

Does LearnSmart Connect Students to Textbook Content in an Interpersonal Communication Course?: Assessing the Effectiveness of and Satisfaction with LearnSmart

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This study examines McGraw-Hill Higher Education's LearnSmart online textbook supplement and its effect on student exam performance in an interpersonal communication course. Students (N = 62) in two sections were either enrolled in a control group with no required LearnSmart usage or a treatment group with requisite LearnSmart assignments. Aggregated exam scores were compared using independent sample t tests. Results indicate that the control and treatment groups scored similarly on the exams with no significant differences; however, patterns of findings reflected a trend of higher scores in the treatment condition. Students utilized the tool primarily as a study aid and generally were satisfied with the online resource except for the perceived value. Suggestions for administration of the LearnSmart tool are provided.

According to a United States Government Accountability Office report (2005), advancements in computers and the Internet combined with increasing demands from educators have led to the proliferation of technology supplements provided by textbook publishers. These supplements can be found across a wide variety of domains, including social sciences like communication studies (e.g., Sellnow, Child, & Ahlfeldt, 2005), natural sciences like anatomy and physiology (Griff & Matter, 2013), and in business foundations like accounting (Johnson, Phillips, & Chase, 2009). Popular textbook publishers like McGraw-Hill, Bedford/St. Martin's, and Pearson sell access to technology supplements, often on top of the printed textbook price. Instructional textbook supplements range from DVDs to book companion websites containing multiple types of online learning resources (Sellnow et al., 2005). Informed by personal experiences, representatives for these publishing companies often use these technologies as selling points for their lines of textbooks. For instance, Pearson provides "Efficacy Implementation and Results" (2014) booklets and web brochures that contain numerous unpublished, non-peer reviewed case studies attesting to the benefits of their MyLab line of textbook technology supplements.

Although informative, these potentially biased studies lack the veracity of published, peer reviewed empirical studies of the effectiveness of these technologies. Therefore, as educators we must caution against making purchasing decisions based upon unsupported claims of improvement in student learning outcomes. It is then prudent to examine these claims to benefit students, educators, and publishing companies alike.

Computer-Assisted Learning

Textbook technology supplements (TTS) are specific technologies in the larger category of computer-assisted learning. Meta-analyses across

multiple disciplines show with consistency a positive influence of computer-assisted learning (CAL) technologies on student performance. Results are often most positive with respect to these technological resources increasing student performance when compared to traditional, non-supplemented learning (Timmerman & Kruepke, 2006). Lewis (2003), in a review of 10 CAL studies in the domain of anatomy and physiology, found support for positive benefits of these technologies on student performance and advocated their use (p. 206). In the context of anatomy and physiology courses, it was suggested that CAL technologies improve performance because they expose students to material in an alternative manner, they promote repeated exposure, and they increase practice in problem-solving. These gains, Lewis speculated, provide benefits to students and educators in that they increase satisfaction with the learning process.

Timmerman and Kruepke (2006) reviewed 118 CAL studies and indicated a Cohen's *d* effect size of .24 standard deviations higher in CAL students' performance than traditional students. The authors declared that CAL technologies were associated with "a reasonable level of improvement in performance when compared to traditional instruction" (p. 91). They investigated moderators like the domain of study, the time of study publication, and multiple media richness constructs. The high number of moderating variables cloud understanding how these technologies actually improve student learning outcomes as these variables potentially inhibit CAL performance (p. 94).

Though the previously mentioned meta-analyses show a small, positive effect of CAL on student performance, the authors also noted that findings are inconsistent across the cross-sectional studies selected for inclusion. The broad range of technological options causes frustration when trying to identify concrete effects of technological supplements *in toto* (Littlejohn,

Falconer, & McGill, 2008). For instance, studies included in Timmerman and Kruepke (2006) assessed CAL technologies of many forms: e-texts, online practice quizzes, interactive discussion boards, and/or videos and other hypermedia enhancements. These varying online resources have potentially incongruous influences on student performance, making it difficult to make general claims about the influence of CAL resources on student learning (Littlejohn et al., 2008). It is also difficult to draw specific conclusions about the effectiveness of one particular type of technology. When discussing future directions for research in an article about textbook supplements in communication studies courses, Sellnow et al. (2005) recommend researchers consider, “Are some technology supplements better equipped to foster intellectual growth than others?” (p. 250). To answer this question and develop a more complete understanding of the benefits and pitfalls of a singular online tool, it is proper to evaluate TTS technologies separately. Thus, one specific TTS technology, LearnSmart, is being investigated to provide targeted information for students, educators, and publishers with an interest in the effectiveness of this individual resource.

LearnSmart: Overview and Findings

LearnSmart is one tool available from the wider collection of online resources available in the Connect package offered by McGraw-Hill Higher Education Publishing Company (MGHHE). Connect is a TTS available across multiple disciplines, and within Connect are multiple resources. For communication studies, the Connect package includes assignments like quizzes and practice tests, access to an e-book edition of the textbook (for additional purchase), media resources for instructors, and the LearnSmart tool. Currently, student access to the Connect TTS can be purchased in addition to a printed textbook for approximately \$50 USD, or access to Connect in combination with an electronic copy of the textbook can be purchased for \$75 (no hard copy text included).

LearnSmart is marketed by MGHHE as an “adaptive technology,” an interactive study tool that dynamically assesses students' skill and knowledge levels to track the topics students have mastered and those that require further instruction and practice (MGHHE, 2013a, p. 1). Griff and Matter (2013) assessed the tool's effectiveness in introductory anatomy and physiology courses and described how the LearnSmart resource works:

For each question in a LearnSmart session, the student first decides his or her confidence level in answering that question, from “yes,” “probably” or “maybe” (I know the answer) to “just a guess.”

Some questions are multiple choice, some are multiple answer (where more than one choice is correct) and some are fill-in-the-blank. The software uses the student's understanding of the material from previous questions and the student's confidence to select subsequent questions. (p. 171)

Resulting information about student progress allows the system to adjust or “adapt” the learning content based on knowledge strengths and weaknesses, as well as student confidence level about that knowledge (MGHHE, 2013a). Educators can access a host of reports documenting overall class progress and areas for additional reinforcement, offering them the ability to instantly evaluate the level of understanding and mastery for an entire class or an individual student at any time. If practiced as intended, then instructors could craft lectures and class discussions toward areas where students lacked comprehension and where certainty is low. Ideally, students and instructors might benefit from adoption of the LearnSmart technology (MGHHE, 2013b).

A primary benefit of student LearnSmart usage advocated by MGHHE is greater learning efficiency, as demonstrated in the numerous case studies they provide on their website (MGHHE, 2013a). Learning efficiency is the degree to which a TTS tool can help reduce overall study time or maximize gain in students' already limited study time. Theoretically, students are better able to understand areas of proficiency and deficiency through the LearnSmart tool (MGHHE, 2013a, p. 4). As a result, it can pinpoint students' knowledge gaps helping to direct their attention and study time where it is needed, therefore allowing for a more focused study plan. Better focus, they claim, is realized and manifested through increased student performance. Although the MGHHE LearnSmart website offers results of case studies that support claims regarding this benefit (e.g., MGHHE, 2013b), relatively few unbiased, published studies document the influence of LearnSmart on student performance.

In one such study, Griff and Matter (2013) evaluated the LearnSmart system in an experimental, treatment-control comparison study that spanned six schools and included 587 students enrolled in an introductory anatomy and physiology course. Scores on posttests were compared with pretests between treatment sections ($N = 264$) that had access to LearnSmart modules and control sections ($N = 323$) that did not. Overall, LearnSmart had no significant effect on improvement compared with the control section, although two of the participating schools did demonstrate significantly greater improvement in treatment versus control sections. Regarding the positive influence for these schools, authors hinted at a spurious relationship extending from instructors at these

schools following the textbook more closely, thereby eliciting a better match between LearnSmart and exam content. As imagined, countless variables can influence student performance, thus contributing to the complexity of identifying a true effect of TTS and CAL technologies on performance (Griff & Matter, 2013, p. 176). Potentially, instructors and students did not use LearnSmart as recommended.

Additionally, Gurung (2015) compared effectiveness of three separate TTS offerings across three semesters of an introductory psychology course. In investigating the relationship between the amount of time spent using LearnSmart and student exam performance, the authors identified a significant, positive correlation such that the more time students spent with the LearnSmart modules the higher they scored on exams (average $r = .17$). Potentially, as described in Lewis' (2003) meta-analysis of CAL technologies, more time with the tool inevitably relates to greater exposure to the material.

Given what is reported in extant CAL literature along with the works of researchers Griff and Matter (2013) and Gurung (2015), the following hypotheses are presented:

H1a: Students in the treatment group have higher exam scores than students in control group.

H1b: Students in the treatment group have higher textbook-only scores than students in control group.

H2: More time spent using LearnSmart relates to higher exam scores.

Additionally, two exploratory research questions are posed as well:

RQ1: How do students use the LearnSmart tool?

RQ2: What are student perceptions of the LearnSmart tool?

Method

This study utilized a group comparison, posttest-only experimental design wherein two groups (control and treatment) were compared for the effect of LearnSmart usage on student exam performance. All procedures for this study were approved by the appropriate Institutional Review Board.

Participants

Participants ($N = 62$) included students enrolled in two sections of an interpersonal communication class during the Spring 2014 semester at a mid-size university in the southwest United States. Enrolled students were not informed of the study procedures, nor did they know in which group they were participating.

As a consequence, intergroup communication was not restricted. It is possible students in the control group may have been exposed to the treatment; however, students in the control group did not indicate awareness of, or make requests for, LearnSmart requirements or assignments. The courses were taught consecutively on the same day by the same instructor in the same room and with identical content being covered. From the two sections, one class served as a control group ($n = 33$) where no LearnSmart modules were required or provided for students. In the treatment group ($n = 29$), access to the LearnSmart online resource was a requisite course material, and students were expected to purchase their own access. No assistance or feedback from MGHHE was solicited for this study.

The two groups were compared across several demographic characteristics including sex, classification/year, program of study (majors versus nonmajors), average number of absences per student during the semester, and average institutional GPA of students' prior to the semester. Data regarding the composition of the groups can be found in Table 1. Shown in this table, the groups have similar numbers of males and females as well as similar average GPA. An independent sample t test comparing average class GPA between the control and treatment groups was not statistically significant, $t(53) = -.64, p = .52, d = .17$. Equivalent GPAs between the groups is necessary given that GPA is found to be a predictor of student performance (Cheung & Kan, 2002; Gurung, 2015). The groups differ in classification (the control group had more seniors than juniors, whereas treatment group had more juniors than seniors), in program of study (the control group had nearly three times more communication studies majors than the treatment group), and absences (the treatment group had more average absences per student). An independent sample t test comparing means between the control and treatment groups regarding absences was statistically significant, $t(60) = -2.45, p = .02, d = .58$.

Procedures

In the control group, students completed online quizzes for each chapter (a total of nine quizzes worth 10 points each), as well as a bonus quiz for posting a personal profile on the course Blackboard site (for a full 100 points toward the final course grade). In the treatment group, students completed LearnSmart modules for each of the nine chapters. Like quizzes in the control group, these LearnSmart modules were a part of the students' final course grade. They were graded for completion to compel students to use the LearnSmart tool based upon previous recommendation (Sellnow et al., 2005, p. 251). Chapter modules were worth 10 points each for 90 points (with a 10-point registration grade for 100 possible LearnSmart points).

Table 1
Comparison of Class Demographics

Variable	Control	Treatment
N	33	29
Sex		
Male	9	7
Female	24	22
Program of Study		
Major	16	6
Non-major	17	23
Classification/Year		
Sophomore	1	3
Junior	13	19
Senior	19	7
Absences M (SD)	1.81 (1.78)	2.90 (1.68)
GPA M (SD)	2.81 (.47)	2.90 (.58)

Note. *Significant difference at $p = .02$.

At the start of a new content area, LearnSmart modules for the treatment group and quizzes for the control group were opened for each of the three chapters covered for the area. Modules did not close and quizzes were not graded until immediately prior to the content area exam. This allowed students to use the respective tool to prepare for lectures, to develop further understanding or improve comprehension, and/or to review past material. It was not requisite that students completed a module before chapter content was covered. Unfettered access provides the opportunity for students to use the LearnSmart tool (and quizzes) in multiple ways both in terms of frequency (several attempts) and function (studying, preparing, etc.), and it allows examination of how the students voluntarily use the tool. Although access to chapter LearnSmart modules and quizzes was unlimited, only the first full attempt counted toward the final course grade.

Within LearnSmart, instructors can select the amount of content for each chapter they want to deliver to students by moving a slider for more or less content. The tool provides an approximate time length for full completion of the module. Previously, students perceived the LearnSmart technology to be “time consuming” (Griff & Matter, 2013), therefore modules for the treatment group were limited to 25 minutes. Completion times ranged from six to 73 minutes ($M = 21.20$; $SD = 10.98$), and the average time students spent with the LearnSmart technology over the semester was 190.86 minutes ($SD = 98.86$).

To gauge student performance, both groups completed three exams throughout the semester. Each exam covered three content chapters via 40 multiple choice questions. Griff and Matter (2013) speculated

that LearnSmart modules would be most beneficial for helping students understand the textbook content rather than any outside materials/content an instructor may bring in to the course. As such, exam questions were classified into two categories: items concerning material discussed in lecture (and presented in the text) or material assigned from the textbook but not discussed in class (textbook-only). Approximately 20% of exam material (eight questions) came from the textbook-only category. Total exam scores were averaged for each student to determine an overall performance score. Second, textbook-only questions were scored for each exam and were aggregated across the three exams for a textbook-only performance score. Information regarding exam scores can be found in Table 2, and a histogram of aggregate scores is provided in Figure 1.

After the semester, students in the treatment group were asked to participate in a survey to ascertain their perceptions of the LearnSmart tool. Students evaluated the online resource with respect to the perceived value, ease of use, habits and tendencies, and satisfaction with the supplement. Students were not required to participate in the survey and were not rewarded/penalized for completing/not completing it. Students provided unique identifiers in class that were any combination of words, numbers, or symbols, and the survey prompted participants to provide their unique identification code to pair responses with course performance.

Measures

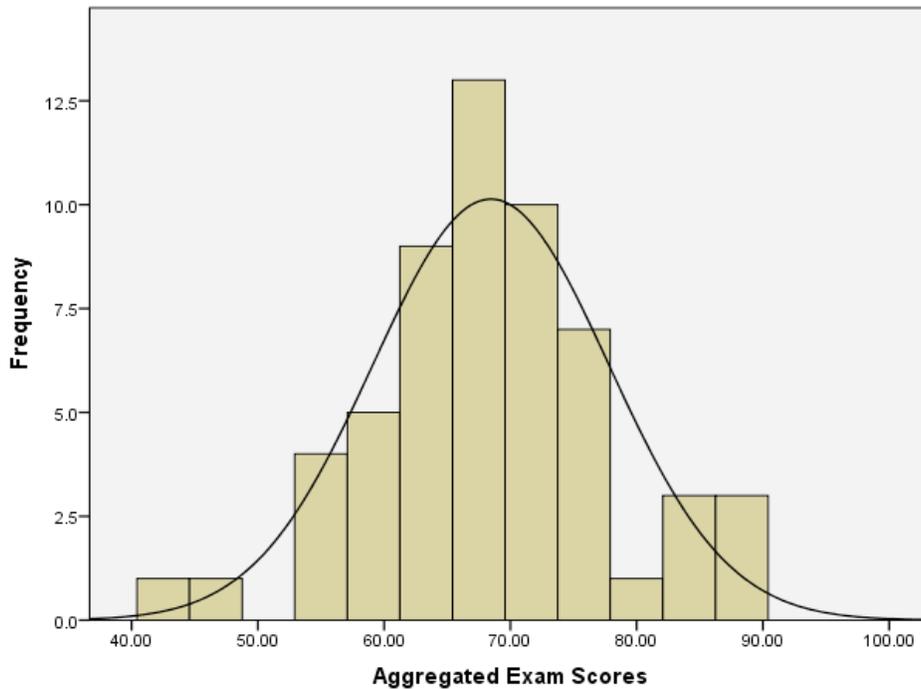
Students’ perceptions. All survey items to examine student perceptions of LearnSmart were

Table 2
Total Exam and Textbook-Only Performance Comparison

Group	Exam Score	SD	Textbook Only	SD
Control	27.04 (68%)	3.75	5.57 (70%)	1.16
Treatment	27.75 (69%)	3.77	6.14 (77%)	1.14

Note. No differences statistically significant at $p < .05$.

Figure 1
Histogram of Aggregated Exam Scores for Both Groups



created exclusively for use in this study. Response scaling ranged from 1 = *Strongly Disagree* to 5 = *Strongly Agree*. Thirty questions covered four general categories of perceptions: Satisfaction, Utility, Usability, and Perceived Value. Satisfaction concerns whether the tool generally met the needs of the student and is indicated by items such as, “I am very satisfied with LearnSmart.” Utility relates to how students used the technology and includes three sub-scales: Understanding, Preparation, and Studying. Understanding reflects the degree to which students thought LearnSmart helped them to better comprehend material (“I was encouraged to rethink my understanding of some aspects of the subject matter”). Preparation measures the students’ use of LearnSmart to introduce course content before discussions and lectures (“I used LearnSmart to cover course content before it was discussed in class”), whereas Studying

assesses the use of the technology to review for exams (“LearnSmart was mainly a tool for review and studying past material”). Usability gauges student perceptions about access and user-friendliness, for example, “LearnSmart allowed me to access online/digital learning resources readily.” Perceived Value indicates student beliefs about the quality of the tool, with items like, “The CONNECT package was worth the cost.”

A total of 20 students from the treatment group completed the survey. Internal consistency was estimated for each of the scales via Cronbach’s alpha: Satisfaction ($n = 5$; $\alpha = .87$; avg. $r = .41$; $M = 3.69$; $SD = 1.03$), Understanding ($n = 4$; $\alpha = .66$; avg. $r = .34$; $M = 3.87$; $SD = .72$), Preparation ($n = 4$; $\alpha = .87$; avg. $r = .64$; $M = 3.36$; $SD = .99$), Studying ($n = 4$; $\alpha = .73$; avg. $r = .42$; $M = 4.16$; $SD = .60$), Usability ($n = 9$; $\alpha = .87$; avg. $r = .46$; $M = 4.05$; $SD = .66$), and Perceived Value

($n = 4$; $\alpha = .91$; avg. $r = .73$; $M = 2.91$; $SD = 1.32$). Most scales achieved adequate internal consistency estimates ($\alpha \geq .70$) except for Understanding.

Hypothesis testing. G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007) was utilized to determine achieved power to detect differences between the two independent sample means. Given sample sizes of 33 for the control group and 29 for the treatment group, power to detect small effects (.20) is .19, medium effects (.50) is .61, and large effects (.80) is .92.

H1a predicted the treatment group would score higher on exams than the control group. Independent sample t tests compared aggregated exam scores to test the hypothesis. Results failed to identify significant differences between the control and treatment groups with respect to exam performance, $t(55) = -.71$, $p = .48$, $d = .19$. Findings indicate the control group ($M = 27.04$; $SD = 3.75$) and the treatment group ($M = 27.75$; $SD = 3.77$) performed similarly on exams, thus failing to support the hypothesis.

H1b predicted that the treatment group would score higher on textbook-only exam content than the control group. Independent sample t tests compared aggregated textbook-only performance to test the hypothesis. Results again failed to identify significant differences between the control and treatment groups at the $p < .05$ criterion, $t(52) = -1.82$, $p = .08$, $d = .50$. Findings indicate the control group ($M = 5.57$; $SD = 1.16$) and the treatment group ($M = 6.14$; $SD = 1.14$) performed similarly on textbook-only exam content. Because the test is nearing statistical significance, there appears to be a moderate effect for the treatment group indicating higher scores on textbook-only exam content. Yet power to detect a significant difference was only .61 for a moderate effect in the current sample; therefore, the study was likely underpowered to detect a significant relationship. It is possible that if the sample size were increased, then difference between group scores on textbook-only content could become significant.

H3 predicted that students who spent more time using LearnSmart would score higher on exams. This prediction was not supported by a bivariate correlations between time spent on LearnSmart modules and exam scores, $r = -.53$ ($p < .01$), nor textbook-only scores, $r = -.46$, $p = .02$. In fact, the association identified in this study was counter to what was predicted and to the findings of Gurung (2015); however, they were in line with findings of Griff and Matter (2013).

To further investigate this paradox, a one-way analysis of variance test was utilized to determine time differences between students of various course grades. That is, students were grouped according to their final course grade (A, B, C, or D) and then compared for their time spent with the tool. Results of the one-way ANOVA were not significant, suggesting no differences between the groups, $F[3, 24] = .66$, $p = .59$.

However, the visual plot of means (see Figure 2) presents an interesting curvilinear pattern demonstrating students who performed the best (A) and worst (D) in the class spent the least amount of time with the technology compared to average students (B and C). Interestingly, A students spent the least amount of total time completing LearnSmart modules ($M = 152.50$, $SD = 49.74$).

This indicates that the less amount of time spent with LearnSmart, the better students performed on exams. Admittedly, once a module is started, the time counter runs regardless if students take restroom breaks, talk or text on the phone, make food or drinks, or cruise the Internet while doing a module. Actions such as these could inflate actual time spent using the tool as well as decrease the effectiveness because attention is distracted. It could be those who completed modules without distractions not only finished quicker but also received more benefits.

Research questions. RQ1 probed how students in the treatment group used LearnSmart modules. Examination of scale means between Studying and Preparation scales provided support for this hypothesis. Students reported using LearnSmart more as a tool for studying past material rather than for comprehension of, or preparation for content. The mean for Studying ($M = 4.16$; $SD = .60$) was higher than either Preparation ($M = 3.36$; $SD = .99$) or Understanding ($M = 3.87$; $SD = .72$).

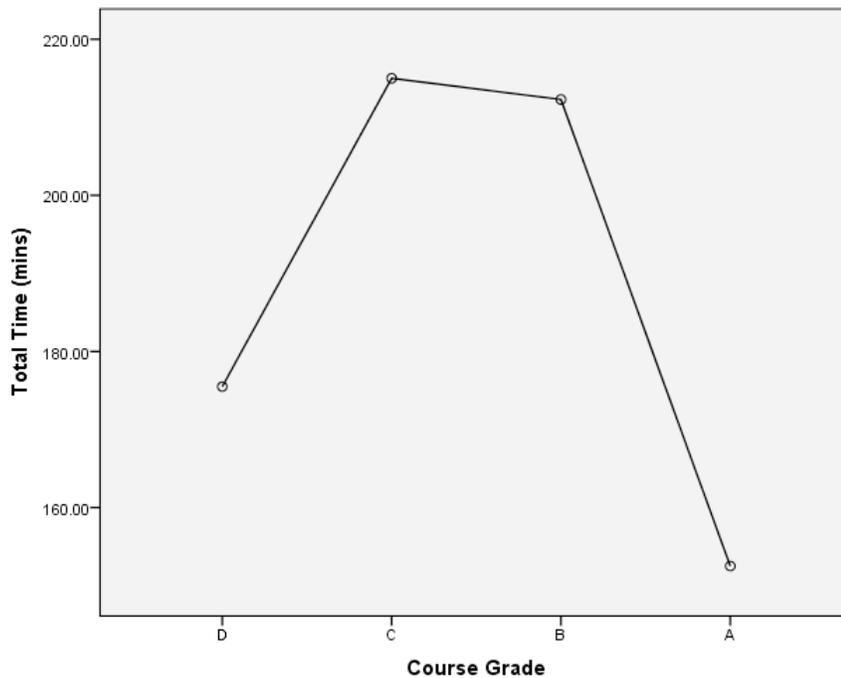
RQ2 questioned student responses regarding perceptions of the LearnSmart tool. First, on average students agreed they were satisfied with the tool ($M = 3.69$; $SD = 1.03$) and found it easy to use ($M = 4.05$; $SD = .66$). Next, however, students did not agree that the tool was of high value ($M = 2.91$; $SD = 1.32$). Perceived value had the lowest average agreement of all the measured dimensions and was the only scale < 3.00 (the response scaling midpoint).

Discussion

This study investigated the effect of MGHHE's LearnSmart on student exam performance, as well as student usage and perceptions of the resource. Foremost, results indicate that students in the treatment group who completed LearnSmart modules scored similarly to students in the control group on overall exam performance, as well as textbook-only performance. Second, time spent using LearnSmart was negatively related to exam scores. Third, students were more likely to use the LearnSmart tool as a study aid rather than for increasing comprehension or preparing for lectures. Although students were satisfied with the resource and found it easy to use, they did not agree that LearnSmart was of great value to them.

Similar to Griff and Matter's LearnSmart study (2013), results of this study found no statistically

Figure 2
One-Way ANOVA, Time Spent with LearnSmart by Overall Course Grade



significant influence of LearnSmart on student exam performance. However, regarding textbook-only exam content, the difference between the control and treatment groups was near statistical significance ($p = .08$); given the small sample size of this study, it is possible that a relationship would become significant if the study were of higher power to detect differences (i.e., larger sample size). Exam scores between the groups did not differ significantly, but the pattern of results hints at a positive influence of LearnSmart on exam performance; however, the magnitude of effect (especially with respect to the total exam scores) seems to be small to moderate. Future studies may be interested in larger comparison groups to determine a more accurate picture of the relationship and effect of LearnSmart on exam performance.

Although no significant gains in student performance were realized, it may be possible that usage of LearnSmart mitigated the negative effects of certain deficient characteristics of the treatment group. When considering the composition and habits of the two groups, it is plausible that the effect for LearnSmart was actually greater than the data indicate. For instance, as compared to the control group, the treatment group was younger (had fewer seniors and more juniors than the control group), had fewer

communication studies majors (therefore potentially less prior exposure to course content), and had significantly more absences. It might be that LearnSmart was able to lessen the negative effect that a variable like absences might have on exam performance by helping keep students actively engaged with course content. It is equally plausible that group differences posed potential confounding variables, thus negatively affecting the acceptance of findings presented here.

Results also show that students are more likely to use LearnSmart for exam review rather than preparing for class. This is not unusual as textbook supplements in the discipline of communication studies are perceived by students primarily as study aids (Sellnow et al., 2005). Thus, the preparatory function that LearnSmart can serve was underutilized in the current study because modules were not required to be completed prior to in-class coverage. Ideally, as suggested by MGHHE (2013a), when completed prior to lecture, this supplement helps students come to class with a solid foundation of concepts that will be covered to help them direct their attention during lectures to areas of deficiency. Theoretically, students could pay closer attention to areas in which they are uncertain and could prepare questions about these areas to aid comprehension. For instructors, requiring completion

of LearnSmart modules prior to lecture could help to direct lecture material toward areas where students are struggling. Future studies might be interested in comparing how the preparation function might influence student exam performance as compared to the sole use of LearnSmart for reviewing exam material.

There are also other benefits that using LearnSmart can provide that were not examined here. For instance, teaching effectiveness as a benefit centers upon student engagement with the material in the classroom through increased discussion and “higher-level question asking” (MGHHE, 2013a, p. 5). MCHHE declares that students who complete modules before class content is deployed are “more knowledgeable about core course content and, as a result, are more engaged in classroom discussion and participation” (2013, p. 5). Assumedly, introduction to course material via LearnSmart prior to engagement with material in the class spurs interest and motivation during class time. Future research might consider ways to measure and evaluate student engagement in the classroom, potentially through self-report surveys or qualitative observations.

Significant improvements in performance were not realized, but students tended to be satisfied with the tool. Survey responses indicated that students agree they are “very satisfied” with the textbook supplement, and in particular students reported it being user-friendly. Whereas students in the Griff and Matter (2013) study complained that the modules were too time consuming, students in this study found the amount of work to be appropriate. One recommendation for instructors, then, might be that LearnSmart modules should take about 30 minutes for students to complete, and anything more might cause attrition. Arguably, what is important is that students are spending extra time with course material when using LearnSmart, which is related to CAL benefits of repeated exposure suggested by Lewis (2003). Overall, it is important to find the right balance of time for each module with too much or too little completion time likely being ineffective.

Despite self-reports of being satisfied with the tool, students disagreed that the textbook supplement was “worth the cost” ($M = 2.78$, $SD = 1.52$). Ranging from \$50 to \$75 USD, the supplement was not deemed valuable at those prices. However, it is my experience that students generally balk at textbook costs regardless of what satisfaction or effectiveness they perceive/receive.

Limitations abound in the scholarship of teaching and learning, notably the difficulty in identifying how a tool like LearnSmart might differentially impact the diverse educational environments across all of higher education (Griff & Matter, 2013). As mentioned by Griff and Matter (2013), “there are many variables in a study of this type” (p. 176) that might have an influence

on student performance. Although researchers might discover general patterns of effectiveness, as evident in this study it still remains unclear why or how much the LearnSmart textbook supplement and others like it impact student learning. There still remain many unexamined and hidden variables that play a role in student performance, not to mention individual differences in motivation (Ames & Archer, 1988), perceptions of technology (Koochang, 1989; Muilenburg & Berge, 2005), and even life circumstances like depression or anxiety (Furr, Westefeld, McConnell, & Jenkins, 2001). There are also limitations specific to the current study including small sample size, cross-sectional design, potential for cross-group contamination, spurious differences between groups, a singular focus on student exam performance, and use of previously untested measures.

Conclusion

This study examined the effectiveness of McGraw-Hill’s LearnSmart textbook supplement technology on student performance in an interpersonal communication class. Findings indicate that exam performance is not significantly improved for students using the online resource; however, results do demonstrate a trend of positive effects for the treatment group. Students largely used the tool as a study aid and were generally satisfied with the resource except for the cost-to-benefit value.

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