Does the Homework Format Really Matter?

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

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

With rapid advances in technology, instructors have witnessed the emergence of e-textbooks with companion online homework platforms[1]. 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).

[1] Online homework platforms are also referred to as "web-based homework" or "online homework management systems" in the literature.

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 read and digest 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. In light of increased pressure for accountability from governmental agencies and accrediting bodies, online homework results can be attractive to institutions of higher learning because of the important role that results can play in providing evidence for meeting student learning outcome goals in the assessment arena.

Despite being technologically savvy, many instructors and students alike profess a preference for traditional paper-and-pencil style homework. Some studies report that homework format makes no difference in test scores of accounting students (Hahn, Fairchild, & Dowis, 2013; Williams, 2012) and that students prefer printed textbooks even while completing online homework (Cutshall, Mollick, & Bland, 2012). Others propose that balancing both paper-based and online homework in the same class is ideal for student learning (Fatemi, Marquis & Wasan, 2014), and that doing so allows the instructor to present course content in different ways suited for different learning styles (Engel, 2015; Muir, 2001; Pardakhtchi & Saidee, 2012).

A key question for accounting faculty is whether to utilize e-textbooks and online homework. They must decide whether web-based learning tools will enhance students' learning experiences and engagement in the course. In this paper, we report on results of a study of

accounting students' satisfaction with online homework. We examine the relationships between online homework, student learning style, engagement, and final grades. The sample utilized in this study is comprised of students enrolled in accounting courses in a college university setting in the Northeast United States.

Literature Review

Student Engagement and Learning: Homework

As new technologies such as online homework platforms emerge, scholars consider different ways to define and operationalize student engagement. For instance, a special issue of *Educause Quarterly* defined it as "a rendezvous between learning and the digital tools and techniques that excite students" (Hays, 2010, Cover). This emphasis on *exciting* students may be particularly important because the levels of student satisfaction, engagement, and learning seem to depend on the specific technology in use. Stefani (2011) cautions us not to use technology "for the sake of technology" (p. 55) but that we consider the effect on student engagement and learning when we adopt it in the classroom.

Cutshall et al. (2012) examined undergraduate business students' perceptions of using an online homework platform in combination with an e-textbook. Seventy-five percent of the students responded that the online homework problems and explanations were useful, however 51% of the students did not want to read the e-textbook online and, in fact, 45% preferred to print the e-textbook chapters in order to read them.

There is evidence in the research to suggest that student learning outcomes are improved when students spend time reading the e-textbook and completing the online homework (Sun & Flores, 2012), and that these positive benefits outweigh those achieved by students completing written assignments (Arora, Rho, & Masson, 2013). Sun and Flores (2012) found e-textbook use

was more likely to increase students' sense of engagement in the course, resulting in better learning outcomes. Sun and Flores (2012) recommended that instructors also use the e-textbook/online homework platform in class discussions in order to engage students.

Online homework can have a positive effect on accounting students' learning experiences. Folami and Simons (2012) reported that students that completed online homework studied more than usual and demonstrated a better grasp of concepts (p. 70). Titard et al. (2014) observed that successful completion of online homework was directly related to higher exam scores, while two other studies found that accounting students performed better on their accounting homework assignments and on subsequent exams than those students in accounting classes that required written homework (Grinder, 2014; King & Mo, 2013). Grinder (2014) credited this improved performance to the additional help available in the online homework platform. Eighty-five percent of the students surveyed by Folami and Simon (2012) preferred to use online homework platforms (p. 62).

Some 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 et al., 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.

Findings have also revealed the benefits of written format assignments over online homework formats. Fatemi et al. (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 focused on the telling impact of attitude on moderate student outcomes. In one study students' learning experiences when working in an online homework platform were found to be favorable as a direct result of their having received immediate feedback; this same positivity was enhanced when the faculty member exhibited a positive attitude about the online homework approach (Lunsford & Pendergrass, 2016). Similarly, in a study by Halcrow and Dunnigan (2012), calculus students who were less motivated to complete homework actually exerted more effort when the homework was in an online format *and* when they had an instructor who kept a positive, supportive attitude throughout the semester, even when the class encountered glitches with the online system. Similarly, Schwarz and Zhu (2015) found that effective management of business student expectations by the instructor positively influenced the effect of online homework on student engagement. The authors recommended that instructors be realistic about both the positives and the negatives of an online system and that they provide "specific examples of previous students' experiences" (p.54).

Student Engagement and Learning: Learning Style

A number of studies explore the potential role that learning style plays in student engagement, learning, and academic achievement (Robotham, 1999; Rinaldi & Gurung, 2008).

Amidst a flurry of research on student learning styles, Pashler, McDaniel, Rohrer, and Bjork (2009) reviewed extant research providing evidence for the hypothesis that the optimal mode of instruction for an individual learner depends on his or her particular learning style. While their review of the literature revealed "ample evidence" (p. 105) that children and adults do express *preferences* for how they receive information, the authors found no prior research that directly addresses the question of the impact of learning styles on online learning. The authors' findings caused quite a bit of controversy about the validity of learning styles (Felder, 2010; Galagan, 2014; Weimer, 2012). Felder (2010) argued that learning styles are "simply useful descriptions of common behavior patterns" (p. 5) that can help inform effective teaching.

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.

The current research explores the potential relationship between students' preferred learning styles and their attitudes about the homework format used in their undergraduate accounting courses. The research is undergirded by the belief that academic achievement relies

on the students' self-efficacy, or the belief that they are capable of successfully completing even difficult coursework. In order for students to be motivated to engage in the behaviors that result in learning, they must believe that there is a connection between those behaviors and the outcomes they desire (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010, p. 77).

Research Motivation

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. This research is particularly important in the context of accounting courses for which online homework platforms are becoming 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, our 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).

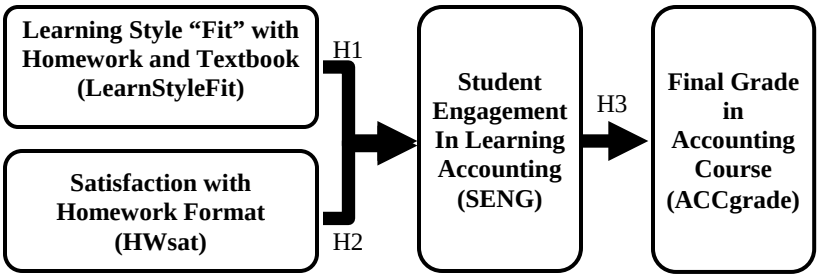

Figure 1. A research model of the impact of homework format on student learning engagement and the final course grade. This figure illustrates students who believe that their preferred learning style is a "fit" for the course-assigned homework format (H1) and who are satisfied using that homework format (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 (H2).

Methods

To test our proposed model, field survey methodology was employed. Both qualitative and quantitative data was gathered to allow a greater understanding of student satisfaction with the homework format in the light of preferred learning style and sense of subject engagement while using the homework format. 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

This study's choice of an online homework platform was not limited to a single publisher, however each of the online homework platforms in use employed exactly the same functions: students entered discrete answers, received immediate feedback on their performance, and were directed to content-specific locations within the textbook. Three online homework platforms were used: (1) ConnectPlus for *Introduction to Managerial Accounting;* (2) WileyPlus for *Introduction to Financial Accounting*; (3) Cengage Learning for *Income Tax Fundamentals*.

A survey was administered and collected in the last two weeks of each semester (Fall 2012, Spring 2013, Fall 2013) to thirteen different accounting course sections of varied sizes. The student survey received Human Subject Review approval. Credit was awarded for each completed homework assignment, in keeping with course learning objectives and designs.

Measures

Participants were asked to rank their preferred learning style from a list of three choices (visual, auditory, interactive) drawn from the Learning Modality Preference Inventory (Neuhauser, 2002; Simsek, 2002). The researchers chose to substitute the word "interactive" in place of the tactile/kinesthetic learning style. Definitions for each learning style were provided on the survey, thus the integrity of the original survey language was maintained even in light of the word substitution.

The survey contained 21 Likert statements[2] to measure attitudinal, learning style, and engagement variables. Eight 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. For example: "The accounting homework/book made me feel more interested in accounting"; "I choose to spend more time reading and reviewing compared to other Business/Accounting courses I have enrolled in"; "The homework/book often motivated me to do on-the-spot Internet research…related to the accounting topics"; "I am motivated to ask more questions in class". Finally, two open-ended questions asked students to report additional detail about their reading and homework experience. The survey instrument is based on previous work by the authors (Stites-Doe, Maxwell, & Kegler, 2013) and draws from Cutshall et al.

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

(2012) and Schaufeli, Martinez, Pinto, Salanova & Bakker (2002). Surveys utilized in the research are available upon request.

Data Analysis

Analyses were conducted using SPSS22. 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) = 2.34, 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) = -2.79, p = .01, two-tailed).

With six different instructors awarding final grades, it is possible that grade distribution differences between instructors could influence the dependent variable, ACCgrade. Therefore, a one-way between-groups analysis of variance explored the impact of six different instructors on the final course grade. There was a statistically significant difference at the $p < .05$ level in

ACCgrade for the instructors: F (5, 332) = 3.9, p = .002. The effect size, calculated using eta squared, was .055 (small effect). Because the effect was small, we retained all data.

Pearson correlation coefficients measured the strength of each relationship among the seven variables in our proposed model for both the online homework and paper homework groups. Gender, age, and overall GPA were included in the analysis as control variables. There were strong relationships between the measures of perceived 'fit' of learning style (LearnStyleFit) and student engagement (SENG) (r = .76, n = 237, p < .01) as well as satisfaction with the homework format (HWsat) and SENG (r = .640, n = 237, p < .01). The relationship between ACCgrade and SENG was relatively weaker (r = .137, n = 232, p < .05). Correlations are reported in Tables 4-5.

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.

Table 1.

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

	Male		Female		N	Min	Max	Mean	Standard Dev.
	N	%	N	%					
Age [1]									
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					
Gender [2]									
Online HW	153	64.3	4	35.7	238				
Paper HW	67	58.3	48	41.7	115				
HW Satisfaction with Format Scale [3]									
Online HW					230	1	5	3.59	.833
Paper HW					84	1	5	3.61	.726
Learning Style "Fits" HW Format Scale [3]									
Online HW					230	1	5	3.37	1.014
Paper HW					84	1	5	3.61	.926
Engagement Scale [3]									
Online HW					230	1	5	2.99	.792
Paper HW					84	1	5	3.22	.720
ACC Grade in Accounting Course[4]									
Online HW					230	0	4	3.07	.913
Paper HW					84	0	4	2.74	.942
Overall GPA[4]									
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 2.
Factor Analysis

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 3.
Independent Samples T-test[1] comparing the means of Paper HW[2] and Online HW[3] groups

	Online HW Mean	**Paper HW Mean**	**Mean Diff.**	**T-Test**	**Sig.[4]**
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 4.
Correlations (Online Homework Group)

	1	**2**	**3**	**4**	**5**	**6**	**7**
1. ACCgrade	1						
2. SENG	.137*	1					
3. LearnStyleFit	.282**	.760**	1				
4. HWsat	.269**	.640**	.795**	1			
5. Gender	.067	.108	.091	.108	1		
6. Overall GPA	.613**	.032	.152*	.121	.069	1	
7. Age	.054	.095	.065	.004	.168*	.084	1

Notes: *$p < 0.05$ (2-tailed), ** $p < 0.01$ (2-tailed)

Table 5.
Correlations (Paper Homework Group)

	1	**2**	**3**	**4**	**5**	**6**	**7**
1. ACCgrade	1						
2. SENG	.167	1					
3. LearnStyleFit	.262*	.448**	1				
4. HWsat	.056	.442**	.813**	1			
5. Gender	-.052	-.009	-.325**	-.258*	1		
6. Overall GPA	.725**	.181	.175	.046	.020	1	
7. Age	-.035	.117	.140	.206	-.237*	-.179	1

Notes: *$p < 0.05$ (2-tailed), ** $p < 0.01$ (2-tailed)

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 6, Step 1, shows that the control variables explain 3% of the variance in online homework student engagement with the coursework and 7% of the variance in paper-based homework student engagement. Adding LearnStyleFit and HWsat measures for each group at Step 2 explains an additional 56% of the variance in student engagement within the online homework group, but only 26% of the variance in student engagement within the paper homework Group. 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.

Table 6.
Engagement with Accounting (SENG) Summary of Hierarchical Regression Statistics

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*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
R^2 *Change*		.03			.59	
F for change in R^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
R^2 *Change*		.07			.26	
F for change in R^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.
*$p < .05$ (two-tailed) ; **$p < .01$ (two-tailed).

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 (see Table 7). Results differed between the groups.

The Age control variable represents two categories of students, traditional (18-24 years old) and non-traditional (greater than 24 years old). There was a significant difference in the mean SENG score between traditional (M = 2.94, SD = .829) and non-traditional students (M = 3.22, SD = .554; t (231) = -2.699, p = .035, two-tailed) in the online homework group. This was also true for the mean LearnStyleFit score between traditional (M = 3.31, SD = 1.033) and non-traditional students (M = 3.61, SD = .865; t (77) = -2.03, p = .046, two-tailed) in the online homework group. Non-traditional students 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 was a significant difference in the mean HWsat score between traditional (M = 3.54, SD = .717) and non-traditional students (M = 4.10, SD = .679; t (91) = -2.36, p = .020, two-tailed). 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. There was a significant difference in the scores for HWsat between males (M = 3.74, SD = .703) and females (M = 3.37, SD = .726; t (91) = 2.462, p = .016, two-tailed) in the paper homework group. There was also a significant difference in the scores for LearnStyleFit between males (M = 3.81, SD = .880) and females (M = 3.24, SD = .967) completing paper homework; t (91) = 2.932, p = .004.

Table 7.
Student Characteristics - Independent Samples T-test[1] comparing the means of Age, Gender, and GPA within Online HW and Paper HW groups

	Online Homework (N=233)		Paper Homework (N=93)	
	Mean Diff.	**T-Test**	**Mean Diff.**	**T-Test**
Age (Traditional/Non-Traditional Student)[2]				
HWsat	-0.127	-1.111	-0.564	-2.360*
LearnStyleFit	-0.288	-2.026*	-0.520	-1.647
Engagement (SENG)	-0.276	-2.699**	-0.385	-1.655
Gender (Male/Female)[3]				
HWsat	-0.189	-1.663	0.373	2.462*****
LearnStyleFit	-0.194	-1.405	0.571	2.932**
Engagement (SENG)	-0.177	-1.638	0.048	0.322
Low/High GPA[4]				
HWsat	-0.088	-0.766	0.156	0.942
LearnStyleFit	-0.155	-1.059	-0.046	-0.218
Engagement (SENG)	-0.012	-0.105	-0.027	-0.162

[1] Excluding cases listwise.
[2]Age presented in two categories: 1=18-24 yrs. (Traditional student); 2= 25 years and older (Non-traditional student).
[3]Nominal scale: 0=male, 1=female.
[4]Nominal Scale: 0 < 3.0; 1 ≥ 3.0.
*p < .05 (2-tailed); **p < .01 (2-tailed).

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 with beta values of .304 and .531, respectively. The High GPA/online homework group reflected the original results of only

LearnStyleFit being statistically significant (beta = .746, $p < .001$). All regression results are in Table 8.

Table 8.
Engagement with Accounting of Low/High GPA Students – Summary of Multiple Regression

	Online Homework Group[1]				Paper Homework Group[2]			
	Low GPA		High GPA		Low GPA		High GPA	
	β	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Gender[3]	-.021	.769	.059	.282	.045	.790	.199	.193
Age[4]	.033	.645	.063	.256	.012	.943	.174	.200
HWsat[5]	.304	.014*	-.008	.925	.496	.078	.027	.908
LearnStyleFit[5]	.531	.000**	.746	.000**	.149	.580	.426	.079
R^2*(Adjusted)*	.615		.563		.300		.135	
F	32.538	.000**	49.086	.000**	4.101	.011*	3.061	.025*

[1] N = 232 (81 with Low GPA, 151 with High GPA).
[2] N = 84 (30 with Low GPA, 54 with High GPA).
[3] Nominal scale: 0=male, 1=female.
[4] Age presented in two categories: 1=18-24 years; 2= 25 years and older.
[5] Each scale item used a Likert scale with 1=strongly disagree, 5=strongly agree.
*p < .05 (2-tailed); **p < .01 (2-tailed).

In summary, three significant relationships are indicated: (1) Non-traditional students are more engaged using online homework than traditional students; (2) Males are more satisfied using paper-based homework than females; (3) Low GPA students who believe an online homework format is compatible with their learning style and who are satisfied with the functionality of the online homework are more engaged in learning about accounting.

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 for students completing online homework ($p = .023$). In that group, Overall GPA has a noticeably higher beta value (beta = .614) than SENG (beta = .120). The SENG partial correlation value is .118, which squared equals .014, thus indicating a unique contribution of 1.4% to the explanation of variance in ACCgrade. While a students' overall

GPA clearly has the strongest positive relationship to the final grade in accounting within both groups, the statistically significant influence of learning engagement within the online homework group cannot be ignored. Table 9 displays results.

Table 9.
Accounting Course Grade (ACCgrade) Summary of Multiple Regression

	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.
[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.

Discussion

Results indicate that online homework platforms can increase student engagement in the course when students are satisfied with the functionality of the platform and when students believe their learning style matches the web-based tools available to them when completing online homework. Further, 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 et al., 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.

Of special note is the finding that online homework seems to have a special appeal for females, non-traditional students, and students with lower GPAs. Females report higher satisfaction with the online homework, whereas males reported having higher satisfaction with paper homework. Non-traditional students report higher levels of engagement when using the online homework even though they express higher levels of satisfaction with the paper homework format. Low GPA students seemed to find more benefits in online homework than students completing paper homework assignments. It is not clear how the low GPA students in our study benefited from their increased sense of engagement or how this engagement directly converted to academic achievement. Similarly, there could be many reasons why females and non-traditional students scored higher levels of satisfaction and engagement, such as maturity or study persistence. Any 'hook' that motivates at-risk students, such as those with low GPA, to exert more effort or spend more time in their studies is worth attention and further exploration.

This study explored a critical feature of collegiate quality: how institutions deploy resources and provide learning opportunities that invite engagement and link to student learning (National Survey of Student Engagement, 2014). 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 & Klein (2006), Salanova, Schaufeli, Martinez & Breso (2010), Schaufeli, et al. (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 females, non-traditional students, and students struggling with low grades.

Research Limitations, Unexpected Findings, and Implications for Accounting Education

Study limitations. Because of limitations in the data, it is not clear how online homework benefitted the lowest-ability student, or whether subtle differences in the various online homework platforms influenced student satisfaction. Six instructors participated in the survey and different exams were used in each class. The mean score for final grades awarded by each instructor was statistically significantly different between two of those instructors (one in the online homework group, one in the paper homework group); albeit the effect size was determined to be small. In future research, it may be advised to include multiple survey distributions at different points of time during the semester to neutralize potential biases.

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. Halcrow and Dunnigan (2012) found students exerted more effort on their online homework assignments when their instructor maintained a positive, supportive attitude about the system. This study's authors echo the advice of Lunsford and Pendergrass (2016) to "be flexible" and let students know "we are 'on their side'" (p. 540).

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.

References

Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., Norman, M. K. (2010). *How learning works: Seven research-based principles for smart teaching.* San Francisco: Jossey-Bass.

Arora, M. L., Rho, Y. J., & Masson, C. (2013). Longitudinal study of online statics homework as a method to improve learning. *Journal of STEM Education, 14*(1), 36-44.

Bonham, S., Beichner, R., & Deardorff, D. (2001). Online homework: Does It Make a Difference? *The Physics Teacher, 39,* 293-296. Retrieved from http://www.ncsu.edu/per/Articles/OnlineHomeworkArticle.pdf

Carini, R. M., Kuh, G. D., & Klein, S. P. (2006). Student engagement and student learning: Testing the linkages. *Research in Higher Education, 47*(1), 1-32. doi:10.1007/s11162-005-8150-9

Cutshall, R. C., Mollick, J. S., & Bland, E. M. (2012). Use of an e-textbook and Web-based homework for an undergraduate business course: Students' perceptions. *Journal of the Academy of Business Education, 13,* 1-11.

Dawkins, W. (2006). Textbooks: the big squeeze. *Black Issues Book Review, 8*(5), 30-32.

Doorn, D., Janssen, S., & O'Brien, M. (2010). Student attitudes and approaches to online homework. *International Journal for the Scholarship of Teaching and Learning, 4*(1), 1-20. http://www.georgiasouthern.edu/ijsotl

Engel, A. M. (2015). What are the learning styles of community college accounting teachers and students? *Community College Journal of Research and Practice, 39*(3), 289-292.

Fatemi, D., Marquis, L., & Wasan, S. (2014). Student performance in intermediate accounting: A comparison of the effectiveness of online and manual homework assignments. *The Accounting Educators' Journal, 24*, 1-19.

Felder, R. M. (2010, Sep. 27). Are learning styles invalid? (Hint: No!). *On-Course Newsletter*. Retrieved from http://www.oncourseworkshop.com/Learning046.htm

Folami, L. B., & Simons, K. (2012). Students' perceptions of online homework software in accounting courses. *International Journal of Education Research, 7*(2), 56-72.

Galagan, P. (2014, Jan. 08). Learning styles: Going, going, almost gone. *TD Magazine*. Retrieved from https://www.td.org/Publications/Magazines/TD/TD-Archive/2014/01/Learning-Styles-Going-Going-Almost-Gone.

Grinder, B. (2014). Online interactive homework help for introductory finance. *Journal of Financial Education, 40*(1-2), 68-93.

Hahn, W., Fairchild, C., & Dowis, W. B. (2013). Online homework managers and intelligent tutoring systems: A study of their impact on student learning in the introductory financial accounting classroom. *Issues in Accounting Education, 28*(3), 513-535.

Halcrow, C. & Dunnigan, G. (2012). Online homework in Calculus I: Friend or foe? *PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies, 22*(8), 664-682.

Hays, N. (Ed.). (2010). Student engagement: A rendezvous between learning & the digital tools and techniques that excite students. *EQ (Educause Quarterly), 32*(4).

Humphrey, R. L., & Beard, D. F. (2014). Faculty perceptions of online homework software in accounting education. *Journal of Accounting Education, 32*, 238-258.

Jones, C. G. (2008). Student perceptions of the impact of web-based homework on course interaction and learning in introductory accounting. *Issues in Information Systems, 9*(1), 223-232.

King, G. H., & Mo, S. (2013). The application of web-based learning in a managerial accounting course. *Academy of Educational Leadership Journal, 17*(4), 53-62.

Lunsford, M. L., & Pendergrass, M. (2016). Making online homework work. *Primus, 26*(6), 531-544.

Lusher, A. L., Huber, M. M., & Valencia, J. M. (2012). Empirical evidence regarding the relationship between the computerized classroom and student performance in introductory accounting. *The Accounting Educators' Journal, 22*, 1-23.

Martyn, M. A. (2005). Using interaction in online discussion boards. *EDUCAUSE Quarterly, 4*, 61-62. Retrieved from http://er.educause.edu/~/media/files/articles/2005/10/eqm05410.pdf?la=en

Muir, D. J. (2001, July). Adapting online education to different learning styles. Paper presented at the National Educational Computing Conference, Chicago, IL. Retrieved from: http://realaudio.rice.edu/ecot/ust/bied5336/session%20i/On-Line%20Learning.pdf

Neuhauser, C. (2002). Learning style and effectiveness of online and face-to-face instruction. *The American Journal of Distance Education, 16*(2), 99-113.

National Survey of Student Engagement. (2014). About NSSE: What is student engagement? Retrieved from http://nsse.iub.edu/html/about.cfm

Pardakhtchi, M. H., & Saidee, A. (2012). Matching teaching/learning styles and student satisfaction. In: Chambers, J. A. (Ed.), *Selected papers from the 23rd International Conference on College Teaching and Learning* (pp. 165-187). Jacksonville, FL: Florida State College at Jacksonville, The Center for the Advancement of Teaching and Learning.

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2009). Learning styles: Concepts and evidence. *Psychological Science in the Public Interest, 9*(3), 105-119.

Rinaldi, C., & Gurung, R. (2008, October 26). Should teaching and learning styles match? *Teaching Forum: A Journal of the Scholarship of Teaching and Learning*. Retrieved from the University of Wisconsin Oshkosh website: http://www.uwosh.edu/programs/teachingforum/public_html/?module=displaystory&story_id=648

Robotham, D. (1999). The application of learning style theory in higher education teaching. *GDN Discussion Papers.* Retrieved from http://www2.glos.ac.uk/gdn/discuss/kolb2.htm

Salanova, M., Schaufeli, W., Martinez, I., & Breso, E. (2010). How obstacles and facilitators predict academic performance: The mediating role of study burnout and engagement. *Anxiety, Stress, & Coping, 23*(1), 53-70.

Schaufeli, W. B., Martinez, I. M., Pinto, A. M., Salanova, M., & Bakker, A. (2002). Burnout and engagement in university students: A cross-national study. *Journal of Cross-Cultural Psychology, 33*(5), 464-481.

Schwarz, C., & Zhu, Z. (2015). The impact of student expectations in using instructional tools on student engagement: A look through the Expectation Disconfirmation Theory lens. *Journal of Information Systems Education, 26*(1), 47-58.

Simsek, N. (2002). Big G16 learning modality inventory. *Journal of Educational Sciences & Practices, 1*(1), 34-47.

Stefani, L. (2011). A plea for 'E' to excite, engage, and enrich. *The International HETL Review, 1*, 53-58.

Stites-Doe, S., Maxwell, P., & Kegler, J. J. (2013). Business students' learning engagement as a function of reading assigned e-textbooks. In L. A. Wankel & P. Blessinger (Series Eds.), *Cutting Edge Technologies in Higher Education: Vol. 6, Pt. D. Increasing student engagement and retention using mobile applications: Smartphones, Skype and texting technologies* (pp. 239-270). Bradford, England: Emerald Publishing Group.

Sun, J. & Flores, J. (2012). E-textbooks and students' learning experiences. *Decision Sciences Journal of Innovative Education, 10*(1), 63-77.

Titard, P. L., DeFranceschi, J. E., & Knight, E. (2014). Using online homework to improve exam scores. *Journal of Business and Educational Leadership, 5*(1), 58-63.

Weimer, M. (2012, Mar. 13). Challenging the notion of learning styles. *Faculty Focus*. Retrieved from http://www.facultyfocus.com/articles/learning-styles/challenging-the-notion-of-learning-styles/

Williams, A. (2012). Online homework vs. traditional homework: Statistics anxiety and self-efficacy in an educational statistics course. *Technology Innovations in Statistics Education*, *6*(1), 1-20. Retrieved from http://escholarship.org/uc/item/32j2998k