The Effect of Online Discussion Board Frequency on Student Performance in Adult Learners

Adam L. Selhorst
Ashford University
adam.selhorst@ashford.edu

Mingzhen Bao
Ashford University
mingzhen.bao@ashford.edu

Lorraine Williams
WASC Senior College and University Commission
lwilliams@wscuc.org

Eric Klein
Ashford University
eric.klein@ashford.edu

Abstract

Classroom discussion boards are a vital part of the online educational experience, providing a venue for peer to peer and student to faculty interactions. However, institutional feedback from students at a large open enrollment university has shown that excess focus on online discussions may lead to fatigue, resulting in lower student satisfaction, and in turn, performance. As such, researchers hypothesized that a reduction from two to one required weekly discussions by program administrators would improve student grade point average (GPA), withdraw rate, fail rate, and progression. Using a variety of revision techniques, program administrators revised seven courses over multiple disciplines to reduce required discussion interaction from two to one discussion per week. Resulting data from over 900 students showed that across all courses, no significant differences were seen in average GPA, fail rate, and progression between experimental and control groups ($p > 0.47$). However, a trend was observed for decreased withdraw rates as courses shifted from two weekly discussions (9.6%) to one (7.2%) ($p = 0.19$). The method of course revision appeared to effect the GPA and fail rate across some individual courses. Combining two discussions into one larger discussion and pooling assessment points seemed to have negative impacts on withdraw rates and fail rates, while shorter discussions with lower point values were correlated with increased achievement. Based on the study, it appears that adult learners in online courses prefer one weekly discussion over two as illustrated by the decreased withdraw rate in experimental groups. Additionally, students show improved performance with greater assessment weight focused on assignments over discussions. Results suggest that program administrators and faculty might benefit from structuring programs focused on adult online learners with one minimally weighted discussion board per week.

Introduction

At a large North American adult learning institution, accelerated courses of only five weeks require students to engage in many assignments in a short time period. For most of its ten year history, Ashford University's courses have included a standardized approach to design that includes two discussion assignments per week in master versions of courses that are copied to individual sections of 30 students or less. This approach has allowed for a standardized and high quality student experience, as well as a means to use sophisticated learning analytics to ensure that learning outcomes are achieved, as measured separately from grades.

Most online universities have utilized a similar discussion design as a means of facilitating student and faculty engagement. As such, a considerable amount of research exists about the value of group discussion in online higher education. Online group discussion has been found to promote student engagement which often positively impacts persistence, satisfaction, and the development of a learning community in which students participate in the co-creation of new knowledge with each other and their instructors (Arbaugh, 2000; Garrison, Anderson, and Archer, 2000; Sher, 2009; Lai and Savage, 2013; Swan, 2001). In the context of graduate level online higher education, Garrison, Anderson, and Archer (2000) found that online classroom discussion "appears to have

considerable potential for creating an educational community of inquiry and mediating critical reflection and discourse (i.e., critical inquiry)." Similarly, in a study of online MBA students, Arbaugh (2000) found that an interactive course environment is correlated with student satisfaction. This is significant as satisfaction is often accompanied by boosts in student engagement and overall performance.

Fewer studies exist, however, that focus specifically on the value of group discussion to improved learning outcomes and student persistence, two strong measures of the value of online education. In a small, quasi-experimental study, Cho and Tobias (2016) found no significant difference in course satisfaction as measured by survey instrument or student achievement as measured by grades under three conditions: when the same class was taught without discussion at all, with discussion but without faculty participation, and with discussion with faculty participation.

Davies and Graff (2005) found in their study of online undergraduate learners' interaction and class performance that those who failed in online courses interacted less than their passing peers, yet increased interaction in online discussions did not correlate with better grades. They also found the interaction between students and instructor to be a pivotal feature in improving student satisfaction (Davies and Graff, 2005). Webb, et. al. (2014) found in their non-experimental study of online discussions in undergraduate math and computing courses that both satisfaction and positive learning outcomes were associated with increased discussion participation. In a small study of one online undergraduate engineering course, Palmer, Holt, and Bray (2008) also found that that student engagement in online discussion was correlated with improved student learning. Moreover, they found that students with a record of prior academic success and those who submitted the most new posts performed best.

Not only is there a paucity of studies on the relationship between online discussion groups and learner satisfaction and achievement, there are few studies of online discussion efficacy in the context of accelerated learning programs. Accelerated learning programs are characterized by classes of much shorter duration than the usual 15 or 16-week terms (Wlodkowski, 2003). Silcock (2003) argues that successful accelerated learning requires a vigorous discussion that involves disagreement, support from faculty, and positive relationships with fellow students. In their meta-analysis of 19 accelerated nursing programs, Doggrell and Schaffer (2016) reported that in five out of six studies of accelerated graduate programs, students had similar or lower attrition rates than those in non-accelerated programs. Wlodkowski (2003) claims that accelerated learning produces no significant difference in student learning or persistence over that of students in traditional length programs, yet students do complete their degree programs much faster.

Based on the literature above in conjunction with the experiences of the researchers, questions arose regarding the optimal frequency of weekly discussions to maximize student achievement. Researchers hypothesized that decreasing the frequency of weekly online discussions for adult learners from twice per week to once per week will result in increased GPA, decreased withdraw rates, decreased fail rates, and increased progression.

Method

STUDENT DEMOGRAPHICS

The study utilizes data gathered from undergraduate students taking COM425 – Communication in Organizations, CRJ201 – Introduction to Criminal Justice, CRJ303 – Corrections, POL303 – The American Constitution, SOC203 – Social Problems, SOC305 – Crime & Society, and SOC320 – Public Policy & Social Services between August 2, 2016 and September 3, 2016 at Ashford University online. The University is an online institution of higher learning offering Associate's (2 programs), Bachelor's (53 programs), and Master's (11 programs) degrees. Its student population consists largely of female (70% of students) adult learners (Figure 1), from a range of ethnic and socioeconomic backgrounds (Figure 2). Additionally, as of 2015, students with military ties make up 27% of the total institutional enrollment (Institutional Research Services, 2015). Up to date information regarding student demographics may be obtained at http://assessment.ashford.edu/behind-numbers/institutional-data/enrolled-student-characteristics#/28/385.

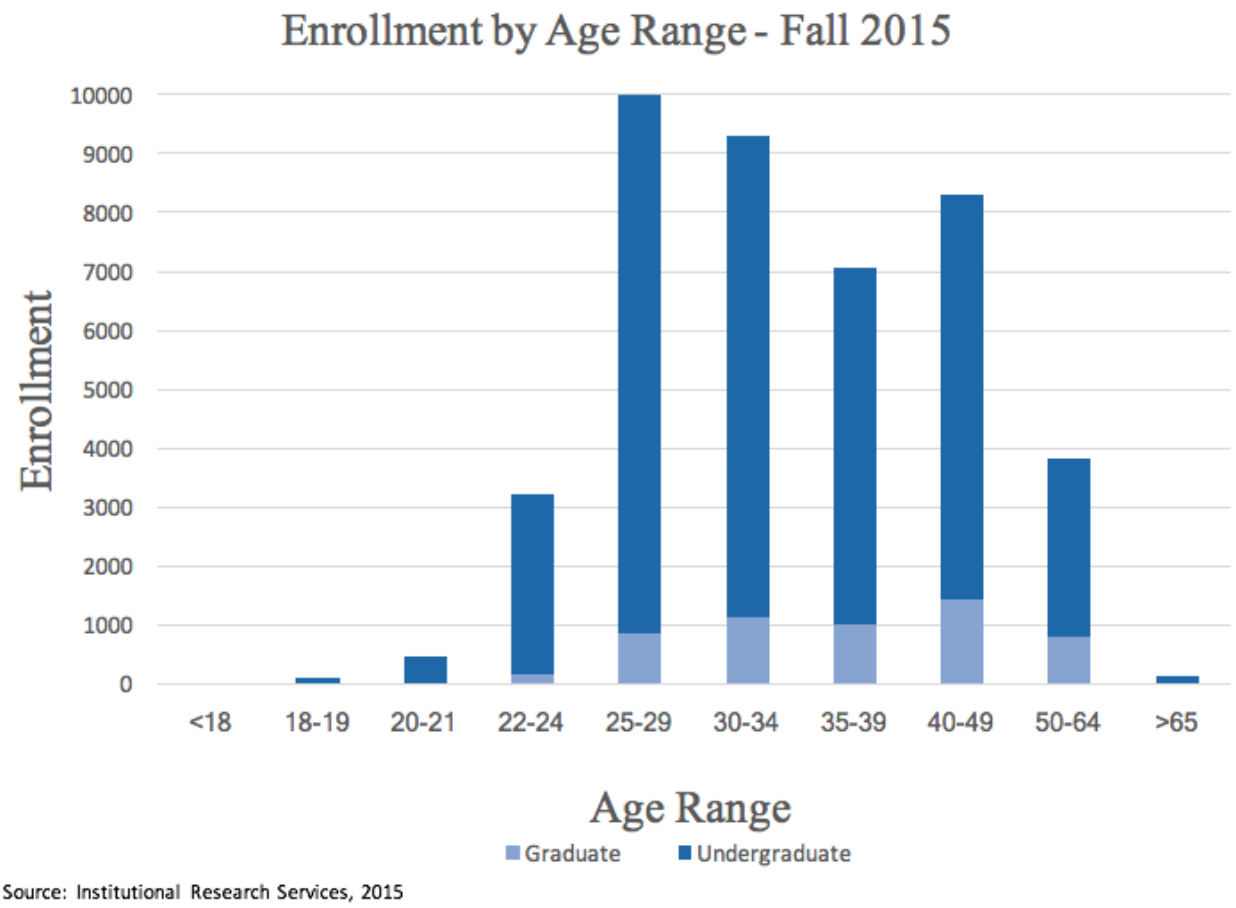

Figure 1. Total enrollment by age range for Ashford University students as of Fall 2015.

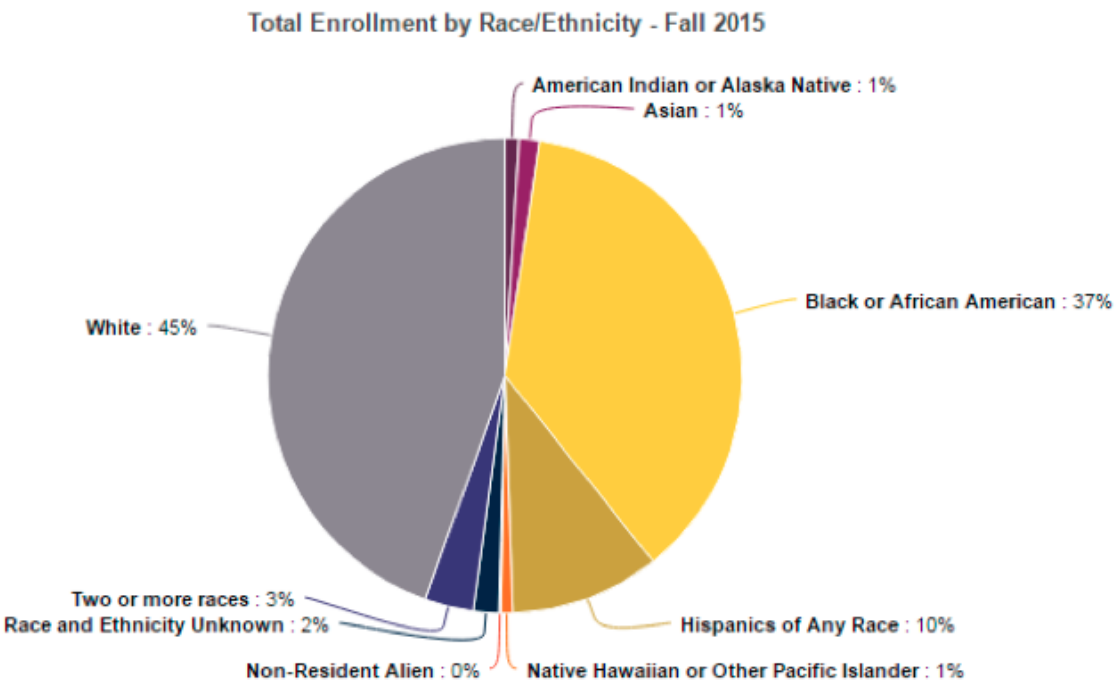

Figure 2. Total enrollment by race/ethnicity for Ashford University students as of Fall 2015.

COURSE MODEL

All undergraduate courses at Ashford University are worth three credits and are five weeks in length, with the exception of laboratory courses, none of which were utilized for this study. Courses are composed of a combination of weekly readings, assignments, quizzes, and mandatory participation in discussion boards. Discussion boards begin each week with a different prompt (identical across course sections) that requires the student to post thoughts in a public forum for view by all students. Additionally, students are required to interact with one another's postings in order to allow for peer to peer and student to instructor engagement covering key concepts from the course. Generally, these discussions provide an adequate substitute for the interactions some students experience in more traditional programs. Additionally, these discussions are assessed and grades attributed based on level of interaction, critical thinking displayed, and knowledge of course concepts shown. All courses utilized within this study require that students participate in two independent discussions each week in each course prior to initiation of the experiment.

EXPERIMENTAL DESIGN

Multiple sections of each course were offered weekly over the duration of the study with a maximum enrollment of 30 students per section. In each week of the study period, one half of the sections offered for each course were randomly designated as control courses with the second half of sections randomly designated as experimental sections. Control courses received no intervention and ran under normal instructional delivery and faculty requirements with two independent discussion boards per week requiring students to interact with peers throughout both discussions. In order to address the effect of discussion board frequency on student success and satisfaction, the experimental courses were revised so that they contained only one discussion board per week, reducing the overall weekly discussion requirement for experimental sections. Experimental courses with one less discussion assignment per week were supplemented in a variety of ways to ensure consistency between control and experimental sections in terms of course rigor, credit hour requirements, and points given for discussion participation. In experimental courses, revision strategies included the addition of required readings, increasing assessment points for the one remaining discussion, and increasing the length and rigor for remaining discussions. Specific revision strategies for experimental courses are illustrated in Table 1.

Course	# Disc/wk Control	# pts/wk/Disc Control	#Disc Experimental	# pts/wk/Disc Experimental	Revision Strategy
COM425	2	3-4	1	5	Elimination of one discussion each week countered by increased length and rigor of remaining discussions to retain credit hour, as well as increase in point value for individual discussions and multiple assignments
CRJ201	2	3-4	1	3-6	Elimination of one discussion each week countered by increased length, rigor, and point value of remaining discussions as well as added required readings and one additional assignment to retain credit hour
CRJ303	2	3-4	1	8	Combined two discussions into one large discussion covering both topics and pooled the point values for both discussions
POL303	2	4-5	1	5	Elimination of one discussion each week countered by increased point value of remaining discussions as well as added required readings and one additional assignment to retain credit hour
SOC203	2	3-4	1	8	Elimination of one discussion each week countered by increased length, rigor, and point value of remaining discussions as well as added required readings to retain credit hour
SOC305	2	3-4	1	5-6	Elimination of one discussion each week countered by increased length, rigor, and point value of remaining discussions as well as added required readings and increased points for multiple assignments
SOC320	2	3-4	1	5-6	Elimination of one discussion each week countered by increased length, rigor, and point value of remaining discussions as well as added required readings to retain credit hour

Table 1. Revision strategies for experimental courses

Instructor requirements for experimental and control sections remained consistent across courses. Total number of courses, sections, and students researched is summarized in Table 2.

Course	# Sections	Avg # Students/Section	Total # Students
COM425			
Control	3	18	55
Experimental	5	20	101
CRJ201			
Control	2	21	42
Experimental	3	21	64
CRJ303			
Control	2	16	32
Experimental	2	17	34
POL303			
Control	4	19	77
Experimental	4	18	73
SOC203			
Control	2	64	68
Experimental	5	22	108
SOC305			
Control	2	23	46
Experimental	3	32	95
SOC320			
Control	2	17	34
Experimental	3	16	49
Total			
Control	**19**	**20**	**384**
Experimental	**25**	**21**	**524**

Table 2. Course statistics for sections utilized throughout the study.

DATA ANALYSIS

Data was compiled from all experimental and control sections and analyzed using SPSS v.23 (IBM Corp., 2014). To analyze the effectiveness of discussion board frequency on student performance, data was collected for course GPA, withdraw rate (percentage of students withdrawing from the course before the last day), fail rate (percentage of students receiving a grade less than 60%), and progression (percentage of students moving on to take another course within two weeks). Interactions between control and experimental groups were analyzed for each course and for all courses combined using one-way ANOVAs. Data illustrating significance at $p<0.05$ were considered strongly correlated, those with significance at p=0.06-0.10 were considered to show strong trends, those with significance at p=0.11-0.15 were considered to show mild trends, those with significance at p=0.16-0.20 were considered to show weak trends, and those with $p>0.2$ were considered uncorrelated.

RESULTS

Data showed no significant difference in average GPA for all sections between students in control (2.75) and experimental (2.78) groups (p=0.77, Table 3, Figure 3). However, difference in average GPA between control (3.66) and experimental (2.77) groups were found in the CRJ303 course ($p = 0.003$). While no significant difference was observed in average withdraw rate for all sections at $p<0.05$, students in control (9.6%) sections weakly trended towards higher withdraw rates than students in experimental (7.2%) groups ($p = 0.19$, Table 3, Figure 4). Similarly, CRJ201, POL303, and SOC305 showed control groups with significantly higher or trending higher withdraw rates than experimental groups ($p = 0.01$-0.16) while observations of weakly lower trending withdraw rates in control groups were found in SOC203 (p=0.19). Data showed no significant difference in average fail rate for all sections between students in control (8.3) and experimental (7.1) groups (p=0.47, Table 3, Figure 5). However, difference in average fail rate between control (11.8%) and experimental (3.7%) groups were found in the SOC203 and course ($p = 0.04$). Finally, data showed no significant difference in average progression for all sections between students in control (78.2%) and experimental (76.9%) groups (p=0.69, Table 3).

	Avg GPA	Avg Withdraw Rate (%)	Avg Fail Rate (%)	Avg Progression (%)
COM425				
Control	3.32	1.8	1.8	71.8
Experimental	3.18	5.9	5.9	67.8
CRJ201				
Control	2.59	16.7[d]	11.9	83.6
Experimental	2.67	7.8	12.5	76.0
CRJ303				
Control	3.66[a]	6.2	0.0[d]	81.7
Experimental	2.77	2.9	5.9	85.3
POL303				
Control	2.13	16.9[b]	14.3	67.5
Experimental	2.38	6.8	12.3	73.6
SOC203				
Control	2.55	7.4[d]	11.8[a]	77.9
Experimental	2.66	13.9	3.7	70.1
SOC305				
Control	2.65[c]	10.9[a]	6.5	87.0
Experimental	2.93	1.1	3.2	89.7
SOC320				
Control	2.70	11.8	5.9	87.1
Experimental	2.66	12.2	12.2	84.9
All Courses				
Control	2.75	9.6[d]	8.3	78.2
Experimental	2.78	7.2	7.1	76.9

Table 3. Results of change in discussion board frequency on GPA, withdraw rate, fail rate, and progression. [a] = $p<0.05$, [b] = $p=0.06$-0.10, [c] = $p=0.11$-0.15, [d] = $p=0.16$-0.20.

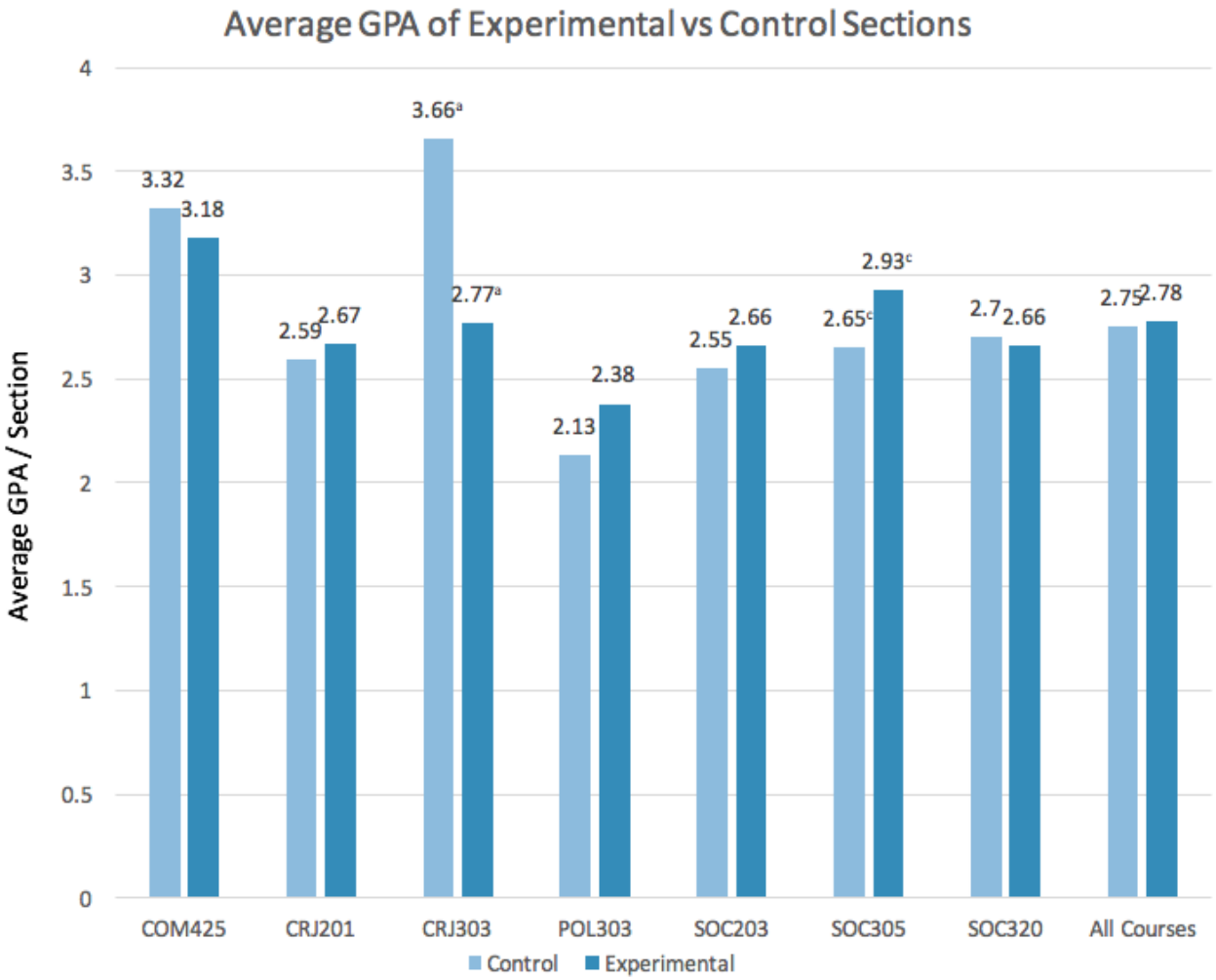

Figure 3. Average GPA for pilot vs. control sections. n = 19 sections for control and 25 sections for experimental courses, n = 384 total students for the control courses and 524 total students for the experimental courses, values with subscripts are significant at a = $p<0.05$, b = p=0.06-0.10, c = p=0.11-0.15, d = p=0.16-0.20 (One-way ANOVAs).

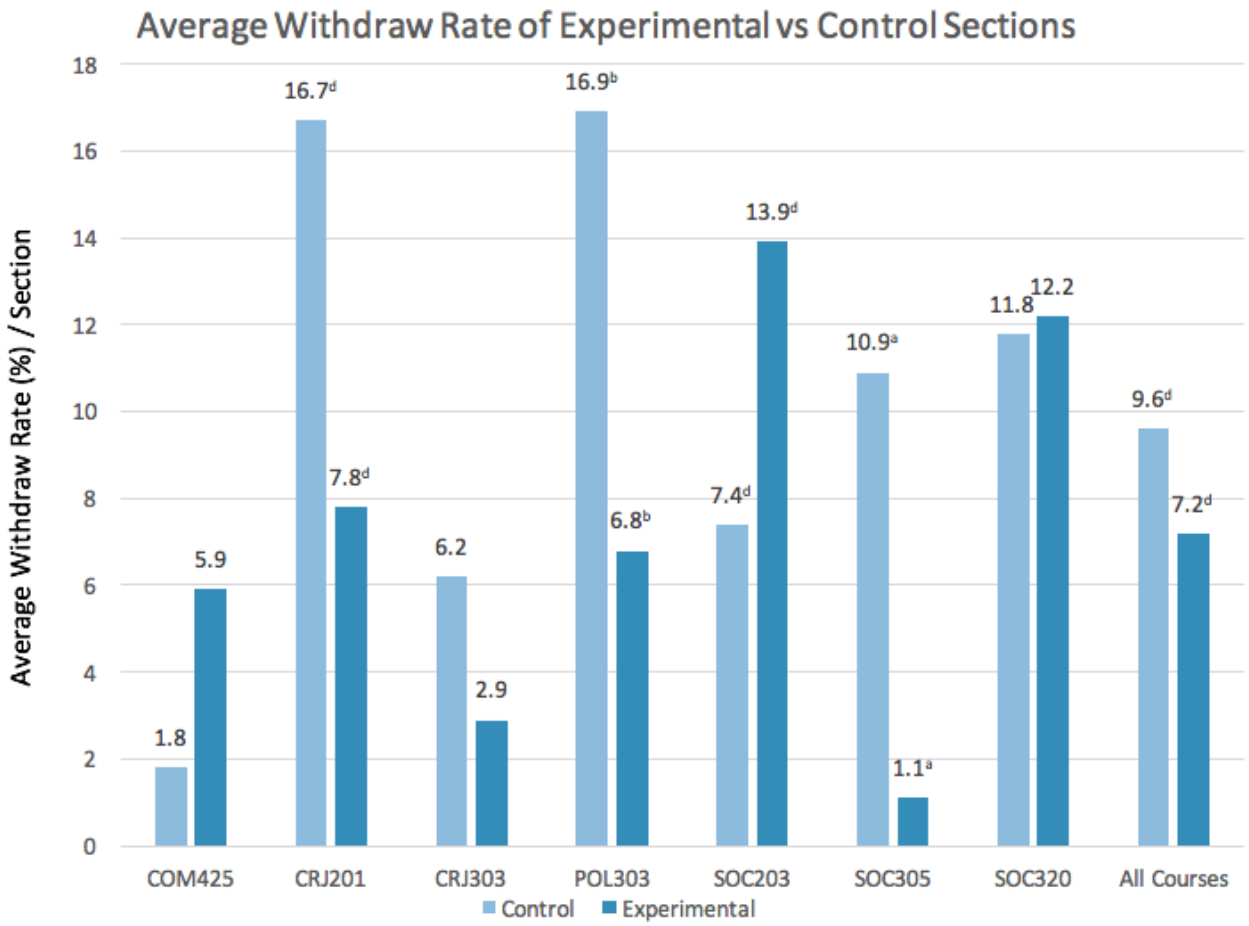

Figure 4. Average withdraw rate (%) for pilot vs. control sections. n = 19 sections for control and 25 sections for experimental courses, n = 384 total students for the control courses and 524 total students for the experimental courses, values with subscripts are significant at a = $p<0.05$, b = p=0.06-0.10, c = p=0.11-0.15, d = p=0.16-0.20 (One-way ANOVAs).

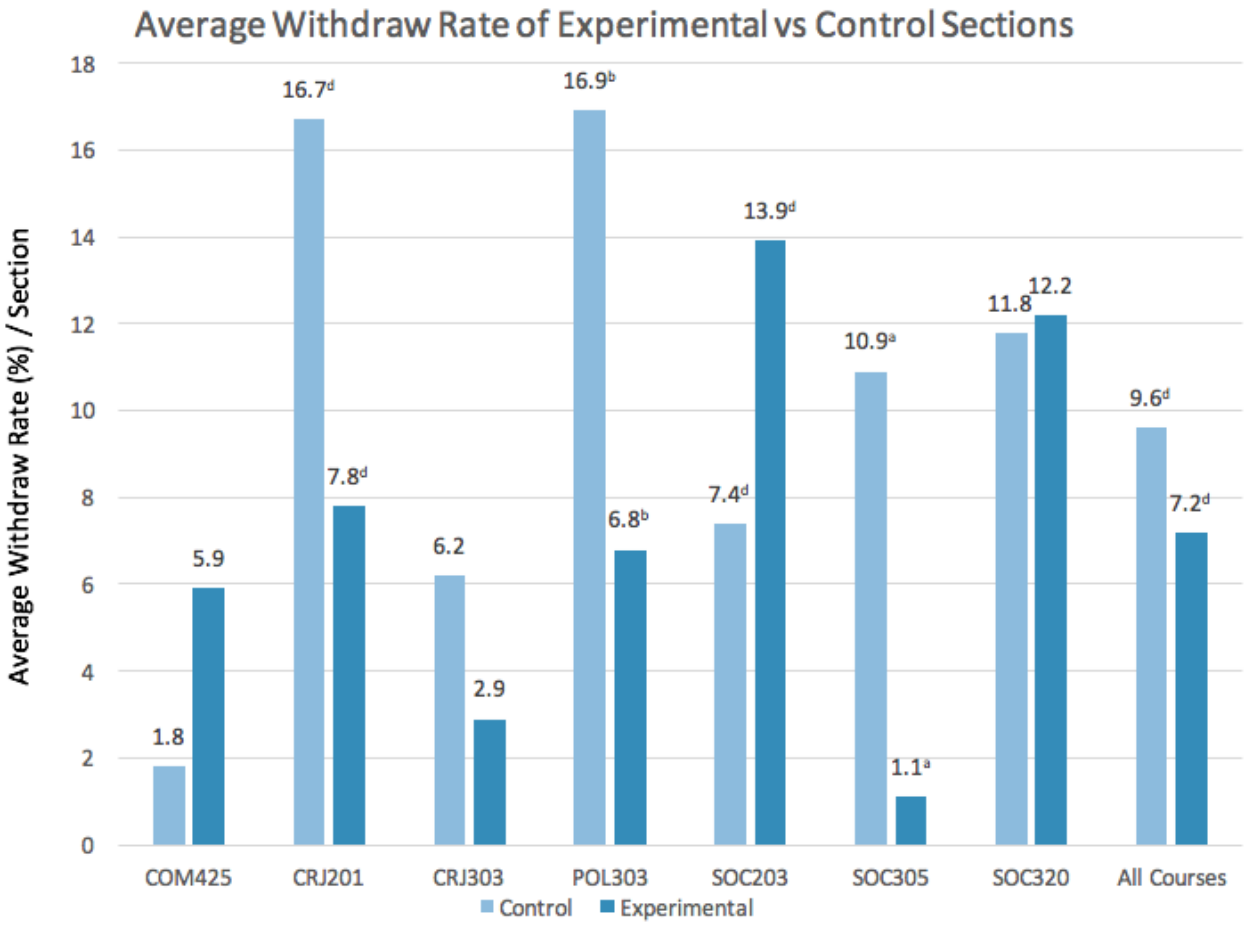

Figure 5. Average fail rate (%) for pilot vs. control sections. n = 19 sections for control and 25 sections for experimental courses, n = 384 total students for the control courses and 524 total students for the experimental courses, values with subscripts are significant at a = p<0.05, b = p=0.06-0.10, c = p=0.11-0.15, d = p=0.16-0.20 (One-way ANOVAs).

After the removal of CRJ303 and SOC203 (experimental sections utilizing 8 point discussions), data showed no significant difference in average GPA, or fail rate for all sections between students in control and experimental groups (Table 4), however, significantly higher average withdraw rates were observed in control (11.8%) groups versus experimental (6.0%) groups (p=0.01, Table 4).

	Avg GPA	Avg Withdraw Rate (%)	Avg Fail Rate (%)
All low pt courses			
Control	2.71	11.8[a]	8.7
Experimental	2.79	6.0	8.4

Table 4. Results of change in discussion board frequency on GPA, withdraw rate, and fail rate for all sections with CRJ303 and SOC203 removed. [a] = p=0.01.

Discussion/Conclusions

In the current study, reduction of weekly discussion frequency did not appear to significantly influence student learning in accelerated online undergraduate courses, as measured by course GPA. Moreover, across all courses, students' fail rate and progression remained relatively unchanged, refuting researchers' hypotheses. The nature of this finding is consistent with the findings of Cho and Tobias (2016) and Davies and Graff (2005), all of whom found no statistically significant differences on similar metrics in related studies.

Researchers did show a trending decrease in the withdraw rate across all courses upon the shift from two

discussions to one, suggesting a student preference for the later. There also seemed to be an accompanying trend towards higher failure rates upon the shift to decreased discussion requirements, originally attributed to increased weight on other, often more difficult, assignments. However, after a more in depth analysis of the data, it appears this increase in failure rate might be attributed more to the mode of revision. Two of the seven courses in the study, CRJ303 and SOC203, combined two discussions into one larger discussion worth double the assessment value, while the other courses utilized a different strategy whereby one discussion was simply eliminated and the points reallocated to other sections of the course. Review of the data shows that the one high point value discussion strategy led to outliers in regards to GPA, withdraw rates, and failure rates for students. Removing these outliers led to results across remaining courses with similar GPA, and fail rates, but dramatically decreased withdraw rates of 5.8% after a conversion to one weekly discussion. This appears to suggest that reduction in discussion requirements from two to one may improve student course satisfaction without harming student achievement, as long as high point value discussions are avoided.

Upon reviewing results, a key point worth considering is that there is likely some variability in research and in practice with regard to how discussions are defined and utilized. Lowman (1995, 159) suggested: "[a] useful classroom discussion consists of student comments separated by frequent probes and clarifications by the teacher that facilitate involvement and development of thinking by the whole group." Overall, Lowman's suggestions are aligned with how discussions at Ashford are utilized, which are commonly described by students and faculty as enjoyable, educational, and lively. Regardless, data presented here appear to suggest there is a limit to the amount of discussion that is preferred by students.

Researchers maintain that although a preference for reduced frequency of discussions may be suggested, they remain an important part of the online learning process and should not be abandoned. Effective discussions can develop students' thinking skills and higher-level learning such as application, analysis, synthesis, and evaluation, and also creativity (Anderson and Krathwohl, 2001; Bligh, 2000). They can also help students acquire better communication skills as they learn to present their ideas clearly and concisely, while contributing to students' affective development through increased interest in a variety of subjects. "Discussion is particularly effective at increasing student involvement and active learning in classes" (Lowman, 1995, 164).

Furthermore, faculty may use the discussion boards as a means to communicate personal interest and passion for the course material to their students. In their study, Lai and Savage (2013) found that the greatest level of student engagement took place when faculty used the learning management tool as a means to share their interests. In this way, discussions provide a venue for teaching in an online setting that can be engaging, educational, and inclusive of all students.

The study presented begs numerous questions for follow up research. First, research following up on the effects of high point value discussions may prove fruitful. While highly valuable, discussions are generally seen as less rigorous than other assignments in regards to assessment. However, in the current study, students appeared to do better in courses with lower point value discussions. A better understanding of why student achievement seems higher in the face of more rigorous coursework could enhance the understanding of student achievement in the online classroom. Secondly, the field of online education may benefit from an in depth examination into the effects of faculty engagement in online discussion boards and the effects on student achievement. Wlodkowski and Ginsberg (2010) argue that for students to succeed in accelerated programs, faculty must actively and intentionally work to motivate students. Identifying and measuring faculty behavior that students find motivating, like sharing their own passion and interest in the course content, could impact the successful outcomes of students in online group discussions. Additionally, tapping into technological advances might help to enhance the nature of online discussions. Among most of the online curriculum components, discussion can be especially enhanced with advanced learning management systems and technology platforms. Examples include video guidance at the beginning of discussion, asynchronous audio and video student posts and instructors' feedback, synchronous webinars, office hours, and tutoring-on-demand services. Perhaps the interaction of reduced discussion frequency with increased technological tools could significantly impact student satisfaction and achievement within the online classroom.

Based on these findings, trends show that adult online students may prefer less frequent, low point value, discussion interactions. However, more research is needed to identify methods of enhancing discussion participation, engagement, and overall student achievement in the online classroom. Finally, it is important to note that these findings may be limited in their application at other institutions as they could be moderated by the accelerated 5-week model and unique student population surveyed. Thus, colleges and university administrators should consider their own unique modalities and student populations when generalizing the results of this study.

References

Anderson, L., & Krathwohl, D. A. (2001). Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. New York: Longman.

Arbaugh, J. B. (2000). Virtual classroom characteristics and student satisfaction with internet-based MBA courses. *Journal of Management Education, 24*, 32-54. doi: 10.1177/105256290002400104

Bligh, D. A. (2000). What's the use of lectures. San Francisco, CA: Jossey-Bass.

Cho, M., & Tobias, S. (2016). Should Instructors Require Discussion in Online Courses? Effects of Online Discussion on Community of Inquiry, Learner Time, Satisfaction, and Achievement. *The International Review Of Research In Open And Distributed Learning, 17*(2). 123-140. doi:http://dx.doi.org/10.19173/irrodl.v17i2.2342

Davies, J., & Graff, M. (2005). Performance in e-learning: online participation and student grades. *British Journal of Educational Technology*, *36*(4), 657–663. doi:10.1111/j.1467-8535.2005.00542.x

Doggrell, S. A., & Schaffer, S. (2016). Attrition and success rates of accelerated students in nursing courses: a systematic review. *BMC Nursing, 15*, 1-8. doi:10.1186/s12912-016-0145-7

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education model. *The Internet and Higher Education*, 2(2-3), 87-105. Retrieved from http://www.anitacrawley.net/Articles/GarrisonAndersonArcher2000.pdf

IBM Corp. Released 2014. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.

Institutional Research Services. Enrollment Student Characteristics. Retrieved, 08/02/2016, from http://assessment.ashford.edu/behind-numbers/institutional-data

Lai, A. and Savage, P. (2013). Learning management systems and principles of good teaching: Instructor and student perspectives. *Canadian Journal of Learning and Technology, 39*(3), 1-21. doi: http://dx.doi.org/10.21432/T25G71

Lowman, J. (1995). Mastering the techniques of teaching (2nd ed.). San Francisco: Jossey-bass.

Palmer, S., Holt, D., & Bray, S. (2008). Does the discussion help? The impact of a formally assessed online discussion on final student results. *British Journal of Educational Technology, 39*(5), 847–858. doi:10.1111/j.1467-8535.2007.00780.x

Sher, A. (2009). Assessing the relationship of student–instructor and student–student interaction to student learning and satisfaction in web-based online learning environment. *Journal of Interactive Online Learning, 8*(2), 102–120. Retrieved from http://www.ncolr.org/jiol/issues/pdf/8.2.1.pdf

Silcock, P. (2003). Accelerated learning: A revolution in teaching method?, *Education 3-13, 31*(1), 48-52. doi:10.1080/03004270385200081

Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education, 22*(2), 306-331. doi:10.1080/0158791010220208

Webb, E., Jones, A., Barker, P., & van Schaik, P. (2004). Using e-learning dialogues in higher education. *Innovations in Education & Teaching International*, *41*(1), 93–103. doi:10.1080/1470329032000172748

Wlodkowski, R. J. (2003). Accelerated learning in colleges and universities. In Wlodkowski, R. J. and Kasworm, C. E. (eds.). Accelerated Learning for Adults: The Promise and Practice of Intensive Educational Formats. *New Directions for Adult and Continuing Education, (97)*. San Francisco: Jossey-Bass. Retrieved from http://www.raymondwlodkowski.com/Materials/Accelerated_Learning.pdf

Wlodkowski, R. J. and Ginsberg, M.B. (2010). *Teaching intensive and accelerated courses: Instruction that motivates learning*. San Francisco, CA: Jossey-Bass.

Back to the Online Journal of Distance Learning Administration Contents