

# Comparison between Online Activity and Performance in a Distance Education Equine Science Course

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## Abstract

This study was designed to examine the online activity of students ( $n=72$  over three semesters) enrolled in a distance education equine science course. The tracking function of Vista 4.0 (Vista Blackboard) provided information about the students' activities online. Students were categorized based on if they were successful in the course (A, B grade,  $n=55$ ), unsuccessful (C or D grade,  $n = 9$  students) or those who failed or did not complete the course ( $n = 8$  total). Analysis of variance was used to determine if activity differed across the categories and correlation analysis was used to determine if online activity was related to the students' final grade. There were significant positive relationships between the time spent online, number of online sessions and the number of files opened, with the student's final grade. Further, students who were successful in the course were more active online, having significantly more online sessions than those who failed ( $P < 0.05$ ) and there was a tendency for successful students to spend more time online than those who were unsuccessful ( $P < 0.1$ ). These results show that online activity can affect the final outcome in a distance education course and therefore faculty should encourage student engagement in their courses and monitor student activity to gauge these efforts.

## Introduction

Distance education (DE) is fast becoming a popular way for students to take courses and obtain degrees. The Sloan Consortium reported that close to four million students (20% of U.S. students) took at least one online class in fall 2007 (Allen and Seaman, 2008). This interest in distance education is expanding into several disciplines, including Animal Science.

Students taking Animal Science classes are changing, in particular with more women entering the field hoping to pursue veterinary school (McNamara, 2009). In addition, more students in the field are from urban and suburban backgrounds (McNamara, 2009). Within several Animal Science departments, companion animals and horses are the most popular species (Meyer, 1990; Moore et al., 2008). Because of the increased interest in fields such as equine science, there is a need to offer new opportunities for study. One such way to satisfy these

interests is to offer online courses through distance education, in addition to traditional live classes. Distance education further enables students to take courses while living elsewhere, working full or part-time and/or balancing a family.

Distance education is criticized because of the lack of hands-on learning (Ma and Nickerson, 2006). However, several introductory-level Animal Science courses do not have laboratories in which hands-on activities are necessary and are therefore well suited for development into online classes. We have created a distance education version of a freshman level introductory equine science course (ANS 110; Introduction to Equine Science). The course provides content through recorded lectures using Camtasia (TechSmith Corp. Okemos, MI) which are loaded onto a learning management system (Vista 4.0, Blackboard Inc. Washington, D.C.). Course notes (PowerPoint, Microsoft Corp.) are also made available for download. Learning is assessed through the use of online open-book quizzes and closed-book proctored exams. Student interaction is encouraged through the use of online discussions, chat sessions (both on Vista) and Elluminate (Elluminate Inc., Pleasanton, CA) review sessions, as well as being able to view and review material such as course notes and recorded lectures.

Whether or not students take advantage of the course resources to the full extent, likely impacts their performance in the class. Performance in the classroom is influenced by many factors including self-efficacy and previous experience (Joo et al., 2000; Perkins and Andreasen, 2001; Schunk, 1995) but may also be influenced by class attendance (Devadoss and Foltz, 1996; Marburger, 2006) and study habits (Plant et al., 2005).

Thus, it is of interest to determine how the student's use of online resources is related to performance, as online activity in a DE class likely reflects both attendance (through viewing lectures and accessing class notes) and study time (reviewing notes and lectures). The objectives of this study were to use the tracking tool of Vista to quantify the online activities of the ANS 110 students. It was hypothesized that students, who embraced the online culture and spent more time online, viewing files and engaging in discussions, would perform better in the class than those who spent less time online.

## Comparison between

### Methods

This study used data collected from three semesters of ANS 110 taught in the summers of 2007, 2008, and 2009. The 2007 and 2008 courses were 10-week sessions and the 2009 course was a five-week session. There were 18, 36, and 18 students enrolled in the course over the three years, respectively.

Over the three years the content remained essentially the same, with new recordings produced each year. The grading scheme was the same each year, with two “midterm” exams and a final exam, quizzes, a term paper, and participation generating points towards the final grade. Participation points were derived from the students' activity in the online discussions and in the Elluminate review sessions.

The tracking tool of Vista enables teachers to determine when students were logged onto the course, how long they spent online and what they accomplished. Data from these summaries used in the present study included; total time online (converted to minutes), number of times they logged on (total sessions), number of discussions read, number of discussions posted and the total number of files viewed.

For the students who completed the course, the correlation between total time online, number of times logged on, number of discussions read, number of discussions posted and number of files viewed and the student's performance in the course (final grade) were determined. In addition, students were categorized as successful (received an A or B grade), unsuccessful (C or D) or fail (Morris et al., 2005). The fail group included students who earned a grade <60% as well as incomplete students who did not complete the course (did not take all assigned tests or quizzes and failed to submit the paper, thus achieving grades of 0 on these assessments), but did not withdraw from the course, and therefore also failed. One-way analysis of variance was used to determine if Vista usage differed between these groups of students. Bonferroni testing compared groups when the overall model was significant. Significant differences were denoted at  $P < 0.05$ , while trends were identified at  $P < 0.1$ . Statistical analysis utilized GraphPad Prism 5.0 (GraphPad Software Inc., LaJolla, CA). Data are presented as mean  $\pm$  SEM.

### Results and Discussion

Data from a total of 72 students were included in the study. The average ( $\pm$  SEM) grades in 2007, 2008, and 2009 were  $83.89 \pm 4.8\%$ ,  $86.90 \pm 1.8\%$ , and  $90.16 \pm 2.2\%$ , respectively. There was no significant

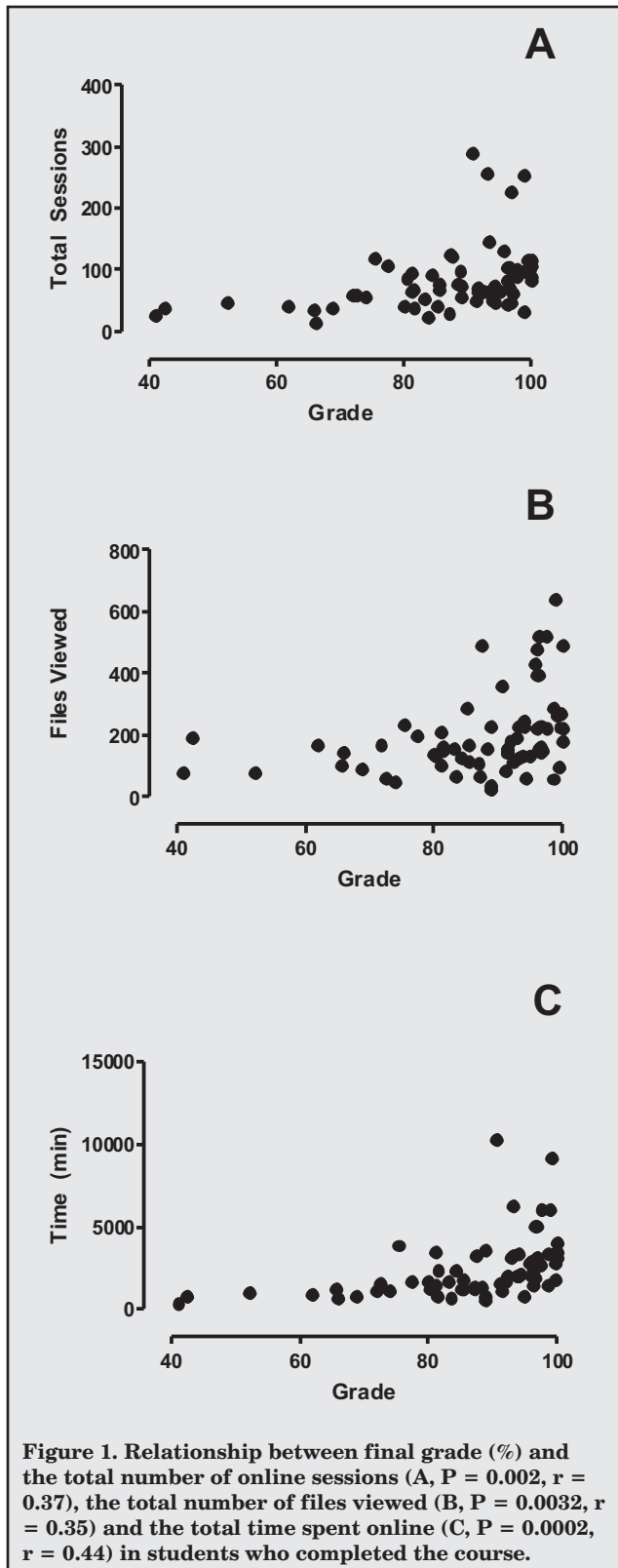
difference in overall grades between the three years. The tracking data for the students in each year is shown in Table 1. There was no significant difference in any of the activity variables between the years, likely due to the wide variation in student activity.

Despite wide variation in online activity, there was a significant relationship between student performance and online activity in students who completed the course. The total number of online sessions ( $P = 0.002$ ), files viewed ( $P = 0.003$ ) and total time online ( $P = 0.0002$ ) were positively related to the student's final grade (Figure 1). These findings may be comparable to studies that have reported a relationship between class attendance and performance (Devadoss and Foltz, 1996; Marburger, 2006). These findings also support the data from Wang and Newlin (2000, 2002) who reported significant relationships between online activities such as homepage hit rate, forum postings read and forum postings written in an online psychology class.

**Table 1. Online Activities (average per student; mean  $\pm$  SEM and [range]) of Students Who Completed the Course. There Were No Differences in Activity between the Years.**

	Total Number of Online Sessions	Total Time Online (min)	Discussions Read	Discussions Posted	Total Files Viewed
2007	84.4 $\pm$ 13.7 [14 - 255]	2154 $\pm$ 349.6 [337 - 6084]	359.6 $\pm$ 147.0 [0 - 2361]	8.1 $\pm$ 1.3 [0 - 18]	340 $\pm$ 40.4 [81 - 640]
2008	90.4 $\pm$ 10.9 [22 - 290]	2493 $\pm$ 421.6 [614 - 10625]	756.3 $\pm$ 315.0 [2 - 9185]	8.6 $\pm$ 1.2 [1 - 24]	142.6 $\pm$ 12.9 [27 - 361]
2009	69.6 $\pm$ 6.2 [33 - 119]	2624 $\pm$ 208.2 [761 - 3882]	165.5 $\pm$ 21.9 [4 - 377]	5.9 $\pm$ 0.56 [1 - 18]	168.8 $\pm$ 14.49 [60 - 288]

One might have expected a stronger relationship between online activity and performance in an online class than what was observed. In fact, there were many students who performed well, but were not active, thus decreasing the strength of the relationships between performance and online activity. Because of the nature of an online course, the flexibility enables students to gauge the effort required to achieve the desired grade. It is likely that students who had ample equine experience did not have to spend as much effort learning the material (Pratt-Phillips and Schmitt, 2010). It is also possible that students used other sources for learning, such as the textbook or downloaded notes. It should be pointed out that the tracking tool in Vista could not determine if a student is actively working on course material. For example, if a student were to log on and open a file, the tracking would start to record the activity, but if the student stepped away from their desk (perhaps for several hours), the tracking would have continued (there is a 2-hr time-out). The number of times the student logged on and the number of times the files were viewed may be a better indicator of effort.



The tracking feature of the learning management system provides a tool to quantify student involvement, despite the aforementioned limitations. The average time spent online in this course was approximately 43 hours. This is more than the approximate 35 hours spent in the traditional face-to-face version of ANS 110 over a 15-week semester. It is

likely that the additional time in a DE class also reflects student studying (reviewing notes and lectures) to some degree, though some students may download notes for reviewing. The total time spent online also does not include the Elluminate review sessions, which were held at least one to two times per week. Meanwhile, a face-to-face student would spend time outside the classroom reading and studying. Thus, it is likely that the total time spent learning material for this online course is similar to that of its face-to-face equivalent course.

Studies that attempt to predict performance in a traditional class based on study time are conflicting (Plant et al., 2005), likely due to difficulty accurately estimating the time students spend on course materials outside of class. Similarly, it was reported that while online activity is correlated to performance in an online class, student's reported study habits were not (Wang and Newlin, 2002). Online activity likely reflects both attendance and study time to some degree, and therefore may be a better quantitative indicator of performance (Wang and Newlin, 2002).

The present study also categorized students as successful (A or B grade, 55 students), unsuccessful (C or D grade, nine students) or fail (eight students). This was based on the model of Morris et al. (2005) to include students who did not complete the course. There were a total of five students (one in 2007 and four in 2008) who did not complete the course, but did not withdraw. These students therefore received an incomplete, failing grade. Of those students who completed the course, there were three students who also failed. There were significant differences between the students who were successful in the course compared to those who failed the course (Table 2). Specifically, there was a significant difference ( $P < 0.05$ ) in the number of sessions started by students who were successful compared to those who failed the course. There was also a significant difference in the number of files viewed between those students who were successful and those who failed ( $P < 0.05$ ). In addition, there was a significant difference in the total time spent online between students who were successful and those who failed ( $P < 0.05$ ) and there was a trend for a difference between those who were successful and those who were not successful in the course ( $P < 0.1$ ). The findings are similar to the work of Morris et al. in which students who were successful in online courses were more active than those who were non-successful (Morris et al., 2005).

Students who do not complete an online course are not uncommon (Morris et al., 2005). One of the six students completed two of the three exams, but then did not complete the final, the quizzes, or paper. Two of the students only logged onto the course five times. It is possible these students underestimated the effort required for such a course, became busy with other ventures or were not comfortable with the online learning environment. Similarly, Wang and

## Comparison between

**Table 2. Online Activity (mean of  $\pm$  SEM) of Students who were Successful in the Course (A or B grade), Unsuccessful (C or D grade) and those who Failed (including those who were incomplete)**

	Successful (n = 55)	Unsuccessful (n = 9)	Fail (n = 8)
Total number of online sessions	89.8 $\pm$ 7.4 <sup>a</sup>	59.0 $\pm$ 11.3	22.5 $\pm$ 5.8 <sup>b</sup>
Total files viewed	214.3 $\pm$ 18.5 <sup>a</sup>	137.4 $\pm$ 21.3	64.2 $\pm$ 21.7 <sup>b</sup>
Total time online (min)	2705 $\pm$ 255.8 <sup>a,c</sup>	1212 $\pm$ 140.6 <sup>d</sup>	358 $\pm$ 87.1 <sup>b</sup>

Columns with superscripts a, b are different at  $P < 0.05$ ; columns with superscripts c, d are different at  $P < 0.1$ .

Newlin reported lower class performance in students who took an online class solely based on availability, compared to students who prefer online courses (Wang and Newlin, 2002). It is unknown however why these students would not withdraw and drop the course officially. It may be recommended that the tracking tool be utilized frequently throughout the semester to detect those who may be less active and therefore at risk for not completing the course. This was done in the case of these students, to no avail however. There were additional students who began the course (approximately two per year) but officially withdrew before the end of term and therefore their data is not included in this study.

The present study highlights the relationship between student online activity and performance in an online class. Tracking student activity periodically throughout the course may help identify the students at risk for not completing the course and may be used as an estimate of student interest and engagement (Wang and Newlin, 2002). Increased interaction with the faculty and other students through the use of well-designed discussion forums or online learning communities may help student engagement (Vonderwell, 2003; Wang and Newlin, 2000, 2002). Synchronous learning opportunities, such as with Elluminate, may also encourage student activity. Along with any efforts made by faculty to provide strategies to engage students, ultimately students must become active and independent learners to be self-motivated to participate in such activities (Palloff and Pratt, 2001).

## Summary

The data presented herein utilize a tracking tool to show that students who are more active online perform better in an online distance education course. This information may be of interest to faculty so they can design their course to encourage students to log on regularly and engage themselves online.

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