Year two: Effect of procrastination on academic performance of undergraduate online students

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ABSTRACT

Procrastination presents problems not only for undergraduate students, but also for undergraduate faculty, and the effects of student procrastination on academic performance is a joint concern.   This two-year follow up study seeks to better understand the relationship between academic performance and the actual time of submission of assignments relative to the deadline imposed on those submissions. The authors investigated the effect of academic assignment submission time and the academic grades earned before, on, and after the assignment submission deadline. These results continue to suggest that the earlier assignments are submitted, the higher the grades tend to be. Therefore, online faculty need to encourage undergraduate online students to develop a better understanding of the potential benefits of adopting the habit of earlier submission of assignments.

Keywords: Procrastination, undergraduate students, academic performance

INTRODUCTION

Researchers are intrigued by undergraduate student behavior and the procrastination of submitting academic assignments and the many studies in educational and psychological research that have been published.   Academic procrastination is one area of student behavior that has been widely studied and is affecting half of the student population (Rosental & Carlbring, 2014). Solomon and Rothblum (1984) defined academic procrastination as pervasive and permanent desire on the part of learners to postpone academic activities, which almost always is accompanied by anxiety.   Binder (2000) expanded the definition and described academic procrastination as "any academic task that is delayed or avoided as a result of the discrepancy between intention and actual behavior to the extent that it produces negative affect in the procrastinator."   Steel's 2007 report that 80-95% of college students procrastinate attracted significant interest and further research into undergraduate student characteristics of procrastination in submitting academic assignments. Steel defined procrastination as the intentional delay of an intended action despite an awareness of negative outcomes (2007). He defined it as a voluntary but irrational delay of an intended course of action, with non-beneficial consequences (Steel, 2007). This delay may be intentional, incidental and/or habitual but significantly affects learning and achievement of university students (Hussain & Sultan, 2010). This study extends the authors' previous research (Jones & Blankenship, 2019) and seeks to further understand the extent of the link between the timing of student submission of online assignments and the academic performance or quality of that submission. For many students, academic procrastination is associated with dysfunctional learning outcomes such as low academic performance, low quality of academic work, lack of knowledge, time pressure, dropout and lengthened course of study.

PROCRASTINATION AND ITS EFFECT ON ACADEMIC PERFORMANCE

Technology, instructor characteristics, and student characteristics have long been recognized as the three main variables that affect student success in online education (Dillon & Gunawardena, 1995; Leidner & Harvenpaa, 1993). As noted by Rakes and Dunn (2010), the online environment increases the tendency to procrastinate and its prevalence is detrimental to student learning and performance (Rakes & Dunn, 2010).   Therefore, for this research study, the authors continued their examination of the student characteristic of procrastination and its effect on online academic performance. It should also be noted that while our study did not differentiate between active and passive procrastinators, Yilmaz (2017) recommended additional research to identify active or passive procrastinators in the online environment.

Yilmaz (2017) compared the relation between assignment and exam performances between 88 distance learning and face-to-face students at a Turkish state university. Academic procrastination and assignment scores were negatively correlated in both the distance learning and face-to-face groups. However, this effect was greater in the distance learning group. Interestingly enough, academic procrastination and exam scores were correlated to each other only in the face-to-face group while there was no correlation between total assignment and exam score in the distance learning group. The author offered an explanation that distance learning offers an advantage to procrastinating students because all exam study materials are readily available. Findings of the study suggested that distance learning environments are disadvantageous to procrastinators.

Cerezo, Sánchez-Santillán, Paule-Ruiz and Núñez, (2016) used educational data mining logs from Moodle, their learning management system, to measure, among other things, procrastination and level of achievement in 140 undergraduate psychology students in a Northern Spain state university. After identifying and grouping patterns of learning, their research indicated students who handed in assignments later were more likely to receive a lower score.

Utilizing educational data mining of e-learning log files and the usage of learning indicators in the Moodle learning management system, Paule-Ruiz, Riestra-Gonzalez, Sanchez-Santillan, and Perez-Perez (2015) studied 33 undergraduate geomantic and topography engineering students at a Northern Spain university. Their analysis of time-related variables revealed that procrastination influenced negative learning performance and time-related indicators were tightly coupled with students' performance in e-learning platforms. They further inferred that "information related to the time until starting an activity on the platform ('time to…') can be adequate procrastination related indicators for the student and educator, as the students who wait a long time until starting a task in the course could obtain a lower performance" (p. 18).

Arnott and Dacko (2014) researched the submission of online end-of-term assignments for 777 first- and third-year undergraduate marketing students from the University of Warwick Business School over a five-year period. Submission times were collated into 18-time categories from "up to the last 24 hours" down to "the last minute." They found students who submitted their work at least a day before the deadline received a mean grade of about 64 while whose who waited until the last minute earned a mean grade of 59. They also discovered that 86.1% of the students waited until the last 24 hours to turn in work, earning an average score of 64.04, compared to early submitters' average of 64.32. Interestingly, the average score for the most part continued to drop by the hour; those who waited until the last minute to turn in the assignment had the lowest average grade of 59. They concluded that students who turned in assignments at the last-minute face a 5% drop in marks when compared with those students who submit their assignments 24 hours or more before it was due.

Informal analytic results covering a typical week of online course participation patterns in an anonymous university showed timely submission of most assignments. However, the median submission time of assignments before due date was only 30 minutes while the median past due submission time of assignments was 1.2 hours (Biray, 2016).

Rotenstein, Davis, and Tatum (2009) researched time of submission of seven online assignments for 297 graduate students taking a financial accounting course for non-accounting majors. Utilizing a program that tracked time of assignment download as well as submission, they reviewed two measures of procrastination from a pool of 2051 assignments. They studied Start (the number of hours from submission download to due date) and Finish (the number of hours from submission to due date). Their conclusion was that "early birds" (students who started or finished sooner) received significantly higher grades than "just-in-timers" (students who started or finished later).

Distance education courses place more demand on self-regulation than traditional face-to-face education (Klingsieck, Fries, Horz, & Hofer, 2012). Accordingly, it is no surprise that time management and independent learning skills are critical to success in online education (Liu, Gomez, Khan, & Yen, 2007). Students who have disabling and habitual procrastinating behavior patterns lack these skills. Parker humorously (2015) describes them as "human ostriches" because they automatically stick their heads in the sand to avoid dealing with unpleasant, complicated, frustrating or boring tasks.

Kim and Seo (2015) synthesized findings from a meta-analysis of 33 relevant studies involving a total of 38,529 participants. Their analysis revealed procrastination to be negatively correlated with academic performance. However, this relationship was not significant and was influenced by the choice of measures or indicators as well as the use of self-report scales and demographic characteristics of the participants. They also reported academic procrastination to be most strongly correlated with academic performance in younger students.

Michinov, Brunot, Le Bohec, Juhel, and Delaval (2011) found that online students who procrastinated earned lower grades than non-procrastinators. However, this relationship was mediated by the level of the learners' participation in discussion forums. Because high procrastinators were less likely to participate in online discussion forums, they suggested instructors utilize strategies to increase participation in the online learning environment.   Although all students in this study were undergraduates, there was no differentiation between student classifications. However, Levy and Ramim (2012) found more sophomores (71.6%) turned in assignments on the due date compared to juniors (57.3%) and seniors (61.6%).

Mlynarska, Greene, and Cunningham. (2016) looked at Moodle data covering 360 courses, 2194 assignments, and 71,077 assignment submissions from the University College, Dublin. A subset of 60 complete assignments submitted on or before the deadline was analyzed and grades were correlated with the amount of time remaining between submission and the deadline.   Although there was one anomaly, most of the assignments (42 out of 60) were positively correlated between grade and time of submission.   Because first year undergraduate students were most likely to have negative correlations between grade and time of submission, the authors theorized that first-year students had not developed good time management practices. Similarly, Kim and Seo, 2015) reported that academic procrastination is more strongly correlated with academic performance in younger students. It is interesting to note that Arnott and Dacko (2014) previously suggested that procrastination be addressed in first year students.

Grunschel, Patrzek, Klingsieck & Fries (2018) found that procrastinators who completed a five-week group training based on a cyclical process model of self-regulated learning significantly reduced academic procrastination and reported improved time management skills.

Levy and Ramim (2012) utilized data analytic techniques to review a dataset of 1629 online exam records from a southeastern United States university. Analyzing five terms of data, they found that 58% of students turned in assignments on the last day of a weeklong task completion window. The procrastinators also earned significantly lower scores (82.9) than the non-procrastinators (87.7).

Goroshit (2018) measured the relationship between self-reported studying procrastination and final course grade when mediated by three different measures of participation in online course assignments. She observed negative but weak direct relationships between self-reported academic procrastination and academic achievement and stressed the need for further study of academic interventions for academic procrastination. The following section describes the methodology used in this study.

METHODOLOGY

The data set for this study comprises assignments from one course from Spring 2019 and two courses from Summer 2019 submitted by undergraduate online Criminal Justice students at

a southern Hispanic Serving University. Using the Blackboard learning management system data, there were 704 different assignments and related information such as date of submission, time of actual submission and grades earned by students on the submitted assignments.

FINDINGS

Using the spring 2019 and summer 2019 data set (Year 2) with 877 assignments, the authors divided this data set into three different time intervals: 1) assignments submitted by students before the actual submission deadline, 2) assignments submitted by students on the actual assignment deadline, and 3) assignments submitted by students after the deadline date.

Table 1 (as indicated in the appendix) indicates the number of assignments submitted using the Before, On and After assignment deadline categories for Year 2.

Using the three categories labeled: Before, On, and After, the authors then compared each specific timeline with the grades earned on the assignments for Year 2.   Tables 1A, 1B, and 1C, (as indicated in the appendix) illustrate each individual grade category for Year 2.

Table 1A (as indicated in the appendix) represents all the assignments that were submitted early or before the submission deadline established. For Year 2, 58% of the submissions received A's, 18% received B's, and 12% received C's. These figures indicate that overall, 76% of students that submitted their work early tended to receive higher grades of A or B compared to 23% who received lower grades or C or below. Only 11% of the assignments received grades on the lower end of the spectrum with D's and F's.

Table 1B (as indicated in the appendix) represents all the assignments that were submitted on the established deadline date. For Year 2, 39% of the submissions received A's, 21% received B's, and 17% received C's. Sixty percent of the submissions earned a grade of A or B compared to 40% who received lower grades or C or below. Grades on the lower end of the spectrum with D's and F's were received by 23% of the assignments.

Table 1C (as indicated in the appendix) represents all the assignments that were submitted after the deadline date. For Year 2, of the 85 assignments that were submitted after the deadline, 7 or 8% earned A's, 16 or 19% earned B's, 12 or 14% earned C's, 8 or 9% earned D's and 42 or 49% earned F's. Forty-two or 49% of the assignments earned failing grades which is more than the first two data sets in Tables 1A and 1B combined.

Tables 2A, 2B, and 2C (as seen in the appendix) compare the complete data set for Year 1 and Year 2 for the three different time intervals and show very little difference between the Year 1 and Year 2 results.

Table 2A shows that in Year 1, 85% of students that submitted their work early tended to receive higher grades of A and B compared to 86% of students in Year 2. In Year 1, 9% of students received a C compared to 12% in Year 2.   Only 6% of the assignments in Year 1 received grades on the lower end of the spectrum with D's and F's compared to 11% in Year 2.

Table 2B shows that for Year 1, 87% of the submissions earned a grade of A, B or C with 77% in the top two grade levels. In Year 2, 77% of the submissions earned similar grades with 60% in the top two grade levels.

Looking at Table 2C, of the 73 Year 1 assignments that were submitted after the deadline, 6 or 8% earned A's, 5 or 7% earned B's, 8 or 11% earned C's, 13 or 18% earned D's and 41 or 56% earned F's. Forty-one or 42% of the assignments earned failing grades which is more than the first two data sets in Tables 2A and 2B combined. Comparing these results to the Year 2 data, in which 85 assignments were submitted after the deadline, 7 or 8% earned A's, 16

or 19% earned B's, 12 or 14% earned C's, 8 or 9% earned D's and 42 or 49% earned F's. Looking at only failing grades for assignments submitted after the deadline, it is noteworthy that approximately half of students who submit assignments after the deadline (49% for Year 2 and 56% for Year 1) will receive an F for their tardiness.

CONCLUSIONS AND RECOMMENDATIONS

The findings in this study show that when students submitted assignments early or on the established assignment deadlines, they tended to do better than when they submitted assignments late or after the deadline. Approximately half of students who submit assignments after the deadline will receive a failing grade. These findings argue that students employing avoidance procrastination, as stated by Ferrari, O'Callaghan, and Newbegin, (2005), tended to use this type of procrastination to delay a task so that weak accomplishment might be understood as owing to time pressure instead of lack of student ability. However, after tasks were assigned, students were given one week or more to complete and submit their work.

Although the present study did not use self-reported data but used actual time of submission as documented by the Blackboard Learning Management System and did not inquire into other measures or demographic characteristics, both Year 1 and Year 2 results are similar in that greater procrastination is shown to be negatively correlated with academic performance. In the authors' Year 1 study, 56% of those submitting assignments after the due late earned a grade of an "F" (Jones & Blankenship, 2019). In the present Year 2 study, 49% of those submitting assignments after the due date earned a grade of "F."

One recommendation for future studies might be to require students to review the results of this research in hope they would be encouraged to submit assignments on or before the assignment dates. The course syllabus provided to students at the beginning of a course might also state that no late work will be accepted in class assignment submissions. It would be one way to understand if absolutely prohibiting late work has any influence on submission grades

Paule-Ruiz et al. (2015) recommended further study into the relationship between performance and learning styles or social networking. They also suggested greater utilization of e-learning platforms that include indicators capable of providing real-time feedback based on the learners' contexts or needs. The researchers concluded these static feedback mechanisms would help learners and educators in planning their learning strategies.

Jansenn (2015) studied the percentage of undergraduate college and high school students who self-reported academic procrastination; the frequency of academic procrastination for specific academic tasks of studying for exams, completing reading assignments, and writing papers; and the relationship between academic procrastination and achievement in this cohort. Although her research involved neither online students nor time of submission of assignments or grades, she did report that individual and group learning assistance were the most successful interventions.   Her rationale was that these settings offered students an opportunity to discuss concerns and attitudes likely to affect their engagement in academic procrastination.

The authors' previous research (Jones & Blankenship, 2019) suggested online instructors can help their online students by means of procrastination surveys, resource links, and explaining how timely submission of online assignments is linked to academic performance.

Online instructors might also wish to follow the work of Akram, Fu, Li, Muhammad, Lin, Jiang, and Tang, (2019). They utilized educational data mining from an online blended learning course to build SAPE (students' academic performance enhancement) an algorithm using

homework submission data to predict student procrastination behavior. Because the algorithm automates the process of early identification of students having learning difficulties, online instructors can provide timely and appropriate feedback to both procrastinators and non-procrastinators. The authors suggest instructors can encourage those students who regularly submit homework on a timely basis and can also motivate others to submit their homework on time.

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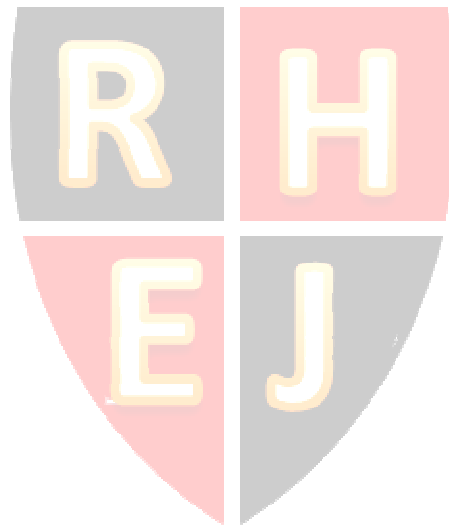
APPENDIX

Table 1: Complete Data Set in Three Intervals – N=877		
Intervals	Submissions	Percentages of Submissions
Before Deadline	343	39%
On Deadline	449	51%
After Deadline	85	10%

Table 1A: The First Interval Before the Submission Deadline – N=343		
90 – 100	200	58%
80 – 89	63	18%
70 - 79	42	12%
60 - 69	23	7%
Below 60	15	4%

Table 1B: The Second Interval On the Submission Deadline – N=449		
90 – 100	177	39%
80 – 89	93	21%
70 - 79	76	17%
60 - 69	48	11%
Below 60	55	12%

Table 1C: The Third Interval After the Submission Deadline – N=85		
90 – 100	7	8%
80 – 89	16	19%
70 - 79	12	14%
60 - 69	8	9%
Below 60	42	49%

Table 2A: Year 2 combined with Year 1: The First Interval Before the Submission Deadline				
Before the Submission Deadline N=343			**Before t**he Submission Deadline **N=246**	
	Spring and Summer 2019 (Year 2)		Spring 2018 (Year 1(	
Grades	Number	Percentage	Number	Percentage
90 – 100	200	58%	140	57%
80 – 89	63	18%	68	28%
70 - 79	42	12%	22	9%
60 - 69	23	7%	10	4%
Below 60	15	4%	6	2%

Table 2B: Year 2 combined with Year 1: The First Interval On the Submission Deadline				
On the Submission Deadline **N=449**			**On** the Submission Deadline **N=385**	
	Spring and Summer 2019 (Year 2)		Spring 2018 (Year 1)	
Grades	Number	Percentage	Number	Percentage
90 – 100	177	39%	182	47%
80 – 89	93	21%	116	30%
70 - 79	76	17%	40	10%
60 - 69	48	11%	28	7%
Below 60	55	12%	19	5%

Table 2C: Year 2 combined with Year 1: The Third Interval After the Submission Deadline				
After the Submission Deadline **N=85**			**After** the Submission Deadline **N=73**	
	Spring and Summer 2019 (Year 2)		Spring 2018 (Year 1)	
Grades	Number	Percentage	Number	Percentage
90 – 100	7	8%	6	8%
80 – 89	16	19%	5	7%
70 - 79	12	14%	8	11%
60 - 69	8	9%	13	18%
Below 60	42	49%	41	56%