Student Perceptions of Online Homework in Introductory Finance Courses

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ABSTRACT. The author examined student perceptions concerning online homework assignments in an introductory finance class. In general, students felt that online homework was preferable to traditional homework assignments that are turned in to the instructor. In addition, students reported that the homework assignments increased their understanding of the material and the time they spent in preparing for the class. Overall, graduate students reported a higher level of satisfaction than did undergraduates.

Keywords: classroom technology, homework, Web-based instruction

Technology has expanded rapidly into the classroom. For example, Cudd, Tanner, and Lipscomb (2004) reported that 40% of finance department faculty use intranet-based software such as WebCT or Blackboard to augment classroom instruction. In addition, they found that 67% of finance department faculty use the Internet for education. Other researchers, such as Michelson and Smith (2004) and Peng (2006) have reported that students have a positive view of Internet-based resources and believe that Web-based enhancements can improve the learning experience for students. Technology now allows faculty to create new learning experiences that were not practical a few years ago. For example, investment simulations such as Stock Trak have become popular additions to investment classes.

A new entrant in this arena is online homework created by textbook publishers. Online homework can benefit students because they receive immediate feedback, which increases student performance (Kulik & Kulik, 1986). Online homework also frees faculty and teaching assistant resources by reducing time spent in manually grading homework assignments. A key determinant of the benefit and use of any technology is the perception of that technology by the end user. This article offers a glimpse into student perceptions of online homework assignments in an introductory finance class.

Several previous researchers have cast doubt on the ability of assigned homework to improve student performance in the classroom. A difference between the present study and previous research on homework assignments is the metric used. Rather than evaluating the success of assigned homework by relating it to student grades, I examined student perceptions of whether homework is valuable. I also examined student perceptions of online homework compared with traditional homework assignments.

Selected Literature

Research concerning the augmentation of the traditional face-to-face learning experience with technology is relatively new. In general, research indicates that the addition of online material can increase students' performance in the classroom.

Biktimirov and Klassen (2008) examined the use of a class Web page that includes homework solutions, PowerPoint slides, and exam solutions in an introductory finance class. They found a positive relation among student performance, access to homework solutions, and hit consistency. They found no support for the hypothesis that access to PowerPoint slides and

exam solutions increases student performance. King and Jennings (2004) examined the use of an online trading simulation to augment a personal finance class. They found increased student performance attributable to the online content.

Whether homework increases student performance and learning has been debated in educational literature. At one end of the debate, several researchers have found that homework does not increase student performance. Peters, Kethley, and Bullington (2002) examined whether required homework increases student performance on a multiple-choice exam in an introductory operations management class. They found that not only did required homework not increase student performance on multiple-choice exams, but the students who were in classes with required homework actually had a lower average exam score.

Several other researchers have also found no evidence that homework increased student performance but did find other benefits to homework. Although Johnson (1989) found no evidence that homework increased student performance in a college algebra class, he did find that homework led to increased long-term retention of the material. Weems (1998) found no evidence that collected homework increased student performance in an intermediate algebra class. In her study, a class that had required homework collection did not perform significantly better than a control class that did not have homework. However, she did find that the number of A grades earned by students in the class with required homework was significantly larger than the number of A grades earned by students in the class without required homework. Although required homework did not improve the average student exam performance in Weems's study, required homework did improve the performance of above-average students.

Other researchers have found that homework does improve student performance in the class. L. G. Rayburn and J. M. Rayburn (1999) found that students who complete homework assignments in an accounting class perform better than their peers who do not complete homework. Lefcort and Eiger (2003) examined whether student performance in an introductory biology class was affected by the timing of the homework assignments. They found that homework increased student performance regardless of whether it was preparatory (assigned before the material was discussed in class) or practice (assigned after the material was discussed in class). Paschal, Walberg, and Weinstein (1984) provided a synthesis of research about the effects of homework on student performance for elementary and secondary students. Their synthesis indicated that student performance increases when homework is assigned and that graded homework increases performance more than ungraded homework.

Empirical research has supported the view that online ancillary materials can enhance student performance. The research on the effect of assigned homework is mixed. One reason why homework assignments may not enhance learning is their lack of timeliness. Homework assignments turned in to the instructor are typically not returned to the student until the next class period or possibly later. When the student receives the graded homework back, it may not be analyzed by the student until a later date. By the time the student learns whether the homework was correct, the class may be covering other topics. In other words, the long turnaround time for homework assignments may reduce its value as a learning tool. The availability of homework assignments online provides instantaneous feedback and may make the assignment more relevant and timely, thereby enhancing student performance.

Homework Manager Description and Survey

Homework Manager is an online homework site designed by McGraw-Hill/Irwin for use with the company's textbooks. Because this was the product used by the students whom I surveyed, the discussion of the assignments and options in this article necessarily relate to this Web site. Other textbook publishers have similar sites available. For example, Thomson/South-Western has ThomsonNOW, an ancillary Web site for its textbooks that also has online homework available.

The students surveyed in the present study were enrolled in three classes during the spring 2006 semester at the university at which I teach. Two classes were undergraduate introductory corporate finance classes required of all business majors. One of the classes was taught by me ($n = 23$) and the other by a first-time adjunct instructor ($n = 27$). The third class was a Master of Business Administration (MBA) prerequisite corporate finance class taught by me ($n = 30$). The MBA prerequisite course is required of all incoming students without a previous undergraduate finance course and students who have not taken an undergraduate finance course in the last 5 years. As a practical matter, more than 95% of all incoming MBA students enroll in the prerequisite class. The textbook used for the undergraduate class was *Essentials of Corporate Finance* by Ross, Westerfield, and Jordan (2007). The textbook used for the MBA prerequisite class was *Fundamentals of Corporate Finance* by Ross, Westerfield, and Jordan (2006). The problems assigned for the undergraduate and MBA prerequisite classes differed, with the problems assigned to the MBA students being more detailed and difficult.

Homework Manager uses the end-of-chapter problems in an online homework format. The difference between the textbook version of the problem and the online version of the problem is that the online version may be reworded from an open-ended problem to create a fill-in-the-blank problem. Most end-of-chapter problems are available in static and algorithmic format. The static version closely replicates the end-of-chapter problem, with the exact numbers presented in the textbook problem. The algorithmic problem is the same problem with different numbers. Because the algorithmic problems have ranges for several different numeric values, it is highly unlikely that two different students would receive the same numbers. This randomizing helps reduce the possibility of a student's copying from a peer. The students in these classes were assigned the algorithmic version of the problems.

At the beginning of the semester, each student who was enrolled in the

class was required to purchase an access code for Homework Manager at a cost of approximately $12.75. Students were also required to complete a homework assignment for each chapter discussed in class. To encourage completion of the homework, the homework scores were included as part of their final grade. Online homework accounted for 13% of the final grade for the MBA class and 23% in the undergraduate class.

Homework Manager has various policy settings that are determined by the instructor. For each chapter discussed in class, the instructor chose end-of-chapter problems. The number of problems for each homework assignment was chosen with the expectation that the homework for each chapter would take approximately 45 min to complete. In addition, students were given optional practice homework for each chapter. The practice homework included every end-of-chapter algorithmic problem, although the student did not have to answer all of the problems. The practice homework grades were not included as part of the grade for the class but allowed the students an opportunity to work on as many problems as they desired.

For each homework assignment, the instructor can allow students to try the homework one–five times or an unlimited number of times. In this case, students were given five opportunities to try each homework assignment. To receive credit for the assignment, the grade on the homework had to be 70% or higher. A homework grade below 70% was counted as the same as a grade of 0. This policy encouraged students to rework the problems that they missed to master the concepts discussed in class. To compute the final homework grade, the highest homework scores for each chapter were averaged.

In the beginning, the entire homework assignment had to be reworked if students scored less than 70% or wanted to retake the homework to improve their grade. For example, if there were 10 problems and the student correctly answered 6, the student would have to rework all 10 problems. After the second homework assignment, this policy was changed, and students were only required to rework the problems that they had answered incorrectly. Although the original implementation encouraged the students to repeatedly drill with all of the assigned problems, the length of the homework meant that students could conceivably spend 5 hr or more on the homework for each chapter. By changing the policy to require students to rework only the problems that they had answered incorrectly, I encouraged students to spend more time on concepts with which they were having difficulty. In addition, the original implementation meant that students were discouraged from retaking the homework to improve their grade. For example, if students earned an 80% the first time they completed a homework assignment, they were less likely to retake the homework because it would generally require another 45 min or more to do so. Thus, these students were discouraged from reworking the problems that they had answered incorrectly.

The instructor is given the opportunity to set the time frame for each homework assignment. In this case, the start date for a homework assignment was the 1st day on which the material was discussed in class. The end date for each homework assignment was originally assigned to be approximately 1 week after the expected completion of the chapter material. This schedule encouraged students to complete the homework while the material was fresh and reinforced the concepts discussed in the classroom. During the semester, the deadline for completion was extended on two occasions because of scheduling conflicts.

The homework assignments are available as timed homework or unlimited-time homework. My policy was to permit students unlimited time. In addition, students were allowed to log in to the Web site, print out the homework problems, and log out of the Web site without grading the homework. The students could then complete the printed version of the homework offline and, when it was done, log back in to the homework and enter the answers. Several students expressed that they preferred this method rather than having to complete the homework in front of the computer.

To assist student learning, the Solutions Manual for the textbook was made available to the students at the beginning of the semester. The Solutions Manual contains the solutions for all the end-of-chapter problems. The solutions are detailed, with step-by-step instructions. Since the problems assigned in the online homework were algorithmic versions of the end-of-chapter problems, the students could not simply enter the answer in the Solutions Manual. Although making the Solutions Manual available to students may allow them to solve the problems with a copy-and-paste methodology, it has been found to increase performance in the class (Biktimirov & Klassen, 2008).

There were two common problems that students experienced with the homework. First, many of the assigned problems had multiple steps. Because the answers for the problems were calculated by a computer, there was no rounding in intermediate steps. For example, if the problem was, "What is 100 divided by 3 times 3?" the final answer calculated by the computer would be 100. If students rounded the first step to 33, their final answer would be 99, which could be graded as incorrect. To allow for small rounding errors, Homework Manager has a built-in range for each answer. However, if students rounded too much during an intermediate step, they could work the problem correctly but enter an incorrect answer because of rounding. Many students initially worked problems with rounding in intermediate steps but soon learned to avoid rounding.

The second common problem that arose was students' misreading the answer format. For example, the student instructions might state, "Enter your answer in whole dollars, not millions of dollars." In this case, especially for the first homework, students might enter 5 million as "5" rather than "5,000,000." These problems were alleviated after students became more familiar with Homework Manager and after reinforcement from the instructor. It should be noted that the instructor may examine the completed homework for each student and manually regrade any problem. This step occurred a limited number of times during the semester when the instructor felt that the student had correctly answered the problem but had entered the answer incorrectly.

Survey Results

A questionnaire was administered to students at the end of the semester to elicit their perceptions of the effectiveness of online homework as part of the learning process in an introductory finance class (for abbreviated results, see Table 1). Overall, students thought that the online homework as administered was valuable and contributed to their learning. Because the undergraduate students have grown up with technology and are often assumed to be more computer savvy, it was somewhat surprising that the MBA students generally had a more positive view of online homework.

The most important question asked of students was whether the online homework assignments were helpful in improving their understanding of finance. Students felt that the homework did improve their understanding, with 8 (16%) undergraduates and 10 (33%) graduate students reporting that it was extremely helpful, and 34 (68%) undergraduates and 16 (53%) graduate students reporting that it was somewhat helpful.

One of the challenges of introducing online homework is reluctance to change. Students have traditionally been assigned homework that was turned in to the instructor, graded, and handed back to the student. To be valuable to instructors and students alike, the implementation of online homework should help both parties, and it should be easy to use. Students overwhelmingly felt that online homework was beneficial to them, with 32 (64%) undergraduates and 21 (70%) graduate students reporting that the online homework was more valuable than traditional homework. In addition, 40 (80%) undergraduates and 100% of graduate students reported that it was easy to use.

Homework has several goals. First and foremost, homework should improve the student's knowledge and retention of the material. Because the knowledge and retention of the material was measured by exams in this class, how well online homework prepared the student for exams is an important measure of success. In all, 23 (46%) undergraduates and 23 (77%) graduate students reported the homework was at least somewhat helpful in exam preparation. Part of the feeling of increased preparedness for exams can be traced to increased study time. Accordingly, 34 (68%) undergraduates and 22 (73%) graduate students reported that they spent more time studying for the class because of the online homework.

A second important goal of practice homework is to encourage students to work to master concepts at the time they

TABLE 1. Abbreviated Results From the Questionnaire Administered to Students

Question	Response options	*n*	
		Undergraduate	Graduate (MBA)
How helpful was Homework Manager in improving your understanding of finance?	Extremely helpful	8	10
	Somewhat helpful	34	16
	No effect	3	3
	Slight hindrance	3	1
	Did not help	2	0
Was online homework more valuable than traditional homework assignments?	Lot more	5	14
	Somewhat more	27	7
	No difference	2	7
	Somewhat less	9	1
	Lot less	7	0
How easy was Homework Manager to use?	Very easy	7	17
	Relatively easy	19	7
	Easy	14	6
	Somewhat difficult	9	0
	Very difficult	2	0
Did Homework Manager increase the amount of time you spent studying for this class?	Lot more	10	11
	Somewhat more	24	11
	No effect	15	7
	Somewhat less	1	0
	Lot less	0	0
How helpful was Homework Manager in preparing for exams?	Extremely	11	9
	Somewhat	12	14
	A little	12	4
	Minor help	13	2
	No help	2	1
Did you cram less because of Homework Manager?	A lot less	3	13
	A little less	16	13
	No	26	3
	A little more	3	1
	A lot more	2	0
Was the ability to take practice homework before the graded homework helpful?	Extremely	5	8
	Somewhat	12	6
	A little	10	6
	Minor	7	3
	No help	14	3
How often did you refer to the Solutions Manual while you did the online homework?	Often	20	18
	Occasionally	2	6
	A few times	6	3
	Rarely	6	1
	Never	16	2
Should the Solutions Manual for the online homework be available to students?	Definitely	31	23
	Probably	15	3
	Irrelevant	3	1
	Probably not	0	1
	Definitely not	0	0

are originally presented. This timeliness is an important determinant of success in an introductory finance class because of the ordering of topics covered. For example, in the classes surveyed, bond pricing follows immediately after the discussion of time value of money concepts. If a student does not understand basic time value of money concepts and calculations, bond pricing becomes extremely difficult to understand. As such, 19 (38%) undergraduates and 26 (86%) graduate students reported that they crammed less for exams because of the assigned homework.

In addition to the graded homework, students were permitted to take optional practice homework for each chapter that did not count toward their final grade. The practice homework could be taken before or after the graded homework. In large part, students did not utilize practice homework. Only 15 (30%) undergraduates reported taking more than six practice homework assignments during the semester. Being able to take the practice homework before the graded homework was helpful to 27 (54%) undergraduates and 20 (66%) graduate students. Students were required to complete the graded homework within a week of the class discussion of the material in the chapter. This schedule meant that the graded homework assignment was not available for the students to rework before the exam on the material. However, the practice homework was still available to students.

Previous research has indicated that having the solutions to problems available increases student performance in the class (Biktimirov & Klassen, 2008). Consistent with this concept, the solutions manual to all end-of-chapter problems was made available to students. It is surprising that only 20 (40%) undergraduates and 18 (60%) graduate students indicated that they often referred to the Solutions Manual while they worked on the homework, whereas another 2 (4%) undergraduates and 6 (20%) graduate students indicated that they occasionally referred to the solutions. Although many students did not use the Solutions Manual, 31 (63%) undergraduates and 23 (76%) graduate students felt that the solutions should definitely be made available to future classes, whereas 15 (31%) undergraduates and 3 (11%) graduate students indicated that the solutions probably should be made available. It appears that although students may not make extensive use of the solutions, they feel the solutions should be available.

Conclusion

In the present study, I examined a new technology, online homework. Online homework benefits the instructor because of the reduced time needed to grade homework. However, for it to be a truly effective teaching tool, students must also accept and benefit from the technology. I administered a questionnaire to undergraduate students in an introductory finance class and graduate students in a prerequisite MBA finance class to determine student perceptions of online homework.

Students reported that online homework increased the time spent in studying for the class and their understanding of the material. Perhaps as important, students preferred online homework to traditional homework assignments, possibly because of the immediate feedback. Although the solutions to similar homework problems were made available to students, many reported that they did not use this resource, although they felt that it should be available to future classes. It is surprising that MBA students reported higher satisfaction with online homework than did undergraduate students.

This study corroborates the potential value of technology in enhancing learning. An advantage of online homework is that it offers immediate feedback to students. It is possible that the time lag inherent in administering manually graded homework is a reason why some previous researchers have found that homework did not improve student learning.

NOTE

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REFERENCES

Biktimirov, E. N., & Klassen, K. J. (2008). Relationship between the use of online support materials and performance in the introductory finance class. *Journal of Education for Business, 8,* 153–158.

Cudd, M., Tanner J., & Lipscomb, T. (2004). An empirical analysis of a cumulative/rework testing strategy: Its effect on student performance in principles of finance. *Journal of Financial Education, 30*(Winter), 16–31.

Johnson, C. W. (1989). The association between testing strategies and performance in college algebra, attitudes toward mathematics, and attrition rate. *Social Science and Mathematics, 89,* 468–477.

King, D. R., & Jennings, W. W. (2004). The impact of augmenting traditional instruction with technology-based experiential exercise. *Journal of Financial Education, 30*(Summer), 9–25.

Kulik, C. C., & Kulik, J. A. (1986). Effectiveness of computer-based education in colleges. *AEDS Journal, 19*(Winter/Spring), 81–108.

Lefcort, H., & Eiger, S. M. (2003). Preparatory versus practice homework. *Journal of College Science Teaching, 33*(1), 16–18.

Michelson, S., & Smith, S. D. (2004). Web usage in financial education. *Advances in Financial Education, 2*(Spring), 10–21.

Paschal, R., Walberg, H. J., & Weinstein, T. (1984). The effects of homework on learning: A quantitative synthesis. *The Journal of Educational Research, 78,* 97–104.

Peng, Z. (2006). Applying internet-based technologies to teaching corporate finance and investments. *Journal of Educators Online, 3*(6), 1–18.

Peters, M., Kethley, B., & Bullington, K. (2002). The relationship between homework and performance in an introductory operations management course. *Journal of Education for Business, 77,* 355–366.

Rayburn, L. G., & Rayburn, J. M. (1999). Impact of course length and homework assignments on student performance. *Journal of Education for Business, 74,* 325–331.

Ross, S. A., Westerfield, R. W., & Jordan, B. D. (2006). *Fundamentals of corporate finance*. New York: McGraw-Hill/Irwin.

Ross, S. A., Westerfield, R. W., & Jordan, B. D. (2007). *Essentials of corporate finance.* New York: McGraw-Hill/Irwin.

Weems, G. (1998). The impact of homework collection on performance in intermediate algebra. *Research and Teaching in Developmental Education*, *15*(1), 21–25.