Understanding Roles of Social Media in Academic Engagement and Satisfaction for Graduate Students

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Abstract
Research indicates positive effects of social media on academia and education. However its main populations have been faculty, teachers, high school or college students, and its primary context has been a course or classroom. We realized that there exists a lack of studies on how Ph.D. (broadly graduate) students use social media for academic purposes and how its use is associated with academic motivation, engagement, and satisfaction, which are salient factors for the success of their graduate degrees and life. Based on the survey responses from 91 current Ph.D. students, our study results highlight that (1) students mainly use social media for broadcasting and keeping up with up-to-date academic and research information; yet, making connections and developing professional networks is one of the primary reasons, and (2) social media use is positively associated with their academic engagement and satisfaction. We discuss implications and future work of our study.

Author Keywords
Graduate students; Academic activities in social media

ACM Classification Keywords
J.4. Computer Applications: Social and Behavioral Sciences

Introduction

Millions of people use social media to share their everyday life and personal interests, and interact with others in virtual, online space [11]. In many cases, people share, seek, and express their interests in information related to their work in social media. For example, a person who is a software engineer may be interested in online programming communities and receive updates from a Facebook developer group. She may also share her time while she is at a conference for software engineers on Twitter.

Over many years, research has investigated how people use and engage in social media through several theoretical standpoints. Among them, Uses and Gratification Theory (UGT) [17] has been widely applied in the context of social media. UGT explains how people use media for their need and gratification; in other words, focusing on what people do with media rather than what media does to people. Prior research grounded by UGT indicates that people use social media for seeking information or status, socializing with others, entertainment, etc. [14] and shows that a gratification of those needs are mediated by active use of and engagement in social media tools [4].

Among many social media studies in different contexts, we study social media in academia and education. A great body of prior research has reported positive effects of social media in this context (e.g., increase class engagement, grade, social interactions with peers and instructors, etc.) [7,10,12,13,16]. However, we found that the main populations in current literature have been faculty, teachers, high school or college students, and its primary context has been a course or classroom. Clearly there exists a lack of understanding on how Ph.D. (broadly graduate) students use social media for academic purposes and measure the relationships between their social media use for academic purposes and general academic factors (e.g., motivation, engagement, satisfaction, etc.). Recent reports indicate that people who are in higher education (have college degree or more) are more likely to use social media than those with a high school diploma or less [15] and the number of graduate students is increasing [1]. These trends have been consistent since 2005. Building on these findings, as a growing number of young adults (who may pursue their graduate degree in the future) are becoming familiar and comfortable with sharing many aspects of their life in social media, we can expect that their social media use for educational and academic purposes as well.

With these research motivations and directions from UGT, we strive to answer the following two research questions through a survey study.

- *RQ1: How do Ph.D. students use social media for their research and academic purposes?*
- *RQ2: What are the relationships among academic motivation, satisfaction, and engagement, and social media use for academic purposes by Ph.D. students?*

Study Design and Analysis

Survey questions

Our survey consists of the questions for demographics (e.g., gender, age, major, etc.), overall social media use (e.g., length, frequency), and types of social media sites and social media use with five specific constructs (detailed in the next section) for academic purposes. The survey was approved by the internal Institutional Review Board at the Pacific Northwest National Laboratory and took about 10 minutes to complete.

Academic Engagement
Presented your research at a seminar or colloquium
Received funding from your department to attend scholarly meetings or conferences
Attended a scholarly meeting/conference
Delivered a paper or presented a poster or demo at a scholarly meeting or conference
Co-authored in journal or conference paper(s)
Published as sole or first author in journal/conference paper(s)

Table 1: Questions for academic engagement (AE). Likert scale (1: None, 2: Once, 3: Twice, 4: Three times, 5: Four or more).

Academic Satisfaction
Develop research skills
Conduct independent research
Obtain faculty mentoring in developing research skills
Pursue own research interests
Learn about other research
Help peers, other grad students
Collaborate with peers
Collaborate with faculty or students from other departments/schools
Present my research to academic audiences
Prepare articles or manuscripts for publications
Forge professional connections and networks

Table 2: Questions for academic satisfaction (AS).

Type	Description	Mean (SD)
Personal	Sharing personal academic achievements (e.g., award, paper accept, presentation, etc.)	2.94 (1.50)
	Sharing personal academic updates (e.g., paper writing, research updates, conference attendance, etc.)	2.71 (1.39)
	Sharing personal academic interests/thoughts/questions (personal reflections/thoughts on one's or others' research, etc.)	2.80 (1.35)
Social	Having academic interest dialogues/conversations with other students and/or researchers (using @)	2.78 (1.37)
	Making connections and developing networks (e.g., following others)	3.66 (1.36)
	Giving and receiving emotional and academic support	2.80 (1.33)
	Teaching, engaging with students (if you are instructors or TA)	2.16 (1.33)
General	Sharing other's academic studies, reports, or activities	3.07 (1.38)
	Seeking/Accessing other's academic studies, reports, or activities	3.16 (1.37)
	Keeping in touch with up-to-date research	3.52 (1.41)

Table 3: Questions for social media use (SMU) for academic purposes.

Five academic constructs in the survey

We used existing and developed survey items to primarily measure (1) *general aspects of academic factors*, including motivation, satisfaction, and engagement, and (2) *social media aspects*, including social media use and post for academic purposes. The following describes the five constructs.

- *Academic motivation (AM)*: We used Academic Motivation Scale that represents extrinsic and intrinsic academic motivations [8].
- *Academic engagement (AE)*: We used Professional Activity Scale [9] that represents different degrees of graduate students' professional academic engagement (Table 1).
- *Academic satisfaction (AS)*: We developed 11 questions that measure a level of satisfaction on research and academic opportunities and activities for graduate students based on the review of a previous survey [9] (Table 2).
- *Social media use (SMU)*: We developed 10 questions to ascertain students' perception of using SNSs for academic purposes based on the review of previous research [16,18,19] (Table 3). This construct consists of three high-level themes, including personal, social, and general, which account for social media use for academic purposes.
- *Social media post (SMP)*: We asked how much Ph.D. students use social media for posting academic related information in social media as follows: *Please estimate the percentage of posts for your academic work in social media (from 0 to 100).*

All constructs (except social media post) were measured using multiple items with a 5-point Likert scale (1: Strongly Disagree, 5: Strongly Agree).

Data collection

We distributed the survey to two groups of Ph.D. students. First, the survey was sent to students in computer and information science major at a large public university in the US through the mailing list. Second, the survey was sent to students (all female) who participated in Women in Machine Learning workshop in 2015 (WiML; http://wimlworkshop.org/).

Construct	Mean (SD)	*α*
AM	3.96 (0.61)	.85
AE	3.03 (1.17)	.88
AS	3.76 (0.56)	.83
SMU	3.00 (0.97)	.88
SMP	18.1 (22.0)	-
Year	3.26 (1.41)	-

Table 4: Descriptive statistics and reliability of constructs. Note that social media post (SMP) and Year have only one question.

Study Samples

We collected a total of 91 survey responses (41 from the university and 50 from the workshop). 28 were male and 63 were female students. The average Ph.D. year is 3.26. More than half of respondents are in their 20s (54), 34 are in their 30s and 3 are in their 40s. More than half of respondents (48) are majoring in computer science, followed by information science (15), engineering (10), biomedical science (8), and others (10).

For their general social media use, all respondents have been using social media for several years (mean 4.76; where 4 indicates between 2-4 years and 5 indicates more than 5 years) and are active social media users (mean 4.32; where 4 indicates once a day and 5 indicates several times a day).

Results

RQ1: Social media use for academic purposes

Each student uses social media for academic purposes differently with respect to posting amount, type, and diversity. The results show that 16.9% of their entire posts were related to their academic activities or interests, and each individual uses more than one social media site (Mean: 1.75, SD: 1.23) for academic purposes. As illustrated in Figure 1, Facebook and LinkedIn are the most popular sites, followed by Academia/Researchgate, Twitter, Blogs, etc. As shown in Table 3, General presents the highest mean value (3.29) compared to Personal (2.82) and Social (3.10). This complies well with the one of the main usage patterns of Twitter – broadcasting information to wider audiences [3]. It is also worth noting that one of the questions in Social, making connections and developing networks, is the highest among all questions. This indicates that our respondents leverage one of the unique affordances of social media, which is networking, for their academic needs and expectations.

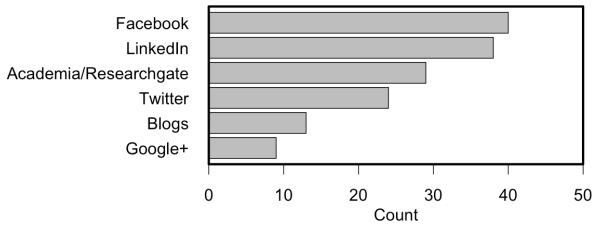

Figure 1: Social media sites for academic purposes.

Table 4 summarizes descriptive statistics and reliability (Cronbach *α*) of four constructs used in the survey. All constructs present high reliability (the requirement is above 0.70), indicating acceptable internal consistency among factors for each construct. Ph.D. year was also used in our analysis. We found that social media post (SMP) was highly skewed (i.e., a high variance), mainly because there were 24 respondents who answered 0%. This result is not surprising, as we expect that not all respondents are likely to share posts related to their academic life or interests.

RQ2: Relationships between social media use and other constructs

To examine the relationships among constructs, we measured Pearson correlations as shown in Table 5. Because we were interested in social media effects, we looked into those aspects carefully. First, academic motivation does not closely relate to both social media use and social media post. This may be because most of our survey respondents showed high academic motivations (Mean: 3.95, SD: 0.61, Table 4).

	AM	AE	AS	SMU	SMP	Year
AM	1					
AE	-.006	1				
AS	.152	.171	1			
SMU	.099	.230*	.242*	1		
SMP	.003	.199*	.179^{+}	.426**	1	
Year	-.278**	.559**	-.190^{+}	.104	.169	1

$^{+}$p<.10, *p<.05, **p<.01.

Table 5: Correlations among constructs.

Type	Social Media Post
Personal	.471**
Social	.263**
General	.399**

**p<.01.

Table 6: Correlations between three types of social media use (SMU) and social media post (SMP). All types are strongly correlated with SMP.

Second, there exists a strong relationship between social media use and post (r=.426, p<.01). As previously described, there were many responses with 0% to the social media post question, yet people who positively responded to social media use for academic purposes are more likely to share their posts about academic information. We also found that all three types of social media use (i.e., personal, social, and general) strongly correlate with social media post (Table 6).

Third, most importantly, we found that social media use presents significant relationships with both academic engagement (r=.230, p<.05) and satisfaction (r=.242, p<.05). Social media post also presents a strong correlation with engagement (r=.199, p<.05) and a marginally significant relationship with satisfaction (r=.179, p=.07). Because engagement and satisfaction are salient factors for academic success, those results indicate a positive effect of social media on students' academic life. Especially for academic engagement, even if its strong relationship with both social media use and post, it could be mediated by Ph.D. year, because of its strong correlation with engagement (β=.559, p<.01). Thus, we further examined the effect of social media on academic engagement by controlling Ph.D. year for the analysis.

Dependent variable: Academic Engagement (AE)			
	Unstandardized β	Standardized β	Adjusted R^2
Block 1: Year	.484**	.551**	.324
Block 2: SMU	.231*	.173*	.354

*p<.05, **p<.01.

Table 7: Results of stepwise multiple regression analysis.

We controlled for Ph.D. year by entering it into the first block of the equation. Social media use and post were then entered into the second block of the regression equation. Results indicate that social media use significantly predicted academic engagement, even when controlling for Ph.D. year (β=.173, p<.05; Table 7). However, social media post does not yield strong prediction to academic engagement, when controlling for Ph.D. year. Given that social media post is one part of social media use (i.e., more than 80% respondents access academic/research related information from social media without posting), it is still reasonable to say that there is the positive relationship between social media use for academic purposes and academic engagement.

Discussions and Conclusion

Our study results give us insights on answering our research questions – (RQ1) how Ph.D. students use social media for academic purposes and (RQ2) the relationships between their social media use for academic purposes and general academic factors. For RQ1, we found that Ph.D. students tend to use social media for general purposes (e.g., broadcast or keep up with academic related information) more than personal

or social purposes; yet, they indicated that making connections and developing networks is one of the primary reasons for using social media. For RQ2, both social media use and post show strong, positive effects on academic engagement and satisfaction. Even if we controlled for Ph.D. year, the relationship between social media use and academic engagement was strong. Overall, our study results highlight positive effects of social media on Ph.D. students' academic life.

There are some implications in our study. As social media use for academic purposes increases academic engagement and satisfaction, it will be worth examining *what drives Ph.D. students to use social media for academic purposes*, which will extend and complement the insights of UGT. For example, Social Cognitive Theory [1] can be used, because it details how user's internal cognitions and environmental factors (e.g., prior experiences, activities from other people, etc.) influence her behaviors or decisions. Users may use and adopt a new social media platform based on their prior social media experience or because of a high adoption rate from their peers [21]. It was found that information that presents explicit and tangible benefits received more attention and online social media traffic [20]. As for another construct, personality can be considered, because research has found its strong association with academic engagement [5]. In this sense, with more theoretically grounded constructs, we can further present not only their correlations but also build a theoretical model such as Structural Equation Modeling (SEM), which allows a set of relationships between independent and dependent variables to be examined and formalizes the relationships among constructs [6].

Although our study presents interesting results and insights, we acknowledge some of its limitations. First, our sample may not represent all Ph.D. students in general, because a sample size was not big enough and most respondents are in computer and/or information science degree(s). To mitigate this concern, we are in the process of recruiting large groups of Ph.D. students with various majors in multiple universities and planning to expand our analysis and present comprehensive insights. Second, although we found that all constructs presented high reliability, some of them, including academic satisfaction and social media use, were non-standardized and have not been subjected to prior testing. It is therefore uncertain whether responses provide an accurate indication of the underlying constructs. As we expand our study to larger populations, we are planning to go through the validity and reliability of the entire survey instruments and present them to research communities in the future.

In summary, our study contributes to a better understanding of how Ph.D. students use and engage in social media for their academic activities as well as of the influence of social media on their academic engagement and satisfaction. We believe our findings are the initial steps to distill the roles and design elements of social media for Ph.D. or broadly graduate students' academic engagement and success.

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