson submissions), despite the weekly email reminders that (humorously) chastised the students who had not started by Wednesday afternoon, or Finished by Friday lunchtime. These chastising emails were sent via the course management system only to those offending individuals.
Male students procrastinate more. They were more likely to initiate the introductory activities on the due date (38%). Figure 2 shows the percentage of students by gender accessing introductory activities in 6 typical weekly lessons.

The average male reflection assignment score (end of lesson reflective thought assignment) decreased each day from Monday to Friday. The mean had a 6% overall drop from Saturday (scores ≈ 91%) to Friday (≈85%). The average scores for female students remained relatively steady Monday (91%) through Friday (88%). Thus, males are susceptible to procrastination behavior affecting the quality of assignments while
females are less affected. Self-report measures indicated that males are less active, dedicate less time to planning, and have a higher perceived self confidence with technology than their counterparts [8]. However, females earn higher overall course grades despite having to work later in the day, lower perceived confidence with technology, and experiencing more problems with using technology [8].

Since Friday was the busiest weekday (580 out of 1,802 entries) for starting the weekly lesson, an analysis was conducted to determine how many students were waiting until the very “last minute” to start the lessons. The submissions were separated into morning (before 11:59 AM), afternoon (noon – 5 PM), early evening (5:01 PM – 9 PM), and late evening submissions (9:01 PM – 11:59 PM). The results are shown in Figure 3. Most of Friday’s activity was between noon and 5 PM (42%). This would give the students a maximum of 7 to 12 hours to complete the weekly lesson that is expected to occupy 4 hours. For the 6 lessons there was a decrease in the average scores from the morning to late evening. The average score went from the 90’s for students that started earlier in the day to the 70’s in the late evening.

Figure 3. The percentage of students who initiated an introductory activity on a particular time period on the assigned due date on six lessons during the spring 2004 semester

When comparing gender by time period for Friday submissions, males were more likely to start lessons later in the day. Figure 4 shows the number of males and females starting the introductory activity during the day on Friday.
The average score for females who started on Friday ranged from the 90’s for students that started in the afternoon to the mid-80’s for late evening students. The average score for male students started in the 90’s for morning students than gradually decreased to the mid-70’s in the late evening. Thus, some students can be successful and obtain high scores despite putting off starting the lesson perilously close to the due date but overall this behavior raised the probability of a significantly reduced score, particularly for males with Friday submission late in the day. The effect is less pronounced for females despite the proximity of the deadline and a greater percentage start earlier in the day on Friday.

Faced with strong evidence that there was procrastination behavior and negative consequences the instructor attempted to mitigate procrastination. A motivational message sent via electronic mail (email) that explained the relationship between procrastination and grades on reflection activities. The investigators predicted that the motivational message would alter procrastination behavior.

A total of 171 the undergraduate students (45% male and 55% female) enrolled in the EGEE 101 “Energy and the Environment” WEB course and attending classes on the University Park campus participated in this study during the fall 2004 semester. Students that worked ahead of schedule or failed to complete the assignment were not included in the data analysis (31% of the entries). Data was collected via the course Web site located on Penn States “A New Global Environment for Global Learning” (ANGEL) course management system. The treatment consisted of a motivational message that described the relationship between the weekday a learner initiates the introductory activity (procrastination) of a weekly lesson and average scores on the culminating lesson activity.

The message was designed based on the strategies described in Keller’s [9-11] model of Attention, Relevance, Confidence, and Satisfaction (ARCS). The ARCS Model is a...
representation of the phases and strategies involved in integrating motivational components into instruction. Previous research has used electronic messages \[12\] and strategies based on the ARCS Model \[13,14\] to create messages that resulted in enhanced achievement and learning in face-to-face classrooms. This study used strategies related to gaining learner attention and enhancing relevance. Students were sent a request via e-mail that 1) asked for participation in the study, 2) described that they would earn a total of 1% toward their final grade for participating, 3) and contained a link that recorded participant consent. Once participants were identified, the first 2 weeks of November was selected for the study because there were no exams scheduled, or other events (i.e., holidays).

The message was sent to students on Monday 1st of November. The course management system allows instructors to view who has read the motivational message; however, many of the messages were forwarded to the students’ personal email accounts and it is unclear if the message was read. Participants were then sent a second email the 11th of November. The second message requested a survey submission (survey being embedded within the lesson material). The survey asked if the student had read the message, not read the message, or did not receive the message. There was a small unreadable snapshot of the email included for reference to aid recall. If students read the message, they were asked to provide a short 2 – 3 sentence summary of the message. The responses to the second email were recorded on the course management system and used to identify students that could be included in one of two groups being analyzed for the study.

The lesson used for analysis was spread out over two weeks. The first week required students to complete a quiz before end of the week. The second week had students completing the reflection activity, which was the penultimate activity for each weekly lesson. The data was grouped by the weekday students started the introductory activity (quiz) of the lesson. There were two groups created based on whether participants read (n=159) or did not read (n= 46) the message describing procrastination and achievement. Students that responded with a “yes” but did not provide a summary were not included in the analysis. SPSS was used to conduct an independent samples t-test. With equal variances not assumed, the two tailed t-test for equality of means revealed that there were no significant differences (.05 level) between the groups on achievement or procrastination (day of the week that an assignment was initiated in proximity to the due date of the weekly lesson). However, this could have been due to the lateness in the semester that the study was conducted, the size of the groups, or that the weekly lesson was spread out over two weeks. In addition, previous research \[15\] found that students’ confidence with course content is higher at the end of the semester than at the beginning of the semester. If a student’s confidence is high, they may not start the activity until later in the week because the assignments become routine and can be completed in a timely manner. In addition, students may be more confident with using the various technologies (i.e., video, chat, WWW) used in completing the lessons \[16\].

“Proceedings of the 2005 American Society for Engineering Education Annual Conference & Exposition
Copyright 2005, American Society for Engineering Education”
Conclusions

This study shows that procrastination is a factor that contributes to the reduced weekly assignment scores within an online environment. Males are more at risk for procrastination and the subsequent negative consequences (lower scores). Some procrastinators were successful despite starting on Friday (the day the weekly lesson was due), however average scores diminished for submissions in the evening hours, especially for males. The motivational message on procrastination did not result in a significant difference between the groups (based on score and timestamp), but this could have been due to timing (end of the semester) and learner experience and confidence with the lessons. Further research is warranted because online learning is increasing in both student enrollment and course availability, and procrastination is contributing to a diminishment in assignment quality and reduced scores.

Bibliographic Information


“Proceedings of the 2005 American Society for Engineering Education Annual Conference & Exposition Copyright 2005, American Society for Engineering Education”


Bibliography

D. ROBERT MORALES is a Ph.D. Candidate (ABD) of Instructional Systems in the department of Learning and Performance Systems, and a Teaching and Learning Consultant for the Schreyer Institute for Teaching Excellence. His research interests are online learning, motivation, and procrastination.

Dr. JONATHAN P. MATHEWS is an Assistant Professor in the department of Energy & Geo-Environmental Engineering, and a Fellow of the John A. Dutton e-Education Institute. His educational interests are enhancing undergraduate online learning for success in lifelong learning. He teaches a large enrollment WEB course at Penn State.

“Proceedings of the 2005 American Society for Engineering Education Annual Conference & Exposition Copyright 2005, American Society for Engineering Education”