Use of Web-Based Homework for an Undergraduate Introductory Finance Course: Students' Perceptions

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ABSTRACT

Effectively learning the concepts in a Principles of Finance course requires considerable practice in the form homework. Many problems in finance classes are word problems and simply watching someone solve them is rarely sufficient to become proficient in this subject. As class sizes increase and enrollment and offerings of online classes is expanded, the demand on faculty members time is increased, but the number of hours in a day remains fixed. Student familiarity with computers and the Internet is extensive. As a result, students are more technologically sophisticated and accustomed to the speed and instant response that this technology promises. This study explores some student perceptions about their experience with an online homework application that accompanies their textbook in a Principles of Finance course. We explore some of the differences between students that prefer online homework and those that prefer paper-based assignments. Accounting majors, Hispanics and those that spent more time working with the web-based homework platform preferred web-based homework to paper-based homework. Management majors, Anglos and surprisingly, those that accessed the internet more often, or spent more hours online indicated that they would have preferred the paper-based system of homework.

INTRODUCTION

Introduction to finance is a business core course that all undergraduate business students are required to take. The quantitative nature of the material in an introductory finance course makes it one of the more difficult courses for students to master. This is where finance instructors can experiment with technology both inside and outside of the class room to help students better learn the finance concepts that will help them in their business careers.

Technology has become more and more prevalent at universities and many finance instructors have sought ways to use this technology to help their students learn. Some instructors have brought technology into the classroom in the form of financial simulations and others have sought to augment their courses with individual course web sites or course management software such as WebCT or Blackboard. This trend toward using technology in finance education can be expected to continue as junior faculty members bring more and more advanced technology into the classroom (Cudd, Tanner, & Lipscomb, 2004).

In this study, the authors look at the use of technology outside of the classroom combined with traditional classroom instruction to help students learn finance. The technology incorporated included a web-based homework application that was included with a print textbook for an undergraduate business introduction to finance course. The authors examine the students' perceptions of using the web-based homework application at the end of their introduction to finance course.

SELECTED LITERATURE

How do you get to Carnegie Hall? Practice, practice, practice. Palocsay and Stevens (2008) found that this adage is also the key to success in learning quantitative topics such as finance. The way students learn quantitative subjects is through extensive practice and feedback. The practice is usually achieved through the use of homework since there is limited classroom time. However, the practice is only useful if there is feedback involved that includes collecting, grading and commenting on the homework. Without the frequent and timely feedback (i.e. grades and explanations/comments), it is difficult to get the students to practice and with growing class sizes it is difficult for instructors to collect and grade the required number of practice problems for students to adequately master the material.

Previous research has shown the necessity of homework (Warton, 2001). With the growth of the Internet and the students' familiarity with the Internet, textbook publishers have started to introduce web-based homework applications as a way for students to receive the practice they need as well as receive immediate feedback on their solutions. Bonham, Deardorff, and Beichner (2003) define web-based homework systems as: being accessible from any standard internet browser and connection, having password authentication, transmission of assignments to students and collection of their answers, and automatic grading and recording of the grades.

Given the short history of web-based homework applications, there have been few studies that examine the impact that web-based homework has on students' performance versus that of paper-based homework (see Hauk and Segalla, 2005; Bonham et al., 2003; Dufresne, Mestre, Hart, and Rath, 2002; Palocsay and Stevens, 2008; Baugher, Varanelli, and Weisbord, 2003; Peters, Kethley, and Bullington, 2002). Most of the studies found that there was no significant difference in student performance between groups given web-based homework versus those that were given paper-based homework. Bonham et al. (2003) and Palocsay et al. (2008) both found that it was the student's GPA that influenced the student's performance and not the method of homework delivery. In addition, Dufresne et al. (2002), when examining the classes of four different instructors, found that the instructor contributed to a difference in student performance but not the homework delivery method.

While significant performance differences have not been found when using web-based homework, other benefits have been found. Baugher et al. (2003) suggested that students that consistently use the web-based homework application will see a positive impact on their course grade. In addition, web-based homework can provide immediate feedback to the student which has been found to be more effective than the delayed feedback associated with manually graded homework (Kulik and Kulik, 1988; and Kulik and Kulik, 1986). Johnson (1989) found that homework led to increased retention of the material. Weems (1998) found that the number of A grades earned by students was significantly higher among the students that were assigned homework. In other research, students have reported a positive view of web-based course

materials and they believe they can improve the learning experience (see Peng, 2006; and Michelson and Smith, 2004).

This study looks at students' perceptions of the use of web-based homework in the quantitative subject area of finance to determine if the students perceive the educational value of this delivery method. The web-based homework application used for this study was MyFinanceLab. This product is tied directly to the textbook. The MyFinanceLab product used in this study allows students to bring up the specific pages from the text the student is using so that they can review the topic for that assignment or problem. As a result, the terminology and formula notations will be the same in the book as the homework and help pages.

The MyFinanceLab software provides a database of questions from which to assign homework questions and allows the instructor to write their own questions. In addition, the MyFinanceLab software includes links that students can use to access the specific pages in their text that discuss the questions and problems asked. MyFinanceLab provides the student with immediate feedback in both explanations specific to the question and in the form of a grade to let them know their progress and learn from their mistakes.

Homework is very important in quantitative courses like undergraduate introduction to finance where out-of-class work is the main way that students practice and develop their problem-solving skills (Palocsay et al., 2008). When provided with non-graded practice problems, students rarely work through a sufficient number of problems. Providing large numbers of paper-based homework problems presents a time and quality issue for the instructors that have to grade problem sets from increasingly growing sections of finance. The time issue has to do with the instructor having enough time to grade the assignments and return them to the students in a timely fashion. The quality issue has to do with the level of detail that the instructor can go into when writing comments on the students' work. Therefore, web-based homework is a good way to provide students with a way to practice developing their skills and a way to receive immediate feedback. But does it increase student performance in undergraduate introduction to finance classes and what do the students think about the web-based homework delivery used in an undergraduate introduction to finance course? The following section will detail the methodology used to answer the second part of the question regarding the students' perceptions of the use of web-based homework in their finance class.

METHODOLOGY

Two sections of an undergraduate introduction to finance course taught in the Fall semester of 2009 were used for this study to uncover the student's perceptions of the use of web-based homework in an undergraduate introduction to finance course. The two finance sections are taught using a web-based delivery method for homework during the semester. The two sections were taught by the same instructor.

For this study, a direct survey was used to collect data regarding the students' perceptions of the web-based homework for the two finance sections. The survey instrument was designed specifically for this study for the purpose of gathering data on students' perceptions on the use of a web-based homework application in their introduction to finance course as well as to gather data on their demographics. To validate the clarity of the survey questions, two professors and one student were asked to read through the questions. Revisions to the instrument were made based on the feedback received.

Information on 30 items was collected from the survey instrument, included in the appendix. Survey items Q1 to Q14 collected demographic data. Survey items Q15 to Q24 were used as five-point Likert scaled questions with end points rating from "strongly disagree" to "strongly agree" and measured students' perceptions on the usage of the web-based homework application in their finance course. Survey item Q25, "I prefer web-based homework over paper-based homework" measured the students' preference for the web-based homework over paper-based homework in their course. Survey items Q26 to Q30 were used to collect data on the students' learning style.

DATA COLLECTION

Surveys were distributed to 84 students enrolled in an undergraduate introduction to finance course at a mid-sized four-year university. The participants were given the 30 item survey and allowed class time to complete the survey. All of the participants were informed that participation in the study was voluntary and that their responses would only be reported in aggregate. The students were asked to rate each of the survey items on a Likert-scale for 1 to 5 with 1 being "strongly disagree" and 5 being "strongly agree". Sixty-two of the 84 students completed and returned the survey instruments with virtually all of the questions answered.

Except for one of the respondents from the College of Education, all of the respondents were students pursuing degrees from the College of Business. The sample was approximately 47 percent male and 53 percent female with an average age of 23.16 years. Approximately 43.6 percent of the respondents were Caucasian, 38.7 percent were Hispanic, 8 percent Asian, 6.5 percent African-American and 3.2 percent classified themselves as Other. Ninety-four percent of the respondents rated themselves as having an average or above average level of computer literacy. The respondents reported using the Internet an average of 36.37 times per week for an average of 24.51 hours spent on the Internet per week. In addition, 93.5 percent reported having taken other courses that used web-based homework.

Approximately 40.3 percent of the respondents agreed or strongly agreed with the statement that they prefer the web-based homework over paper-based homework. Approximately 32.3 percent of the respondents preferred to have paper-based homework. The remaining 27.4 percent were neutral in their preference regarding the homework delivery method.

ANALYSIS AND DISCUSSION

Most of the survey instruments (73.8%) were returned with virtually all of the questions answered. The data collected demonstrated an internal consistency score (Cronbach's alpha) of 0.918, suggesting reliability of the data. Nevertheless, it should be noted that the acceptable level of reliability relates to the data resulting from the measurement and not the survey instrument itself.

To examine the students' perceptions of the use of web-based homework, the mean responses to each question were calculated and are reported below. The survey items were on a Likert-scale from 1 to 5. The questions that scored a mean of 3.5 (out of 5) or better are listed in Table 1.

Approximately sixty percent of the students found that the web-based homework problems were useful in helping them understand the course material. The students provided that statement with an average rating of 3.58 out of a possible 5. Since the web-based homework was

assigned for a grade in the course, students were more likely to complete the homework. So as Palocsay and Stevens (2008) reported, working through practice problems is how students learn quantitative topics such as finance. Hence, the students found the incentivized practice helpful.

Table 1: Top Scoring Questions

Question	Mean
The MyFinanceLab application was easy to navigate.	3.94
The MyFinanceLab application made it easy to find information.	3.84
The MyFinanceLab practice problem explanations were useful.	3.65
The MyFinanceLab application made it easier to understand the course material.	3.58
The MyFinanceLab exercises helped me better understand the material.	3.52

Students reported that the web-based homework was easy to navigate and they made it easy for the students to find information. The students rated the ease of navigation with an average score of 3.94 out of a possible 5 with 69 percent of the respondents agreeing or strongly agreeing to the ease of navigation statement and only 13 percent disagreeing or strongly disagreeing. In addition, they rated the ease of finding information with an average of 3.84 out of a possible 5 with 71 percent agreeing or strongly agreeing with the statement.

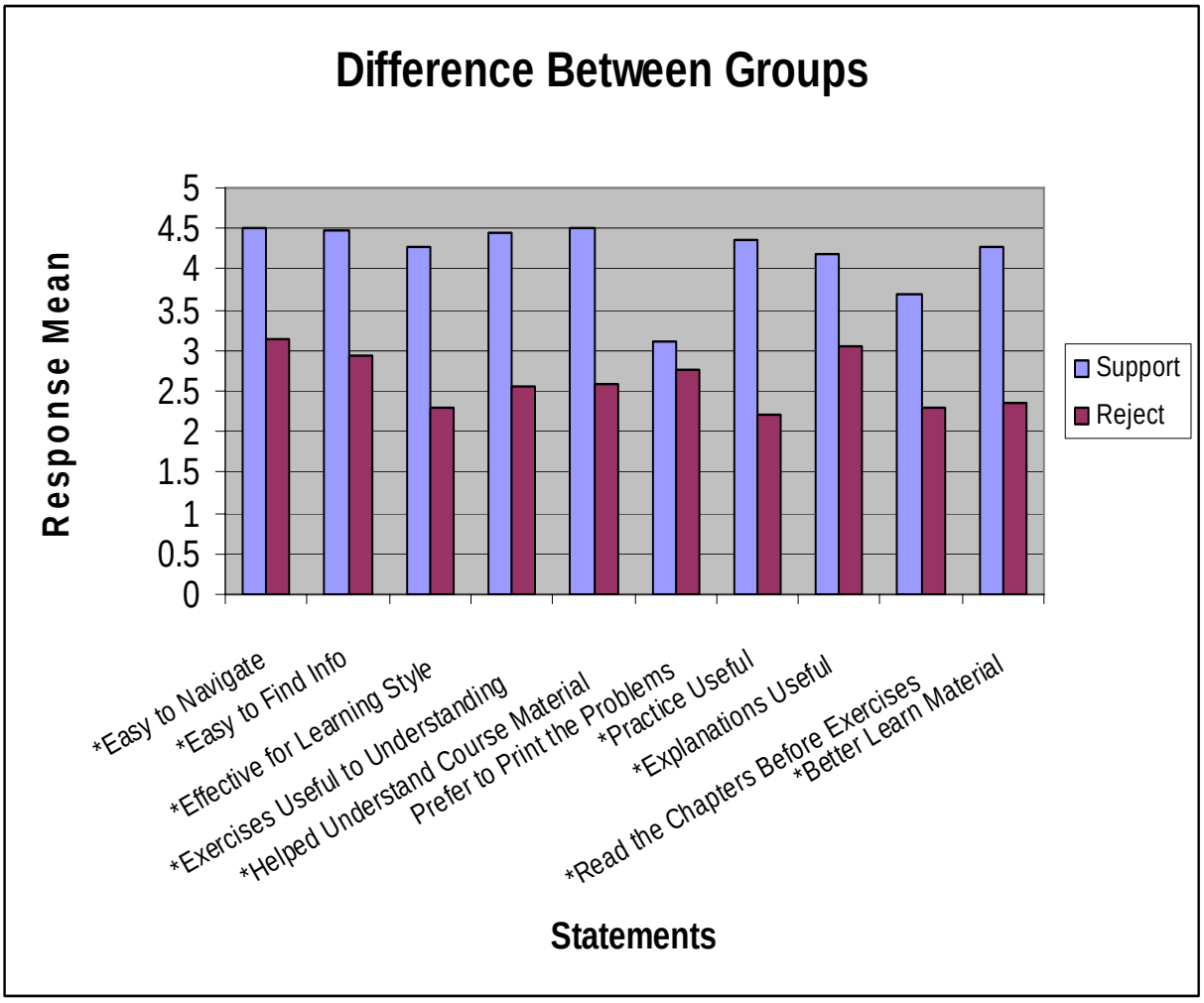
Approximately 60 percent of the students agreed or strongly agreed with the statement that the homework problem explanations were useful. The average rating for this statement was 3.65 out of a possible 5. This finding is a little lower than expected since Kulik and Kulik (1988) reported that immediate feedback at the point of learning is preferred by students over delayed feedback.

In relation to the previous statement that students found the web-based homework useful, fifty-eight percent of the students agreed or strongly agreed that the web-based homework made the course material easier to understand. The average rating for this statement was 3.52 out of a possible 5.

While the students reported the usefulness of the web-based homework exercises and explanations, thirty-two percent of the students disagreed or strongly disagreed with the statement that they preferred web-based homework over paper-based homework. In addition, thirty-nine percent of the students reported that they preferred to print out the homework problems to complete them and then enter the answers into the MyFinanceLab application. This is possibly due to the need to have the problems on paper where the students can work through the formulas and refer to the printed problem for the required information.

Support Group vs. Reject Group

To determine if there are any systematic differences between students who prefer web-based to paper-based homework, we sorted the sample by the answer to Question 25, “I prefer web-based homework over paper based homework”. To increase the power of the test, we eliminated those students who reported being uncertain in their preference from the comparison. T-tests were conducted to determine if there were any significant differences between the support and reject group.



Here are the questions in order from Q15 to Q24. A table with the actual means and p-values is displayed below.

Table 2 Difference of Means for Support and Reject group. (Neutral group is excluded to increase the power of the test.

	Support (mean)	Reject (mean)	p-value
Q15 Easy to Navigate	4.52	3.15	0.0005
Q16 Easy to Find Info	4.48	2.95	0.0002
Q17 Effective for Learning Style	4.28	2.3	0.0000
Q18 Exercises Useful to Understanding	4.44	2.55	0.0000
Q19 Helped Understand Course Material	4.52	2.6	0.0000
Q20 Prefer to Print the Problems	3.12	2.75	0.4201
Q21 Practice Useful	4.36	2.2	0.0000
Q22 Explanations Useful	4.2	3.05	0.0018

Q23 Read the Chapters Before Exercises	3.68	2.3	0.0002
Q24 Better Learn Material	4.28	2.35	0.0000

There appears to be a significant difference in the way that the support and reject group feel about the MyFinanceLab online homework. All of the answers to the questions are significantly different between the groups except one. The only question that does not appear to be different is number 20 "I prefer to print out the problems and work them on paper then enter them into MyFinanceLab".

So in what ways are the students that prefer web-based homework different from those that prefer paper-based homework?

Q1 Computer Knowledge								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**Total**
Support	0	0	2	2	7	8	6	**25**
Reject	0	0	1	0	8	7	4	**20**
Neutral	0	0	1	1	6	4	5	**17**
Total	***0***	***0***	***4***	***3***	***21***	***19***	***15***	***62***

The self-reported computer knowledge appears to be similar between the three groups. Preference for paper-based homework is not a reflection of their perceived computer skill levels.

Q2 How often do you use the Internet per week?							
	0-24	**25-49**	**50-74**	**75-99**	**100 and Above**	**Total**	**Average**
Support	15	5	1	0	4	**25**	31.48
Reject	10	3	3	0	4	**20**	38
Neutral	8	4	3	0	2	**17**	34
Total	***33***	***12***	***7***	***0***	***10***	***62***	

The Reject group appears to use the Internet with a greater frequency per week. Furthering the inference from Question 1, the reject group seems to use the Internet more frequently than the support group. Clearly they have the availability and the skills to access the assignments.

Q3 How many hours per week do you use the Internet?							
	0-24	**25-49**	**50-74**	**75-99**	**100 and Above**	**Total**	**Average**
Support	17	4	4	0	0	**25**	22.46
Reject	11	3	4	0	2	**20**	32.9
Neutral	14	2	1	0	0	**17**	17.65
Total	***42***	***9***	***9***	***0***	***2***	***62***	

The Reject group appears to spend more time on the Internet per week than the Support group. Not only does the Reject group, access the Internet more often, they spend more time using the Internet. While it is not possible to make conclusions from this sample, it is possible that the more frequent Internet users have a higher expectation about the 'entertainment value' of the MyFinanceLab product.

Q4 What is your classification?						
	Freshman	**Sophomore**	**Junior**	**Senior**	**Graduate**	**Total**
Support	0	0	12	13	0	**25**
Reject	0	1	8	11	0	**20**
Neutral	0	0	8	9	0	**17**
Total	***0***	***1***	***28***	***33***	***0***	***62***

There appears to be no class rank difference between the Support and Reject groups. However, this is a junior level class and it is required to be taken before students can proceed to the core Business Policy class. Given the prerequisites to the class, it would not be possible for a Freshman, and very unlikely for a Sophomore to take the class. While graduate students could take this class to meet the prerequisites for the MBA core finance class, none of the sample did.

Q5 Your College						
	A&H	**Business**	**Education**	**Nursing**	**S&T**	**Total**
Support	0	24	1	0	0	**25**
Reject	0	20	0	0	0	**20**
Neutral	0	17	0	0	0	**17**
Total	***0***	***61***	***1***	***0***	***0***	***62***

Almost all of the respondents were enrolled in the College of Business with the exception of one student enrolled in the College of Education. Because of the number of prerequisites, it is unlikely that someone from any other college would take this class. It is an option as part of the minor in Personal Financial Planning, but very few students choose this class as there are several other options with fewer prerequisites available.

Q6 What is your major?									
	ACCT	**ECON**	**FINA**	**General Business**	**MGMT**	**MIS**	**MKTG**	**Other**	**Total**
Support	8	1	4	4	2	0	5	1	**25**
Reject	4	0	4	3	5	0	4	0	**20**
Neutral	3	0	2	3	5	1	3	0	**17**
Total	***15***	***1***	***10***	***10***	***12***	***1***	***12***	***1***	***62***

The respondents majoring in accounting seem to have a more favorable view of web-based homework than students in other majors. Respondents majoring in management seem to indicate a preference for paper-based homework.

Q7 First generation college student			
	Yes	**No**	**Total**
Support	10	15	**25**
Reject	6	14	**20**
Neutral	6	11	**17**
Total	***22***	***40***	***62***

First generation college students appear to prefer the web-based homework while the respondents that are not first generation students who are almost evenly split between the Support and Reject groups. However, there may be a high degree of multicolinearity with the variable for race.

Q8 Expected grade in course						
	A	**B**	**C**	**D**	**F**	**Total**
Support	8	10	6	1	0	**25**
Reject	7	8	4	1	0	**20**
Neutral	0	10	6	1	0	**17**
Total	***15***	***28***	***16***	***3***	***0***	***62***

Expected course grade does not appear to influence whether a respondent belongs to the Support or Reject group. It does not appear that (self reported) better students show any different preference than the weaker students. Technology superiority or access does not seem to drive the preference for online or paper-based homework.

Q9 Gender			
	Male	**Female**	**Total**
Support	13	12	**25**
Reject	9	11	**20**
Neutral	7	10	**17**
Total	***29***	***33***	***62***

Gender does not appear to factor into Support or Reject group membership.

Q10 Age								
	18-20	**21-23**	**24-26**	**27-29**	**30-32**	**33 and above**	**Total**	**Average**
Support	4	17	2	1	0	1	**25**	22.6
Reject	3	12	2	1	1	1	**20**	23.8
Neutral	4	7	3	1	1	1	**17**	23.3
Total	***11***	***36***	***7***	***3***	***2***	***3***	***62***	

On average the younger respondents belong to the Support group while the slightly older students belong to the Reject group. However, the table is consistent with most traditional college classes. There is not a great deal of variability in the ages of the sample participants to determine that either older or younger students prefer one homework delivery method over another.

Q11 Ethnicity

	African	Anglo	Asian	Hispanic	Native American	Other	Total
Support	3	7	2	11	0	2	**25**
Reject	1	12	3	4	0	0	**20**
Neutral	0	8	0	9	0	0	**17**
Total	***4***	***27***	***5***	***24***	***0***	***2***	***62***

Hispanics appear more likely to favorably view the usefulness of web-based homework than do Anglos.

Q12 Taken other courses with web-based homework

	Yes	No	Total
Support	23	2	**25**
Reject	19	1	**20**
Neutral	16	1	**17**
Total	***58***	***4***	***62***

Having taken other courses with web-based homework does not appear to make the respondent more or less likely to support the use of web-based homework. As this delivery method becomes more popular and online courses become more prevalent, the power of this variable to differentiate is decreased.

Q13 Hours spent working on web-based homework

	0-4	5-9	10-14	15-19	20-24	25 or more	Total	Average
Support	16	5	1	0	1	2	**25**	6.14
Reject	14	2	3	1	0	0	**20**	4.6
Neutral	13	3	1	0	0	0	**17**	3.29
Total	***43***	***10***	***5***	***1***	***1***	***2***	***62***	

The respondents that viewed the web-based homework as useful spent more time practicing with the web-based homework than the reject group. Of course this may well be a self-fulfilling prophecy. Students that prefer/like this homework delivery method are more likely

to take advantage of it. Those that do not like to use it, simply choose to not spend a great deal of time with it.

Q14 Computer platform			
	Windows	**Mac**	**Total**
Support	23	2	**25**
Reject	19	1	**20**
Neutral	16	1	**17**
Total	***58***	***4***	***62***

The majority (93.5%) of the respondents used a Windows based computer to access the web-based homework.

CONCLUSION

With the ever increasing use of internet based technology in higher education and the ever increasing familiarity of the Internet by each new class of college students, web-based homework is emerging as one of the ways that may offer a change for the better in the way that undergraduate classes are taught. Increasing class sizes and the increased demands to know not only one's subject but the technology to deliver it take time away from some of the requirements of teaching a class. Students increasingly are demanding nearly instant feedback on the assignments that they turn in. Online homework allows the opportunity to automate some of the grading requirements and also provides students faster reinforcement for their efforts.

This study investigates the students' perceptions on the use of a web-based homework application used in an undergraduate business finance course. On the whole, the students indicated that the program used (MyFinanceLab) was effective at increasing their understanding of the material. They found the program easy to navigate and were able to search and find information effectively. The practice problem explanations were easy to follow, the application and exercises made it easier to understand the material.

When the survey responses were split on the student's preference for paper-based and web-based homework, though, there were significant differences in student opinion. With the exception of one question ("I prefer to print out the problems and work them on paper then enter them into MyFinanceLab), those that preferred paper-based homework had a statistically more negative opinion of every aspect of the program.

An examination of the demographic make up of the two subgroups suggests that students that used the Internet more often, in both number of visits and time spent per week, were less enthusiastic about web-based homework. Further investigation into this relationship is warranted, but the implications about the cause are not possible from this survey instrument.

Accounting majors were more likely to prefer web-based homework problems, while management majors indicated that they preferred paper-based homework. Hispanics tended to prefer web-based homework, while Anglos preferred paper-based assignments. Not surprisingly, and perhaps as a result of self selection, those that spent more time doing the web-based assignments indicated a preference for the web-based platform over a paper-based system.

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