A Comparison of Student Perceptions of Traditional versus Online Homework in an Introductory Operations Management Course

Lynn A. Fish

Student perceptions of different homework methods - traditional pencil-and-paper instructor-graded homework, modified traditional instructor-graded homework, and online homework (automatically computer-graded) in an introduction to operations management course are analyzed. Students perceive value in homework as a learning tool - regardless of the specific methodology used for homework. Contrasting with more optimistic perception studies, only slightly more than half (51.22%) prefer online homework to the more traditional homework methods. With the continued proliferation of technology such as online homework into the classroom, educators and administrators need to work with students to improve student’s perceptions and capabilities in the online environment.

Keywords: undergraduate student perceptions homework online

LITERATURE REVIEW

As education continues to add evolving technology into the delivery methods, instructors need to evaluate the relevance of the various activities used to assess student performance, particularly as more courses and programs transition to the online environment. The techniques, whether

Lynn A. Fish, Department of Management/Marketing, Canisius College, Buffalo, NY 14208, (716) 888-2642, fishl@canisius.edu
homework, announced or unannounced quizzes, frequent exams or few exams, discussion boards, case studies or other activities used in any class should drive student learning. Students need to perceive these techniques as having educational value in order to motivate them to perform at their best. Traditional education in terms of brick-and-mortar, paper-and-pencil continues to be modified and include more ‘virtual’ elements. ‘Virtual’ elements exist in online programs, hybrid (or low residency) programs, online courses (100% online), hybrid courses (substantial portion online and substantial portion face-to-face), and blended courses (campus-based courses that use online components). A recent study by the Babson Survey Research Group noted that over 6.1 million students took at least one online course during the fall 2010 term, an increase of 560,000 students over the previous year (Allen & Seaman, 2011). Much research remains to be evaluated in the online arena and the value of course-support materials (Biktimirov & Klassen, 2008). With respect to blended and hybrid courses, which are the more common method with online materials used to supplement traditional face-to-face teaching, a lack of research on best practices exists (Baugher, Varnelli & Weisbord, 2003).

In the face-to-face environment, instructors view homework as improving student’s abilities, knowledge and material retention; however, this is not always the case. Educators assign homework because they believe that by doing homework, students engage in the activity and that it can assist students to study (Rayburn & Rayburn, 1999). Several studies address the homework issue by evaluating the impact of homework on student performance, with some favoring homework (Eskey & Galey, 1988; Lefcort & Eiger, 2003; Rayburn & Rayburn, 1999) and others finding no impact of homework on student performance (Johnson, 1989; Peters, Kethley & Bullington, 2002; Weems, 1998). Similar studies address the debate between online homework and student performance. While empirical research supports the view that online ancillary materials can enhance student performance, results for online homework are also mixed (Smolira, 2008). Several studies found a positive relationship between online homework and performance (Arasasingham, Taagepera, Potter, Martorell
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& Lonjers, 2005; Arasasingham, Martorell & McIntire, 2011; Biktimirov & Klassen, 2008). While other studies found no significant differences between homework formats impact upon student performance (Cole & Todd, 2003; Bonham, Beichner & Deardorff, 2001; Bonham, Beichner & Deardorff, 2003; Fisher & Holme, 2000; Chamala et al., 2006; Anstine & Skidmore, 2005; Palocsay & Stevens, 2008; Kodippili & Senaratne, 2008; Dufresne et al., 2002). In short, there is still a lack of consensus regarding the effectiveness of online homework which highlights the need for further investigation (Arasasingham et al., 2011). For homework to assist students to improve, teachers need to understand student’s views about their homework and homework behaviors (Hong, Wan & Peng, 2011). This study aims to evaluate student perceptual differences regarding the use of online homework (in a blended course format), a modified homework and traditional pen-and-paper homework method.

Online homework offers several benefits to students and instructors over the traditional paper-and-pencil methods, including: students receive immediate feedback (Kulik & Kulik, 1986); algorithmic (versus static) problems can reduce possibility of student’s copying from one another (Smolira, 2008); students can repeat units multiple times with virtually an unlimited pool of questions to work with (Arasasingham et al., 2011); instructors receive early feedback on student learning that enables them to change instructional methodologies or clarify concepts (Arasasingham et al., 2011); the instructor spends less time grading homework; and each student receives a new and different set of problems on each topic, changes them each time the student logs in again, makes the students think and encourages them to really understand the material (Arasasingham et al., 2011).

With respect to online homework, researchers are just beginning to explore new technology’s effect in the educational setting and individual differences. Although 62% of academic leaders believe that learning outcomes of online education are the same or superior to those in traditional face-to-face education (Allen & Seaman, 2006), critics argue that due to intrinsic differences, online education does not replicate the learning that occurs in the traditional classroom (Bejerano, 2008).
Correctly or incorrectly, educators assume that whatever information technology is implemented in a classroom, it contributes to student learning (Peng, 2009). However, the successful implementation of instructional technology in the class to assist in student learning may depend upon student motivation (Raman, Ryan & Olfman, 2005). Educational settings can include student performance differences with respect to many facets such as the number of times students may retry problems, availability of instruction manuals and ungraded problems, seeking mastery versus limited attempts, static versus algorithmic problems, unlimited versus limited completion time, and printing abilities. For instance, some researchers question the number of times to re-try homework as some feel it may lead to students not studying as hard since they know they can rework their mistakes. That is, using multiple tries for online homework encourages a ‘guess-and-check’ strategy instead of careful reasoning to solve a problem (Pascarella, 2004). Similarly, researchers using an online homework system in an operations management class found allowing just 2 - versus 4 attempts at online homework was preferred as more attempts actually decreased student success (Yourstone, Kraye & Albaum, 2010). Individual differences, such as intrinsic motivation, and computer efficacy (or an individual’s confidence in ability to use the computer) are crucial factors in determining the success of an educational system, but perceived interactivity of the system is not a factor (Peng, 2009). In fact, some students increase their homework effort not in an effort to learn but merely to use the shortcuts to accomplish the task (Peng, 2009).

Other researchers study student and instructor perceptions regarding online homework (Smolira, 2008). Student perceptions in introductory finance courses indicate that both undergraduates and graduates thought online homework was valuable and contributed to their learning (Smolira, 2008). Student responses indicate that homework assisted in exam preparation, decreased cramming for exams, increased time spent studying for the class, increased understanding of material, and benefitted them through immediate feedback (Smolira, 2008). Graduate students reported a higher satisfaction level than undergraduates. Similarly,
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oncology students noted benefits associated with online submission of assignments instead of traditional methods (postal or directly handing in) (Bridge & Appleyard, 2008); however, students distrusted the online system’s receipt of material. Students credited the system with helping them learn and understand chemistry material (Arasasingham et al., 2011); however, students noted that lectures and textbooks need to be closely aligned and integrated with homework, avoid ‘picky’ answering schemes, confusing wording, and multiple times to complete homework to achieve mastery was onerous. The perception of any technology by the end user is the key determinant of its benefits and continued use (Smolira, 2008). Student perceptions will impact upon the continued growth of online courses compared to traditional courses. Watters and Robertson (2009) reported 75% of undergraduate and graduate students found an online accounting course was as effective, and possibly more effective, than a traditional course. In an accounting course, individual intrinsic motivation and computer efficacy are important factors in determining student’s effort and perception (Peng, 2009). For example, with respect to the instant feedback parameter, students who received feedback are more satisfied and their perception of learning is greater (Lindquist & Olsen, 2007), while unmotivated students are more likely to use the instant feedback mechanism to reduce their cognitive burden (Peng, 2009).

From an instructor perspective, positive aspects of online homework including keeping the class on task and on track, and students could work at their own pace on different practice problems (Arasasingham et al., 2011). In some Web-systems, the instructors can track individual student progress and pinpoint exactly where student difficulties lie (Mendicino, Razzaq & Heffernan, 2009). However, other instructors may find online instruction too time-intensive, relationally unrewarding due to the continual e-monitoring throughout the course, and feel a loss of the relational interactions with students (Bejerano, 2008). In general, if course instructors enthusiastically embrace the online approach and integrate assignments with course material, then the students embraced it as well (Arasasingham et al., 2011).
Students' perceptions regarding their own abilities significantly impact upon their effort to do homework (Peng, 2009). Weaker academic students exert more effort in doing homework if they believe the system is interactive; however, it appears to provide a 'shortcut' for less motivated students to complete the required homework (Peng, 2009). Educators cannot use a 'one-size fits all' approach with respect to online homework systems as not all students benefit equally from online homework systems (Peng, 2009). From a student perspective, students appreciate online homework most when it is easy to use, carefully planned and integrated seamlessly with course material, and supported by the instructors (Arasasingham et al., 2011).

**Method**

Participants in the study included 171 undergraduate students in six sections (2 for each of the 3 different semesters) of an introduction to operations management course taught by the same instructor at an AACSB-accredited university. In the fall 2002, the instructor taught two operations management sections to 66 undergraduates using a completely traditional methodology for homework (pen-and-pencil). Technology methods used included POM-QM for Windows, Blackboard and email. Recently, over two consecutive semesters (spring 2011 and fall 2011 semesters), the same instructor taught four sections using the same content and pedagogical methods with the exception of the homework method. The spring semester 2011 included 60 students, while the fall semester 2011 included 45 students. The online components consisted of Angel as a course management tool, POM-QM for Windows (Weiss, 2006) that accompanies the textbook, and myOMlab, an online homework site designed by Pearson. The instructor used Angel in all courses for grade posting, emailing, announcements, and backup copies of documents. The myOMlab accompanied the textbook, *Operations Management Student Value Edition* by Heizer and Render (2011). (Note other publishers have similar sites available to accompany their textbooks,
such as Homework Manager by McGraw-Hill/Irwin, or ThomsonNOW by Thomson/South-Western.)

In the fall 2002, two operations management sections used a traditional homework format using paper-and-pencil, and the instructor graded each of the nine assignments. (This format is designated as ‘traditional’ homework throughout the paper.) The best 7 out of 9 homework assignment grades were included in the student’s performance (20%). Each assignment included 2 to 4 textbook problems, potentially with sub-parts, that specifically corresponded to material covered the prior week, and was expected to take the student roughly 45 minutes to an hour to complete. The problems could be quantitative problems with multiple subparts or qualitative responses (where students had to type responses). Once the homework was collected, the instructor posted the solutions to Blackboard and outside the instructor’s office for students to view prior to taking a quiz on the material for the next class. The instructor returned homework at the next class session when the students took a corresponding quiz. Quizzes (best 7 of 9) accounted for 20% of the student’s overall grade. Additionally, over the semester, the student took three exams, each accounting for 20%. Each exam consisted of qualitative questions (multiple choice, short answer and interpretation; roughly 50-55% of the exam) and quantitative questions (problems with formulas provided; roughly 45-50% of the exam). (Note the quiz and exam formats remained the same each time the course was taught, but questions, while similar, were not used twice.)

In the spring 2011, two sections used a traditional homework format using paper-and-pencil; however, the instructor modified the homework grading method. (This format is designated as ‘modified traditional’ homework throughout the paper.) By the spring of 2003, the instructor made the decision to modify the homework based upon the increasing appearance of ‘collaboration’ on homework. (In fact, one student actually commented “You should definitely keep the homework and not get upset about students working in groups. It helps in the learning process.” See Appendix A.) With this in mind, the instructor modified the grading
policy from spring 2003 through spring 2011 accordingly: Satisfactory (approximate score greater than 70%; 3 points), Unsatisfactory (approximate score 35-70%; 1.5 points) or No credit (0 points). Homework continued to include a mix of quantitative and qualitative questions, and where appropriate also included a computer portion that accounted for a half point of the total homework grade. (Due to any potential computer issues, students had a one-week grace period on the computer portion.) Again, each assignment included 2 to 4 textbook problems, potentially with subparts, that specifically corresponded to material covered the prior week, and was expected to take the student roughly 45 minutes to an hour to complete. The total exam score included the homework scores so that exam one included homework 1 through 3, exam two included homework 4 through 6, and exam three included homework 7 through 9. Once the homework was collected, the instructor posted the solutions to Angel for students to view prior to taking a corresponding quiz on the material for the next class. The corresponding quizzes (best 7 of 9), worth 25% of the final grade, were given over the course of the semester, with the lowest 2 scores dropped. Three exams, including the homework scores, were each worth 25% of the student’s grade.

In the fall 2011 semester, due to increasing time demands upon the instructor and external forces, the instructor used myOMlab for homework instead of traditional or modified traditional homework, and hence, moved the class toward a more blended approach. (This format is designated as ‘online’ homework throughout the paper.) As a prerequisite to the course, all students are required to take a one semester introduction to information technology course. The school also provides a ‘Readiness for Online Website’; however, students are not required to partake in the course. Homework was assigned to correspond to quizzes and represented 8% of the student’s final grade. Similar to the traditional homework, each assignment included 2 to 4 textbook problems, potentially with sub-parts, that specifically corresponded to material covered the prior week. The myOMlab problems were 100% quantitative and corresponded directly to the book problems. (Note the instructor has the ability to add customized quantitative and qualitative
questions; however, this was not done for any of the assignments.) The instructor posted suggested problems that consisted of prior homework solutions to Angel for additional student support. The myOMlab homework was set so that students had three tries on each problem, problems were algorithmic not static, students received an unlimited time to complete the homework by the required due date (which corresponded to an upcoming quiz and recently taught materials), could not print out the homework to work off line, and access to similar suggested problems (that consisted of prior homework solutions) were posted to Angel for additional student support. Student evaluation also consisted of corresponding quizzes (23%) that followed homework due dates, and three exams (23% each). With minor course improvements, the fall courses were similar to the spring courses. Note different quizzes and exams were given between the semesters; however, the material and format for each section directly corresponded.

Results

On the last day of the semester, all classes completed a traditional pen-and-pencil survey consisting of questions specific to the course. The instructor slightly modified survey questions to incorporate specific questions to the methods and techniques used over each semester. The information was compiled by graduate assistants in the department and forwarded to the instructor. While students were not required to complete each question, 57 (86%), 46 (77%), and 39 (87%) students completed the survey in the fall 2002, spring 2011, and fall 2011 semesters, respectively.

As shown in Table 1, survey questions specifically addressed the number of homework problems, whether the student felt the homework assisted their learning, whether the number of problems should change, whether suggested problems should be given instead, and whether a computer portion (not included in the fall but included in the spring) should be considered as well. Without hesitation, students in all methods supported homework as a learning tool. The traditional (92.98%) and modified traditional (100%) students strongly favored this, while online
homework students were favorable (84.62%) with some students undecided (12.82%). Students felt the number of homework problems given (2 to 4) was acceptable regardless of whether the homework was traditional (91.23%), modified traditional (95.6%) or online (92.31%). As for modifying the number of problems, modified traditional students felt that the number of problems was acceptable with no changes (95.65%). Online homework students, while favoring no change (89.19%), had some wanting an increase (5.41%) and others wanting a decrease (5.41%). Traditional students, while favoring no change (80.70%), were also split as some preferred a decrease (10.53%) and others favored an increase (8.77%). With regard to changing the homework to suggested problems instead of required homework, modified traditional students were very split with their responses (yes - 34.78%; no 39.13%; undecided - 26.09%). The majority of online homework students indicated that they would not attempt the problems (57.89%) and the rest of online homework students were equally split between yes and undecided (21.05%). As for including the computer portion, modified traditional students favored including it by a margin of 2:1, while online homework students were very divided with the majority indicating it should not be included (44.74%), and nearly twice as many students (36.8%) favoring a computer portion versus those who were undecided (18.42%).

Additionally, the instructor gathered specific feedback regarding traditional homework versus the modified traditional homework as shown in Table 2. The majority of students who completed the traditional (96.49%) and modified traditional (93.48%) homework indicated that the instructor graded their homework fairly and promptly. Upon modifying the homework (spring 2003), the instructor added additional survey questions. Results for the spring 2011 students reveal that most students did not want to return to graded homework (69.57%); however, many students wanted graded traditional homework (19.57%), while some were still undecided (10.87%). Roughly two-thirds of the students were satisfied with the modified traditional homework method, but one-third of the students were not. Hence, student dissatisfaction was one of the reasons to consider modifying the homework policy again. Interestingly,
### Table 1. Survey Questions: Traditional, Modified Traditional or Online.

<table>
<thead>
<tr>
<th>Question</th>
<th>Traditional Homework</th>
<th>Modified Traditional Homework</th>
<th>Online Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did these problems help you to learn the tools taught in class?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>53</td>
<td>46</td>
<td>33</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Undecided</td>
<td>4</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>The number of homework problems given was:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptable</td>
<td>52</td>
<td>44</td>
<td>36</td>
</tr>
<tr>
<td>Undecided</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Unacceptable</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>The number of problems should:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No Change</td>
<td>46</td>
<td>44</td>
<td>33</td>
</tr>
<tr>
<td>Decrease</td>
<td>6</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Would you still attempt the problems if they were listed as suggested problems and they did not count toward your grade?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>34.78</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>39.13</td>
<td>22</td>
</tr>
<tr>
<td>Undecided</td>
<td>12</td>
<td>26.09</td>
<td>8</td>
</tr>
<tr>
<td>Should the computer portion be considered part of homework?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30</td>
<td>65.22</td>
<td>14</td>
</tr>
<tr>
<td>No</td>
<td>14</td>
<td>30.43</td>
<td>17</td>
</tr>
<tr>
<td>Undecided</td>
<td>2</td>
<td>4.35</td>
<td>7</td>
</tr>
<tr>
<td>General Homework Questions</td>
<td>Traditional HW</td>
<td>Modified Traditional HW</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-------------------------</td>
<td></td>
</tr>
<tr>
<td>Were the problems graded fairly and promptly?</td>
<td>Yes</td>
<td>55</td>
<td>96.49</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Undecided</td>
<td>2</td>
<td>3.52</td>
</tr>
<tr>
<td>Should I grade every homework instead and count them towards your grade? (NOTE THIS WOULD ASSUME THAT YOU WOULD NOT SEEK ASSISTANCE FROM YOUR FELLOW CLASSMATES)</td>
<td>Yes</td>
<td>9</td>
<td>19.57</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>32</td>
<td>69.57</td>
</tr>
<tr>
<td></td>
<td>Undecided</td>
<td>5</td>
<td>10.87</td>
</tr>
<tr>
<td>Should the homework policy be changed?</td>
<td>Yes</td>
<td>4</td>
<td>8.70</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>38</td>
<td>82.61</td>
</tr>
<tr>
<td></td>
<td>Undecided</td>
<td>4</td>
<td>8.70</td>
</tr>
<tr>
<td>Should the homework grade count toward your exam grades?</td>
<td>Yes</td>
<td>34</td>
<td>73.91</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9</td>
<td>19.57</td>
</tr>
<tr>
<td></td>
<td>Undecided</td>
<td>3</td>
<td>6.52</td>
</tr>
<tr>
<td>Should the credit given for each homework change?</td>
<td>Yes</td>
<td>5</td>
<td>10.87</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>33</td>
<td>71.74</td>
</tr>
<tr>
<td></td>
<td>Undecided</td>
<td>8</td>
<td>17.39</td>
</tr>
</tbody>
</table>
while many students wanted the instructor to grade the homework (19.57%), most did not want the homework policy to change (82.61%). With respect to using the homework grade as a portion of the final exam grade, most students favored (73.91%) this method; however, some did not (19.57%). With respect to the point system used for homework, most students did not feel the credit should change (71.74%); however, some students wanted a change (10.97%) and others were undecided (17.39%).

As shown in Table 3, survey questions specific to the online homework, most students rated the online homework experience as above average (40%), with an weighted average score of 3.43 (out of 5). Most students prefer myOMlab automatically graded homework (51.22%), followed next by grading homework as pass/fail (31.71%), and next by graded homework (17.07%). Most students found the myOMlab easy to use (50%); however, some noted minor problems (36.11%) and others indicated major problems (13.89%). As noted in Appendix A (General Comments, Fall 2011), one student had minor issues with the prompts, another indicated minor rounding issues, and yet another indicated major rounding issues. When presented with alternative homework methods, only a few (14.29%) wanted to continue using myOMlab with no changes while some wanted myOMlab to be just for practice (10.71%). The majority of students favored dropping the lowest scores and continuing to use myOMlab (42.86%). Still others (32.14%) indicated using a pass/fail type of method with additional points added onto the students’ average for successful completion of the myOMlab. With respect to the additional suggested problems posted on Angel, roughly two-thirds of the students used them. Most students did not feel the number of posted suggested problems needed to change (74.29%), while a significant portion (20%) suggested an increase.

**Discussion**

As technology continues to be integrated into the traditional classroom, instructional methods need to be assessed as to their teaching value.
**Table 3.** Survey Questions: Online Homework.

<table>
<thead>
<tr>
<th>myOMlab Questions</th>
<th># Students</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate your overall experience with myOMlab. (1=poor, 5=outstanding)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Would you prefer: MyOMlab automatically graded homework</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Graded homework</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Homework Pass/Fail(points added to exam scores)</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>No homework</td>
<td>0</td>
</tr>
<tr>
<td>Comment on the following: I found myOMlab:</td>
<td>Easy to use (no problems with use)</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Minor problems but I overcame them.</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Major problems which impacted upon my grade</td>
<td>5</td>
</tr>
<tr>
<td>Should I use myOMlab grade, add additional points (3 to 5) onto your average for</td>
<td>myOMlab</td>
<td>4</td>
</tr>
<tr>
<td>successful completion, drop lowest scores or just use as practice with no grade?</td>
<td>myOMlab but drop lowest scores</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Additional points</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Just as practice</td>
<td>3</td>
</tr>
<tr>
<td><strong>Posted Suggested Problems:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regarding the suggested problems on Angel: Did you use them?</td>
<td>Yes</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>13</td>
</tr>
<tr>
<td>The number of suggested problems should:</td>
<td>Increase</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Decrease</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No change</td>
<td>26</td>
</tr>
</tbody>
</table>
Best practices in hybrid courses are lacking (Baugher et al., 2003). This paper delves into student perceptions regarding the value of homework - regardless of the homework method used. The survey results overwhelmingly indicate that students - regardless of the specific methodology used for homework - favor homework as a learning tool. In fact, most students indicate that they would not attempt homework if the problems were just ‘suggested problems’. The results do not show one homework method being significantly favored by students over another; however, the online homework received the least support (versus traditional or modified traditional) as a learning tool. Thus, while other researchers (Bridge & Appleyard, 2008; Smolira, 2008; Arasasingham et al., 2011) indicate that online students perceive the learning value of homework, the results indicate that students favor homework - regardless of the delivery method. Perhaps, for this course, students perceived the value in doing homework particularly its impact on their exam scores and are aware of the relationship between the two. Most students, regardless of the homework method, indicated that the number of problems (2 to 4, which is roughly 45 minutes to an hour), was acceptable. Ironically, modified traditional students favored including a computer portion in the homework, while the online homework students tended not to want it included.

With respect to traditional pencil-and-paper homework methods, both sets of students felt that the instructor graded their homework fairly and promptly. The change to a modified homework policy occurred due to an increasing number of students wanting the ability to collaborate on homework. (From an instructor’s evaluation standpoint for student performance, students who collaborate should not be given individual credit for homework.). However, when delving further into the modified traditional homework, some student ‘unrest’ was noted. As noted in previous semesters, roughly two-thirds of the students were satisfied with the modified traditional homework method, but one-third of the students were not. However, it was not clear from the survey what students wanted as most modified traditional students said they would not attempt suggested problems (39.13%). Most students indicated that they
did not want graded homework assignments (69.57%), and yet, they felt homework had learning value.

Regarding the online homework students, most found their overall experience to be above average, with an average response of 3.43 (out of 5). Slightly over half the students (51.22%) preferred myOMlab to traditional homework, or a modified traditional method, which implies that close to half of them (48.78%) do not want online homework. Most students found the online homework to be easy to use; however, some noted problems. When pressed further, 57.15% of students choose myOMlab as it was delivered or with the lowest scores dropped. Again, 42.85% wanted another homework method. The students in this study do not overwhelmingly prefer an online homework system to other homework methods. Since the instructor adopted a ‘one-size fits all’ approach in matching the online homework settings for the given textbook, this result is in keeping with the idea that individual students have different learning styles that need to be addressed in the online system (Peng, 2009). Similar to other studies, students negatively commented on online rounding and data entry difficulties (Smolira, 2008; Arasasingham et al., 2011). Other student complaints regarding alignment of homework, lectures and the textbook, or confusing wording, or too many attempts being allowed (Arasasingham et al., 2011) did not surface over the semester. One of the features of myOMlab allows students to contact the instructor through email with any particular questions that they may have. This feature was never used by any of the students over the semester. Perhaps this can be attributed to posted suggested problems, which the majority consulted.

Student perceptions for the introduction to operations management course are similar to student perceptions in the introduction to finance course (Smolira, 2008), as both sets of students saw online homework as valuable. A few points need to be made regarding differences in online delivery. Both online homework sets included algorithmic versus static problems, an unlimited time to complete the homework, a schedule corresponding to course delivery, and posted ungraded problems. Differences between the two online homework setups include printouts, 5 tries
(versus 3) with a mastery focus, and book solutions being provided for the finance course (and not the operations management course). Regardless of these differences, the student’s perceptions are similar: homework is valuable!

A limitation of this study is the fact that only one online homework system, myOMlab, was used. Other online homework systems may be perceived differently by students. Another limitation is myOMlab is used for operations management homework. Other online homework systems for different functional areas may be perceived differently by the students. While this study outlines differences in student perceptions regarding the different homework methods, this study does not analyze differences between student performance and homework methods. This is a topic for future research.

As some researcher have noted (Smolira, 2008; Peng, 2009), student and instructor perception of technology is key to its continued use and growth. While other studies overwhelmingly indicate students’ perceptions are favorable to online homework (Bridge & Appleyard, 2008; Smolira, 2008; Arasasingham et al., 2011), these mixed results do not. In this study, only slightly more than half (51.22%) prefer online homework to the more traditional homework methods. Student do not benefit equally from an online homework system (Peng, 2009). These results are also somewhat in contrast to Watters and Robertson (2009) that found 75% of students found online instruction more effective than traditional instruction. Perhaps the students in this study do not have significant experience with online homework or were not adequately prepared. While certainly more technological than previous generations, students may still be adjusting to new instructional methods. As noted in the literature review, there is still a lack of consensus regarding the effectiveness of online homework which highlights the need for further investigation (Arasasingham et al., 2011). Assuming today’s undergraduate population is capable of moving onto ‘online’ experiences without proper training is a mistake. Students need training as many of the assessment methods, such as homework, while similar, are different than what the student may
be accustomed to. Student perceptions are a critical factor to consider and should not be taken lightly. Book publishers need to include tutorials to assist students with their perceptions and make improvements to the currently available online homework programs. As technology is integrated into the classroom experience, instructors and administrators need to work with students to overcome the barriers to continued proliferation of online methods.
REFERENCES


APPENDIX A.

UNEDITED STUDENT RESPONSES

Spring 2002

Any comments on the homework.

- Some of the homework were too long. It helped to work with others on the homework because it clarified questions we all had.
- Tended to be too particular at times on grading the homework, more leeway should be involved.
- You should definitely keep the homework and not get upset about students working in groups. It helps in the learning process.
- I understand the concept of doing homework is to learn, but some problems were never discussed in class.
- I think that less than 7 out of 9 should be counted.
- Keep homework assignments.
- Could be fairly annoying but did help with the learning.
- So many that we never had a breather in the course.
- Don’t get rid of them.
- Good mix of written out problems and computer problems.
- As far as group work is concerned, I firmly disagree with copying. However, when working through homework together, if questions arise, there is someone there to help you out. (Time constraints only allow some individuals to start homework late and are able unable to contact you for questions.)
- When a student is required to do homework alone, some like I, can become confused and tend to get off track (use wrong method, misunderstand material).
- Very helpful in understanding material, especially difficult material.
- You should give some bonus for those who did their homework on their own!
• The homework given during the second part of the class was more difficult, so more time should be given.
• You get really sick of doing them every week.
• Maybe just have students hand in homework, not graded, and just a check.
• I liked the partial credit.
• Through they were fair and helpful.
• Straightforward.
• Some of the assignments were not worded very clearly.
• Doing problems always helps reinforce what we learn in class.

Should the homework policy be changed?
If so, how?

• Give like a one or two day grace period on handing it in able to do corrections to
• Should be a percentage of overall average or bonus points to tests not a part of the test grade.

Should the credit given for each homework change?
If so, what should the credit be?

• 5pts?
• Increase it. Free points=win-win
• I preferred not having to do problems from the book
• Additional more difficult problems that require more work and a deeper understanding of material for greater pts or to reduce pts for exam weight, this is because some students simply don’t test well but understand the material. Removes lack or good test taking skills.
• Credit is acceptable
• Half points back
Any comments on the homework.

- Great way to get students to do it as well as a fair credit towards the exam grade.
- Fair
- A very reasonable amount of HW was given and the problems very accurately reflected the material.
- HW was a good learning tool for exams and quizzes.
- Very fair grading. Not endless hours of homework
- Good assignments
- Count as separate grade.
- Really liked the philosophy- of giving homework
- I like that your homework policy includes credit on exams. It gave me more motivation to complete them.
- Don’t increase problems because then it becomes overkill and students don’t focus on them.

Spring 2011
Fall 2011
I found myOMlab:

Minor problems but I overcame them.
Comments:

- I wish there was better prompts if problems were answered wrong.
- Sometimes it rounded things oddly.

Major problems which impacted upon my grade
Comments:

- Decimals were hardly rounding was a major issue and it does not really help solve problems.
Any additional comments on myOMlab or suggested problems?

- I like the online homework.
- Difficult to adjust too.
- Every class this semester seemed to have some online components along with textbook. The total costs were outrageous.
- I liked myOMlab. It is nothing you can change but I don’t like how it corrects the problem if you get it wrong but doesn’t give you any insight on how to do it.
- The questions were not specific, making it difficult to answer.
- myOMlab was not ideal. Rather have hw to hand in to professor so she could correct and make comments.
- Easy to forget to do.
- The suggested problems help me understand concepts I didn’t fully understand in class but they weren’t always indicative of what would be on the quizzes like you suggested they’d be.
- Sometimes the program didn’t get the right answer, and the formulas didn’t always match.
- Would much prefer if professor graded homework to myOMlab.