
Exploring the Use of Social Media as a Digital Study Guide

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.Abstract

The purpose of this case study was to understand how students could study for course examinations using social media. This study used two theoretical frameworks, Web 2.0 Technologies and connectivism, as the guiding concepts to explore how students in an introductory college course perceived the use of Twitter and Storify as test reviews and study guides. Forty-six university students in a journalism course were surveyed about their perceptions of these approaches. Results showed students believed the Twitter in-class review helped them to recall information more effectively. In addition, students used Storify as a study guide, and most said Storify helped to improve their test grades. Recommendations to modify this pedagogical approach and future research ideas are discussed.

Keywords: Social Media, Test Review, Student Achievement

In today's college classrooms, students busily type messages into their phone or tablet to communicate with peers and others via social media. Professors may become frustrated with this practice, but rather than banning devices, these social media tools can be used to enhance educational experiences. Advances in the Internet have presented a number of opportunities for educators and researchers. New ways of teaching and learning have surfaced with the development of social media tools, which have generated great interest among educators (VanDoorn & Eklund, 2013). A growing body of research suggests that online and social media have the power to increase social connections in all levels of educations (Cheung & Lee, 2010). Recently, social media has become the new wave in education. Yet, despite the

growing adoption of social media, new challenges have been presented for educators, one particularly being how to use social media to enhance learning outcomes.

The purpose of this study is to understand better how students in the digital age study for course examinations. This case study uses two theoretical frameworks, Web 2.0 Technologies and connectivism, as the guiding concepts to explore how students in an introductory college course perceived the use of Twitter and Storify as test reviews and study guides.

The uniqueness and importance of this research, still in its infancy, is in two areas. First, few studies have surveyed Twitter's instructional use in higher education (Yakin & Tinmaz, 2013). This study will seek to broaden the postsecondary

scope; however, results from this research can be modified for use in other educational levels. Second, the use of Twitter and other digital technologies in the area of exam preparation or test recall has not been examined extensively, enabling this research to encourage additional scholarship in this area of education. In any case, the authors of this article stress that this study is not limited to higher education. Educators of all grade levels and researchers are encouraged to continue this research or investigate other ideas and strategies that will enhance student achievement.

Literature Review

The Internet is becoming more social, and as such, the term social media is synonymous with the World Wide Web and social software (Dabbagh & Kitsantas, 2012). Social media can include social networking sites, video sharing sites, wikis, blogs and other online content (Madge, Meek, Wellens, & Hooley, 2009). As for social networking sites, Twitter, Facebook, YouTube, Google Groups and Wikipedia are the most preferred by students for learning activities (Yakin & Gencel, 2013). Those who use social media can share information, collaborate with others to create content on the Web and use it (Yakin & Gencel, 2013). Social media emphasizes sharing, participating and collaborating processes and activities (Lucas & Moreira, 2009). As a result, social media provides a new way of communicating information (Ebner, Lienhardt, Rohs, & Meyer, 2010).

In applying the use of social media to education, these tools facilitate a connection or interaction among members where learning may occur (Lucas & Moreira, 2009). Social media includes many tools, applications and services that support different types of learning activities (Lucas & Moreira, 2009), such as talking and

sharing resources with others, searching the Internet and experimenting with new techniques (Lohman, 2006). Various research groups are working to discover more in depth how Twitter can support the learning process (Cohen & Duchan, 2012).

Twitter as an instructional tool

Twitter, established in 2006 and became a publicly traded company in the United States in 2013, is one of the most popular microblogging social networking websites in the world. It allows users to post 140-character messages, known as tweets, to their followers. Those who increasingly use Twitter do so because the microblog helps people to communicate with others (Chen, 2011).

Educational implications for social media are emerging, especially the integration of Twitter into the learning process by forming a community or organizing activities in class (Galagan, 2009). Yakin and Gencel (2013) found that Twitter is becoming popular in learning activities. In general, information sharing is one function in which microblogging provides opportunities for students and teachers to collaborate and communicate in an educational setting (Ebner, et al., 2010).

For educators and researchers, Twitter presents a number of opportunities. Because Twitter maintains tweets in chronological order, it offers a platform for designing and conducting academic studies (Ovadia, 2009). In addition, research opportunities in studying Twitter as an educational tool are surfacing (Fox & Varadarajan, 2011). So far, Twitter research has focused on usage in the K-12 setting. For example, Cohen and Duchan (2012) conducted a study using Twitter as a teaching-supporting tool in face-to-face

learning with ninth-grade students and found that the students and the teacher used Twitter as a learning space for answering questions and uploading information for educational use.

Studies that have surveyed Twitter's instructional use in higher education are beginning to take shape (Yakin & Tinmaz, 2013), primarily research exploring the use of Twitter in specific college and university courses. Yakin and Tinmaz (2013) surveyed 48 students in a computer applications course for the social sciences at a private university on their experiences using Twitter in a learning-teaching context. The results suggested that Twitter could be used effectively in higher education courses. In addition, the results asserted that the more students are engaged with Twitter in a learning context, the more they will use its options and applications for instructional purposes. In a study exploring the effects of Twitter in a first-year seminar for 125 pre-health professional majors, Junco, Helbergert, and Loken (2011) concluded that the use of Twitter in an educational context can increase student engagement, with an increase in the grades of the experimental groups also observed. In another study, Fox and Varadarajan (2011) used Twitter in a pharmacy management course to investigate the positive and negative aspects of microblogging. Their results indicated that most students felt Twitter encourages interaction among students, class participation, discussion and attendance. However, they also felt Twitter can be distracting or overwhelming.

Social media curation as a pedagogical instrument

The word "curate" stems from the Latin root "curare," meaning "to cure." Historically, curation has been associated with the museum or library, both environments where physical material such as artifacts or books are selected, organized and presented. Curation now has entered the digital sphere, and social media curation services such as Storify are now succeeding.

Storify started by invitation only in September 2010 and opened to the public in April 2011 by Bert Herman (Fincham, 2011). Herman had worked as a foreign correspondent for the Associated Press for 12 years and had a vision for a social media curation tool that could be used to tell narratives in a digital format with social media posts such as Twitter, Facebook, Instagram, Flickr, YouTube, GIFs, and Web links. He devised Storify after spending a year as a Knight Fellow at Stanford University in 2009 (Fincham, 2011). When using Storify as a digital narrative, the writer can begin by writing a brief headline or title for the post and then write an introductory paragraph. Storify's drag-and-drop functionality allows the writer to incorporate tweets and write additional comments in text boxes.

The pedagogical implications of digital curation tools for media educators are tremendous (Mihailidis & Cohen, 2013). Storify especially can be an efficient tool for teaching about various online topics and issues, such as multimedia consumption, sources, agenda setting and credibility (Leu et al., 2011). In addition, students are not reading single information sources in linear formats from start to end; they are reading opening paragraphs, watching videos, scrolling through images, tweets, texts and posts (Mihailidis & Cohen, 2013). Today's new learning trends in the digital generation approach a framework that includes social

media curation, which educators can use to improve a variety of competencies.

Background on test preparation

Research that specifically examines the preparation a student makes to demonstrate knowledge and improve achievement is sparse, although findings in studies on improving student achievement have shown that computer engagement and computer-based instruction can be used to improve student outcomes (House, 2012). Yet, the relationship between preparation and performance is fascinating, and questions about the ways in which students prepare to show competence need to be addressed. In *The Freshman Year Experience: Helping Students Survive and Succeed in College*, Upcraft and Gardner (1989) promote “exam preparation” as a basic component of the first-year college curriculum (Britton, Burgess, Martin, McLeod, & Rosen, 1975, p. 109). In 1980, there were more than 100 “how to study” books in print (Main, 1980), and students now have access to the Internet and other digital methods to search for books, articles, tips, and other messages that can help them with preparation and recall.

The type of test review method will matter for the student. Ayres (1996) found that it is not the amount of preparation but rather the type of preparation that makes a difference. This supports an earlier finding that suggests preparation strategies will differ based on learning style (Britton, et al., 1975). Carrell and Menzel (1997) studied students’ test preparation in a communication course, and results showed that although not many students used the study guides, the ones who used it made a significant difference. Another study looked at the type of test given, which could influence how a student will study. If the

test will include multiple-choice or true-false questions, students will memorize certain bits of facts and information (Milton, Pollio, & Eison, 1988).

Theoretical Background: Web 2.0 Technologies and Connectivism

Two theoretical frameworks, both of which are relative to the changing landscape of education, are the guiding concepts for this study. The first one is Web 2.0 Technologies, which relates to digital innovations, and the second one is connectivism, which helps to examine the application of Web 2.0 technologies in pedagogy and curriculum. Both of these are integral to the nature of this study.

Web 2.0 Technologies

The World Wide Web has transformed from static HTML pages where visitors locate and copy information to a participatory, interactive space where individuals can create, collaborate, and share information (Solomon & Schrum, 2007). Today, Web 2.0 is both a platform on which innovative technologies have been built and a space where users can share content (Cohen & Duchan, 2012). Web 2.0 tools have been highly developed, and their role in education is growing (Yakin & Tinmaz, 2013). This technology has facilitated online learning by increasing interactivity, active participation, and feedback mechanisms (Harrison & Thomas, 2009).

Web 2.0 encompasses a number of tools. It includes social networks such as Facebook; media sharing, such as YouTube and Flickr; creative content, such as podcasts, videocasts, blogs, and microblogs with Twitter as an example; and a host of other content platforms. All of these tools have the potential to promote and improve

educational processes (Cohen & Duchan, 2012).

The theoretical concept of Web 2.0 was introduced by Tim O'Reilly in 2005. He noted that Web 2.0 technologies are more oriented to participation by indexing information in the form of tags. Thus, Web 2.0 technologies can be viewed as controlling the Web through participation with regard to the construction and distribution of information (Siemens & Tittenberger, 2009). In addition, Web 2.0 technologies present more opportunities for collaboration than previous tools (Fu, Liu, & Wang, 2008), leading to additional expression, communication and interaction via the Internet (Office of Communications, 2008). Plus, because higher education institutions practice alternative business and learning models, such as online and distance education, the use of Web 2.0 and other tools have gained greater acceptance.

Using Web 2.0 in any form of education comes with advantages and challenges. Students become active in the instruction process, cooperative learning occurs and students can access knowledge whenever they want (Harris & Rea, 2009). However, with these tools, learning becomes dependent on computers and related technologies, plagiarism could occur, and students could experience a level of discomfort in the publicity of their work (Harris & Rea, 2009).

Connectivism

This section provides an overview and evolution of connectivism, as well as the debate over whether the concept is indeed a learning theory. However, this research is concerned with the application of this learning model in pedagogy and curriculum, not necessarily the process at the pure theory

level. It is important, nonetheless, to include a look at these issues and provide a historical overview of the theory for a thorough examination.

Developed by George Siemens in 2004, connectivism is contextualized in a digital era and characterized by the influence of technology in the education setting. This theory stems from the traditional learning theories of behaviorism, cognitivism and constructivism; however, these frameworks are limited because they do not explore the impact technology has on learning, at least not to the extent that it does today. Siemens suggests that in the last two decades, technology has restructured how people live, communicate, and learn (O'Bannon & Britt, 2012). Pedagogically, connectivism is observed when students use the technology in the classroom, share information and establish a relevance to the content as knowledge in a dynamic experience. At this level of the theory, the integration of social media tools and test recall is where this study is concerned.

The theory is rooted in the premise of distributed knowledge. In the connectivist model, knowledge is distributed across an information network and stored in a variety of digital formats (Kop, 2008). Learning takes place when cognition and emotions combine in the process, which then becomes cyclical. Learners will connect to a network to share and find new information, modify their thoughts based on the new information and then connect to a network to share these new discoveries and find new material. Learning not only is consumed but created (Siemens, 2008).

Connectivism also is concerned with cognitive development; in other words, whether learning occurs, not connections to networks, may be interpreted. As Siemens

(2006) has posited, “the learning is the network.” Some theorists have argued that connectivism is not a new learning theory because there aren’t any new principles to derive from connectivism (Verhagen, 2006). On the other hand, Siemens has said that connectivism is a learning theory because of the vastness of information on the Internet, new possibilities for people to communicate on global networks, and the ability to aggregate different information systems (Kop & Hill, 2008). Knowledge then resides across a network (Siemens, 2008).

Web-based and digital activities are popular examples of learning through the lens of connectivism, and this study is concerned with this dynamic. This relationship is powerful because of the ubiquitous use of the Internet in today’s world (Kop & Hill, 2008). However, like all other learning theories, connectivism should not be seen as the mechanism to explain higher order thinking in the digital era – at least not to a level deemed as sufficient. Kerr, in fact, challenges connectivism to explain “transferring understanding, making understanding and building understanding” (Kerr, 2007). Siemens has explained that when a learner is engaged in creating and recreating his own learning network, understanding occurs because information is distributed through technology to the learner.

Much debate has persisted over connectivism as a learning theory. Despite the theoretical perspectives heavy in this discussion, the fact is connectivism is appropriate for pedagogy and enhances practical curriculum design. Verhagen (2006) says the theory is compatible with pedagogy and curriculum. In fact, many of today’s popular Web 2.0 tools, including social media, that are embraced by students were not designed for classroom use, but

educators have found ways to connect the technology and students. Regardless of the platform, traditional or technological, people still learn, but educators are tasked to connect the material to students – essentially, to encourage learning.

Background of the exercise

During the spring semester 2014, the researchers noticed students in their introductory journalism writing classes used Twitter extensively for communication with their peers as well as a method for keeping up with news sources and news stories. The professors also had used Storify as a digital writing tool in their upper-level journalistic writing classes. One of the professors decided to combine the students’ knowledge and use of Twitter for an interactive test review session in a face-to-face class and then use those tweets to build an interactive digital study guide in Storify. To begin, the professors posed review questions to the students in class during a test review session, and students had to tweet the correct response with the class hashtag, which was #JMC194. Students were allowed to work individually or with groups, the latter especially for those students who did not have Twitter accounts, and they could consult their notes or textbook for the correct answers. The professors posted the live Twitter stream on the screen as the students replied either from their smart phones, tablets or a Mac desktop located in the classroom, and the professors interacted with the students both by giving verbal directions and by marking the correct tweets as favorites or retweeting several of the responses. Professors also interacted by replying directly to tweets that asked questions or raised matters of clarification from other students’ tweets. For this response, the professor used a smartphone as the results streaming on-screen came from

the classroom instructor computer station that was hooked to the audio-visual system.

After class, the professors collected the responses via Twitter by searching through the class hashtag. The professors then compiled the tweets into a Storify post, complete with a headline (i.e., JMC194 Test 1 Review). The professors began the Storify with an introductory paragraph that provided the overview of the material for the test and the format that the test would be given (i.e., true/false questions, multiple choice, writing, etc.). The professor then wrote a sentence about the first question from the interactive study guide and pulled in the tweets. If a student had answered incorrectly, the format of Storify allowed the professor to write an explanation after the tweet and correct the student. The additional narration function also allowed the professor to add information from class lectures or PowerPoints to clarify any areas of confusion that the professor noticed via the class tweets.

Once the professor finished compiling the Storify, the professor saved the test review and then uploaded the URL address to the campus learning management system. The professor also notified the students via email and Twitter (with the class hashtag as an identifier) and included the URL in the email.

The professors conducted the interactive test review for three examinations, including the final exam, in each class during the spring 2014 semester.

Research questions

Current higher education students are actively engaged with social media tools, specifically Twitter. The Pew Internet Research Project's Social Media Update (Duggan & Smith, 2013) found that 31 percent of people ages 18-29 actively use

Twitter, which was the age group with the highest usage. Because Web 2.0 addresses the usage of social and digital media as a learning method, the literature and theories of connectivism and Web 2.0 helped to shape the following questions for this study:

RQ1: What impact did students perceive the in-class interactive exercise using Twitter to have on their test performance?

RQ2: What impact did students perceive the Storify digital exercise to have on their test performance when they used it as a study aid?

Methodology

When investigating real-life phenomenon in an in-depth manner, the case study method is one of the most suitable research options (Yin, 2009). The researchers investigated a new use of social media within an instructional context at a public university and sought students' perceptions toward it. To explore students' perceptions and answers to the research questions, a descriptive survey method was used to analyze, interpret and report the results. Open-ended questions also were used to supplement the descriptive data results.

Sample. In the first eight weeks of the spring 2014 semester, the researchers introduced the Twitter-Storify interactive test review session to three sections (n=46) of the introductory journalism writing course, which is required in the journalism and public relations major. The sample tested was predominantly female (n=35) to male (n=11). Enrollment in the writing and production courses was capped at 15 at the researchers' university per recommendations from an accrediting council, but two sections ended up with overrides for

additional students who needed the course in order to advance in the program at a specified time.

Survey instrument. The researchers developed a 14-question survey that combined Likert items with open-ended questions. Three questions at the end of the survey asked students their major, year of classification and gender. The other questions on the survey asked students about their typical studying methods prior to class examinations, about their social media habits of using Twitter and Storify, about how they perceived the Twitter-Storify exercise helped their studying, and about how they perceived the interactive exercise helped their grades on the examinations. The complete survey is presented in the appendix.

Participants voluntarily completed the paper survey administered near the conclusion of the courses in April 2014, and anonymity was assured. The Institutional Research Board at the researchers' university approved the survey instrument and research protocol. The researchers chose to administer the paper survey prior to the beginning of class, and to observe the IRB's requirements, the professors did not administer the surveys to their respective, assigned classes.

The survey was developed by the researchers and pilot-tested with an upper-division research class and department faculty members, total of 15 individuals, to gauge content validity. The pilot test helped to discern whether the questions and the response items in the survey instrument were easy to understand and whether the questions related to the purpose of the study. The panel rated each question in terms of whether the knowledge measured by each question was essential to the performance of what is being measured. The content validity

ratio (CVI) was .73. This translation suggests that the CVI for this number of panel reviewers could be considered evidence of good content validity. Based on the pilot effort, the researchers were satisfied that the survey contained sufficient content validity to support the study.

Data analysis. Descriptive analysis was used for this case study. At the end of the semester, researchers compiled the student survey responses and coded each response into an Excel spreadsheet. In the Likert items, a value of 1 was assigned to the first answer choice on the survey, and a sequential order of 2, 3 and so on as needed was followed (e.g., 1 = "Strongly agree," 2 = "Agree," 3 = "Indifferent," 4 = "Disagree," and 5 = "Strongly disagree"). The spreadsheet was shared via Google Doc to ensure validation of data from the other researcher. The researchers also compiled the open-ended responses into the same shared Excel spreadsheet and used content analysis to identify and classify responses based on positive and negative expressions and statements (e.g., "I liked the exercise" or "This review was not effective"). Responses were analyzed to determine how they added depth to the survey results and/or to the research questions. These qualitative coding procedures were shared and discussed between the researchers.

The researchers also asked demographic information such as gender, classification (i.e., freshman, sophomore, junior, senior, graduate student, non-credit) and major (journalism, public relations, television production, advertising, organizational communications, graphic communication management or other, which asked for an entry). The course tested is a requirement for students enrolled as journalism or public relations majors and

minors but an elective for the other majors listed in the survey.

Findings

Before answers to the research questions are explored, it is interesting to note students' previous study habits during test preparation. Prior to the implementation of the Twitter-Storify review session, 63 percent of students (n=29) reported that they used their own notes, a textbook or other sources to study on their own, and 35 percent (n=16) reported that they used a study guide if an instructor provided one. Only one student reported that he or she did not study at all. No students reported that they studied in groups. Additionally, 54 percent of the students (n=25) reported that they normally study a few days in advance of an examination in the class; 37 percent (n=17) a day before the test; and less than 1 percent (n=4) a week before the test.

This study sought to better understand how students in the digital age study for course examinations. Findings are presented for each of the research questions.

RQ1: What impact did students perceive the in-class interactive exercise using Twitter to have on their test performance?

In response to RQ1, 80 percent (n=37) of the students surveyed reported that the Twitter in-class review session helped them to recall information more effectively for the examination. Forty-two of the 46 students had Twitter accounts established. Sixty-seven percent (n=31) reported using Twitter three or more times a day, and 23 percent (n=11) reported that they used Twitter less than three times a day.

When asked their thoughts on the use of Twitter as a test review tool in class, more students responded with positive comments. Some of their comments included the following:

"It was more fun than a lecture."

"Twitter was helpful."

"Helpful and interactive."

"I enjoyed it. It was a fun way to study for an exam. I liked how it got everyone involved."

"I thought it was a fun way to learn what we are already familiar with."

Three students replied that they did not perceive the in-class exercise to be helpful. One of the students wrote, "It seems very social and hard to see in an educational light," while another one said he or she would not recommend using Twitter in the classroom. Both of these students were majors outside the journalism and mass communications department. See Table 1 for demographic information on the students in this case study.

RQ2: What impact did students perceive the Storify digital exercise to have on their test performance when they used it as a study aid?

In regard to RQ2, 65 percent (n=30) reported that they believed the Storify study guide helped to improve their grades on the resulting examination, and 72 percent (n=33) reported in the survey that they used the Storify to study for the examination. One student wrote in the survey, "I saw visible results in the outcome of my grade."

Another student wrote, "It makes the information easier to recall." Here are other responses that students reported on their use of Storify outside the classroom:

"I thought it worked a lot since I am on the computer already. It was easier to study."

Table 1: Demographic information about students involved in Twitter-Storify case study

Demographic information		
Gender	N	Percentage
	Male	11
Female	35	76
Classification		
Freshman	17	37
Sophomore	11	24
Junior	14	30
Senior	4	<1
Graduate student	0	0
Non-credit	0	0
Major		
Journalism	12	26
Public Relations	20	43
Advertising	0	0
Graphic Communications Management	0	0
Television Production	4	<1
Other	10	22

“It is an easy way to review the information and can easily recall info for a test.”

Three students who responded that they did not use the Storify study guide said they did not use it because they did not have a Storify account. A Storify account is not required to view content on the social media curation site, which the researchers attempted to make clear to students during

the interactive exercise. The students who indicated that they had not wanted to use the Storify study guide reported in the open-ended section:

“I like the conventional study guide better.”

“It was very creative, but I prefer my own notes.”

“I used the study guide we were given” (the actual questions for the Twitter exercise).

Fifty-four percent of students surveyed (n=25) recorded favorable remarks in the open-responses about their perception of the learning and outcomes involved with this assignment. These students observed that the in-class Twitter exercise and the Storify study guide were beneficial when combined, as indicated in their comments:

“It was very useful for test prep.”

“I liked it and how it helped me to recall certain material.”

“It was an enjoyable way to study during class time and an effective way to review when I was by myself.”

“Yes, it was a good way to actively review and discuss the material being tested.”

Discussion and Conclusion

Today’s college students actively engage in social media, and when professors use social media in the classroom, the result may be an effective learning environment that encourages interaction among students, class participation, and discussion (Fox & Varadarajan 2011). Since the majority of the students in the three sections of the journalism class already used Twitter, and of those students, 67 percent, reported using Twitter more than three times a day, the professors suspected the Twitter-Storify exercise might help students engage more effectively with the content and improve learning outcomes. This case study can serve as the beginning of a new pedagogical paradigm establishing social media as a tool for knowledge recall in the digital age.

Another benefit to this exercise is that students gain social media competency. Specifically in the media field, for example,

Twitter competency is a skill that journalism and public relations students must master for their career development, since the professions use Twitter to convey messages. The Oriella PR Network found that 59 percent of journalists worldwide use Twitter, with higher usage rates found in the United States, the United Kingdom, France, Spain, Canada, and Australia (Oriella PR Network.com). Evans, Twormey and Talan (2011) interviewed 25 top public relations executives and found that PR professionals need to use Twitter as a strategic communications method. Other professional groups also may use Twitter to communicate with customers, employees or other audiences.

Since 80 percent of the students surveyed agreed that the Twitter in-class session helped them to recall information, the students formed a connection with the material, thus employing the theory of connectivism (Siemens, 2006). In fact, when asked what they would recommend to enhance the exercise, three students suggested that Twitter “be used more often” and with other classroom activities, not just tests. One student asked the professors to consider not placing students into groups for the interactive exercise because students felt more comfortable using Twitter as a solo writing activity similar to how they use the microblogging service for communication with their peers. As for the Storify portion of the test review, students reported favorable results from using the Storify review session, but 63 percent (n=29) reported that they normally would use their own notes for exam preparation. However, since 65 percent reported a favorable perception of their test score improvement by using the interactive test review via Twitter and Storify, it is possible, as House (2012) showed in his study, that computer

engagement can increase student achievement.

A 2004 study compared how students took notes from traditional lectures versus those conducted with visual aids and showed that guided presentations with visual aids produced better test results than a traditional lecture (Austin, Lee & Carr, 2004). If the assertion of improved test scores after an enhanced lecture is correct, the addition of a social media interactive exercise also should help students to improve their scores. This case study did not measure differences in student averages, although this is an idea for future research. However, the researchers noticed considerable improvement among students who performed poorly on the first test. For subsequent exams, these students participated more during the in-class test review using Twitter and said they referred to the instructors' Storify post as part of their review.

Although some skepticism may exist among higher education professors about the effectiveness of using social media tools in the classroom, a Pearson study (Seaman & Tinti-Kane, 2013) found 59 percent of faculty surveyed believed that online and mobile technologies improved the learning environment. The same survey also showed that 59 percent of the faculty surveyed used social media for instructional purposes.

Professors who employ social media exercises might be well-served to consider asking their students to set up and use a separate Twitter account solely for class exercises. One student wrote in the open-ended response section of the survey, "Create a JMC account so that it doesn't affect personal accounts." Four of the 46 students surveyed indicated that they had set up and used a specific Twitter account for

their journalism classes, but the majority of the students, 83 percent (n=38), reported that they used their personal Twitter account. By asking the students to set up a separate Twitter account for class, the students will be able to focus on a class account and keep their personal account for their communication with friends and family. Harrison (2012) recommended after a study of Twitter in a journalism class that students concerned with privacy set up a separate class account and set the privacy setting as "Protect My Tweet." This setting allows only those who are following the student, presumably the instructor and any other classmates, to see the tweets originating from the account, and tweets are not placed into the public sphere. The concern about privacy among students and educators is not new. More than 70 percent of higher education instructors surveyed by Pearson in 2010 reported serious concerns about privacy when using social media as an instructional tool (Moran, Seaman & Tinti-Kane, 2011). The concern over privacy increased to 80 percent for the 2013 survey (Seaman & Tinti-Kane, 2013).

However, even with the concerns, teaching with social media can help students with making connections or an interaction where learning may occur (Lucas & Moreira, 2009). Based on the Web 2.0 and connectivism frameworks, students in the journalism class examined in this study first made connections with the material by recalling the information quickly and sharing their information with their classmates and the professor in real-time. Next, the usage of Storify combined with the in-class tweets further embodies the theoretical models of Web 2.0 and connectivism. Storify's narrative function can allow students to have a better recall of the information and reflect on the tweets shared in class (Cox, 2013). This type of

activity allows the learning to become active rather than passive. An exercise in which the professor assigned students to read tweets would be considered passive, while an exercise such as the Twitter-Storify review is considered active because students engage with the professor in class with the tweets, but then they consume the Storify as the review sheet on their own time. Cox (2013) asserts that the ultimate goal for a class engaged with social media pedagogy is the building of community. With the students engaging in tweets, both individually and in groups, they built a community and connected with the classroom materials.

Based on the positive reactions to the test review method, the researchers plan to take the students' suggestions, particularly the one about setting up a separate Twitter account solely for usage in the journalism curriculum, and refine this exercise for future test reviews, possibly extending this type of test review to upper-division classes that also use true-false, multiple-choice, and short answer questions on examinations. The researchers note that they will need to stay current with social media communication practices among their students as they continue to devise ways to use social media as a teaching tool in the Web 2.0 environment.

Limitations and Future Research

These findings must be interpreted with caution in light of the study's limitations. This case study examined a test review method in specific courses required for majors in particular mass communication with a limited population of students. As such, whether gender plays a role in the affinity toward a digital or traditional test review method could not be examined. This case study was not able to consider this variable in a qualitative context since the

number of females far outweighed the number of males.

For future research, the researchers could test the traditional test review method in one section of the same class and use the Twitter-Storify review with the other class to see which class recorded higher student achievement and increased learning outcomes. Researchers also could test this method across disciplines to determine if the social media review method works better with students actively engaged with majors that require social media knowledge for strategic measures or if this method could be broadened to engage students in traditional general education classes that have relied on the traditional test review method of an instructor distributing a study guide or presiding over an in-class review session in which students verbally respond. In addition, other social media venues need to be researched to see if there are other effective digital study test aids.

As social media technology becomes more visual, pedagogy for all grade levels must reflect this in a new dimension of visual learning. Research will be necessary to generate solid discussion of how students respond to innovate ways of social media instruction. The case study shared in this article can extend beyond the mix of Twitter and Storify and can work to engage learners at all stages of education. The authors hope that the ideas and findings presented in this research can chart new creative and critical approaches to teaching in the digital age.

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