Building a Framework for the Influence of Digital Content on Student Course Engagement

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Abstract

Grounded in the Motivated Learning Strategies Model, this paper proposes a testable framework to explore how access to digital information impacts learning through examining the mediating factor of engagement. While the implications of patterns of behavior on learning and learning outcomes are significant, we first must understand what drives students to engage with their course content in the first place. In this paper, we propose to explore whether students perceive electronic content delivery (engaging e-textbooks, YouTube videos, Ted Talks, professor-presented video lectures, etc.) will improve their likelihood of engagement with the material. The purpose of this paper is to present the framework for a testable model examining the impact of digital, open educational resources (OER) on student engagement and involvement in learning.

Keywords

Student engagement, engagement, digital content, digital textbooks, Motivated Learning Strategies Model, learning, open educational resources.

Introduction

In today’s ever-increasing digital landscape with students distracted by their devices, multi-tasking prevalent, and attention fragmented, the challenges of finding effective pedagogical approaches to engage and educate students continues to grow. As IS educators struggle with understanding these nuances and employing effective pedagogical approaches for digitally-connected students, employers are also struggling to find qualified, engaged and skilled people to fill the demand in the IS workforce.

Students are more often than not tethered to their devices, constantly accessing information and participating in social media. Students in today’s society receive much of their information in short, cursory stories, headline grabs, and bait-and-switch teasers. All of this, coupled with the accessibility of technology, has dramatically changed the way today’s students receive, access, and process information. Thus, we argue that students learn differently today, engage more intensely with technology, and are more technologically savvy with accessing digital content than ever before.

Regardless of any perceived changes in technology interactions and subsequent changes in learning styles, evidence shows that engagement in content not only leads to deep learning (Goldspink & Foster 2013), it is a required pre-condition (McMahon & Portelli 2004, Nelson Laird, Shoup, & Kuh 2005). This makes understanding how digital information impacts learning critically important. However, before seeking to understand these effects, it is worthwhile to examine the impact of digital content on its mediating factors. Goldspink & Foster (2013) suggest the link between curriculum and successful practice is engagement. Thus, while the implications of patterns of behavior on learning and learning outcomes are significant, we must first understand what drives students to engage with their course content in the first place.

If we understand the drivers of engagement, we can better understand best practices of course delivery. We propose to explore whether students perceive digital, open educational resources (OER) will improve their likelihood of engagement with the material. While OER covers a range of definitions for different
constituencies, for the purposes of this study, OER are defined as “freely accessible resources for educational purposes.” (Pawlowski & Bick 2012) To support the purpose of broad adoption, many OER resources are digital in format. Examples of digital OER include e-textbooks, YouTube videos, educational games and simulations, among other objects.

Thus, the driving research question for this study is whether students believe they are more likely to engage with their course material if the material is presented in accessible, digital formats. The purpose of this paper is to present the framework for a testable model examining the impact of digital OER on student engagement and involvement in learning. In the following sections, we will first define engagement in the context of this study and present a background of the relevant literature before discussing the methodology proposed to explore this research question.

**Literature Review & Theoretical Framework**

From the education literature, the role of student engagement in learning is developed in the discussion of self-regulated learning. Pintrich and DeGroot (1990) define self-regulated learning as having three distinct dimensions. The first dimension includes students’ metacognitive strategies for planning, monitoring and modifying their cognition with respect to the material being learned. The second dimension is students’ management and control of their effort on academic tasks, i.e. the ability to maintain engagement with the material. The third dimension of self-regulated learning consists of the actual cognitive strategies that students use to learn, remember and understand material.

Within the IS literature, engagement stemming from motivation has long been seen as an important factor in the decision to use a particular system. Agarwal and Karahanna (2000) show that cognitive absorption, defined as an intrinsically motivating state of deep involvement with software (Agarwal, Sambamurthy, & Stair 1997), influences perceived usefulness and perceived ease of use, and thus the behavioral intention to use, an information system. Cognitive absorption, rooted in IS acceptance research (Agarwal & Karahanna 2000; Saade & Bahli 2005; Suki, Ramayah, & Suki 2008), corresponds to the second dimension of the Student Involvement in Self-Regulating Learning construct presented above (Pintrich & DeGroot 1990). Extending this further, perceived affective quality (PAQ), “an individual's perception that an object has the ability to change his or her affective state” (Zhang, Li, & Sun 2006, p. 2, Russell 2003), is seen as an antecedent to cognitive absorption, which would motivate a user to employ an IS for a stated goal (Zhang, Li & Sun 2006) much like the decision to engage in digital content in a course for the purpose of mastering the material.

In the field of education, the concept of flow, an aspect of cognitive absorption, has also been studied to determine its impact on student engagement (Mills & Fullagar 2008, Whalen 1997). Mills and Fullagar (2008) find that flow is more strongly associated with four self-determined forms of motivation: intrinsic motivation-knowledge; intrinsic motivation-accomplishment; intrinsic motivation-determination; and extrinsic motivation-identified regulation, and that these three self-determined forms of intrinsic motivation explain a significant proportion of the variance in flow. In the field of IS, flow is identified as one dimension of cognitive absorption. Within that context, flow is defined as “the exploratory and intrinsically motivating nature of the interactions and individual experiences with the software.” (Agarwal, Sambamurthy, & Stair 1997). Thus, the IS view of cognitive absorption as a measure of the intrinsically motivating nature of individual interactions with software is a very consistent view to the nomological net on engagement that is given in the education field of college teaching and learning (McKeachie et al. 1986).

From this perspective, we argue that student perception of instructional methods, a cognitive aspect of engagement, will drive their decisions and motivations to engage in course content. When exploring motivation and engagement, Hsieh (2014) in a study of 178 junior students found learning motivation to predict learning outcomes stressing the importance of the instructor providing students with learning environments and experiences that improve confidence in learning abilities, thus their likelihood to engage. Students who feel more confident they will succeed with a task are more likely to engage in that task.

McKeachie et al. (1986) provides one of the best conceptual models for providing a framework for understanding these phenomena especially in the context of college classrooms. Their Motivated Strategies for Learning Model (MSL) is presented in Figure 1.
In this study, we are interested specifically in the impact of the availability of digital, open instructional materials on student engagement, or – as depicted in this model – student involvement in self-regulated learning. Thus we focus this study on the subset of the general model of teaching and learning that includes instructional methods (which includes course learning materials), student motivation, student cognition, and student involvement in self-regulated learning (see Figure 1). From this framework and the review of salient literature, we develop the model for testing presented in Figure 2. In the following sections, we will establish each of the constructs as we develop the foundation for and present the hypotheses.

**Instructional Methods: The Advent of Digital Course materials**

In the MSL Model (Figure 1), instructional methods comprise any process or approach of presenting material to a class for the purpose of delivering content that results in learning, whether student centered or instructor centered. Examples include lectures, cases, simulations, games, classroom activities and discussion, independent study, and even reading aloud. The results of McKeachie’s (1986) earlier comprehensive review of the literature conducted prior to the development of the MSLQ instrument suggested that differences in instructional methods made very little difference in outcomes. However, McKeachie et al. (1986) asserted and later with others (e.g., Hsieh) illustrated that it is erroneous to conclude that teaching does not make a difference. Evaluating the impact of instructional methods requires testing hypotheses with appropriate dependent variable measures rather than just final exams, which prove be problematic in numerous ways to include understanding the mediating effects of engagement (McKeachie et al. 1986, Duncan & McKeachie 2005).

**Student Motivation and Student Cognition: Engagement**

Our choice of focus on engagement stems from its impact on student involvement in the learning process and, ultimately, student learning outcomes. Primarily, instructors choose the curriculum for the student as a direct path to positive student learning outcomes. However, engagement is an important mediating factor between curriculum and learning outcomes because engagement is primarily student controlled. Thus, being able to influence a student’s engagement with the curriculum and its materials leads to an ability to influence the student’s learning outcomes (Goldspink & Foster 2013) in a way that the student controls, rather than a way that feels forced upon the student.

Engagement is seen as a real-time indicator of motivation (Charland, Leger, & Skelling 2015) comprised of the behavioral component, affective component, and cognitive component (Fredericks, Blumenfeld and...
In the MSL model, McKeachie et al. (1986) depict these components as student motivation and student cognition, with motivation including behavioral and affective measures.

**Behavioral Component of Engagement**

The MSL and its resulting questionnaire is partially grounded in expectancy-value theory (Eccles et al. 1983, Eccles 2005) which posit that an individual’s beliefs about how well they will perform on a task and how much they value the task will explain an individual’s choices, persistence, and performance (Atkinson 1957, Eccles et al. 1983, Wigfield 1994, Wigfield & Eccles 1992, 2000). Expectancy theory, a core tenet of motivation theory, says that an individual will behave a certain way over other behaviors based on what they believe the expected outcome to be from that chosen behavior. Thus, we argue a student who believes there is value in the behavior of engagement, will indeed engage. It is plausible, then, to assert that the accessibility and familiarity of digital content over traditional textbooks would increase the value of the activity of engaging in course material.

H1: Students who perceive higher task value in the activity are more likely to engage with course materials if provided digital OER course content in place of a traditional textbook.

Motivation is a central thrust of the behavioral component of engagement. The assumption is that student goals, both intrinsic and extrinsic, influence the value they attach to an activity such as engaging in their course materials (McKeachie et al. 1986). This “task value refers to student’s beliefs that their efforts to learn will result in positive outcomes” (Hsieh 2014).

Building on the intrinsic motivation model, the MSL framework suggests that “the [classroom] environment must provide students with appropriate opportunities and resources” (McKeachie et al. 1986, p. 53) to stimulate interest. We argue intrinsic drivers such as curiosity, challenge, and mastery are further stimulated with accessibility and familiarity of digital course content leading us to our second hypothesis.

H2: Students with higher intrinsic goal orientation are more likely to engage with course materials if provided digital OER course content in place of a traditional textbook.

Extrinsic motivation, on the other hand, encompasses the degree a student believes that participating in an activity will achieve an external goal (Pintrich et al. 1991) such as “grades, rewards, performance and competition or evaluation by others” (Hsieh 2014, pp. 419). When individuals exhibit high extrinsic motivation, they typically view an activity or task as a means to the end. Thus, if a student views involvement, or engagement, in course content as a means to achieve their extrinsically motivated goals, they are more likely to engage. Given the accessibility and familiarity of digital content, environmental barriers to ease of use suggest a student who is extrinsically motivated is more likely to engage with digital content than a traditional textbook.

H3: Students with higher extrinsic goal orientation are more likely to engage with course materials if provided digital OER course content in place of a traditional textbook.

A final aspect of the behavioral component of engagement is an individual’s self-efficacy for learning. Self-efficacy beliefs powerfully influence states such as an individual’s mood, anxiety levels, and stress levels (Pajares 2001). These states of being in turn influence an individual’s behavior. Thus, it is plausible to assert that an individual with a positive belief for their ability to learn and do well in a course would affect their decision to engage with course content. More so, the accessibility to and familiarity with accessing and absorbing digital content would, we argue, make it even more likely that they would engage in course material if it were digital than if they only had a traditional textbook.

H4: Students who have positive self-efficacy for learning and performance in a given course are more likely to engage if provided digital OER course content in place of a traditional textbook.

**Affective Component of Engagement**

Rounding out the two components of student motivation is affect. Affect in the context of this study is how a student feels about their ability to learn course material and do well in a course. Understanding affect in the context of student learning can unveil more about the motivation behind observed behaviors.
Affect, however, is tricky to measure. As Goldspink & Foster (2013) point out, affect is subject to much interpretation, and a student’s emotional state can ebb and flow over the duration of a course. They also go on to explain these issues can be addressed, however, with techniques such as averaging scores over time.

In the McKeachie et al. (1986) model, test anxiety is the sole affective construct considered. While we believe there is more to the affective component than identified in the MSL model – such as the enjoyment dimension of the flow construct that predicts technology acceptance, use, and behavior (e.g., Agarwal & Karahanna 2000, Agarwal, Sambamurthy, & Stair 1997, Ghani & Deshpande 1994, Ghani, Supnick & Rooney 1991) – that discussion goes beyond the scope and intent of this study. The model we have developed will conform to the MSL model framework. Thus, we propose the fifth hypothesis:

**H5:** Students with higher test anxiety are less likely to engage even if provided digital OER course content in place of a traditional textbook.

### Cognitive Component of Engagement

While the behavioral and affective aspects of engagement are critical, the cognitive component is equally important. McKeachie et al. (1986) approach the cognitive factors as students’ cognitive structure, or how they think and process information. Cognition serves to reveal the level of engagement an individual has with learning itself and “what the learner thinks about his/her situation” (Goldspink & Foster 2013) including time devoted to thinking about, comprehending, and reconciling the material. Cognition, similarly difficult to measure as affect, can be captured by observing behavior or collecting data from self-reported instruments.

McKeachie et al. (1986) point out that understanding an individual’s internal representation of content and how he or she processes it is key to understanding how he or she interacts with material. It is logical, then, to assume students who spend more time critically thinking about course material are more likely to choose to engage in it. From this assumption we propose the final hypothesis.

**H6:** Students with higher cognitive processing activities are more likely to engage if provided digital OER course content in place of a traditional textbook.

### Proposed Model

The research question driving this study is whether students will perceive higher engagement in their course material if the material is presented as digital OER content rather than a traditional textbook. Based on this research question, with the treatment of curriculum materials being digital or non-digital in nature, we proposed the research model as shown in Figure 2.

![Figure 2: Model of Student Engagement](image-url)
Methodology

Our proposed study to test the research model and hypotheses will survey two groups of respondents. Each group is enrolled in an introductory, undergraduate level IS course in the business school. The first group is taking the course in a section where the course materials are all digital OER in form. The types of materials used for course content in this section include interactive modules and tutorials, freely available e-texts, videos, and other electronic resources, such as software applications. The second section is taking the course with an assigned course textbook as the primary course content material. Both sections have the same instructor and the same course objectives. Both sections are conducted face-to-face with lecture and lab components, where students were provided identical lecture notes from the instructor for the course. The students are undergraduate level students at the junior or senior level of their four year degree. The GPAs, gender and age compositions of the sections do not differ significantly from each other.

The survey is being conducted using an online survey platform. All of the items used for the survey were adapted from the Motivated Strategies for Learning Questionnaire (MSLQ), developed specifically to measure higher education student populations (Pintrich, Smith, Garcia and McKeachie, 1991, 1993). This instrument addresses research on motivation and cognition and is particularly well suited to assess cognitive engagement of students in the context of a particular course. In prior research, the MSLQ has been used extensively to assess the motivational and cognitive effects of different aspects of instruction, including instructional strategies, course structures, interventions, and educational technology (Duncan and McKeachie, 2005).

Six of the fifteen subscales of the MSLQ were used in this survey administration. The motivation section of our survey includes items that measure behavior components of motivation (value-expectancy factors) and affective components of motivation. The behavior subscales include those measuring task value (6 items), intrinsic goal orientation (4 items), extrinsic goal orientation (4 items), and self-efficacy (8 items), for a total of 22 items. The affective subscale consists of text anxiety, which consists of 5 items. The cognitive section includes items measuring cognitive and metacognitive processing activities, measuring rehearsal (4 items), elaboration (6 items), organization (4 items), critical thinking (5 items), and metacognitive self-regulation (10 items), for a total of 29 items. Items measuring demographics of the students were also added. The final wording of the item measures are consistent with those of the published survey.

Discussion & Conclusions

The digital revolution has not only disrupted the textbook business model, it is dramatically disrupting the university business model as well. In addition employers, more and more, are accepting non-traditional credentials from free and inexpensive MOOCs and other life-long learning outlets such as Coursera, Udemy, and Lynda.com in entry level IT employees. Thus, it is critical that we understand the implications of these disruptors. While an examination of organizational-level disruptions in higher education are warranted, we have begun at the pedagogical layer to ultimately examine the effectiveness of evolving models, and more specifically how we can facilitate flow theoretically leading to improved learning outcomes. In this study we have taken the first step in that direction through developing a research framework for exploring the perceived increase in student engagement through digital course materials. The findings of this proposed study will provide further insight to the students’ perceptions about their levels of engagement in digital course material. These findings will help IS educators understand the reception and expected use of digital course materials in the curriculum.

REFERENCES