Social Media in Educational Practice: Faculty Present and Future Use of Social Media in Teaching

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Abstract

This paper presents results from a questionnaire (n=333) designed to gain an understanding of instructor motivations and experience with social media use in educational practice. Data on overall use of social media, and instructors' use of social media in classes are applied to assess factors leading to present and future use of social media in teaching, using a framework based on the Unified Theory of Acceptance and Use of Technology (UTAUT2) model. Our findings show use in teaching is driven by factors associated with UTAUT's Performance Expectancy construct, i.e., personal engagement with social media, and Moderating Condition of age, with older participants making greater use of social media in teaching. Other constructs associated with use are Habit (experience teaching online), Social Influence (colleagues using social media), Effort Expectancy (awareness of barriers, staying informed), Facilitating Conditions (institutional technology support) and Moderating Conditions (teaching at a two-year college).

1. Introduction

A recent Pew Internet and American Life report described social media use in the US as 'ubiquitous among younger adults' and 'notable among older adults.' In a 2015 survey of social media use in the U.S., 90% of young adults 18-29 years of age were using social media compared to only 12% in 2005; and 77% of adults aged 30-49 were using social media compared to 8% in 2005 [1]. At universities, instructors are also increasingly adopting and incorporating social media in their teaching. Moran et al. [2] found that nearly two-thirds of all teaching faculty in their survey (n=1,920) had used social media in their classes; and Lupton [3] in a survey of academics' use of social media (n=711) found 97% of respondents used social networking sites in their academic life. However, in spite of the growing importance of social media to academics, few studies have focused on discovering instructors' reasons for using (or not) social media in teaching. This work builds on some earlier studies that examined factors behind instructors' adoption of web 2.0 technologies for teaching (e.g., [24, 25]).

To address this research gap, we designed a questionnaire to explore factors associated with faculty adoption and use of social media in teaching. The definition of 'social media' used here is deliberately broad, defined as "any website or web-based service that includes web 2.0 characteristics and contains some aspect of user generated content" [4]. This broad definition includes a wide array of possible social media tools from document sharing to microblogging to social networking sites.

With this broad definition, the questionnaire was designed to gather as much detail as possible on university instructors' social media use both inside and outside classes, and to gain an understanding of their motivations and experience with social media use in educational practice. Our first analyses of these data [5,23] focused on how social media use and usefulness in teaching accorded with theoretical educational reasons for the use of social media in learning (see below).

This paper examines further the factors leading to adoption and continued use of social media in teaching. We expected a number of factors to matter – factors that map well to constructs in the Unified Theory of Acceptance and Use of Technology (UTAUT; e.g., [6]). While our questionnaire was not originally designed to include or adapt items from UTAUT studies, the wide range of questions asked provide sufficient data to model processes using this framework. The overall research question asks:

- What factors promote or inhibit social media use in teaching?

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The factors and corresponding UTAUT constructs are:
- Prior use of social media in general (Performance Expectancy)
- Experience with teaching in general and online teaching (Habit)
- Support, modelling, or observed use by peers (Social Influence)
- Barriers perceived and/or encountered (Effort Expectancy)
- Institutional support (Facilitating Conditions)
- Individual and institutional variations such as age, gender, level of instruction, institution type (Moderating Conditions).

The following provides a brief review of studies that have explored social media use by faculty in teaching, followed by a review of studies that relied on the UTAUT model to discover and explain factors in the area of social media adoption.

2. Literature review

2.1. Faculty use of social media for teaching

The surveys noted above ([2]; [3]) show that social media is being adopted in academia for personal, professional, teaching and learning purposes. Adopters appear to come from a wide range of demographics, with a number of studies finding no difference across gender, age, other uses of social media. For example, [7] found no statistically significant relationships between the use of social media in the classroom and demographics of gender, age, seniority, or highest degree earned; and [8], in a UK study with 74 respondents, found no relationship between social media use outside class and inside. However, those with early adopter characteristics have been found to be more likely to use social media in teaching [9]; as well as those who are teaching online or hybrid courses [7].

Among the types of social media used for teaching at universities, [2] found that online videos, podcasts and blogs were the most used social media by instructors in teaching. [10] found the most common use was asking students to create blogs, and second, to listen to podcasts, and then a relatively even distribution of creating, consuming, and commenting on social networking sites. [3] found motivations and uses included engaging with others in the class, engaging with external learning communities, quickly responding to information and to people, and sharing information and personal interests. In a qualitative study, [11] found that interviewees (eight instructors) emphasized the value of using social media to build

communities and collaborate. Respondents in [8] saw the potential of social media as being able to promote active participation in the learning process and information dissemination.

In our initial study using data from the questionnaire reported here [23], qualitative coding of answers to questions about social media use and usefulness for teaching were analyzed in light of three theoretical reasons that emerge from education and learning theories and suggest why instructors may seek to introduce social media into their classes in support of teaching and learning: exposing students to practice; extending the learning environment; and promoting a social, collaborative approach to learning. Results of a Principal Component Factor Analysis of the coded data identified six ways social media were used for teaching (60% of total variance explained; variance per factor 8-13%): (1) *Facilitating Engagement* through student participation and reflection; (2) *Organizing for Teaching* by facilitating the organization of teaching activities; (3) *Reaching Outside* to connect the class experience to knowledge and work outside the classroom; (4) *Enhancing Student Learnin*g by using social media as a way to enhance further evaluation of class content; (5) *Building a Community of Practice* by fostering communities among students; and (6) *Discovery* of relevant information by instructors and students. These factors also accord with a Uses and Gratifications perspective that depicts adopters as active media users choosing and shaping media use to meet their own needs. Taken together, these factors provided an understanding of these instructors' diverse purposes for their use of social media for teaching.

2.2. UTAUT and social media adoption

UTAUT is a technology acceptance model formulated by [6] that explains factors behind why people adopt and use various computer systems. It was formulated based on an extensive study of eight prominent technology acceptance and use models, including Diffusion of Innovation Theory [12] and Technology Acceptance Model (TAM) [13]. UTAUT describes four key constructs that influence the intention to use technology [6]:
- Performance Expectancy: "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (p. 447)
- Effort Expectancy: "the degree of ease associated with the use of the system" (p. 450)

- Social Influence: "the degree to which an individual perceives that important others believe he or she should use the new system" (p. 451)
- Facilitating Conditions: "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (p. 453)

According to the model, Performance Expectancy, Effort Expectancy and Social Influence are combined to determine Behavioral Intentions to use a technology; in turn, these Behavioral Intentions and Facilitating Conditions determine final Use Behavior. Age, gender and experience are proposed to moderate various UTAUT relationships.

[6] found the UTAUT model predicted the acceptance of an information communication technology in approximately 70% of the cases. From this, they concluded that they were "approaching the practical limits of our ability to explain individual acceptance and usage decisions in organizations" (p. 471). To address this, in 2012, and after many replications of the model in different fields, [14] revised UTAUT and updated it to a "*consumer use* context"; thus giving place to UTAUT2. Three additional constructs were integrated into UTAUT:

- Hedonic motivation: "the fun or pleasure derived from using a technology"
- Price value: "consumers' cognitive tradeoff between the perceived benefits of the applications and the monetary cost for using them"
- Habit: "the extent to which people tend to perform behaviors automatically because of learning" ([14], pp 161-162)

UTAUT has been applied in the area of social media adoption. In the non-profit sector, [15] used UTAUT to assess the factors behind organizations' use of social media. Their research revealed how the structure of non-profit organizations affected their use of social media, concluding that "organizations with public relations departments … were more likely to adopt social media practices than those without public relations departments" ([15], p. 90). In the medical field, a survey of health educators [16] (n=503, of whom 135 were academics) found Performance Expectancy and Effort Expectancy to be the two most significant constructs to explain social media use among health educators. In the political context, [17] applied UTAUT to investigate the factors for acceptance of social media in Egypt. A survey of subscribers to the Facebook page "Kalid Saied" (n=87) showed that Effort Expectancy, Social Influence and Facilitating Conditions had a significant correlation with Behavioral Intention.

In higher education, a study by [4], based on 51 semi-structured interviews of academics in the field of information science and technology, employed UTAUT to explore intention and use of social media by scholars. Results revealed a positive association between UTAUT constructs Performance Expectancy and Social Influence and academics' intention and use of social media; and a negative association between Effort Expectancy and Facilitating Conditions and academics' intention and use of social media. In another study of higher education, [18] used UTAUT2 to examine conditions influencing instructors' use of technology in the classroom. Data from an online survey of business faculty members (n=46) teaching face-to-face classes at a university in southeastern United States, showed that Performance Expectancy, Effort Expectancy, Social Influence and Habit were the most important constructs in explaining instructors' use of technology. Results also showed complex effects of gender as a moderating variable: Performance Expectancy and Effort Expectancy effects on intention to use classroom IT were stronger for men, while Social Influence was stronger for women.

Last, [19] employed UTAUT2 to discover the perceived advantages and relevance of Facebook as a learning tool. Analysis of data from a questionnaire completed by business administration students at a Spanish public university (N=956) showed that Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation and Habit all influenced students' intention to use Facebook in relation to their studies.

These multiple studies suggest the usefulness of the UTAUT model for gaining an understanding of motivations for use of social media in teaching, and thus was taken as a framework for evaluation of data from our questionnaire.

3. Methodology

3.1. Questionnaire

The questionnaire was designed to study social media use by university-level instructors of any rank or employment status. The questionnaire was launched in March 2014. To facilitate as much participation as possible, it remained open until February 2015. Recruitment was done via a variety of means, including academic mailing lists, personal emails to known or recommended contacts, and presentations at various conferences. It consisted of 27 questions in two main parts. The first part asked participants to provide information about use of social media in any

aspect of their teaching; and the second part asked participants to answer questions about social media use in a particular class. This was followed by demographic questions about the respondent and their institution. In total, 417 respondents began the questionnaire, but after analysis, the set was reduced to 333 respondents who provided at least 10 responses to questions or parts of questions.

Demographics on gender, age, country, and discipline (number of responses per question ranged from 165 to 230) indicate our sample was: 60% women; 50% 25-40 years of age (41% 41-60; 9% over 60), largely from English speaking countries (45% US; 20%: Canada: 6% UK; 6% Australia), but also representing a wide range of other countries: Germany and Brazil (3%); Switzerland (2%); Turkey, Sweden, Spain, Romania, New Zealand, Netherlands, Israel, Ireland, Denmark (1%). Respondents came from a number of disciplines, but primarily social science areas: journalism, media studies and communication disciplines (19%), Information Science (9%), Education (8%), Computer Sciences (8%), Sociology (6%), and a further variety of fields, from Library and Museum studies (5%) to History (1%), Engineering (1%), Design (1%), Earth Sciences (1%), Economics (1%) and Cultural and Ethnic Studies (1%).

Of those who completed the second part of the questionnaire, 100 gave demographic data, with much the same distribution as above: 59% women; 49% aged 41-60; 50% from US, 18% Canada, 6% Australia, 5% UK, 10% from continental Europe, and 11% from 10 other countries. The distribution of disciplines was the same as for the full sample.

Our aim in soliciting participants was to hear from those using social media in teaching. As will be seen below, respondents are active, early adopters of social media in general, and social media in teaching.

3.2 Data collected

Data collected from the questionnaire covered both the types of social media respondents used in general, and those they used specifically in teaching. Two primary sets of data underpin this analysis:

- Which social media platforms respondents used in general as a *consumer*, i.e., read, watch, listen, visit, and as a *contributor*, i.e., post, share, comment, build (Table 1);
- Which social media platforms participants used in teaching: in the past, the present, and as expected use in the future (Table 2).

To avoid missing social media included in the learning management system and/or developed in-house, general categories of social media were asked

about rather than named popular tools, e.g., the questionnaire asked about use of social networking sites instead of asking about use of Facebook, LinkedIn or other sites. As noted in our definition of social media, a wide variety of social media categories were covered as listed in Table 1.

4. Results

4.1 Overall use of social media by instructors

The participants in our study were found to be active social media users, both consuming from and contributing to a number of social media platforms (see Table 1). That they are active users is not surprising given that the call for participants went out across various social media and targeted audiences who we felt were likely be active users of social media. The range of media used is wide, going well beyond SNS, blogs, and wikis. As well, use is characterized by active engagement, with high proportion of contribution: ratios of contribution to consumption range from highs of .9 for social networking sites, document sharing, synchronous discussion, to .4 for wikis.

Table 1. Overall social media use

Social Media Type	Consume*	Contribute	Ratio
Social Networking Sites (SNS)	303	284	.94
Multimedia repository	284	157	.55
Document sharing	281	256	.91
Wikis	276	113	.41
Microblogging	257	222	.86
Synchronous discussion	255	237	.93
Blogs	253	165	.65
Academic SNS	250	183	.73
Asynchronous discussion	234	162	.69
Presentation sharing	203	124	.61
Academic bookmarking	136	108	.79
Social bookmarking	129	97	.75
Virtual worlds	76	47	.62

Ordered by 'Consume'

4.2 Past, present and future use of social media in teaching

Respondents also appear to make comparable wide-ranging use of social media in teaching (see Table 2). Most used in teaching, across all periods, are multimedia repositories, social networking sites, discussion boards, and document sharing.

Table 2. Past, present and expected future use of social media in teaching

Social Media Type	Past	Present*	Future
Multimedia repositories	144	154	134
Social networking sites	131	152	124
Discussion boards	152	144	131
Document sharing	135	140	135
Synchronous discussion	122	120	124
Microblogging	111	107	131
Student Individual blogs	137	105	127
Wikis	125	90	99
Central course blog	115	84	94
Academic SNS	58	83	72
Presentation sharing	79	80	86
Social bookmarking	61	45	60
Academic bookmarking	48	41	57
Virtual worlds	49	20	33
Other	15	11	15

Ordered by Present use

Associations across time periods are high, suggesting past use is continued into present use, and expected future use of social media. Chi-square results are all significant across time periods: past and present use: $\chi^2(1)=122.6$, p=.000; past and future use: $\chi^2(1)=140.6$, p=.000; present and future use: $\chi^2(1)=196.8$, p =.000.

For some media, instructors report particularly high expectations of future use, e.g., for microblogging and presentation sharing, while lower expectations for other media, such as social networking sites. Thus, even though instructors' past, present and future use of social media are positively associated, some nuances are present and may signal general changes in practice. Such information about future use can be particularly useful for planning technical and pedagogical support for both instructors and students.

4.3 Modelling instructor use of social media

Since the UTAUT2 model is concerned with both the adoption of a technology and its continuous use, two dependent variables were used (Table 3). SM-PRESENT, the number of social media platforms instructors currently use in their teaching , was used as the best representation of the adoption stage of media use. SM-FUTURE, the number of social media platforms instructors reported they expected to use in their teaching in the future, was used as the best representation of the behavioral intention to continue using social media in teaching.

Table 4 presents the independent variables derived from instructors' answers on the questionnaire. Demographic variables for individuals include age, gender, years of teaching, number of online courses taught, whether a Massively Open Online Course (MOOC) has been taught, and academic level of

teaching. Variables describing the institution, as reported by the participant, include the type of institution. Variables addressing individual level engagement with social media include the number of platforms they contribute to and the number they use only for consumption, perceived barriers to use of social media in teaching, and how they stay informed about use of social media in teaching. Variables addressing institutional level engagement, as reported by the participant, include perceived pedagogical and technological support for use of social media in teaching, and perceived use of social media by colleagues. (More details on questions used to gather the data are available in [23])

Table 3. Dependent variables used in the OLS Analyses

DEPENDENT VARIABLES*		
Variable name	Type	Range
SM-PRESENT Number of social media platforms instructors report using currently in their teaching	Scale	Range: 0 to 14 No missing values
SM-FUTURE Number of social media platforms instructors report they expect to use in their teaching in the future	Scale	Range: 0 to 14 No missing values

*Skewness and kurtosis levels for the dependent variables SM-PRESENT (0.686; -0.313) and SM-FUTURE (0.554; -0.994) are considered acceptable as they are between -2 and +2. Additionally, a visual examination of the Q-Q plots of both variables shows that they are normally distributed.

Table 4. Independent variables used in the OLS Analyses

INDEPENDENT VARIABLES *Corresponding UTAUT2 Construct*		
INSTRUCTOR-LEVEL INDEPENDENT VARIABLES		
AGE *Moderating Condition*	Scale Range: 25 to 79	#of Missing 115
GENDER *Moderating Condition*	Nominal 1-Male; 2- Female	101
YEARS-TAUGHT *Habit* Number of years instructor has been teaching.	Scale Range: 1 to 40	107
ONLINE-COURSE *Habit* The level of experience of teaching online courses	Nominal 0 – no experience; 1 – taught 1-10 courses; 2 – taught >10	43
MOOC *Habit* Whether an instructor taught a Massive Open Online Course?	Nominal 1 – Yes; 2 – No	5
ACADEMIC-LEVEL *Moderating Condition* Students' academic level in which the instructor teaches	Ordinal 1 – UG (Undergrad) 2 – G (Graduate)	103

SM-CONTRIBUTE *Performance Expectancy* Number of different social media platforms used by the respondent to post content (not just in teaching)	Scale Range: 0 to 13	0
SM-CONSUME *Performance Expectancy* Number of different social media platforms used by the respondent to consume information (not just in teaching)	Scale Range: 0 to 13	0
SM-BARRIERS *Effort Expectancy* Whether the instructor feels any barriers to including social media in teaching Note: respondents were asked to write in up to 3 barriers to use. This is a count only of that data.	Nominal -1 – no answer; 0 – did not report any barriers; 1 – at least one barrier	51
STAY-INFORMED *Social Influence* Whether and how the instructor gains information on social media use in teaching Note: Category was coded manually to the 'closest' contact (e.g., friend if both friend and media were reported)	Nominal 0 – don't stay informed; 1 – friend; 2 – seminar; 3 –impersonal media	120
INSTITUTION-LEVEL INDEPENDENT VARIABLES (as reported by the instructor)		
INST-TYPE *Moderating Condition* Type of institution in which the instructor teaches	Ordinal 1 – two year pgm / community college; 2 – four year pgm/ primarily UG; 3 – Graduate (to Master's only; 4 – Graduate (to Master's and Doctoral)	103
PED-SUPPORT *Facilitating Conditions* Perception of pedagogical support for use of social media in teaching given by the instructor's institution	Scale 1 (very low) to 5 (very high)	103
TECH-SUPPORT *Facilitating Conditions* Perception of technical support for use of social media in teaching given by the instructor's institution	Scale 1 (very low) to 5 (very high)	103
SM-PEERS *Social Influence* Perception of colleagues' level of social media use	Scale 1 (very low) to 5 (very high)	103

In building our conceptual model, we relied on the UTAUT2 constructs, which we tentatively map to the following independent variables bearing in mind this is one of the first studies to apply UTAUT2 to investigate why instructors adopt and use social media

in their teaching. Future work will refine and validate these constructs in the teaching and learning context.

Performance Expectancy is represented by both SM-CONTRIBUTE and SM-CONSUME, as we expect that those instructors who are already active social media users in general would also likely understand how social media might be able to help them in their teaching work.

Effort Expectancy is represented by SM-BARRIERS. This is because we expect that those instructors who reported barriers to using social media in teaching might be less likely to continue using social media.

Social Influence is represented by SM-PEERS, the instructors' perception of colleagues' level of social media use, and STAY-INFORMED that indicates if and how the instructor learned about the best practices of using social media in teaching (especially when they learned these from a friend). We expect that instructors whose peers use social media and/or who stay informed on these matters via their friends are also likely to use social media in their teaching.

Facilitating Conditions is represented by two variables about institutional support for the use of social media: PED-SUPPORT for pedagogical support and TECH-SUPPORT for technical support. Here we expect a higher level of institutional support will have a positive effect on one's decision to adopt and/or continue using social media for teaching.

Habit was as the level of experience of teaching, including the following variables here: YEARS-TAUGHT (the number of years of teaching), ONLINE-COURSE (the level of experience of teaching online courses), MOOC (whether the instructor taught a Massive Open Online Course). We expect all three variables would positively influence the instructor's decision to use social media, especially if the instructor has some experience teaching in the online environment.

The remaining independent variables were grouped under *Moderating Conditions,* including individual instructor characteristics such as AGE and GENDER, and variables related to their home institution such as ACADEMIC-LEVEL (whether they teach undergraduate or graduate students) and INST-TYPE, the type of institutions (community college, undergraduate, Master's only, Master's and Doctoral).

When conducting the mapping process, we also noticed that some UTAUT2 constructs did not align themselves well within the context of the current research; namely, *Price Value* (since the majority of social media platforms are free to use) and *Hedonic Motivation* (since the intended use of the technology

is more professional than personal); and therefore were excluded from the analysis.

4.4 Factors explaining social media use in teaching

We performed the Ordinary Least Square (OLS) regressions to analyze the responses from the 333 participants, using the Automatic Linear Analysis feature (SPSS statistics, version 23; [20]). The model building method was Forward Stepwise using the Information Criterion. The Automatic Linear Analysis procedure in SPSS automatically trims outliers by setting their values to a cutoff of three standard deviations from the mean, and it also merges categories of nominal variables that are not significantly different to maximize association with the dependent variable. Prior to running the regression analysis, we used the SPSS Multiple Imputation procedure to impute missing values. Following the literature [21-22], we set the number of imputations to 30, since some of the variables had about 30% of values missing. Two analyses were conducted using the dependent variables of present, SM-PRESENT, and expected future, SM-FUTURE, use of social media in teaching; and the fourteen independent variables listed in Table 4.

The resulting models are shown in Table 5. The estimated models explain 34.7% of the variance of social media use in teaching by instructors for the present, and 30.7% for expected future use.

The analysis revealed that both instructors' Present and expected Future Use of social media in teaching were significantly positively associated with:

- Overall social media contribution behavior (SM-CONTRIBUTE), mapped here to the UTAUT2 construct of *Performance Expectancy*
- Reporting a barrier related to social media use (SM-BARRIERS=1), mapped here to the construct *Effort Expectancy*
- Age of respondent (AGE), mapped to *Moderating Conditions*

And negatively associated with

- Not staying informed about social media use in teaching (STAY-INFORMED = 0), mapped to *Social Influence.*

Present Use was also positively associated with:

- Having experience teaching a MOOC class, mapped to *Habit*

And negatively associated with

- Lack of experience of teaching online classes has a negative impact (ONLINE-COURSE = 1), mapped to *Habit*
- Not having colleagues using social media has a negative impact (SM-PEERS = 0,1) mapped to *Social Influence.*

And, Future Use was positively associated with:

- Teaching at a two-year college (INST-TYPE = 1), mapped to *Moderating Conditions*;
- Consuming via more social media (SM-CONSUME), mapped to *Performance Expectancy*

And negatively associated with

- Lack of technical support at one's institution (TECH-SUPPORT = 0), mapped to *Facilitating Conditions.*

Table 5. Automatic linear analysis results for dependent variables of present and expected future use of social media use in teaching

	Present		Future	
	Coef.	Sig.	Coef.	Sig.
Intercept	0.630	.565	-0.736	.561
SM-CONTRIBUTE	**0.263**	**.000**	**0.212**	**.002**
STAY-INFORMED = 0	**-1.910**	**.000**	**-2.957**	**.000**
STAY-INFORMED = 1,2,3	0ᵃ		0ᵃ	
SM-PEERS = 0	**-1.335**	**.016**		
SM-PEERS = 1	**-1.109**	**.070**		
SM-PEERS = 2,3	0.057	.890		
SM-PEERS = 4,5	0ᵃ			
MOOC	**1.919**	**.003**		
SM-BARRIERS = 1	**1.078**	**.020**	**1.484**	**.007**
SM-BARRIERS = -1,0	0ᵃ		0ᵃ	
AGE	**0.031**	**.046**	**0.036**	**.048**
ONLINE-COURSE = 1	**-0.599**	**.094**		
ONLINE-COURSES = 2,3	0ᵃ			
SM-CONSUME	0.098	.117	**0.227**	**.002**
TECH-SUPPORT = 0			**-2.142**	**.043**
TECH-SUPPORT = 1,2,3			0.195	.664
TECH-SUPPORT = 4,5			0ᵃ	
INST-TYPE = 1 (2yr)			**1.238**	**.046**
INST-TYPE = 2,3,4			0ᵃ	

Note: Empty cells reflect null values in the Automatic Linear Analyses results.
ᵃ Automatically set to zero because it is redundant

5. Discussion

Evaluating the results in terms of the UTAUT2 model, we found that instructors' use of social media in teaching is highly associated with their personal use of these tools: the more instructors use social media, the more they use these tools in classes. From this, we infer that use breeds a positive familiarity that promotes incorporation of these media into teaching. This accords with the *Performance Expectancy* construct of UTAUT2 which states that the use of technology is associated to the individual's expected gains in using the system; here modelled with variables SM-CONTRIBUTE and SM-CONSUME. But our results also offer a refinement to performance expectancy: that our results indicate show a significant role for social media *consumption* as a predictor of *future* use suggests a 2-step model of performance expectancy for incorporation into professional

practice. Familiarity through predominantly consumption behavior supports future attention to social media in teaching, but it is both consuming and constructing that leads to actual present use in this professional context.

Results also suggest that the UTAUT2 *Effort Expectancy* construct has an effect on instructors' use of social media in teaching. The construct is modelled with variable SM-BARRIERS and is positively associated with social media use when an instructor *reports* a barrier. While at first this appears counter intuitive – that barriers associated with use support use – the variable also signals active users are aware of issues associated with use. Those who have used social media in their teaching are more likely to be aware of its challenges and constraints and thus more likely to be able to report them in the survey, and sufficiently engaged to keep trying despite these barriers. It may be that these early adopters, who operate with little institutional and peer support, are willing to take the extra effort to pioneer and perhaps also adjust their use of these systems.

The next UTAUT2 construct was *Social Influence*, modelled here with SM-PEERS, and STAY-INFORMED, both variables that reflect how isolated or connected individuals are with others who use social media in teaching. As the theory predicted, this factor is positively associated with adoption of social media in teaching (SM-PRESENT); however, it has no effect in relation to expected continued or new social media use in the future (SM-FUTURE). Again, this may reflect the independent character of these adopters. Indeed, we might conjecture that they may be influencing others to adopt, but are not themselves influenced by others, although this is something that would need to be tested.

Also under the *Social Influence* construct, we expected that if an instructor staying informed about best practices of social media use via social interactions with friends or colleagues, this would positively influence the social media use. However, the results suggest that it is not necessarily how instructors staying informed, but whether they *are or are not* staying informed on the topic that matters – those who reported 'not staying informed' on this topic were less likely to use social media in teaching than those who stayed informed in some manner. From this case it appears that any information is good information. Given this lack of social influence, it is possible that 'keeping informed' should be considered a variable associated more with *Effort Expectancy* than *Social Influence*. With that interpretation, staying informed is a behavioral characteristic associated with continued use of one's tools for teaching.

We also expected to find some association between instructors' use of social media and the technical and pedagogical support given by instructors' institutions. Our data do corroborate our initial expectations, but only in conjunction with technical support: instructors' future use of social media is negatively affected where they report a lack of *technical* support from their home institution. These results accord with the *Facilitating Conditions* construct which states that individuals' belief in organizational and technical infrastructure support is associated with the use of technology. However, we also found that this construct did not affect the extent of current use of social media in teaching. Other data from our questionnaire suggest a reason for this. In our previous study, we found overwhelmingly that current users were adopting social media not provided within the university learning management systems ([23]). Thus, lack of internal technical support is a non-issue for current use as reported by these participants, but can be seen to be a barrier to future use.

Following the *Habit* construct, modelled here with variables YEARS-TAUGHT, ONLINE-COURSE, MOOC, we expected instructors' use of social media to be related to their previous experience of teaching in general and/or online. Results indicated that only the online experience had a significant effect, and only on the present use of social media. This suggests that it is online habits that matter in social media use adoption for teaching. As above, since experience consuming and then contributing to social media contributes to adoption into teaching, we can expect that the media experience gained in teaching online also supports the move to include social media in teaching. For overall teaching experience, it is possible that this has been accounted by the instructor's age variable, as discussed below.

As for the fact that *Habit* was not significant in the Future model, one possibility is that having experience of teaching in the online setting is more important during the adoption phase (present use) than during decisions to continue using social media. Another possibility is that online teachers have reached saturation, already engaged with as many social media as they can once they are in the online environment.

Our models also highlight the effect of the *Moderating Conditions,* modelled here with AGE, GENDER, ACADEMIC-LEVEL, and INST-TYPE. Age but not Gender has an effect on present and future use, with greater numbers of media used in teaching by older and presumably more experienced teachers. These findings are of interest as they go against the expected trend for younger people to be more engaged with social media use. This may be interpreted to mean that to see the benefits of using social media in

teaching, it is first necessary to understand both social media use (as demonstrated by the high number of platforms used overall) and teaching practice to know how to affect teaching using social media. This suggests another two-fold process playing into adoption of these technologies into professional practice, here the practice of teaching.

Finally, also under the *Moderating Conditions*, we found that those who were teaching at a two-year community college were more likely to continue or start using social media in the future. One possible explanation is that social media is broadly used by undergraduates and thus the instructor may face a higher demand to use these tools in class, and in institutions devoted to this younger age group.

6. Conclusions and future work

This research set out to address the overall question of what promotes or inhibits social media use in teaching, using the UTAUT framework to examine the effects of prior use, experience, support, perception of barriers, institutional support, and individual and institutional demographic variation. Our data come from a sample of active, most likely early adopters of social media use in teaching. Our respondents reported using a wide variety of social media in teaching and overall. Multimedia repositories, social networking sites, and document sharing were the most popular platforms reported for past, present, and future use for teaching. For the future, some media are expected to be used more, e.g., microblogging and presentation sharing sites, while others will be used less, e.g., social networking sites.

In exploring what promotes or inhibits social media use, we found that instructors' personal engagement with social media – the number of media contributed to, their awareness of barriers to use, their effort to keep informed about social media; – and their age – which we take to be a proxy for experience with pedagogy – are positively associated with both present and expected future use of social media in teaching. We also found that present use – our adoption condition – is further enhanced by habit, acquired through experience teaching online, and the social support of colleagues using social media in general. Future use – our behavioral intention condition – is further enhanced by two institutional factors: institutional technology support, and teaching at a two-year college.

Our findings also suggest some considerations for adoption of technology into professional practice. First, our results suggest that familiarity through social media consumption is a starting point for considering future use, but engaging through contributing is a necessary step before use in teaching, at least for these early adopters who are operating with little institutional support, and generally using technologies not supported by their institution. Second, results highlight the relation between professional practice and technology use (the socio-technical relationship). Adoption of social media into teaching appears to be favored by those with the age and experience to understand the social practices of teaching, widespread use of media to give technology fluency and choices. These ardent users also then demonstrate persistence in dealing with the inevitable socio-technical friction, as we find that they are the ones who can report barriers, put effort to keeping informed about social media, and carry on despite the lack of institutional supports.

Overall, the UTAUT2 constructs applied here were generally useful in exploring factors behind instructors' adoption and continuing use of social media in teaching. Attention to these factors also suggested modifications of our mapping, e.g., as in the case of STAY-INFORMED, an item originally coded for social influence that turns out to be more aligned with effort. Although some constructs demonstrated a reversed relationship from the one we expected, this led to further interpretation and understanding of the data, e.g., that awareness of barriers to using social media in teaching is a positive aspect of effort, and that age and experience with teaching has a positive effect on social media use, likely due to understanding how to fit media use to pedagogical aims. Future work is needed to refine and further valid the UTAUT2 constructs by directly and more formally incorporating and testing them as part of a questionnaire.

From a more practical standpoint, our research reveals profiles of users and non-users and the factors that may influence their adoption and continuing use. For example, social media users in the teaching context are those who are older, already using social media more generally, have taught online courses, keep themselves informed about best practices in social media use, and have institutional colleagues who are also using social media. Institutions that want to encourage the future adoption and use of social media in teaching can look to more experienced instructors for pedagogical input, and to their technology offerings for further support and options for social media use.

7. Acknowledgments

would like to thank anonymous reviewers for providing very helpful comments.

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