Faculty Usage of Social Media and Mobile Devices: Analysis of Advantages and Concerns

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Abstract

This study seeks to understand the perceptions of professors using social media (also called Web 2.0 tools) in the classroom, what kinds of mobile devices are used to access the social media used, and what drives individuals to use them. In addition, it seeks to identify the advantages and concerns faculty has with the use of social media for classroom instruction. Two-Way Multivariate Analysis of Variance (MANOVA) procedure was used to ascertain whether differences existed between two dependent variables and (a) gender, (b) different academic ranks, and (c) gender *rank to determine if there are any interaction effects between genders regarding the magnitude of their perceptions of advantages and concerns about social media uses for classroom instruction as they migrate through the ranks. Professors, regardless of sex or rank, held statistically the same views of the advantages as well as the concerns related to social media usage in the classroom.

Keywords: social media, mobile devices, web 2.0, faculty rank, gender, teaching

Introduction

The rapid advance of technology is driving educators to implement tools they may have just learned. Students, otherwise known as Digital Natives, Gen Y, Net Gen, and Millennials (Zimerman, 2012) are far ahead in the usage of technology and are demanding technology be used within the classroom. According to Prensky, this younger generation of students have "spent their entire lives surrounded by and using computers, video games, digital music players, video cams, cell phones, and all the other toys and tools of the digital age" (Prensky, 2001, p.9). These Digital Natives have created their own communities of interest on Facebook and Twitter as well as chosen to be there virtually even during class time (Akhras, 2012). However, some other research showed that not all the Digital natives are the same when it comes to the active use of social media tools (Kilian, Hennigs, & Langner, 2012).

In today's classroom, the reality is that laptops have started to take the second

row to allow space for smart phones, tablets, and other mobile devices. Most of the new applications "apps", which are created for mobile devices, social media or web 2.0 tools, are accessed easily from mobile devices.

Literature Review

A recent survey conducted by the Babson Survey Research Group in collaboration with New Marketing Labs and the education-consulting group Pearson Learning Solutions, drew from almost 1,000-college and university faculty nationwide and revealed that more than 80 percent of professors are using social media in some capacity and more than half use these tools as part of their teaching. The survey noted that 30 percent are using social networks to communicate with students (trading posts on blogs, for instance) while more than 52 percent are using online videos, podcasts, blogs, and wikis (group authored websites) during class time. They also found that older faculty (those teaching 20 years or more) use social media at almost the same level as their younger peers (Blankenship, 2011). Rank also subsumes age differences that exist among faculty: older people normally occupy the rank of associate and full professors.

O'Shea (2013) argues the distinctions for adopting technologies are blurring among the traditional dichotomies that characterizes five groups of individuals: innovators, early adopters, early majority, late majority, and laggards. At least one study finds that age is a poor predictor of social media usage within a research context (Rowlands, Nicholas, Russell, Canty, & Watkinson, 2011). Obviously, the use of social media is increasing rapidly in the classroom (Dabbagh & Kitsantas, 2012).

Educators do not want to integrate these tools into their curriculum just for the sake of technology (McCarthy, 2010). However, the Millennials (also known as Gen Yers) are the first generation to grow up with the internet—they do not remember a time when it did not exist. They are technologically savvy and dependent upon it. Therefore, educators must reach out and engage the Millennials with social media and even join their communities or create similar ones (Aviles & Eastman, 2012; Jacques 2009). It seems that the use of new technology and social media for teaching is no longer an option. Therefore, this review of literature will discuss the use of technology and mobile devices in higher education, the advantages and concerns of using social media tools in higher education, and the role of gender and academic rank in the use of social media by college and university faculty.

Use of Technology and Mobile Devices in Higher Education

Web 2.0 tools and mobile devices are relatively recent phenomena. The use of social media and mobile devices in the classroom to improve student engagement and to increase interactivity has been reported to be useful (Aviles & Eastman, 2012; Bansavich, 2011; Chao, Parker, & Fontana, 2011; Crews & Wilkinson, 2010; Enriquez, 2010). A study that focused on the use of tablets in the classroom showed an increase in students' active participation during lectures, an enhanced ability to evaluate student learning, and a robust method for providing immediate feedback to improve student performance (Enriquez, 2010).

Some universities have emphasized their efforts to integrate technology into their learning environments. A northern university, classified as a commuter school, created a virtual campus to create a sense of community for their students and to provide them with a safe and secure learning environment. This university designed a Campus Connect program with the help of a wireless company where they integrated mobile phones into their learning management system. Every student was required to have a mobile phone to receive all campus information and alerts (Chapel, 2008). Another university developed their own interactive social media based learning

environment where students could use their mobile devices to interact with the system during the lecture and at home (Chao, Parker & Fontana, 2011).

Students' preference regarding the use of technology in teaching may be different from faculty. When students were asked to indicate their preference of educational material delivery, they chose customized notes posted online and multimedia material over the paper textbook (Robinson & Stubberud, 2012). Aviles and Eastman (2012) found similar results, where business students rated the learning management system higher than some Web 2.0 tools, but their device of choice was the smart phone. When it comes to assessments and receiving feedback, research has shown that millennial students prefer multimodal approach where e-handwritten notes are provided along with audio and visual feedback (Crews & Wilkinson, 2010).

However, the use of mobile technology in the classroom does not come without disadvantages; distraction has been stated as a major problem. Both "older" students and professors alike are disturbed by the non-academic use of mobile devices during lectures (Hammer et al., 2010).

Advantages and Concerns of Using Social Media Tools in Higher Education

One of the major advantages of social media tools, which has been reported many times in the research, is the creation of community. Social media fosters communication, engagement, and collaboration (Harris & Rea, 2009; Hung & Yuen, 2010; Junco, Heiberger, & Loken, 2011; Wankel, 2009). A community can be created locally for a particular class, beyond the boundary of a single classroom, for the university, or even beyond the campus using a virtual world, such as Second Life. Using Second Life allows students to communicate with each other and the instructor through a three dimensional simulator which comes complete with a variety of audio and visual objects (Wankel, 2009). Second Life is the perfect tool for millennial students where they can investigate, socialize, and collaborate (Harris & Rea, 2009).

Use of social media tools to complement face-to-face classes was shown to enhance learning and engagement particularly among freshman and international students. While some introverted students may find it difficult to participate in face-to-face classes, they may be more comfortable posting comments and thoughts to special groups on Facebook (McCarthy, 2009). International students also may find it easier to interact via social media tools, where they can express themselves freely without the fear of inadequate fluency in spoken English (McCarthy, 2009).

The field of Information Systems has used the Technology Acceptance Model (TAM) to describe attitudes towards the use of technology. TAM suggests that a positive attitude towards new technology is explained by the perception of the usefulness and ease of use with the technology (Davis, 1989). Lee, Cho, Gay, Davidson, and Ingraffea, (2003) showed that there is a relationship between attitudes and satisfaction with the distance learning class.

A 2010 study, which explored students' attitudes toward the use of social media in creating a community of learning, reported a high degree of student satisfaction which supported the above claim. The authors reported that students were able to find and share educational resources, participate in discussions, share personal interests, and collaborate with others in a manner that heightened the sense of community. The researchers of the study choose to use Ning (www.ning.com) rather than public social networks like Facebook and MySpace, to avoid the threat of spam and phishing (Hung & Yuen, 2010).

However, professors have also expressed concerns about the increased use of social media. They have cited a loss of control, a much bigger time commitment to preparation, and the possibility of information overload for students (Reuben, 2008). A study by Moran, Seaman, and Tinti-Kane (2011) found that the two most pressing concerns faculty have about the use of social media are

privacy and integrity. They found that 80 percent of 1,920 faculty from various disciplines reported that a "lack of integrity of student submissions" is an "important" or "very important" barrier, and over 70 percent say privacy concerns are an "important" or "very important" barrier. Other barriers identified in this study included a lack of training, the amount of time that using social media takes, and lack of institutional support. In spite of those concerns, however, these faculty members believed that social media offers value in teaching.

The Role of Gender and Academic Rank in the Use of Social Media

The literature has indicated that gender and rank appear to be important dimensions related to social media usage in college teaching. However, these variables have not been fully investigated and, therefore, should be explored further to determine if a relationship exists among gender, rank, and social media usage in college teaching. Some research has supported the argument that there is a difference between the genders when it comes to the use of technology and the Internet in general and social media in particular (Agbatogun, 2013; Huang, Hood, & Yoo, 2013; Ruleman, 2012) while others did not find generational differences regarding the use of technology (Kim, Kwon, & Cho, 2011; Sahin & Thompson, 2007).

A recent Forbes article reported that 57 percent of Facebook users are female and those women are more active with 8 percent more friends and accounting for 62 percent of the sharing (Goudreau, 2010). Thus, it seems that females are more likely to use communication social tools (e.g., Facebook) than males as reported by Rovai and Baker (2005) and Ruleman (2012). Ruleman also found, contrary to traditional thought, that older faculty (61+), both male and female, use social media more than the middle-aged group (45-60). Kim, Kwon, and Cho (2011) found no significant relationship between the use of social media, gender, and academic rank. Agbatogun (2013) reported that gender did not make any significant contribution to the faculty use of social media. However, he did find that faculty with higher academic qualifications and a higher level of academic rank had a higher tendency not to integrate social media tools into the classroom.

Rationale for Study

Many educational researchers and practitioners believe that the web has vast potential to shape the way people learn (Barbour & Plough, 2009; Drexler, Baralt & Dawson, 2008). It seems reasonable for educators to make instructional use of social media and mobile devices to create optimal, natural environments for learning to take place. Nevertheless, social media use in higher education comes with its own problems: dependence on Internet availability, possibilities of plagiarism, ethical and copyright issues, and a lack of privacy in certain cases (Harris & Reo, 2009). If educators have concerns about using social media then these concerns need to be identified so that they can be addressed.

The research regarding whether there is a difference between the genders and faculty rank concerning the use of technology and social media has provided mixed results. Therefore, this study seeks to determine if females and males are homing in on different social media for classroom instruction, and, if they do, what and where in the academic levels of college teaching do they differ.

The study also attempts to determine if any significant differences occur in the perceptions of faculty and the use social media in the college classroom that are influenced by gender as faculty members migrate up the ranks. It is very important that professors understand, that as faculty are promoted through the ranks, the perceptions they develop might differ from other faculty members at lower or higher ranks on the appropriateness of social media usage in the classroom.

Measuring the changes in the magnitude of these perceptions might lead to a better understanding of some meaningful interaction effect. Whatever the differences might be in social media perceptions between males and females and across ranks, they could inevitably spill over into the college classroom.

Additionally, this study seeks to determine what kinds of social media and mobile devices are being using in the classroom as well as to understand what is driving faculty to incorporate these tools within the classroom. Finally, the study will identify what faculty believes are the advantages of using social media and identify the concerns professors have about incorporating such tools in the classroom.

Therefore this study seeks (1) to explore differences between genders and among the ranks of higher education faculty regarding the use social media in the classroom, (2) to understand what kinds of mobile devices and social media are currently used by higher education faculty, (3) to determine what factors drive professors to use social media in their classrooms, and (4) to identify what faculty perceive are the advantages and concerns of using social media.

Methodology

Heightened interest in social media and how to use it effectively for teaching and research has inspired researchers to develop different survey instruments to measure attitudes, beliefs, and practices. Some studies have asked students to answer questions concerning their experience with social media and its effect on their sense of community and interaction with other students (Hung & Yuen, 2010). Others have tested the impact of using Twitter on class engagement and semester grades (Junco et al., 2011). The difference in attitude towards and perceived benefits of social media between students and faculty has also been examined (Roblyer, McDaniel, Webb, Herman &Witty, 2010).

According to Spector (1994), the use of self-report studies should not be automatically dismissed as being an inferior methodology; rather, these studies should be encouraged, where appropriate. He stated further that self-reports can be quite useful in providing a picture of how people feel and can identify inter-correlations among various feelings and perceptions.

Data Collection

After a review of the literature, a survey was developed that explores the use of social media and mobile devices and highlights the attitudes and feelings of educators about social media. Survey questions included 15 Likert-type scale questions, several demographic data questions, and a few open-ended questions. (See the Appendix for complete survey questions.) The study was reviewed by a statistician for recommendations before it was distributed. Following this, Institutional Review Board approval was sought. Once approval was obtained, the survey was distributed online using Qualtrics, a web-based research surveying software program to the researchers' own campus as well as to two LinkedIn Groups entitled "Higher Education Teaching and Learning" (28,081 members) and "The Teaching Professor" (25,550 members).

Results

Some statistics are primarily descriptive (percentages) as the questions do not make definitive statements of cause and effect or even correlation (Cardon, 2010). Males represented 32.8 percent and females represented 67.2 percent of responses. The majority (34 respondents 29.3 percent) were assistant professors. (See Table 1 for additional demographic information.) When respondents were asked if they had used any social media tools (Web 2.0) in their teaching, 63 percent responded yes, which is a similar finding to that of Blankenship (2011) who found 80 percent of professors using social media in some capacity, and more than half are employing the

tools as part of their teaching. This also supports the findings of Moran, Seaman, Tinti-Kane, and Babson Survey Research (2011) who found that over 90 percent of all faculty are using social media in courses they teach or for their professional careers outside the classroom. Therefore, this study supports prior research in that a majority of university faculty is using social media within their teaching. Although the data are not available online by a live link, data for this study is available through an email request to the third author of this study.

Table 1: Frequency and Percent for Gender and Rank as Independents

Demographic Categories		Frequency	Percent	Cumulative Percent
Gender	Male	38	32.8	32.8
	Female	78	67.2	100.0
	Total	116	100.0	
Rank	Support Faculty	22	19.0	19.3
	Lecturer	18	15.5	35.1
	Assistant Professor	34	29.3	64.9
	Associate Professor	22	19.0	84.2
	Professor	18	15.5	100.0
	Total	114	98.3	
	Non Responses	2	1.7	
	Total	116	100.0	

When asked which of the social media (Web 2.0) categories were used in teaching, image or video received the largest percent at 61 followed by collaborative authoring tools for sharing and editing documents at 50 percent. It appears the most prevalent functions served by these tools are communication, content delivery, interaction, and collaboration. Our findings support the work of McGee and Diaz (2007) and of Tuten and Marks (2012) who said that social media provides the opportunity to communicate with students, to share material with students, to encourage joint work, to support posting and sharing of student work, to enable students to produce work, and to encourage interaction among students. It was somewhat surprising that wikis, which encourage student teams to collaborate on work as well as to publish their work, received only 31 percent for this study.

Regarding mobile devices, 79 percent of the professors reported they are using smart phones in their classrooms and 62 percent use tablets. Since mobile devices have a multiplicity of functions, some are better than others when used for teaching purposes, i.e., devices with audio and eReader functions and Internet for YouTube assignments. It seems that increasing numbers of educators are using smart phones as educational tools. This may be because many researchers have argued that mobile devices are appropriate for supporting social contacts and collaborative learning opportunities (Bansavich, 2011). Being connected in the classroom has been reported to promote a more active learning environment, facilitate the building of learning communities, provide greater feedback for lecturers, and improve student motivation (Chao et al., 2011; Chapel, 2008).

Regarding what drives these professors to use social media in their teaching, the three highest responses were personal initiative, 67 percent; technology, 58 percent; and students, 48 percent. It

was surprising to find that students came in third. Since most students are knowledgeable concerning the use of social media, it was thought that professors might want to keep up with their students and would thus be motivated to employ social media because of their students. However, it seems professors are choosing to use social media for their own reasons and are personally motivated to employ it in the classroom. These professors are proactive educators who are geared towards life-long learning and are driven to learn and adopt new technology (Dohn, 2009). Agbatogun (2013) also found that faculty who are convinced of the importance of interactive technology in teaching and have the required skills are more likely to use these tools in teaching.

Factor Analysis and MANOVA Tests

There were 15 Likert-type items used to measure respondents' perception of the advantages and concerns of using social media for classroom instruction. For the 201 persons who completed the survey, 58 percent completed enough of these Likert-Type items for those items to be useable in factor analysis and MANOVA tests. The fact several people did not continue with the second half of the survey was associated with their possible misunderstanding of operating the electronic survey Qualtrics and, thus, signed off too early in the survey. Nevertheless, factor analysis techniques are robust and allow researchers to gauge the adequacy of samples sizes using the Kaiser-Meyer-Olkin Measure of Sampling Adequacy Test. The 15 items Likert-type scale questions were tested for reliability in SPSS 18.0 using a Cronbach's (1984) alpha. The scale reliability was .739, standardized .781, which exceeds the commonly reported Nunnally (1978) criterion of .70 for an acceptable alpha. An alpha of .70 is normally acceptable for nearly all exploratory research cases (Devellis, 1991, p. 85). Fifteen variables (survey questions 1-15) were selected to represent common rationales for using social media in classrooms as described in current literature.

Responses to the 15 items measuring social media usage were subjected to an un-rotated Principal Component Factor Analysis, with a Scree Plot (in IBM's SPSS 18.0). The Scree Plot suggested four factors. An unrotated initial solution also suggested four factors with an eigenvalue of one criterion. Those four factors explained 74.893 percent of variance. To gauge for sampling adequacy, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy Test was .818 and the Bartlett's Test of Sphericity was 1041.182 with degrees of freedom at 105, with p= .000. These tests are shown in Table 2. Based on these results, it seems that the sample size was appropriate. The average communalities of .749 are well above the .600 threshold for sample sizes below the rule-of-thumb 300-sample size minimum. Notice also, shown in Table 2, how highly correlated extraction is to the item upon which it loaded.

Nevertheless, a two-factor solution was more parsimonious than four with a cut-off of .40 on a four factors solution when using a Principal Axis Factoring with a Promax Rotation. Two factors, therefore, were deemed more appropriate in further analysis. A variable was said to load on a factor if it had a component loading of .40 or higher on that factor and less than .40 on any other factors (Devellis, 1991; Hatcher, 1994; Kachigan, 1991). The derived factors are correlated; nevertheless, none of the factors had a factor score greater than ±2 in the Factor Score Covariance Matrix. The derived factors were indicative of the social media usage construct that was being measured. Principal Axis Factoring with Promax Rotation was used to extract the two factors, which converged in only three iterations, as shown in Table 3. Only item, Q31, did not survive the rotation and was not considered when naming the factors.

Table 2: Reliability Statistics, KMO and Bartlet's Test, and Communalities

Reliability Statistics Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.739	**.781**	15

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.818
Bartlett's Test of Sphericity	Approx. Chi-Square	1041.182
	df	105
	Sig.	.000

Communalities	Initial	Extraction
Q14	1.000	.781
Q15	1.000	.893
Q16	1.000	.743
Q17	1.000	.779
Q18	1.000	.839
Q20	1.000	.710
Q22	1.000	.593
Q24	1.000	.721
Q25	1.000	.751
Q26	1.000	.838
Q27	1.000	.786
Q28	1.000	.758
Q29	1.000	.856
Q30	1.000	.556
Q31	1.000	.629
Average		**.749**

Extraction Method: Principal Component Analysis.

Table 3: Component Loadings, Pattern Matrix, and Named Factors

Pattern Matrix[a]	Factors	
	Advantages of Social Media Usage	*Concerns with Social Media Usage*
Q29: Using social media allows my students to receive informative and rewarding feedback from multiple sources.	.933	
Q18: I think students are more engaged with Social Media learning than other e-learning platforms used because students have more interactional opportunities for sharing personal interests and exchanging resources in addition to discussing course-related content.	.916	
Q17: I do believe that the information-sharing feature of social media greatly enhanced students' learning experiences.	.846	
Q16: I believe social media, used as a supplementary learning tool, holds promise for enhancing students' sense of classroom community.	.808	
Q27: I believe the interactive nature of social media allows students to participate in collaborative work and create work where the quality of the whole may well exceed the sum of its parts.	.794	
Q14: Social media allows me to discuss topics of interest and/or to communicate with my students about course-related topics.	.686	
Q30: Using social media improves my students' creativity and output.	.618	
Q15: Social media allows me to find and share educational resources.	.607	
Q28: Exposing my students to the latest technology helps prepare them for work and provides an opportunity for them to acquire additional skills.	.591	
Q31: I believe using social media allows more interaction between US students and international students.		
Q26: I am concerned about who is monitoring the social media for inappropriate or offensive use and thus who we deal with it.		.951
Q24: I am concerned over who would be responsible if students or professors say something online that results in litigation against the university.		.688
Q25: I believe there should be an institutional approach to how and what social media is used for educational teaching.		.623
Q22: I sometimes feel overwhelmed by the overabundance of information shared.		.570
Q20: Using social media to supplement face-to-face courses is too time intensive.		.462

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

The components that loaded onto each factor were used to label that factor. Thus, two names captured the true nature of the semantics represented by the items that loaded onto each factor. The factors were named based on interpretation of language contained in the components loadings.

Naming the factors, helps explain the factor loadings. For example, the language found in the nine components that loaded on Factor 1, combined seems to represent the "Advantages of Social Media Usage" for classroom instruction. The names capture the meaning of the items loading on each of the factors. For example, Factor 1 was named *Advantages of Social Media Usage* because items Q14, Q15, Q16, Q17, Q18, Q 27, Q28, Q29, and Q30 loading on it combined are a semantic approximation of the advantages of classroom usage of social media for instructional purposes. Hence, Factor 2 was named *Concerns with Social Media Usage* because items Q20, Q22, Q24, Q25, and Q26 loading on it combined are a semantic approximation of the concerns of using social media for instructional purposes. The component loading, pattern matrix and named factors are shown in Table 3.

MANOVA

Two-Way Multivariate Analysis of Variance (MANOVA) procedure was used to ascertain whether differences existed between two dependent variables and (a) males and females, (b) different academic ranks, and (c) gender * rank to determine interaction effects regarding faculty members' perceptions of advantages and concerns about social media uses for classroom instruction. To further test social media theory, hypotheses 1, 2, and 3 were written, based on the fact, that there were two sub-components of the social media construct derived from the factor analysis. Furthermore, the researchers needed to know further if differences exist that can be interpreted in a way to help strengthen instructional methodology when social media is used in a classroom environment. Gender and rank were selected as independent variables because of the mixture of meaning found in the literature with opposing results from various researchers. For example, gender and rank were found in a number of studies, described earlier in this paper, to either differ or not to differ when it comes to social media uses among faculty. Either way, it is obvious that researchers believe these variables to have influence on the use and perceptions of uses of social media and mobile devices. Thus, the research hypotheses are as follows:

H_1:   Means between males and females will differ on the two derived factors, advantages and concerns of social media for classroom instruction.

H_2:   Means among Support Faculty, Lecturers, Assistant Professors, Associate Professors, and Professors will differ on the two derived factors, advantages and concerns of social media for classroom instruction.

H_3:   There will be no differences in the interaction effect between males and females as they rise through the academic ranks on the two derived factors, advantages and concerns of social media for classroom instruction.

To test the three hypotheses, the two factors (advantages and concerns regarding social media usage) were used as dependent variables and gender and academic ranks were used as independent variables in the two-way MANOVA tests. A summary of the MANOVA tests and Between-Subjects Effects are shown in Table 4.

Table 4: Tests of Between-Subjects Effects using MANOVA with Gender and Rank as Independents

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Advantages of Social Media Usage	6.932[a]	9	.770	.769	.645	.062
	Concerns of Social Media Usage	11.002[b]	9	1.222	1.336	.227	.104
Intercept	Advantages of Social Media Usage	.161	1	.161	.161	.689	.002
	Concerns of Social Media Usage	.001	1	.001	.001	.979	.000
Gender	Advantages of Social Media Usage	.039	1	.039	.039	.843	.000
	Concerns of Social Media Usage	.464	1	.464	.508	.478	.005
Rank	Advantages of Social Media Usage	1.919	4	.480	.479	.751	.018
	Concerns of Social Media Usage	5.611	4	1.403	1.534	.198	.056
Gender * Rank	Advantages of Social Media Usage	5.906	4	1.477	1.475	.215	.054
	Concerns of Social Media Usage	4.115	4	1.029	1.125	.349	.041
Error	Advantages of Social Media Usage	104.119	104	1.001			
	Concerns of Social Media Usage	95.136	104	.915			
Total	Advantages of Social Media Usage	111.067	114				
	Concerns of Social Media Usage	106.142	114				
Corrected Total	Advantages of Social Media Usage	111.050	113				
	Concerns of Social Media Usage	106.138	113				

a. R Squared = .062 (Adjusted R Squared = -.019)

b. R Squared = .104 (Adjusted R Squared = .026)

H_1: means between males and females will differ on the two derived factors, advantages and concerns of social media for classroom instruction, was not accepted. Advantages of social media usage had an F (1,104) = .039, p= .843. Concerns of social media usage had an F (1,104) = .508,

p= .478. This is an indication that male and female instructors are statistically equal on the two factors. Pillai's Trace for gender on the two factors was .778, non-significant.

H_2: means among support faculty, lecturers, assistant professors, associate professors, and professors will differ on the two derived factors, advantages and concerns of social media for classroom instruction could not be accepted. Advantages of social media usage had an F (4,104) = .479, p= .751. Concerns of social media usage had an F (4,104) = 1.534, p= .198. This is an indication that support faculty, lecturers, assistant professors, associate professors, and professors are statistically equal on the two factors. Pillai's trace for rank on the two factors was .362, non-significant.

Table 5: Using Pillai's Trace as the Measure of Significance

Effect/ **Multivariate Tests**[c]		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.002	.091[a]	2.000	103.000	.913	.002
	Wilks' Lambda	.998	.091[a]	2.000	103.000	.913	.002
	Hotelling's Trace	.002	.091[a]	2.000	103.000	.913	.002
	Roy's Largest Root	.002	.091[a]	2.000	103.000	.913	.002
Gender	Pillai's Trace	.005	.251[a]	2.000	103.000	.778	.005
	Wilks' Lambda	.995	.251[a]	2.000	103.000	.778	.005
	Hotelling's Trace	.005	.251[a]	2.000	103.000	.778	.005
	Roy's Largest Root	.005	.251[a]	2.000	103.000	.778	.005
Rank	Pillai's Trace	.081	1.103	8.000	208.000	.362	.041
	Wilks' Lambda	.920	1.101[a]	8.000	206.000	.364	.041
	Hotelling's Trace	.086	1.099	8.000	204.000	.365	.041
	Roy's Largest Root	.069	1.798[b]	4.000	104.000	.135	.065
Gender * Rank	Pillai's Trace	.100	1.366	8.000	208.000	.213	.050
	Wilks' Lambda	.903	1.354[a]	8.000	206.000	.219	.050
	Hotelling's Trace	.105	1.343	8.000	204.000	.224	.050
	Roy's Largest Root	.064	1.672[b]	4.000	104.000	.162	.060
a. Exact statistic							
b. The statistic is an upper bound on F that yields a lower bound on the significance level.							
c. Design: Intercept + Gender + Rank + Gender * Rank							

Finally, H_3: There will be no difference in the interaction effect between males and females as they rise through the academic ranks on the two derived factors, advantages and concerns of social media for classroom instruction was accepted. Advantages of social media usage had an F

(4,104) = 1.477, p= .215. Concerns of social media usage had an F (4,104) = 1.125, p= .349. This is an indication that neither males nor females across any of the ranks (support faculty, lecturers, assistant professors, associate professors, or professors) differed statistically on the two factors, measuring the magnitude of their perceptions of advantages and concerns of social media usage. Table 5 illustrates that Pillai's trace criterion was used to determine the acceptance or rejection of the hypotheses since Pillai's Trace is a better criterion for determining significance than Wilk's lambda when there are unequal sample sizes and the assumption of homogeneity of variance is violated.

Discussion

Findings indicate that male and female faculty members do not differ in any meaningful way on the two factors of advantages and concerns of using social media. This is important because there seems to be pedagogic agreement that the perceptions of the advantages of social media for instructional purposes were contained in the components that loaded on to factor 1, named advantages of social media usage. For gender * rank on the two factors Trace was .213, non-significant. The best way to understand the true meaning of an interaction effect (in this case a non-significant effect on both factors) is to view the means plotted on separate lines (gender) and a horizontal line (rank). The Estimated Marginal Means Plots for Factor 1 (Advantages of social media usage) is shown Figure 1, and Factor 2 (Concerns of social media usage) is shown in Figure 2.
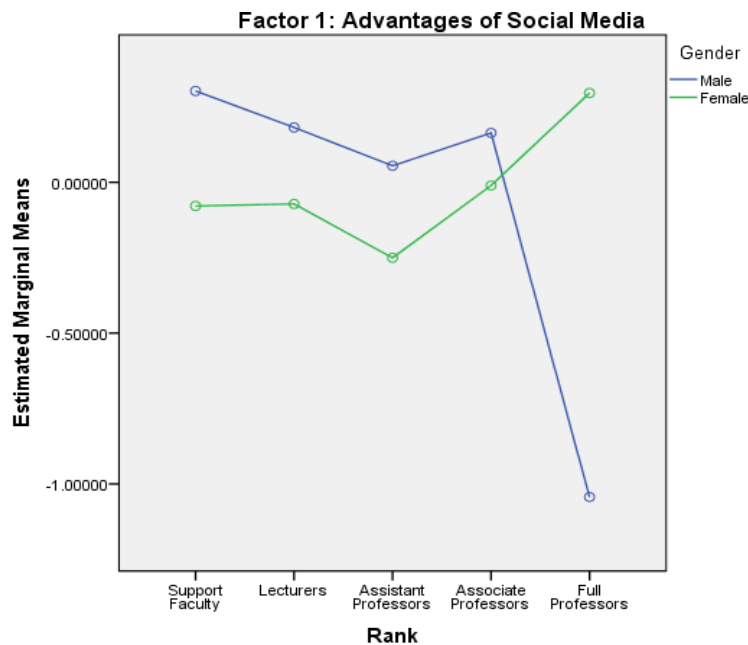

Figure 1: #Advantages of Social Media Usage on Gender * Rank

In addition, the study suggests that the different academic ranks do not differ on the two derived factors. Finally, it seems that there is no meaningful interaction effect on the two factors either as gender was compared by rank on the two factors used as dependent variables. Further, there is agreement in the perceptions of concerns about social media usage for teaching purposes. Every faculty member, regardless of gender or academic rank, who responded to the survey, seems to be in general agreement concerning the pros and cons of using social media in the classrooms. While some research has supported the argument that there is a difference between the genders

when it comes to the use of technology and the Internet, and more specifically, social media (Agbatogun, 2013; Huang et al., 2013; Ruleman, 2012), this study did not find evidence to support that finding. However, this study does concur with Kim et al. (2011) and Agbatogum (2013), who found no significance relation between the use of social media, gender and academic rank.
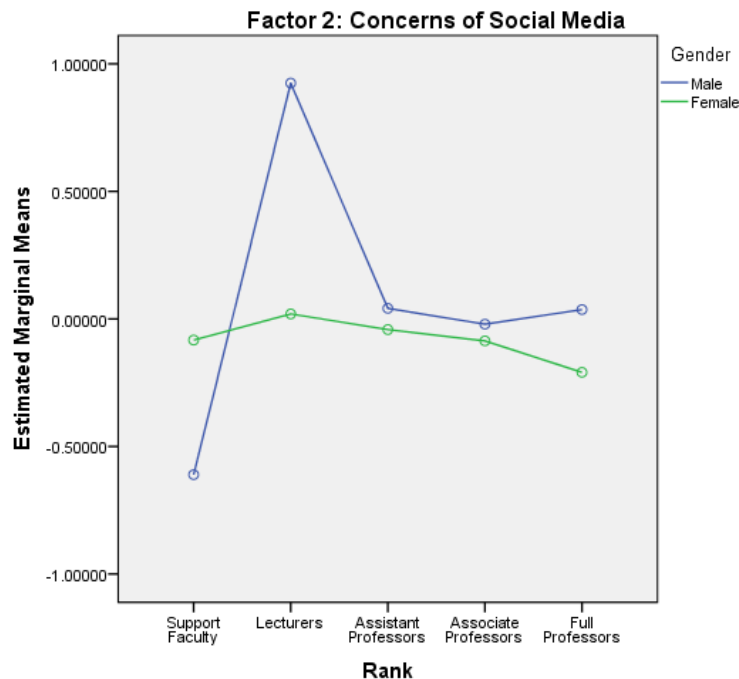

Figure 2: # Concerns of Social Media Usage on Gender * Rank

Conclusion

The goal of this research was to gain insight into the use of mobile devices and social media tools by faculty across disciplines. A survey was conducted and the responses of 201 participants were analyzed. Results suggest that educators, both male and female, across academic ranks are using social media tools and agree to the advantages and concerns of social media usage.

It was thought that the rapid advance of technology and increasing student use were driving faculty to implement technology within the classroom, but the faculty who participated in this study were self-motivated to use social media for teaching. However, as Kelm (2011) stated, faculty can still learn from young people how to use technology by observing how their students use mobile devices and social media to complete assignments and interact with their peers.

This study found faculty, regardless of gender or academic rank, who currently use social media concur regarding the advantages and concerns of using social media. The advantages include student feedback from multiple sources, more engaged students, information sharing, stronger classroom community, higher quality student collaborative work, discussion opportunities, improved creativity, and preparation for the work environment, while the concerns shared by the respondents include monitoring, liability, a need for institutional approach, overabundance of information, and time intensive. This finding should prove valuable to faculty who may not have used social media so that they become aware that a consensus has occurred regarding the advantages and concerns of using social media in the classroom.

While the growth in social media brings both excitement and opportunity to the classroom, it also raises challenges and concerns that need to be addressed. Initially, as with any change endeavor, faculty can experience anxiety and a feeling of loss of control. Therefore, if institutions of higher learning can provide training and support, it will make this transition much easier for their faculty who enter the classroom to teach and facilitate learning.

Limitations and Directions for Future Research

As is true of all surveys, people who elect to answer a survey are somewhat different from those who do not answer the survey. Thus, not all answers might be generalizable to all faculty in institutions of higher learning. Although an effort was made to include as many different disciplines as possible (business, education, health science, social science, math, arts, computer science, physics, life/biological sciences, chemistry, and humanities), some disciplines may have accidentally been omitted. In addition, a larger sample size might have provided a different result and outcome as well. While it was hoped that more people would participate in the survey, for whatever reason, some individuals elected not to participate. Given the limitations, the present study sheds more light on the use of mobile devices and social media in teaching. Since there is limited research regarding the use of social media and mobile devices in teaching, this study contributes to the research.

More studies should be undertaken on the use of mobile devices and social media. The researchers found it was difficult to find many studies that focused specifically upon social media and mobile devices for teaching as well as the role gender and rank might play in its use.

Instead of only comparing faculty across disciplines, a better-targeted study might be to look at faculty from one discipline. A more in-depth study could analyze the use of mobile devices and social media as used by specific faculty within a particular discipline.

Finally, there have not been formal measurements of the advantages and concerns of using mobile devices and social media. Most of the published research is based on surveying students and faculty, and thus is self-reporting data. Clearly, there is a need to establish measurements of the benefits or the effectiveness of the use of social media in the classroom that would provide guidelines to help educators employ those technologies in the classroom.

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Appendix

Faculty Survey

Survey Questions

The purpose of this study is to explore how social networking technology is being used by professors to enhance learning. For the purpose of this study, we have categorized social media tools as follows:

Social networking
- <u>Social Networking</u>: *Facebook, MySpace, LinkedIn, Google +, Ning, hi5, bebo*
- <u>Blogging</u>: *WordPress, Blogger, BlogHer, Drupal, ExpressionEngine, LiveJournal, Open Diary, TypePad, Vox, Xanga*
- <u>Microblogging</u>: *Twitter, Dailybooth, FMyLife, Google Buzz, Identi.ca, Jaiku, Nasza-Klasa.pl, Plurk, Posterous, Qaiku, Tumblr*
- <u>Collaborative authoring tools for sharing and editing documents:</u> *WordPress, Blogspot, E107 (CMS), Drupal, Joomla, Plone, Docs.com, Dropbox.com, Google Docs, Syncplicity*
- <u>Wikis:</u> *PBworks, Wetpaint, Wikia, Wikidot, Wikimedia, Wikispaces, Wikinews*
- <u>Social tagging and bookmarking</u>: *CiteULike, Delicious, Diigo, Google Reader, Stumble-Upon, folkd, Zotero*
- <u>Scheduling and meeting tools</u>: *Doodle, Go to Meeting*
- <u>Conferencing:</u> *Skype,*
- <u>Image or video sharing</u>: *YouTube, Qik, Vimeo, Dailymotion, Metacafe, Nico Nico Douga, Openfilm, sevenload, Viddler, flicker, slideshare*

We appreciate your help in taking the survey; even if you don't use social media in your teaching we would like you to answer very few questions.

Demographic Questions

1. **Gender**
   F   M

2. **Age**
   Less than 30
   30-50
   50-60
   60 Or older

3. **Type of Institution**
   Community College
   Four-year University - Teaching focus,
   Four-year University - Research focus

4. **Average class size**
   12 or less
   12-40
   More than 40

5. **Academic Rank**

Support faculty
Lecturer/
Assistance professor
Associate professor
Professor

6. **Discipline**
   Business
   Education
   Health Science
   Social science
   Math and computer science
   Life science
   Physics
   Chemistry
   Biological science
   Arts and humanities

7. **Teaching Experience**
   My teaching schedule includes many online classes and or hybrid
   My teaching schedule is mainly face-to-face

8. **Using Roger's typology of consumer behaviors toward new technology, do you consider yourself?**

   *Innovator "*Innovators are the first individuals to adopt an innovation. Are willing to take risks, have great financial lucidity, and have high risk tolerance."

   Early adaptor" has the highest degree of opinion leadership among the other adopter categories, has advanced education, and is more discrete in adoption choices than innovators."

   Early majority" adopt an innovation after a varying degree of time. This time of adoption is significantly longer than the innovators and early adopters."

   *Late majority "*approach an innovation with a high degree of skepticism and after the majority of society has adopted the innovation."

   *Laggard "*individuals in this category show little to no opinion leadership, have an aversion to change-agents and tend to be focused on "traditions."

9. **Have you used any of the social media (Web 2.0) tools in your teaching**
   Yes
   No (you choose No, go to Q ##?)

10. **What drives you to use social media in teaching?**
    Personal Initiative
    Technology (it makes these tools available and easy to use)
    Peers outside my institution
    Colleagues at my institution
    Students
    Administration

11. **Which of the following social media (Web 2.0) categories you are aware of**? **(mark all what applies)**

   o *Social Networking:*
   o *Blogging:*
   o *Microblogging:*
   o *Collaborative authoring tools for sharing and editing documents:*
   o *Wikis:*
   o *Social tagging and bookmarking:*
   o *Scheduling and meeting tools:*
   o *Conferencing:*
   o *Image or video sharing:*

12. **Which of the following social media (Web 2.0) categories do you use in teaching? (mark all what applies)**
   o *Social Networking:*
   o *Blogging:*
   o *Microblogging:*
   o *Collaborative authoring tools for sharing and editing documents:*
   o *Wikis:*
   o *Social tagging and bookmarking:*
   o *Scheduling and meeting tools:*
   o *Conferencing:*
   o *Image or video sharing:*

13. **Which of the following mobile devices do you use?**
   Smartphone
   Tablet
   Other mobile device
   None

Advantages of Social Media
Likert Scale Questions

14. Social media allows me to discuss topics of interest and/ or to communicate with my students about course-related topics.
15. Social media allows me to find and share educational resources.
16. I believe social media, used as a supplementary learning tool, holds promise for enhancing students' sense of classroom community.
17. I do believe that the information-sharing feature of social media greatly enhanced students' learning experiences.
18. I think students are more engaged with Social Media learning than other e-learning platforms used because students have more interactional opportunities for sharing personal interests and exchanging learning resources in addition to discussing course-related content.

Concerns and Problems with Using Social Media
Likert Scale Questions

19. I feel concerned about the threat of spam and phishing attacks when using social media in the classroom.
20. Using social media to supplement face-to-face courses can become too time intensive.
21. I believe using a private social networking appears to be the answer to grapple with issues of privacy and information security.
22. I sometimes feel overwhelmed by the overabundance of information shared.
23. I have concerns about vague copyright and intellectual property issues involved in social media.
24. I am concerned over who would be responsible if students or professors say something online that results in litigation against the university.
25. I believe there should be an institutional approach to how and what social media is used for educational teaching.
26. I am concerned about who is monitoring the social media for inappropriate or offensive use and thus how we deal with it.

Impact of Social Media on Teaching Style and "Classroom" in General

Likert Scale Questions

27. I believe the interactive nature of social media allows students to participate in collaborative work and create work where the quality of the whole may well exceed the sum of its parts.
28. Exposing my students to the latest technology helps prepare them for work and provides an opportunity for them to acquire additional skills.
29. Using social media allows my students to receive informative and rewarding feedback from multiple sources.
30. Using social media improves my students' creativity and output.
31. I believe using social media allows more interaction between US students and international students.

Answer this question only if you mentioned earlier that you don't use social media

32. Which of the following might be the reasons for not employing social media in teaching in your classes? (Mark all that applies).

_____ *lack of time*
_____ *the benefits are not clear*
_____ *lack of knowledge of the use of social media in education*
_____ *inadequate IT support/ help*
_____ *concern for student privacy*
_____*fear losing control to the students*
_____ *unsure about moral rights or copyright*
_____ *tools are not mainstream*
_____ *concern for student experiencing*

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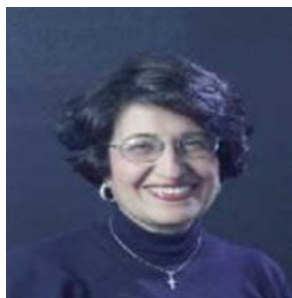
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