

Does the Homework Format Really Matter?

The Impact of Online Homework Format and Learning Style on Accounting Students' Learning Engagement and Academic Achievement

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Abstract: The experience of students submitting written homework is compared to those using online homework platforms at a college in the northeastern United States. Results indicate that online homework platforms can increase student engagement in the course when students are satisfied with the platform's functionality and when students believe the web-based tool matches their own learning style. Findings suggest that students not inclined towards e-textbook use might be willing to set aside their preferences and try an online homework platform if they believe that the experience will be compatible with their learning style. Given the links between perceptions of learning style and platform functionality with positive student perceptual outcomes, results suggest faculty may be able to increase their students' sense of efficacy towards online homework by demonstrating a positive attitude toward the platform, and showing their own engagement with web-based tools.

Introduction

There is a growing body of literature that credits online homework with improving student achievement on tests, final exams, and final grades in accounting courses (e.g., Folami & Simons, 2012; Grinder, 2014; Jones, 2008; King & Mo, 2013; Lusher, Huber, & Valencia, 2012; Titard, DeFranceschi, & Knight, 2014). Online homework platforms provide students with immediate feedback on their work while also reducing instructors' workload. Another benefit of online homework is its integration with the course textbook. This is significant, as integration can provide encouragement for accounting students to more fully engage in the learning experience by reading and digesting the textbook material using multiple points of entry and a variety of learning tools. It is widely thought that engagement in the classroom begins with students' reading of the content material and yet, there is increasing evidence that undergraduate students are not choosing to purchase their books due to the increasing cost of textbooks (Dawkins, 2006, p. 30). Online homework platforms that are bundled with the textbook can play a role in encouraging textbook purchase and, therefore, encourage greater engagement.

Findings have also revealed the benefits of written format assignments over online homework formats. Fatemi, Marquis, and Wasan (2014) found an important distinction in learning outcomes when comparing two different sections of Intermediate Accounting II, with one section utilizing online homework and the other section utilizing the same assignments, but in a written format. The students who used the online homework platform performed significantly better completing problems, but they performed significantly worse on the multiple choice questions designed to assess whether the students had mastered a deeper understanding of the course material. The authors concluded that, while the online homework platform helped students better grasp the mechanics of completing problems, the written assignments helped students gain a better understanding of conceptual issues and encouraged students to think more critically.

Other studies have reported no differences in student learning for accounting or math courses using either an online homework platform or the traditional pen and paper format (Bonham, Beichner, & Deardorff, 2001; Hahn, Fairchild, & Dowis, 2013; Williams, 2012). Bonham et al. suggest the underlying pedagogy makes the difference in student learning. They acknowledge that the use of online homework frees instructors up to explore other topics, and suggest that this freedom may enable the employment of other kinds of more valuable assignments than may be possible in paper-and-pencil exercises.

A key question for accounting faculty, then, is whether web-based learning tools will enhance students' learning experiences and engagement in the course. Is there a significant difference in learning engagement and academic achievement between students using online homework and students submitting written homework?

There are a number of studies exploring the potential role that learning style plays in student engagement, learning, and academic achievement (Robotham, 1999; Rinaldi & Gurung, 2008). Researchers continue to explore learning styles and their potential role in developing educational best practices. Engel (2015) explored the learning styles of students and teachers in an introductory accounting course at a community college, proposing that "[a] better understanding of learning styles could help students become more aware of their own learning style and help teachers become more aware of their own approach to teaching" (p. 290). The author found that over one-third of the accounting students reported having an interactive learning style while 22% reported a multimodal learning style (p. 291). In a related study, Pardakhtchi and Saidee (2012) examined learning styles in the context of student satisfaction, finding that student satisfaction is high when students' learning styles match the instructor's self-reported teaching style and when students' learning styles match the learning style that students identify as belonging to the instructor.

More research is needed to understand whether it is the homework format itself that increases engagement, or the influence of other factors such as student and instructor attitudes, learning style preferences, GPA, age, or gender. As online homework platforms become increasingly prevalent, accounting faculty continue to raise concerns about the effectiveness of online homework platforms as learning tools and how students view the use of online technology in completing their coursework (Humphrey & Beard, 2014).

In order to investigate whether there is a significant difference in academic achievement between students using online homework and students submitting written homework, this study offers the following hypotheses:

H1. Students' perceptions that the homework format matches their learning style will positively impact their level of engagement with the coursework.

H2. Students' level of satisfaction with the homework format will positively impact their level of engagement with the coursework.

H3. Students' level of engagement with their course is positively related to the final grade in that course.

The research design informing this study appears in Figure 1. As shown in the figure, students who perceive that their learning style is suitable for the homework format (online or paper) will report a higher level of course engagement (H1). This model also illustrates that student satisfaction with the homework format is predictive of the student's level of engagement with the course subject (H2). Ultimately, the model predicts that students reporting a high level of engagement in the course subject will earn a higher grade in the course (H3).

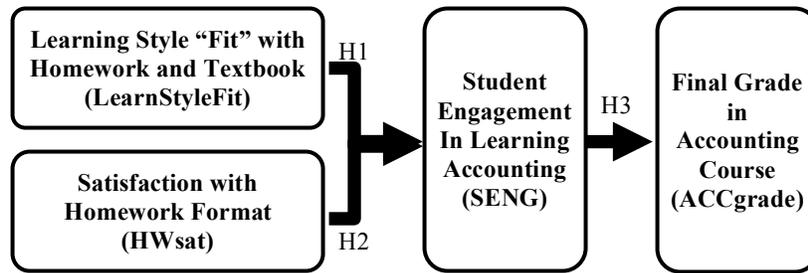


Figure 1. A research model of the impact of homework format on student learning engagement and the final course grade. This figure illustrates students who believe that their preferred learning style is a “fit” for the course-assigned homework format (H1) and who are satisfied using that homework format (H2) will report higher levels of engagement in learning the course subject. It also predicts that student engagement has a positive relationship with the final course grade (H3).

Methods

To test the proposed model, field survey methodology was employed. Satisfaction with the homework format (HWSat) is defined as students’ reported level of satisfaction completing homework either online or with paper/pencil, from accessing the homework format and information, to ease of recording homework answers. The students’ perceived “fit” of learning styles (LearnStyleFit) represents the students’ levels of agreement that (1) the homework and (2) the textbook were effective for the student’s preferred learning style. Learning style is defined by three learning modality preferences (visual, auditory, and tactile/kinesthetic) of the Learning Modality Preference Inventory (Neuhauser, 2002; Simsek, 2002). Student Engagement (SENG) in learning accounting focuses on the active learning dimension of student engagement, as defined by the quality of the learning experience when completing homework through measures of students’ agreement that the homework format increased interest in the subject or motivated activities such as additional research or asking questions in class. Lastly, archival data collection was used to obtain students’ actual grade in the accounting courses in which they were enrolled for the homework assignments (ACCgrade), and then to record their cumulative GPA.

Setting and Participants

This study was conducted at a public comprehensive college in the northeast United States. Undergraduate business students enrolled in 13 different face-to-face accounting course sections participated in this study. While the majority of participants were 18-24 years of age, non-traditional students aged 25 years and older also participated. Six different instructors taught the courses. Three of the instructors required their students to turn in handwritten homework; the other three instructors required their students to use an online homework platform. Of the 353 participants, 115 completed handwritten paper/pencil homework; 238 completed online homework. All students had the choice of using either an e-textbook or a traditional printed textbook.

Procedure

A survey was administered and collected in the last two weeks of each semester to thirteen different accounting course sections. Credit was awarded for each completed homework assignment.

Measures

The survey included 18 Likert statements¹ to measure attitudinal, learning style, and engagement variables. Six statements addressed the respondents' attitude towards and satisfaction with their required homework method and course textbook, as well as whether that method "fit" the respondent's self-identified learning style. Twelve statements described learning engagement during homework. Surveys utilized in the research are available upon request.

Data Analysis

The data file was split between online homework and paper homework students. Seven variables were utilized in the primary analyses. Table 1 presents descriptive information for both groups.

Factor analysis guided the development of three scales: (1) LearnStyleFit (students' perception that the homework and textbook "fit" their preferred learning style), (2) HWsat (satisfaction with homework format), and (3) SENG (student engagement). Table 2 shows that each scale had good/very good internal consistency, with Cronbach alpha coefficients ranging from .774 to .911.

Independent samples t-tests were conducted to compare the mean scores of the paper homework and online homework groups for each of the continuous variables (see Table 3). There was a significant difference in the mean SENG score between paper homework ($M = 3.22, SD = .72$) and online homework ($M = 2.99, SD = .790$); $t(314) = 2.36, p = .02$, two-tailed). There was also a significant difference in the Accounting final grade (ACCgrade) between paper homework ($M = 2.74, SD = .94$) and online homework ($M = 3.07, SD = .91$); $t(314) = -2.83, p = .01$, two-tailed).

Hypotheses for each group were tested using hierarchical multiple regression to assess the ability of LearnStyleFit and HWsat to predict SENG, after controlling for the influence of age, gender, and overall GPA. Results are in the following section.

[1] Likert statement measured level of agreement with a statement where 1=strongly disagree and 5=strongly agree.

	Male		Female		N	Minimum	Maximum	Mean	Standard Deviation
	N	%	N	%					
Age¹									
Online HW	153	64.0	85	36.0	238				
18-24	130	85.0	61	71.8					
25 & older	23	15.0	24	28.2					
Paper HW	67	58.0	48	42.0	115				
18-24	55	82.1	48	100.0					
25 & older	12	17.9	0	0.0					
Gender²									
Online HW	153	64.3	4	35.7	238				
Paper HW	67	58.3	48	41.7	115				
HW Satisfaction with Format Scale³									
Online HW					230	1	5	3.59	.833
Paper HW					84	1	5	3.61	.726
Learning Style "Fits" HW Format Scale³									
Online HW					230	1	5	3.37	1.014
Paper HW					84	1	5	3.61	.926
Engagement Scale³									
Online HW					230	1	5	2.99	.792
Paper HW					84	1	5	3.22	.720
ACC Grade in Accounting Course⁴									
Online HW					230	0	4	3.07	.913
Paper HW					84	0	4	2.74	.942
Overall GPA⁴									
Online HW					230	1	4	3.04	.568
Paper HW					84	1	4	3.05	.547
¹ Age was presented in two categories: 1=18-24 years; 2=25 years and older.									
² Nominal scale: 0=male, 1=female									
³ Each scale item used a Likert scale with 1=strongly disagree, 5=strongly agree. For details, see Table 2.									
⁴ Grades computed on four-point scale, with 4 = A.									

Table 1. Descriptive Statistics for Students in Paper Homework and Online Homework Undergraduate Accounting Courses at a Public College

Variables	N	Cronbach's alpha	Factor	Eigenvalue
LearnStyleFit (Perceived 'Fit' of Learning Style)¹				
Online Homework Group	214	.774	1	1.631
Paper Homework Group	92	.901	1	1.820
1. The homework was effective for my learning style. 2. The textbook was effective for my learning style.				
HWsat (Satisfaction with the Homework Format)				
Online Homework Group	230	.798	1	2.496
Paper Homework Group	93	.821	1	2.606
1. Was easy to enter answers/write out. 2. Helped student better understand the material. 3. Made it easy to find information. 4. Made it easier to find study opportunities.				
SENG (Student Engagement)				
Online Homework Group	118	.911	1	6.166
Paper Homework Group	22	.901	1	6.105
1. Motivation to perform assignment-related research on the Internet when completing homework. 2. The homework increased motivation to ask questions in class. 3. Feeling connected to the assigned subject when completing homework. 4. Confidence about understanding of subject matter when completing homework. 5. Homework increased interest in accounting. 6. Practice problems were useful. 7. Motivation to perform assignment-related research on the Internet when reading the textbook/e-textbook. 8. Reading the textbook/e-textbook increased motivation to ask questions in class. 9. Feeling connected to the assigned subject when reading the textbook/e-textbook. 10. Confidence about comprehension of subject matter when reading the textbook/e-textbook. 11. Textbook/e-textbook increased interest in accounting. 12. Choice to spend more time reading and reviewing the textbook/e-textbook compared to other Business/Accounting courses student has enrolled in.				
¹ Each scale item used a Likert scale with 1=strongly disagree, 5=strongly agree.				

Table 2. Factor Analysis

	<u>Online HW Mean</u>	<u>Paper HW Mean</u>	<u>Mean Diff.</u>	<u>T-Test</u>	<u>Sig.⁴</u>
HWsat ⁵	3.59	3.61	-.015	.146	.884
LearnStyleFit ⁵	3.38	3.61	-.234	1.926	.055
Engagement (SENG) ⁵	2.99	3.22	-.232	2.339	.020*
ACC grade ⁶	3.069	2.738	.331	-2.787	.006**

¹ Excluding cases listwise; ² N = 84; ³ N = 230;
⁴ * $p < 0.05$ (2-tailed), ** $p < 0.01$ (2-tailed)
⁵ Each scale item used a Likert scale with 1=strongly disagree, 5=strongly agree.
⁶ Grades computed on four-point scale, with 4 = A.

Table 3. Independent Samples T-test¹ comparing the means of Paper HW² and Online HW³ groups

Results

Descriptive Statistics

In all, 353 undergraduate students participated in the survey: 238 completed online homework (64% male, 36% female); 115 completed paper homework (58% male, 42% female). Participants were predominantly between 18-24 years of age (80% of online homework group, 90% of paper homework group) and enrolled full-time (97% of online homework; 91% of paper homework). There were a larger proportion of upper division students (juniors and seniors) in the online homework group (69% compared to 54% completing paper homework). All students were business majors. Most students considered themselves to be interactive learners (48% of online homework students/47% of paper homework students).

Hypothesis Testing

H1-2: Student Engagement as a Result of Learning Style and Homework Format.

Hypotheses one and two predict positive relationships between two measures (LearnStyleFit and HWsat) and the students' level of engagement with the coursework for either type of homework format. Hierarchical multiple regression was used to test these hypotheses within each group by first controlling for the influence of gender, age, and overall GPA, and then introducing the two independent measures (LearnStyleFit and HWsat). Table 4 shows that, in the final model, only the online homework group's LearnStyleFit and Overall GPA measures were statistically significant, with the LearnStyleFit scale having the highest standardized beta value ($beta = .68, p < .01$). There is a significant relationship between the perceived 'fit' of learning style (LearnStyleFit) and student engagement (SENG) with accounting ($p < .001$) only within the online homework group. The Overall GPA control measure is also significant ($p = .024$) for those completing online homework, but in a negative direction ($beta = -.09$), implying that students with lower GPA who believe their learning style is a fit for online homework will report higher levels of engagement while completing the online homework.

Student Characteristics of Learning Engagement.

Age, gender, and overall GPA were further examined to determine any significant relationships with student engagement (SENG) by conducting independent samples t-tests to compare the mean scores of each student characteristic within each homework group. Results differed between the groups.

Non-traditional students (greater than 24 years of age) reported significantly higher levels of agreement that their learning style fit the online homework format they were using, and felt more engaged with their accounting coursework when using the online homework. On the other hand, non-traditional students within the paper-based

group assigned significantly higher levels of satisfaction with paper-based homework. There were no significant differences in fit of learning style or coursework engagement scores between traditional and non-traditional students in the paper group.

Males in the paper homework group reported significantly higher levels of satisfaction with the paper homework and the ‘fit’ of their learning style with paper-based homework.

The effect of overall GPA on student engagement was explored in two ways. First, independent samples t-tests were conducted to compare the mean scores of low GPA and high GPA students in each homework group. The t-tests revealed no significant differences in LearnStyleFit, HWsat, or SENG mean scores between students with a high GPA and a low GPA in either homework group. Second, each homework group was split according to students with low or high GPA (where high GPA ≥ 3.0), and the regression analyses were repeated. Interestingly, the regression output for the low GPA/online homework group showed that low GPA student engagement with accounting coursework is statistically significant for *both* satisfaction with online homework and fit of learning style. For students with a high GPA in the online homework group, only LearnStyleFit and SENG indicated a significant relationship.

Variable	Step 1			Step 2		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Online Homework Group (N = 230)						
Gender ¹	.14	.11	.09	.05	.07	.03
Age ²	.25	.13	.12	.12	.09	.06
Overall GPA ³	.01	.09	.01	-.13	.06	-.09*
LearnStyleFit				.53	.05	.68**
HWsat				.10	.07	.10
<i>R</i> ² Change		.03			.59	
<i>F</i> for change in <i>R</i> ²		2.09			155.69**	
Paper Homework Group (N = 84)						
Gender ¹	.04	.16	.03	.24	.15	.16
Age ²	.48	.29	.19	.31	.26	.12
Overall GPA ³	.27	.14	.20	.17	.13	.13
LearnStyleFit				.21	.14	.27
HWsat				.23	.17	.23
<i>R</i> ² Change		.07			.26	
<i>F</i> for change in <i>R</i> ²		1.87			10.54**	
¹ Nominal scale: 0=male, 1=female. ² Age presented in two categories: 1=18-24 yrs.; 2=25 years and older. ³ Grades computed on four-point scale, with 4=A. * <i>p</i> < .05 (two-tailed) ; ** <i>p</i> < .01 (two-tailed).						

Table 4: Engagement with Accounting (SENG) Summary of Hierarchical Regression Statistics

H3: Engagement and Academic Achievement.

The third hypothesis proposes that there is a positive relationship between students’ level of engagement in the accounting course (SENG) and their final grade (ACCgrade) regardless of homework format. Empirical results are statistically significant ($p < .01$) between Overall GPA and ACCgrade in both groups. For students completing online homework, SENG was also significant ($p < .05$). Table 5 displays results.

	β	p^1	Partial Correlation
Online Homework Group (N=232)			
Gender ²	.020	.703	.020
Age ³	-.029	.587	-.028
Overall GPA ⁴	.614	.000**	.608
SENG ⁵	.120	.023*	.118
R^2		.392	
F	36.608	.000**	
Paper Homework Group (N=92)			
Gender ²	-.060	.425	-.058
Age ³	.106	.168	.101
Overall GPA ⁴	.734	.000**	.723
SENG ⁵	.065	.380	.064
R^2		.544	
F	25.912	.000**	
¹ Two-tailed level of significance: * $p < .05$, ** $p < .01$ ² Nominal scale: 0=male, 1=female. ³ Age presented in two categories: 1=18-24 yrs. (Traditional student); 2= 25 years and older (Non-traditional student). ⁴ Grades computed on four-point scale, with 4=A. ⁵ Each scale item used a Likert scale with 1=strongly disagree, 5=strongly agree.			

Table 5: Accounting Course Grade (ACCgrade) Summary of Multiple Regression

Experimental Variables

Further insight into student attitudes towards their assigned homework format and use of textbook is presented here for survey items not included in our statistical analysis.

The majority of students in each group agreed that they preferred to continue using the assigned homework format: 67% of the online homework group stated they preferred online homework; 73% of the paper homework group preferred paper homework.

An electronic version of the course textbook was included with the purchased license to access the online homework platform. Even so, 46% of the students in the online homework group elected to purchase a print version. Just over half of the online homework students who purchased print textbooks reported they never accessed the e-textbook, while the other half alternated between both the digital and print versions. Forty-four percent of students in the online homework group reported they consistently read the e-textbook throughout the semester. In comparison, 11% of students in the paper homework group purchased e-textbooks for their accounting course. Students in the online homework class were more frequent users of the textbook table of contents (24% compared to 11% in the paper homework group), and more online homework students reported “sometimes skimming, sometimes reading” their textbook (32% compared to 9% in the paper homework group). There were more students professing to be “deep readers” in the paper homework group (18% compared to 10% in the online homework group).

Discussion

Results indicate that online homework platforms can increase student engagement in the course when students believe their learning style matches the web-based tools available to them when completing online

homework. The results of this research indicate that students who believe online homework fits their learning style report higher levels of engagement in the subject. In this way, learning style fit is suggestive of students' sense of efficacy about whether they can successfully utilize the online homework and e-textbook platform for academic achievement. This finding is especially significant for two reasons. First, a specific learning style is not as important as whether students *perceive* their preferred style of learning is compatible with the homework platform. Second, the positive relationship between learning style "fit" and engagement suggests that students who are apprehensive about taking technology-based courses might be willing to try the online homework platform if they believe it is compatible with their learning style. Previous studies exploring student learning styles and their satisfaction with course-related technology support this (Doorn, Janssen, & O'Brien, 2010; Martyn, 2005; Neuhauser, 2002; Simsek, 2002).

In the current study, personal learning style "fit" with the online homework platform most influenced the students' sense of engagement, even more than their satisfaction with the web-based technology. In turn, the more engaged students felt, the better they performed. This positive relationship between engagement and final grade was significant only within the group of students completing online homework.

In this study, instructors chose the online homework platform to be their content delivery system and blended online homework with face-to-face instruction. Data analyses reported here show positive links between student satisfaction with the online homework, measures of course engagement, and academic achievement. This is consistent with previous research reported by Carini, Kuh and Klein (2006); Salanova, Schaufeli, Martinez and Bresó (2010); Schaufeli, Martinez, Pinto, Salanova, & Bakker (2002); Sun and Flores (2012). It can therefore be concluded that online homework platforms are enhancing the student's experience in accounting courses, and can be an especially appealing resource for non-traditional students and students struggling with low grades.

Implications for Accounting Education.

Findings suggest that instructors can increase their students' sense of efficacy towards online homework by demonstrating a positive attitude about using the online homework platform and by saying things like, "I've observed students use this successfully..." The instructor can model effective use of the online homework and companion e-textbook during class lectures. For example, each of the e-textbooks in this study offered side note features such as "Did you know?" and "What would you do?" By highlighting these features, the instructor demonstrates to the class why s/he values the platform beyond its ease of grading papers, and introduces relevant topics for class discussion.

Further research in the field of technology-mediated learning will guide faculty members in the most effective use of online homework platforms for teaching, learning, and engagement. The authors hope that the current results will provide additional opportunities for further research.

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