EXPLORING DEEP LEARNERS PERCEPTIONS OF ONLINE HOMEWORK

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ABSTRACT

Do deep learners perceive on-line homework systems (OHS) differently from surface learners? This question is important because accounting instructors control the assignment of OHS to both kinds of learners. A second question is if one of the groups benefits from the use of OHS at the expense of the other group? Prior studies document students' satisfaction with OHS, but not from the lens of deep/surface learning theory. This exploratory study analyzes survey results from 207 accounting students to compare responses between learners with deep verses surface characteristics. Survey questions focused on perceptions of long-term retention, study attitudes, solving accounting problems and overall satisfaction. The survey results suggest that deep learners perceive OHS assignments similarly to surface learners, but five statistically significant exceptions were discovered: (1) more surface learners feel they are using OHS to get a grade or (2) to pass the course, (3) more deep learners find OHS helpful for long-term memorization, (4) deep learners are more likely to believe OHS is best suited for "A" students, and (5) deep learners are more likely to prepare in advance of an OHS session. Additional study is recommended. While this study found that the perception of OHS is favorable for both deep and surface learners, it also found that in both types of learners approximately 30% would prefer to use pencil and paper and create their own study tools.

Keywords: On-line homework systems, Accounting, Deep/surface learning theory

INTRODUCTION

What a student does in terms of learning activities, enhances or detracts from the learning process. Further, the instructor controls the types of activities assigned. From those two premises it follows that the quality of the learning assignments matters.

In accounting education, instructors utilize online homework systems (OHS) provided by large textbook publishing houses (e.g. Wiley, McGraw-Hill, Pearson). Publishers tout that OHS improves and increases student time on task while reducing instructor grading time. "The online homework system allows professors to use Internet technology to implement homework problems that students are able to complete online" (Peng, 2009). Phillips & Johnson (2011) stated that OHS provides greater content practice and more timely feedback to students. In addition they found that OHS provides structure to questions, in the form of response fields or drop-down menus, which may aid students in organizing or analyzing questions. OHS advantages include 24 hour accessibility and diversity in how students can study and practice (Wu & Cheng, 2015).

At the same time, accounting educators continue to be challenged with the task of reaching different student populations. Student populations include those who eagerly embrace accounting studies due to curiosity and desire for understanding, as well as those students whose main goal is to fulfill credit requirements. One theory that has been used to distinguish between these two types of students is that of the deep versus surface learner.

The goal of this exploratory research project was to survey students and determine if deep learners perceive OHS differently from surface learners. The study included if deep learners perceive long-term retention, OHS study value, solving accounting problems, and overall OHS satisfaction differently from surface learners.

LITERATURE REVIEW

Online Homework Systems

Elliot (2002) explored which aspects of a student's educational experience were more important in influencing student satisfaction. He found instructional effectiveness ranks second, behind student centeredness, in importance in predicting student satisfaction. University instructors should not ignore student satisfaction when it comes to assigning learning activities.

"Publishers advertise their online homework managers as a key component of their textbook inventory and assert that they improve learning" (Woolley, 2015, p. 337).Floami and Simons (2012) conducted a survey of students including a variety of accounting courses (managerial, intermediate, cost and advanced), a variety of instructors, and a variety of publisher platforms. They concluded that students react positively to the use of OHS regardless of course, instructor or OHS platform. Their results indicate that students perceive OHS to be (1) easy to use, (2) OHS makes students study more, and (3) it increases students understanding of concepts.

Managerial accounting students described OHS advantages as (1) instant feedback, (2) links to access course resources, and (3) around-the-clock availability (Gerard, 2015). Dillard-Eggers, Wooten, Childs, & Coker (2008) found implementing OHS in principles of accounting increased student performance and students believed OHS was an effective way to study. Despite this they also found that 31% of students felt that pencil/paper assignments would increase learning. Titard, DeFranceschi, & Knight (2014) found that Financial and Managerial accounting students who scored at least 70% on the OHS assignments performed statistically higher on exams than students achieving less than 70% on OHS assignments. Woolley (2015) found that financial accounting students perceived OHS to be helpful, but that using an OHS did not improve exam performance. Sundaram & Roberts (2015) compared paper and OHS homework assignments to performance results and found no difference. When they examined students' ability to complete an integrative accounting cycle problem they discovered OHS users performed better. They found that using an OHS increased time spent on assignments and a student preference for instant feedback. Gerard (2015) noted that a check feature was used by several students to guess through their managerial accounting assignments. Peng (2009) found that some students increase OHS effort apparently due to the shortcut provided online, rather than using the system to learn. He also stated that interactivity is one of the most acclaimed OHS features. Maxwell, Smoker, & Stites-Doe (2018) found that OHS can increase student engagement when students are satisfied with the OHS functionality and when students believe the OHS tool matches their personal learning style. When

principles of accounting students were given the option (not required) to use OHS, students that chose the OHS were found to have a higher grade point average and earned a higher grade in the course. Although using an OHS appeared to provide a greater benefit to low-performing students compared to high-performing students. (Wooten & Dillard-Eggers, 2013).

General chemistry educators noted that OHS significantly improved retention rates, students perceived OHS as worth the effort, and overwhelmingly recommended it be assigned to future general chemistry students (Richards-Babb, Henry, & Robertson-Honecker, 2011). These students used Wiley-Plus for the OHS. In teaching economics, Wu & Cheng (2015) found significant improvement in student performance after implementing SaplingLearning. Improvements were made in exam scores, essay assessments, and attendance rates. In introductory finance courses, Smolira (2008) found that students prefer online homework to traditional assignments turned into the instructor. The students perceived that the online homework increased their understanding and the time they spent on the materials. Graduate students were found to be even more satisfied with OHS than undergraduates. Settlage & Settlage (2015) examined perceptions to OHS, specifically Aplia, for microeconomics. They found that the stronger a student's favorable opinion of OHS the better they tended to perform in the class.

Accounting and non-accounting students have expressed a preference to use an OHS. Mixed results are found whether using an OHS provides better exam and course results. Instant feedback has been noted as an OHS advantage, yet the ability to "game" assignments in lieu of learning has also been noted.

Deep and Surface Learners

The concept of deep versus surface learning arose in 1976 with the scholars Marton and Saljo. The concept has subsequently been explored by a number of educators, including John Biggs (Biggs, 2012). "Understanding exactly how students approach learning has been widely investigated and has been conceptualized as deep and surface learning approaches" (Everaert, Opdecam, & Maussen, 2017, p. 78). Referring to a deep or surface approach to learning is now commonly used (Lucas, 2004). Characteristics of deep learning includes a pursuit of meaning involving vigorous interaction with subject matter, relating new subject matter to existing knowledge, and critical evaluation forming logical arguments and conclusions (Lau & Lim, 2015). Biggs described two learners, Susan and Robert. He states that Susan comes to class eager, prepared and with questions. She reflects on her learning and virtually teaches herself. Through reflection Susan invokes higher cognitive thinking skills such as analyze, theorize, relate and generalize. On the other hand Robert comes to class unprepared. He approaches learning as accumulating just enough bits and pieces of knowledge to pass the course. Robert focuses more on skills such as memorize, describe, enumerate, and identify. Biggs stated that the approaches to learning of Susan (deep) and Robert (surface) are not personality traits but approaches that can be changed by intervention of the teacher with appropriate learning activities. Biggs also developed a learning process questionnaire to tease out deep from surface learners among middle school students (Biggs, 1987).

Central to Biggs' deep versus surface concept is his idea of what is good teaching. Biggs points out that educational institutions and individual teachers often have three different points of view

about learning. Using a systems model Biggs framed the assumptions fundamental to three common theories regarding teaching:

1. Learning is primarily a direct result of individual differences between students.
2. Learning is primarily the result of appropriate teaching.
3. Learning is the result of students' learning-focused activities which are engaged by students as a result both of their own perceptions and inputs and of the total teaching context. (Biggs, 2012, p. 43)

Biggs states that learning activities are key to engaging surface learners and what the instructor asks the student to do is critical. It is essential that the learning activities are designed to elicit deep understanding, not just memorize bits and pieces of information, regardless of the learner's disposition to the subject. Lucas (2001) stated that accounting, as in other disciplines, deep and surface learning approaches can be identified.

OHS is something that instructors ask the student to do. When OHS assignments simply utilize multiple choice questions and one correct response answers to mathematical problems it is reasonable to question OHS as a tool that promotes deep understanding and higher cognitive skills. "Educators hold deep learning and the search for meaningful understanding in high regard" (Baeten, Kyndt, Struyven & Dochy, 2010, p. 284). "Developing deep approaches to learning is claimed to enhance students' engagement with their subject material and result in improved analytical and conceptual thinking skills" (Hall, Ramsay, & Raven, 2004, p. 489). Although findings suggest it may be easy to prompt a surface approach, but more difficult to develop a deep approach to learning (Hall, Ramsay, & Raven, 2004).

Lau & Lim (2015) found that "surface learning is not completely useless as it constitutes the first step towards deep learning" (p. 862). They also report "that female undergraduates are more inclined to adopt deep learning" (p. 865). A deep learning approach is not always required in terms of successful assessment (Baeten, Kyndt, Struyven & Dochy, 2010). In summarizing Biggs, Beattie, Collins, & McInnes (1997) pointed out that deep and surface approaches designate student engagement within the context of a specific task to be accomplished. Students learn what is required for success and seek out what will be tested then allocate time and resources to be successful (Wynn-Williams, Beatson, & Anderson, 2016). One should not assume that a surface approach to learning is necessarily inferior (Lucas, 2001). Jackling (2005) confirmed that differences in perception of learning context relates to students motives and strategies. Favorable perception of the learning context tended to be associated with deep learning. If students perceived that a task required memorization then a surface strategy was used.

The concept of deep and surface learners is not without opposition. Beattie, Collins & McInnes (1997) have said it is an overly simplistic dichotomy. They trace the deep versus surface concept as an historical development and evolving concept. In particular they conclude that students modify their learning approaches based on the situation to include "…perception of the relevance of the learning task, the attitudes and enthusiasm of the lecturer and the expected forms of assessment" (p. 10).

Hall, Ramsay & Raven (2015) suggest that accounting educators "…through changes in the learning environment, may be able to influence the learning approaches adopted by accounting students" (p. 498). They believed that their introductory financial accounting students lacked engagement with the material and that this lack of engagement led to surface learning strategies. In restructuring tutorial sessions they found that at the end of the semester, "accounting students exhibited a small but statistically significant increase in their deep learning approach, and a small but statistically significant reduction in their surface learning approach" (Hall, Ramsay & Raven, 2015, p. 189). They attributed the small increase in utilization of deep strategies to the change in what the students did during the tutorials, specifically more engaging group work. Baeten, Kyndt, Struyven, & Dochy (2010) stated students tended to use a deep approach when teachers are involved, focused on students and on changing student conceptions.

Phillips & Graeff (2014) implemented an in-class accounting simulation attempting to make accounting concepts less abstract in nature. Their simulation was found to improve students' confidence, increase understanding, and helped students move from a surface knowledge of the content to a deeper knowledge level.

Zlatovic, Balaban & Kermek (2015) measured the degree to which students believed they met deep versus surface learning goals based on announcing the type of on-line test. When it was announced that the on-line test would be an essay test, students perceived that they were then better at matters suggesting deep learning. When it was announced that the test would be a multiple choice test, students perceived that they were then better at matters implying surface strategies. Their study supports the concept that deep versus surface learning strategies are influenced by what students are asked to do, in this case essay versus multiple choice assessment.

In surveying second year accounting students Booth, Luckett, & Mladenovic (1999) found students were rated significantly higher on surface strategy, motive, and approach. In studying first-year undergraduates taking their second accounting course Everaert, Opdecam, & Maussen (2017) found accounting students scored slightly higher for deep learning as opposed to surface learning. In addition they found a deep approach had a positive effect on academic performance. Elias (2005) surveyed both first and second accounting course students finding that a deep learning approach was correlated with students' expected course grade and overall GPA.

Student Assignments

"The aim of the educational process in accounting, as in all disciplines, it to achieve high quality learning outcomes" (Booth, Luckett, & Mladenovic, 1999, p. 277). What students are asked to do matters. For example, in a collection of essays on the case study method the educator John Dewey addressed good teachers.

> "They give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking, or the intentional noting of connections; learning naturally results… The most significant question which can be asked, accordingly, about any situation or experience proposed to induce learning is what quality of problem it involves… it is indispensable to discriminate between genuine and simulated or mock problems…" (As cited by Barnes, Christensen, & Hansen, 1994, p. 10)

OHS may not meet Dewey's standard for good teaching due to the heavy reliance on mock problems. In addition, OHS often relies on one right answer questions. Educator Marjorie Siegel points out:

> In recent years, the well-worn image of classrooms as places where teachers talk and students listen, memorize, practice and display knowledge has begun to fade as educators recognize that there is more to teaching and learning than words…. Enquiry models invite learners to see themselves as knowledge makers who find and frame problems worth pursuing, negotiate interpretations, forge new connections, and represent meanings in new ways. Unlike the instructional routines associated with the transmission model, which have led students to believe there is no ambiguity in learning, no risks to be taken, no new knowledge to be made, enquiry models give a central place to instructional practices and strategies that encourage generative and reflective thinking. (Seigel, 1995, p. 455-456)

"Despite offering benefits over paper-and-pencil homework, an OHS is not perfect. Feedback is often limited to the accuracy of students' answers, remaining silent about the methods students use to reach their answers. Further, an OHS provides little help to students who 'do not know where to start' because the system can assess only the outcome of the problem-solving process" (Phillips & Johnson, 2011, p. 89).

Because OHS often lacks ambiguous, generative or reflective thinking, deep learners may find OHS assignments less satisfying than other types of assignments. Peng (2009) stated that educators should not assume students will benefit equally from OHS. Wooten & Dillard-Eggers (2013) point out that no single study tool will be best for all learners in all situations. The goal of this exploratory research project was to survey students and determine if deep learners perceive on-line homework systems (OHS) differently from surface learners.

RESEARCH DESIGN

Accounting students at four Minnesota universities were surveyed regarding OHS usage. Universities included three state and one private institution. Students were enrolled in either financial accounting, managerial accounting, cost accounting, or auditing. A total of 222 surveys were gathered and 207 were complete and deemed classifiable between deep and surface learner. Survey questions were analyzed regarding (1) long-term retention, (2) study attitudes, (3) accounting problem solving and (4) overall satisfaction.

Three survey questions were used to identify deep learners, Table 1 shows the questions used. If 3-of-3 or 2-of-3 questions were answered as "materials interesting", "help my reasoning and problem solving skills", or "exploring matters in more depth", as opposed to "pass the course" or "fear of poor grade", then respondents were coded as deep learners. All others were coded as surface learners. Of the 222 surveys collected there were 68 respondents coded as deep learners, 139 coded as surface learners, and 15 incomplete surveys. All statistics were run list-wise to eliminate non-responders. For each category the premise was that no statistically significant differences would be found between respondents coded as deep learners, as opposed to respondents coded as surface learners on the survey.

Table 1. Questions to classify respondents between deep and surface learners.

Q2: Which of the two sentences below BEST describes you as a student?

I work hard at my accounting studies because I find the material interesting.	39.8%
I work hard at my accounting studies because I need to pass this course.	58.3%

Q4: Which of the two sentences below BEST describes you as a student?

I work at my accounting studies because I fear getting a poor grade on tests and examinations.	56.5%
I work at my accounting studies because I believe accounting studies help my reasoning and problem solving skills.	42.5%

Q7: Which of the two sentences below BEST describes you as a student in an accounting course?

I usually do as much work as I need to pass the course and get the grade I want. I have other interesting things to spend my time on.	72.5%
I usually spend extra time on my accounting studies, exploring matters in more depth than is necessary to get the grade I want.	26.1%

Deep Learner	32.9%
Surface Learner	67.1%

RESULTS

Survey responses were explored regarding (1) long-term retention, (2) attitudes regarding OHS study value, (3) solving accounting problems, and (4) overall satisfaction with OHS. Table 2 reports the survey questions and frequency statistics which are organized by question category. In Table 3 Levene's test of equality was used to determine statistical significance among responses. Responses to five of the sixteen survey questions were statistically significant between deep and surface learners. Tables 3 reports both the equality of variances and the equality of means. Note that questions are grouped by category within the table. Significance was determined using a value of .05 or lower.

Long-term retention

Six questions regarding long-term retention were analyzed. Questions and frequency statistics are reported in Table 2. Levene's test of equality of variances was run on all questions and two questions were found in Table 3 to be statistically significant showing non-homogeneity of variance within groups.

In terms of frequency Q6 (Question 6) in Table 2 reports approximately 70% of both groups perceived that OHS is a helpful tool for long-term retention. Similarly, Q11(b) reports approximately 70% of both groups indicated that given a high stakes need to learn they would prefer OHS with immediate feedback over a textbook, pencil, paper and solutions key approach. Regarding study tools Q17 reports over half but less than two-thirds of both groups prefer using OHS to creating their own study tools.

Three long-term retention questions were found to have statistically significant differences in Table 3. The first is Q15 which found 71.9% of surface learners versus 45.6% of deep learners (Table 2) believe that when they work with OHS, they feel they are completing the assignment to get a grade rather than to retain accounting knowledge. The second statistically significant difference is Q23 and corroborates the first statistically significant finding. Around 60% of surface learners versus 28% of deep learners (Table 2) believe that graded OHS assignments best prepare them to obtain points towards passing the course, as opposed to retain knowledge.

The third statistically significant difference is Q11regarding attitudes towards memorization. For deep learners 66.2% responded (Table 2) that OHS is helpful for the long-term memorization of accounting concepts. For surface learners 56.8% reported that OHS helps with memorization to simply pass the test. The distribution of responses were found to be significantly different, however the response frequencies were not a dynamic difference.

One interpretation of the differences in responses between deep and surface learners is that deep learners are more likely than surface learners to approach OHS with the intention of using it in a deep manner. This is consistent with a deep learner approach to obtain and retain knowledge. This may be an obvious outcome, but this result also validates the separation of learners into two distinct groups. It is a new finding that deep learners are not "turned off" by OHS. In addition deep learners use OHS as a means to obtain long-term retention and accounting knowledge. OHS then does not benefit the surface learner at the detriment of the deep learner. At the same time, it is interesting

Table 2. Question Response Rates

Long Term Retention	Deep Learner	Surface Learner
Q6: My perception of the OHS is that it helpful tool for long-term retention of accounting concepts.		
Yes	73.5%	71.2%
No	26.5%	28.8%
Q11: My perception of the OHS is that it helps with:		
Memorization of accounting terms and concepts to pass the test.	33.8%	56.8%
Memorization of accounting concepts for the long-term and to pass the test.	66.2%	43.2%
Q11(b) Assume that something really important (more than a grade) was at stake - such as getting the perfect job. And, assume further that in one year, you had to demonstrate your accounting knowledge via multiple choice test. What means would best prepare you for that test in one year?		
Use OHS with immediate feedback provided.	69.1%	69.1%
Use a textbook, pencil, paper and solutions key.	29.4%	30.9%
Q15: When you work with OHS, which statement BETTER describes how you feel?		
The on-line homework feels like I am completing the assignment to get a grade.	45.6%	71.9%
The on-line homework feels like I am learning to retain knowledge.	54.4%	28.1%
Q17: For memorizing accounting terms, I learn more when I:		
Use an on-line quiz tool with immediate feedback provided.	61.8%	55.4%
Create my own study tools.	36.8%	44.6%
Q23: When I think about OHS I believe the graded assignments best prepare me to:		
Retain accounting knowledge.	72.1%	39.6%
Obtain points towards passing the course.	27.9%	59.7%

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Table 2. Question Response Rates *continued*

Study Value Attitudes	Deep Learner	Surface Learner
Q5: Which of the following is MORE important to you with respect to the OHS?		
It organizes my studying and homework for me.	60.3%	69.1%
It engages me in a deeper way, such that I spend more time studying accounting.	36.8%	30.2%
Q8: My perception of OHS is that it is best for students who typically get		
"A" grades	79.4%	62.6%
"C" grades	16.2%	37.4%
Q10: Assume that you are locked in a room for one hour with an accounting textbook and a computer with accounting on-line homework. You must study. Would you prefer to?		
Answer multiple choice questions in the OHS.	63.2%	72.7%
Outline the key concepts in the textbook.	36.8%	27.3%
Q13: My perception of the on-line homework system is that it is valuable because		
It helps me learn accounting better than I could learn it on my own.	51.5%	51.1%
Knowing that it is graded helps me to get my homework done.	47.1%	48.9%
Q22: When I think about using the OHS versus handwriting accounting problems with pencil and paper, I believe		
OHS is more challenging	44.1%	32.4%
OHS is less challenging	55.9%	67.6%
Q26: Before doing the on-line homework assignment, I read the text and/or go over class notes or other materials.		
Yes	60.3%	34.5%
No	39.7%	65.5%

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Table 2. Question Response Rates *continued*

	Deep Learner	Surface Learner
Solving Accounting Problems		
Q3: The OHS helped me to understand the problem solving process that accountants use.		
Yes, I usually found it helpful.	85.3%	79.1%
No. Understanding the process of problem solving was usually extra work on top of my normal studying.	14.7%	20.9%
Q16: Assume that the in-class examinations (tests) or assignments will be done with pencil and paper. What method would BETTER prepare you for achieving the grade you want on test or assignment questions that require calculations?		
Use a textbook, pencil, and solutions key.	36.8%	50.4%
Use an on-line homework system that provides feedback.	63.2%	49.6%
Q19: How well do you believe the on-line homework prepares you for the examination (test) questions or in-class assignments that require solving problems? Usually it is:		
GOOD preparation	82.4%	75.5%
POOR preparation	17.6%	24.5%
Overall Satisfaction with OHS		
Q28: I prefer it when accounting instructors set up GRADED homework through:		
OHS.	80.9%	79.9%
assignments not associated with the OHS.	17.6%	20.1%

to note that per Q11(b) (Table 2) approximately 30% of students would prefer to use pencil and paper or their own study tools. This is less than half of students, but still a significant number.

Study Value Attitudes

Six questions regarding study approach were analyzed. Questions and frequency statistics are reported in Table 2. Levene's test of equality of variances is reported in Table 3 and two questions were found to be statistically significant showing non-homogeneity of variance within groups.

In terms of frequency Q5 (Table 2) reports that for both groups 60% or more believe that OHS is valuable because it organizes their studies as opposed to engaging them in a deeper fashion. Further per Q10, students would prefer to study using OHS multiple choice questions as opposed to

Table 3. Independent Samples Test

		Levene's Test for Equality of Variance		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
	Equal Variance Assumption	F	Sig.	t	df	Sig. 2-tailed	Mean Difference	Std. Error Difference	Lower	Upper
Q6	assumed	.495	.483	.345	205	.730	.023	.067	-.109	.155
	not assumed			.348	135.789	.728	.023	.066	-.108	.154
Q11	assumed	7.758	.006	-3.170	205	.002	-.230	.073	-.373	-.087
	not assumed			-3.216	138.269	.002	-.230	.072	-.372	-.089
Q11b	assumed	.159	.691	.115	205	.908	.0079	.0684	-.1269	.1427
	not assumed			.116	134.594	.908	.0079	.0681	-.1268	.1425
Q15	assumed	14.440	.000	-3.804	205	.000	-.264	.069	-.400	-.127
	not assumed			-3.667	121.213	.000	-.264	.072	-.406	-.121
Q17	assumed	5.992	.015	-.972	205	.332	-.0710	.0731	-.2152	.0731
	not assumed			-.982	136.833	.328	-.0710	.0723	-.2141	.0720
Q23	assumed	12.405	.001	4.545	205	.000	.3213	.0707	.1819	.4607
	not assumed			4.672	143.105	.000	.3213	.0688	.1854	.4573
Q5	assumed	2.524	.114	-1.107	205	.270	-.0766	.0692	-.2130	.0598
	not assumed			-1.090	127.829	.278	-.0766	.0703	-.2157	.0625
Q8	assumed	50.894	.000	2.841	205	.005	.1903	.0670	.0582	.3223
	not assumed			3.098	167.130	.002	.1903	.0614	.0690	.3115
Q10	assumed	6.324	.013	-1.384	205	.168	-.094	.068	-.229	.040
	not assumed			-1.345	123.777	.181	-.094	.070	-.233	.044
Q13	assumed	2.071	.152	-.152	205	.879	-.0113	.0741	-.1574	.1349
	not assumed			-.152	133.644	.879	-.0113	.0740	-.1577	.1351

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Table 3. Independent Samples Test *continued*

	Levene's Test for Equality of Variance		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	Equal Variance Assumption	F	Sig.	t	df	Sig. 2-tailed	Mean Difference	Std. Error Difference	Lower	Upper
Q22	assumed	7.110	.008	1.654	205	.100	.117	.071	-.023	.257
	not assumed			1.618	125.868	.108	.117	.073	-.026	.261
Q26	assumed	1.799	.181	3.609	205	.000	.258	.071	.117	.398
	not assumed			3.569	129.322	.001	.258	.072	.115	.400
Q3	assumed	4.893	.028	1.062	205	.290	.062	.058	-.053	.176
	not assumed			1.112	150.213	.268	.062	.055	-.048	.171
Q16	assumed	10.340	.002	-1.850	205	.066	-.136	.073	-.281	.009
	not assumed			-1.871	137.078	.064	-.136	.073	-.280	.008
Q19	assumed	5.375	.021	1.105	205	.270	.068	.062	-.053	.190
	not assumed			1.150	147.887	.252	.068	.059	-.049	.185
Q28	assumed	.466	.495	.300	205	.765	.0176	.0588	-.0982	.1335
	not assumed			.304	138.444	.761	.0176	.0579	-.0968	.1321

outlining a chapter. Both groups are equally divided in Q13 regarding whether or not the main benefit of OHS is better learning or the fact that it is graded. Finally, overall 62% of both deep and surface learners in Q22 perceive OHS to be less challenging than handwritten assignments.

Two study value attitude questions were found to have statistically significant differences in Table 3. The first is Q8 (Table 2) which reports 62.6% of surface learners believe that OHS is best for students who typically get "A" grades. In comparison 79.4% of deep learners believe that OHS is best for students who typically get "A" grades. It is notable that in aggregate more learners perceive OHS as best for "A" students, while at the same time more learners also perceive that OHS is less challenging than handwritten assignments.

The second statistically significant difference is Q22. Table 2 reports 60.3% of deep learners will read the textbook and/or go over class notes prior to attempting the OHS assignments. The opposite is true for surface learners, with only 34.5% reading the textbook and/or going over class notes prior to attempting the OHS assignments. This result is consistent with the interpretation proposed previously, that deep learners approach an OHS session with an attitude for higher study value.

Solving Accounting Problems

Three questions regarding perceptions about solving accounting problems were analyzed. Frequency statistics are reported in Table 2. Levene's test of equality of variances (Table 3) was run on all questions but no statistically significant differences were found in responses between the two groups. In general, both deep and surface learners believe that OHS prepares them for understanding the problem solving process of accountants. Both groups also believe OHS is good preparation for exams.

Overall Satisfaction with OHS

No statistically significant difference was found in Table 3 between deep and surface learners on their preference to have graded assignments done through OHS. Table 2 reports the frequency of responses regarding graded assignments. It shows that 80% of respondents prefer that their graded assignments be based on OHS. This finding is consistent with the findings of Floami & Simons (2012) and Smolira (2008) regarding student satisfaction with OHS.

DISCUSSION

Do deep learners perceive OHS differently from surface learners? In many regards no differences were discovered between the two groups. OHS was found to organize students' studies and was the preferred study tool. However, students perceived OHS to be less challenging than handwritten assignments.

Differences were found regarding the outcomes of OHS assignments. Surface learners were more likely to feel OHS was to get a grade or pass the course as opposed to retaining knowledge. Deep learners were more likely to feel that OHS helps with long term memorization.

Is OHS used at the expense of either deep or surface learners? There was no evidence that this is the case. Both groups found value in using OHS. The two groups were found to approach OHS differently, which is consistent with the concept of deep and surface learners.

LIMITATIONS AND FUTURE STUDY

Students surveyed were enrolled in face to face classes. How online students perceive OHS is left for future study. In addition, this study utilizes survey results and represents student opinions and perceptions. There is no empirical data reporting actual performance differences between the deep and surface learners using OHS. This is also an opportunity for further study. As the surveys were conducted over a variety of accounting courses and diverse student groups attending four different types of colleges and universities, the researchers believe the results can be generalized to other US colleges. This is believed true even though our sample population was all within one Midwest state.

The research question format of giving students two choices, in some cases yes or no and in other cases two different possibilities, was both a weakness and strength of the survey. In formulating survey questions for this research study both alternative choices were informed by the Biggs

(1987) survey. The question topics about perceptions were informed by the revised two factor study process questionnaire by Biggs, Kember, & Leung (2001). A weakness of asking students to choose one of two possibilities is that there are often more than two possibilities. However, an essay survey allowing for many possibilities was believed to be less likely to be completed by students. Very few students chose not to participate and less than 7% of surveys were unusable due to being insufficient. The high participation rate strengthens the reliability of the survey.

The researchers believe the deep learner groups meet the external validity criterion because the questions used to separate deep from surface learners were informed by looking at other researchers' questionnaires on this matter. In addition, the survey was constructed to elicit this attribute by asking multiple questions that probed for the same information. This method allows reasonable assurance that the results are internally valid.

CONCLUSION

The researchers of this paper have taught lower and upper division accounting courses to students that are representative of varied college environments, including two-year community colleges, urban state universities, a rural land grant university, and an urban religion-affiliation college. Members of the research team experienced the transition from when instructors were primarily responsible for creating and grading learning activities to the current prevalence of publisher created on-line learning systems. The researchers of this paper have a common goal of creating excellent learning experiences for students.

As experienced educators, the researchers are aware of deep and surface learning theory and have indeed noticed such dichotomy in their teaching environments. Therefore, the question arose as to whether when approaching OHS assignments one of these groups benefit from the implementation of on-line tools at the expense of another. In addition, the question of whether deep learners perceive OHS differently than surface learners was of interest.

Based on survey responses the researchers identified students that fit each description. The researchers could find no definitive percent as to students in accounting courses that can be considered deep versus surface learners. This survey's classification found approximately one-third of students being deep learners and this matched their general perceptions within the classroom. Regardless, the researchers believe the statistically significant conclusions are valid to the two groups irrespective of the true distribution of "deep" and "surface" learners.

The research cited earlier in the paper indicates that on-line study tools are generally perceived favorably by students and these perceptions were corroborated in this survey. However, the statistical analysis in this research shows that the two groups (deep and surface) perceive on-line learning tools differently and in noteworthy ways. At the same time, no evidence is seen that OHS impairs or is less satisfying to deep learners as compared to surface learners. This finding suggests for all accounting instructors some level of comfort with continued use of on-line learning supplements. The deep learners apply their "deep learning" methods of reading the text and reviewing notes before doing the assigned homework, in greater numbers, than surface learners.

At the same time, it was noted that approximately 28% of students (Table 2, Q6) do not feel that OHS is a helpful study tool for long-term retention of accounting concepts. It is advisable that accounting instructors include more experiential activities in their on-line assignments that have the potential for increasing long-term retention. Instructors can include cases, simulations, and group activities to provoke greater long-term retention.

Instructors should recognize that a large percentage of both deep and surface learners perceive OHS as a satisfying learning experience, while a smaller percentage of both deep and surface learners do not perceive it as satisfying. In addition, deep learners are more likely than surface learners to approach OHS with advance preparation, such as reading the text or notes beforehand. Deep learners are also found to perceive that they obtain accounting knowledge and long-term retention of concepts as opposed to just completing OHS to get a grade or pass the course.

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