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Use of Social Media in Teaching and its Impact on Student Learning Outcomes

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ABSTRACT

Social networking sites are transforming the landscape of education and offering new opportunities. Although increasing number of research has investigated the adoption of social media (SM) in teaching, little research has examined the impact of SM use by faculty on learning outcomes. This study examined the impact of SM use on learning outcomes at a Historically Black College and University and found that: 1) perceived usefulness of SM has positive effect on the use of SM in teaching; (2) perceived risk of using SM does not discourage use of SM, and (3) SM use has positive effect on learning outcomes.

KEYWORDS: Social media, Risk, Self-efficacy, Teaching, Learning outcomes

INTRODUCTION

The growth of social media and other Web 2.0 technologies is unprecedented (Lenhart et al., 2010). Social media (SM) is broadly used to describe applications related to collaboration and community (Joosten, 2012; Ngamassi et al., 2014, 2016). SM is also described by other names such as social networking sites (SNSs), blogs, wikis, multimedia platforms, virtual game worlds, and virtual social worlds (Tess, 2013; Ngamassi et al., 2015). SM is generally used on a regular basis by millions of people across the globe for different reasons. A big portion of SM users is made up of youths, most of whom are college students. SM applications such as Facebook, Twitter, MySpace, YouTube, Flickr, Skype, Wiki, blogs have been widely used for information dissemination and gathering, collaborative learning, and online social and professional connections (Cao et al., 2013). Educators are exploring the opportunities of these applications for their learning and teaching value (Elgort et al., 2008). Although the popularity of SM has motivated some faculty to use SM in higher education (Hamid et al., 2015), research shows that SM applications are not extensively used by academicians in teaching. (McCarthy, 2013).

SM applications can enrich student learning experience and improve student learning outcomes (Redecker et al., 2010; Taylor et al., 2012). Learner-centered and SM enriched interactive learning can enhance dynamic faculty–student and student–student interactions. Such interactive learning improves student satisfaction leading to better learning (Redecker et al, 2010) through the use of online social networking technologies. These technologies provide advantages over traditional teaching technology (e.g., lectures, written contents and face-to-

face communications) with new opportunities and outlets for creativity (Hamid et al., 2015, Cao et al., 2013).

Although many institutions encourage faculty to adopt SM applications in teaching (Wankel, 2010), many faculty are skeptical about the use of SM in teaching and view SM applications as not conducive to better learning outcomes (Moran et al, 2012). In order to address such skepticism, more research is required to answer if SM use in teaching leads to improved learning outcomes. Therefore, in this study, we examined the factors that influence the use of SM in college teaching and the impact of SM use on student learning outcomes.

RESEARCH MODEL AND HYPOTHESES

Prior studies indicate that the main reason for use of SM in teaching is that SM provides multiple formats, directions and channels of communication, which can improve educational outcomes (Cao et al., 2013). With a view to understanding the use of SM by the teaching faculty, we draw on the literature from technology acceptance, risk, and self-efficacy. Technology adoption theories have been widely used to explain the cause and effect of different factors of SM such as Twitter and blogging as valuable contemporary curriculum content and learning experience (Ajjan & Hartshorne, 2008; Giannakos & Vlamos, 2012; Park, Nam & Cha, 2012). Self-efficacy construct has been used by many information systems (IS) researchers to help explain user behavior with information systems (Claggett & Goodhue, 2011).

Figure 1 gives the conceptual model of our study.

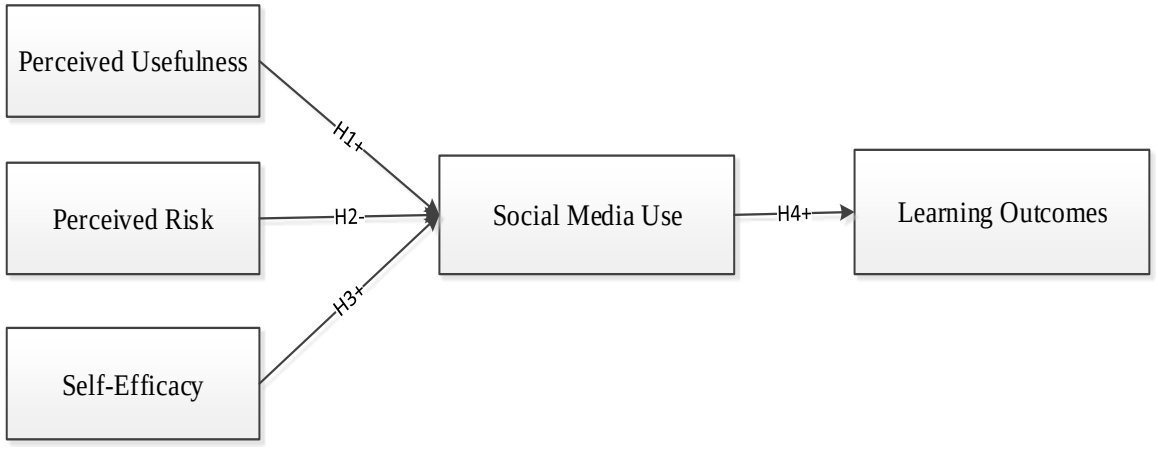

Figure 1: Research Model

Perceived usefulness: Perceived usefulness captures the users' perception regarding the usefulness of specific technology to perform their tasks successfully (Davis, 1986). Prior studies suggest that if the users perceive the technology to be useful in successfully completing their required tasks, they will be more inclined to use the specific technology (Ajjan and Harshone, 2008). SM can enhance interaction between the faculty and the students. SM can help faculty members keep in touch with the students living off-campus as well as with their ex-students. Further, faculty can share data and information that are collected during field study trips with mobile devices and share it with students using SM. This has the potential to make teaching and learning more exciting and real time. Therefore, if the faculty perceive that using SM will

enhance their teaching ability, then they will have a positive attitude towards using SM for teaching purposes. Therefore, we hypothesize that:

H1: Perceived usefulness of SM applications has a positive effect on SM use in teaching.

Perceived Risks*:* Perceived risk examines the users' belief regarding the potential uncertain negative outcome of using a specific technology to complete their tasks (Kim et al., 2014). The users' perceived risk plays an important role in their decisions (Anthony et al., 2006). Some of the risks associated with using SM from a faculty perspective include difficulty of using SM, privacy related issues, time involved, loss of control, and lack of effective assessment tool for evaluating the benefits of SM in teaching and learning (Moran et al., 2012). Such perceived risks and challenges may keep the faculty from moving towards the adoption of SM applications in their classrooms. Thus, we hypothesize that*.*

H2: Perceived risk of using SM applications has a negative effect on SM use in teaching

Self-Efficacy: Self-efficacy refers to people's judgments of their readiness to accomplish a certain level of performance (Bandura, 1986). Self-efficacy belief typically determines the effort that someone will invest and how long the effort will persist (Bandura, 1986). In case of SM use, self-efficacy refers to faculty's degree of confidence that they can successfully use SM applications in the classroom. People with high computer self-efficacy set higher goals for themselves and are more persistent in their usage attempts, even in the face of set-backs (Claggett & Goodhue, 2011). Thus, faculty with high self-efficacy may find it easier to adopt and learn using SM in their classrooms. Therefore, we hypothesize that:

H3: Self-efficacy has a positive effect on SM use in teaching.

SM use: SM use refers to the perception of faculty regarding the use of SM in classroom for teaching purposes. Faculty use different technology and techniques in classroom to ensure that the students learn the materials presented in class. One of the ways faculty can measure the effectiveness of their teaching techniques is through students' learning outcomes. Thus, if the faculty feel that they can improve students' learning outcome through the use of SM, then they are more likely to adopt SM in their classroom settings. Further, prior studies have indicated that the use of SM does have an impact on students' learning outcome (Cao & Hong, 2011). The Institute for Prospective Technological Studies of European Union also reported that students had positive experience using SM applications through content enhancement, creativity experiences, connectivity enrichment, and collaborative engagements (Redecker et al, 2010). Students who expect real-time communication with their instructors can find SM tools such as Tweeting, blogging and virtual interactions very satisfying (Cao & Hong, 2011). Thus, we hypothesize that:

H4: Use of SM in teaching has a positive effect on student learning outcomes.

RESEARCH METHODOLOGY AND DATA COLLECTION

A survey methodology was used to test our research model. The survey items for measuring the constructs were adapted from previously validated instruments and contextualized in accordance with our research design. The survey items were measured using a five point Likert scale with (1) indicating "strongly disagree" and (5) indicating "strongly agree". A convenient

sampling was used to collect data. The survey was administered online using Qualtrics to all the faculty in the College of Business at a Historically Black College and University (HBCU) situated in the Southwest of the United States.

DATA ANALYSIS AND RESULTS

We used partial least square (PLS) techniques to analyze our data. PLS has the ability to handle smaller sample sizes better than other multivariate techniques (Macoulides & Saunders, 2006). We used SmartPLS 2.0 (Ringle, Wende, & Will, 2005) to test our research model. SmartPLS 2.0 provides with measurement model and structural model. The measurement model was used to examine the reliability and the validity of the instrument. The structural model was used to evaluate our hypotheses.

Measurement Model

We examined the average variance extracted (AVE) of the constructs to assess convergent validity. The amount of variance captured by the indicators of the latent construct relative to the amount of variance captured due to the measurement error is provided by AVE (Chin, 1998). The AVE scores for all our constructs were greater than 0.5 (Table 1). This indicates that all our constructs in the model exhibit adequate construct validity (Komiak & Benbasat, 2006; Ramakrishnan et al., 2012).

Table 1: AVE for the Latent Constructs

LATENT CONSTRUCTS	AVE
Perceived Usefulness (PU)	**0.879**
Perceived Risk (PR)	**0.675**
Self-Efficacy (SE)	**0.744**
SM Use (SMU)	**0.713**
Learning Outcome (LO)	**0.968**

We evaluated the discriminant validity by examining the correlation among the latent variables and the square root of the AVEs of those latent variables. For the constructs to exhibit adequate discriminant validity, the correlation among the latent constructs must be lesser than the square root of the AVEs of the latent constructs (Ramakrishnan et al., 2012). Table 2 provides the relationship between the square root of the latent constructs and the correlation among the latent constructs. The correlation among the latent constructs (non-diagonal elements) is lesser than the square root of the AVEs (diagonal elements). This suggests that all the constructs in our model exhibit satisfactory discriminant validity.

Table 2: Square Root of AVEs and Correlation among Latent Constructs

	PU	PR	SE	SMU	LO
PU	**0.93755**				
PR	-0.706	**0.821584**			
SE	0.056	-0.322	**0.862554**		
SMU	0.651	-0.322	0.122	**0.844393**	
LO	0.364	-0.326	0.181	0.357	**0.98387**

The composite reliability of all our constructs was greater than 0.7 (Table 3), indicating adequate reliability.

Table 3: Composite Reliability (CR) for the Latent Constructs	
Perceived Usefulness (PU)	0.978
Perceived Risk (PR)	0.891
Self-Efficacy (SE)	0.744
SM Use (SMU)	0.908
Learning Outcome (LO)	0.995

Structural Model

In PLS, the relationship between the theoretical constructs is represented by the structural model. A recommended 500 random samples were generated using the bootstrapping procedure in SmartPLS (Majchrzak et al., 2005). A one-tailed t-test was used to evaluate the hypotheses as they are unidirectional in nature. The path coefficients, t-values, and their respective p-values for the hypotheses are given in Table 4.

Table 4: Path Coefficients, T-Values, and P-Values for Hypotheses testing			
Hypotheses	**Path Coefficients**	**T-Test**	**Significance**
H1	0.91	4.157	0.00***
H2	0.383	1.508	0.07*
H3	0.194	1.058	0.15
H4	0.357	2.249	0.01**

(*p < 0.10 **p < 0.05 ***p < 0.01)

We had R-squares of 0.49 and 0.13 for the SM use and learning outcomes respectively. Thus, 49% of the variance in SM use is explained by our model and 13% of the variance in the learning outcomes is explained by our hypothesized model. Hypothesis H1 examines the relationship between perceived usefulness and SM use in teaching. We found this relationship significant at 0.01 level. Hypothesis H2 looks into the relationship between perceived risk and SM use in teaching. We found this relationship to be significant at 0.10 level but in a different direction than what was hypothesized. Interestingly, we did not find any support for our Hypothesis H3 that looks into the relationship between self-efficacy and SM use in teaching. Hypothesis H4 examines the relationship between SM use and learning outcomes. We found this relationship to be significant also at 0.01 level.

DISCUSSIONS, LIMITATIONS, AND FUTURE DIRECTIONS

The objective of this study was to examine the impact of the use of SM in teaching on learning outcomes at institutions of higher learning. In line with the literature on the factors that influence individuals to adopt new technology (Venkatesh et al., 2003), the results of our study regarding the use of SM indicate that perceived usefulness has positive influence on the intention to use SM in teaching. Thus, if the faculty believe that using SM can enhance their teaching, then they will be inclined to use SM in teaching. We found a significant, but positive relationship between risk perception and the use of SM. This is very interesting. One of the reasons for such a finding may be that the faculty members taking the survey were highly motivated and examined these risks as a challenge that can be overcome. Another reason could be that the faculty members are very familiar with the SM that they use and as such do not consider them risky. Yet another

possibility is that there are different dimensions for the perception of risk and we are exploring only one of them. Thus, one of the future directions for this study is to explore in detail the relationship between risk perception and the use of SM in classroom for teaching purpose. The results of our study also indicate a strong relationship between the use of SM and the improved learning outcomes. Thus, the faculty who use SM for teaching do perceive it to be good for the students also and have recorded an improvement in their learning.

Interestingly, however, we did not find any support for the relationship between self-efficacy and the use of SM in teaching even though self-efficacy is important to the intention and the actual use of SM in teaching (Ajjan and Hartshorne, 2008). Thus, rather than directly influencing the use of SM, self-efficacy may be indirectly affecting the behavior intention through some other factors such as perceived usefulness. Therefore, another future direction of this study is to explore more factors that can possibly mediate the relationship between self-efficacy and the use of SM.

Although the data supports the proposed model, the findings of our study must be evaluated in light of its limitations. A convenience sampling methodology was used to conduct this study. All the respondents involved in this study were from the College of Business at an HBCU situated in the Southwest of the United States. Thus, additional study is required to conclude the generalizability of these results. Further, other factors such as privacy, security, experience in using SM, students' perception regarding SM that are relevant to the adoption and use of SM in classroom were not considered in this study. The purpose of this study was to develop and test a model that examines the influence of perceived usefulness, perceived risk, and self-efficacy in the use of SM in teaching. Therefore, future research is required to examine these factors and also to examine additional predictors to improve the scope and explanatory power of our proposed model.

THEORETICAL AND PRACTICAL IMPLICATIONS

This study has got both theoretical and practical implications. From a theoretical perspective, this study adds to the existing research in SM use in teaching. Prior literature on SM in higher education focuses on the adoption of SM applications and its motivators in and out of the classrooms and there are not many empirical studies that examine the utilization of SM in college teaching. (Cao et al., 2013). This study provides a cogent framework to understand the use of SM in college teaching.

This study also has practical implications. This research examines the factors influencing the use of SM by college and university faculty. The results of this study can act as a guideline for college and university administrators to encourage their faculty to use SM in teaching. This study suggests that faculty can be motivated to using SM by convincing them that the use of SM has benefits and leads to improved learning outcomes. In order to motivate the faculty to use SM applications, college and university administrators must create an environment that is conducive to the actual use of SM in teaching leading to improved student learning outcomes.

REFERENCES

Ajjan, H. & Hartshorne, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: theory and empirical tests. *The Internet and Higher Education*, *11*(2), 71–80.

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology*, *4*(3), 359–373.

Cao, Y. & Hong, P. (2011). Antecedents and consequences of social media utilization in college teaching: a proposed model with mixed-methods investigation. *On the Horizon*, *19*(4), 297–306.

Cao, Yingxia, Haya Ajjan, and Paul Haya. 2013. Using social media applications for educational outcomes in college teaching: A structural equation analysis. *British Journal of Educational Technology*, *44*(4), 581-593. doi:doi:10.1111/bjet.12066.

Claggett, Jennifer L. & Goodhue, Dale L. (2011). Have IS Researchers Lost Bandura's Self-Efficacy Concept? A Discussion of the Definition and Measurement of Computer Self-Efficacy. *Proceedings of the 44th Hawaii International Conference* on System Sciences,

Davis, F. (1986), "A technology acceptance model for empirically testing new end-user information systems: theory and results", doctoral dissertation, *Sloan School of Management*, Massachusetts Institute of Technology, Cambridge, MA.

Elgort, I., Smith, A. G., & Toland, J. (2008). Is a wiki an effective platform for group course work? *24*(2), 195-210. Retrieved from http://www.ascilite.org.au/ajet/ajet24/elgort.html

Giannakos, M. N. & Vlamos, P. (2012). Educational webcasts' acceptance: empirical examination and therole of experience. *British Journal of Educational Technology*, *44*, 125–143.

Hamid, Suraya, Waycott, Jenny, Kurnia, Sherah, & Chamg, Shanton (2015), Understanding students' perceptions of the benefits of online social networking use for teaching and learning, *Internet and Higher Education*, *26*, 1-9.

Joosten, T. (2012). *Social media for educators: Strategies and best practices*. Hoboken, NJ, USA: Jossey-Bass.

Komiak, S. Y. X., & Benbasat, I. (2006). The Effects of Personalization and Familiarity on Trust and Adoption of Recommendation Agents. *MIS Quarterly*, *30*(4), 941-960.

Lenhart, A., Purcell, K., Smith, A., & Zickuhr, K. (2010). *Social media & mobile internet use among teens and young adults*. Washington, DC: Pew Internet & American Life Project.

McCarthy, J. (2013). Learning in Facebook: first year tertiary student reflections from 2008 to 2011. *Australasian Journal of Educational Technology*, *29*(3), 337-356.

Moran, M., Seaman, J. & Tinti-Kane, H. (2012). *Blogs, wikis, podcasts and Facebook: how today's higher education faculty use social media*. (Babson Survey Research Group). Boston, MA: Pearson Learning Solutions.

Ngamassi, L., Ramakrishnan, T., and Rahman, S. (2014). Social Media Technology in Disaster Management: Linking Tools to Relief Phases. *In Proceedings of the 2014 DSI Annual Meeting*, Tampa, FL

Ngamassi, L., Ramakrishnan, T., and Rahman, S. (2015). Use of Social Media in Disaster Management. In Z. Ma (Ed.), *Trends and Research in the Decision Sciences* (pp. 25-32). New York, NY: Pearson/FT Press

Ngamassi, L., Ramakrishnan, T., and Rahman, S. (2016). Use of Social Media for Disaster Management: A Prescriptive Framework, *Journal of Organizational and End User Computing*, *28*(3), 122-140.

Park, S.Y., Nam, M.-W. & Cha, S.-B. (2012). University students' behavioral intention to use mobile learning: evaluating the technology acceptance model. *British Journal of Educational Technology*, *43*(4), 592–605.

Ramakrishnan, T., Jones, M. C., & Sidorova, A. (2012). Factors Influencing Business Intelligence (BI) Data Collection Strategies: An Empirical Investigation. *Decision Support Systems*, *52*, 486-496.

Redecker, C., Ala-Mutka, K. & Punie, Y. (2010). Learning 2.0—the impact of social media on learning in Europe. Policy brief. *JRC Scientific and Technical Report*. EUR JRC56958 EN.

Taylor, R., King, F. & Nelson, G. (2012). Student learning through social media. *Journal of Sociological Research*, *3*(2), 29–35.

Tess, Paul A. (2013). The role of social media in higher education classes (real and virtual) – A literature review. *Computers in Human Behavior*, *29*, 60-68

Venkatesh, V., Morris, M., Davis, G., and Davis, F. (2003), User Acceptance of Information Technology: Towards a Unified View. *MIS Quarterly*, *27*(3), 425–478.

Wankel, C. (2010). Cutting-edge social media approaches to business education: teaching with Linkedin, Facebook, Twitter, *Second Life, and Blogs (HC)*. Charlotte, NC: IAP.