Patterns of Twitter Usage in One Cohort-Based Doctoral Program

Jason A. Draper, Armand A. Buzzelli, and E. Gregory Holdan
Robert Morris University, Moon Township, PA, USA

draper@rmu.edu; buzzelli@rmu.edu; holdan@rmu.edu

Abstract

An Instructional Management and Leadership doctoral program (IML) incorporated the use of Twitter to examine what this looked like in practice. Did students actually use Twitter, and if so, how frequently, for what purpose(s), and were there differences between students on the pattern of use? Additionally, we sought to determine if Twitter is a legitimate instructional tool and if the use of Twitter can help mitigate feelings of isolation. Utilizing a descriptive case study design we implemented a survey methodology by distributing a modified version of the First Year Engagement Questionnaire to five IML cohorts. Active use of Twitter was infrequent. IML students used Twitter to gather news, follow experts, and find stimulating interactions. Active users and students who previously had a Twitter account were more positive about using Twitter. On average however, IML students were infrequent, passive Twitter users, aggregating information to supplement instruction. They did not use Twitter to reduce feelings of isolation. Female and male students used Twitter similarly. Younger students were more active than older students. Familiarity with the platform potentially moderates Twitter activity. Twitter has utility as a supplemental instructional tool but expanded use requires active student engagement.

Keywords: Higher Education, Case Study, Social Media, Twitter, Doctoral Cohort, Accelerated program.

Introduction

As the higher education marketplace changes and diversifies, executive style and cohort based doctoral programs are increasingly prevalent worldwide. As Erickson, Howard, Borland, and Baker (2004) explained, "the traditional doctoral student is disappearing in today's educational leadership programs – a trend that is emerging in other professional disciplines as well" (p. ix). Elite institutions such as Harvard University and the University of Pennsylvania market accelerated doctoral programs in educational leadership to working professionals. Institutions offering these programs design the curricula to meet the needs of the students as they balance work, home, and academic responsibilities. A by-product of institutions streamlining curricula is the reduced amount of time students spend face-to-face with their peers. Bernauer, Semich, Klentzin, and Holdan (2013) noted, as institutions craft rigid curricula attempting to balance focus on core research competencies and pushing progress toward completion of the dissertation document, there is little time left for supplemental

or elective coursework, which further limits the peer-to-peer exposure common to traditional doctoral education.

The program presented in this study is the Instructional Management and Leadership Program (IML PhD) at Robert Morris University (RMU) in Pennsylvania. The program is a three-year, accelerated Ph.D. program within the School of Education and Social Sciences. Students from the fields of nursing, business, higher education, public education, and the military have comprised the cohorts. Cohorts consist primarily of students from the United States, but recently students from Cameroon, the Ivory Coast, and Saudi Arabia have been accepted into the program.

In addition to students not meeting face-to-face on a daily basis in a cohort program, the social sciences have challenges that may tend to isolate researchers from their colleagues. Delbanko (2012) suggested that students in the physical sciences are part of a culture, where incremental progress is easier to identify, but those in other disciplines often "remain concerned with preserving truth by rearticulating it rather than advancing truth by discarding the old in favor of the new" (p. 95). Students within the social sciences, because of their expectations to create a singular and novel contribution to the research literature and because they are less likely to be a member of a lab or larger research team as their natural science counterparts, are more likely to be individualistic (Deem & Brehony, 2000).

Researchers (Bess, 1978; Hawlery, 2003; Lovitts & Nelson, 2000) have widely discussed doctoral attrition rates due to isolation. However, Ali and Kohun (2006) were the first to advocate including purposeful opportunities for socialization into a doctoral cohort model. One modern method for enhancing socialization among students is through the use of social media. While Facebook is the most popular social media platform worldwide, Twitter is another growing social media network that researchers have established merit for in the classroom (Buzzelli, Bissell, & Holdan, 2015; Clarke & Nelson, 2012; Junco, Heiberger, & Loken, 2011).

This case study examined the Twitter usage of five doctoral cohorts in the RMU IML PhD program during a three-year period from 2012-2015. Students who took a section of quantitative research methodology were required to register for Twitter and maintain an account for the duration of the eight-week course period. Students were not required to use their accounts but were occasionally prompted by the instructing faculty member to respond to short prompts through Twitter. Students were encouraged to share research findings that they found interesting and to begin to use Twitter as a news feed, following either local and national news sources or professional organizations of interest. Students were also encouraged to use Twitter to share personal information as appropriate. In April 2015, students completed a survey through QuestionPro about their experiences using Twitter and the results were reported and analyzed.

Motivation for the Study

Students in the RMU cohort model meet just once per week for four hours. Getting students actively involved in learning about, consuming, and doing research during class is an integral part of the curriculum for the doctoral level research class. Students did not interact with each other outside of class time. Blackboard discussions were required to motivate students to engage with one another outside of class, but discussion within the Blackboard platform was limited and consisted primarily of rote summarization of the material the instructor had previously delivered in the classroom setting.

The instructor of the course considered other options such as Facebook and Twitter as alternative platforms/methods to increase student involvement. The limitations of the Twitter platform proved beneficial and meshed well with the busy lifestyle led by the majority of students in the RMU IML PhD. The instructor ultimately chose Twitter as an additional instructional tool to potentially increase student engagement because the platform limits the amount of content in a sin-

gle post, thus necessitating additional action on the part of the student to-investigate an item of interest. The seamless integration of Twitter as part of a commonly used social mobile technology, and the novelty of integrating social media into the educational setting were also attractive.

Most students viewed Twitter as a social media platform with little educational or professional utility. Before implementation, they did not view Twitter as an information aggregator through which they could get information from professional and news organizations, as well as from each other. The use of Twitter by RMU IML PhD students eventually became a method by which the students within cohorts could share information, both professional and personal, with one another ultimately increasing both involvements as related to educational goals as well as drawing the cohort closer to one another.

Purpose of Study

The primary purpose of this study was to describe what the incorporation of Twitter into the IML PhD curriculum looked like in practice – did the students use Twitter, how frequently did they use Twitter, for what purpose(s) did they use Twitter, and did differences in their pattern of Twitter use exist? Beyond simply describing their Twitter usage, we hoped to be able to answer two additional questions that initially motivated the implementation of Twitter into the IML PhD curriculum: Is Twitter a legitimate instructional tool? Is the active use of Twitter a mechanism by which doctoral students can mitigate the isolation they often feel? Literature exists within the field of education (Buzzelli et al., 2015; Junco et al., 2011; Welch & Bonnan-White, 2012) on the effects of social media on engaging students, but limited research exists on the impact to doctoral cohorts. Additionally, faculty and program directors may extend the results of this study in designing future implementation of Twitter into an accelerated doctoral curriculum. This paper includes a brief review of the literature on doctoral models in education, reducing isolation through technology, the acceptance of technology by varying demographic groups, and social media use in education. The study describes the methodology used for data collection and analysis, results, and recommendations for future research ideas based on the study.

Review of Literature

A review of the literature reveals that despite the limited face-to-face time typical to a doctoral cohort program, research on the doctoral cohort model has shown that students enrolled in a program based on this model experience both positive and negative consequences as result of being in such a program. Among the positive consequences students experience are being able to share experiences with their fellow cohort members (Lei, Gorelick, Short, Smallwood, & Wright-Porter, 2011) and having a supportive and shared environment in which to pursue their degree (Bista & Cox, 2014; Sax, 2008; Tokuno, 2008). In contrast, dominant and potentially negatively personalities may arise in the classroom as the same students, being in the cohort together, see one another in every class (McPhail, Robinson, & Scott, 2008), and while these students always see one another in class, limited additional time for collaborative research outside of the classroom exists given the nature of these students as professionals, family members, and working adults (Bernauer et al., 2013). When doctoral students are interacting infrequently in person with their peers, the potential for isolation and loneliness occurs.

Doctoral isolation is a serious problem that contributes to an estimated dropout rate that approaches 50% in doctoral programs across the country (Ali & Kohun, 2006; Sowell, Zhang, Redd, & King, 2008). Research has shown that infusing technology into distance learning may reduce isolation in doctoral students. Online collaborative workspaces such as SharePoint are an example of useful distance tools for faculty and student dissertation cooperation (Rockinson-Szapkiw, 2011). Online scholarly communities have also been advantageous to the success of doctoral learners in completing their dissertation and program of study (Berman & Ames, 2015).

Social networks such as Twitter are massive online community platforms that provide real-time updates on information that users choose to follow. According to Twitter's company site, as of July 2015, Twitter had 316 million active users, with an approximate 500 million tweets sent out daily. Studies have shown that Twitter has the potential to engage students through mobile technology (Junco et al., 2011; Kassens-Noor, 2012; Welch & Bonnan-White, 2012). While significant research exists that incorporated social media and Twitter specifically, into the instructional environment, limited research is available in using Twitter as a tool for doctoral cohort community building and engagement. This study intends to add to the existing literature.

Doctoral Cohort Model

Success at the doctoral level is a difficult task that typically involves rigorous amounts of reading, the in-depth examination of theoretical underpinnings of a subject area, the development of a student's ability to articulate research findings, and the challenges associated with developing and conducting independent research. "Doctoral students have to tread these unknown and challenging areas of their academic potential while being plagued by loneliness, isolation, confusion, stress, excessive workloads, and tight finances" (Hadjioannou, Shelton, Fu, & Dhanarattigannon, 2007, p. 4). For many individuals, the time and financial demands of a traditional doctoral program limit their ability to complete or to even enroll in a program. Ali and Kohun (2006) estimated a dropout rate of approximately 50% during various stages of doctoral programs.

In response to these challenges, many universities have begun to develop cohort models of doctoral programs. Lei et al. (2011) defined cohort-based educational doctoral programs as "a group of about 10-25 students who begin a program of study together, proceed together through a series of developmental experiences in the context of that program of study, and end the program at approximately the same time" (pp. 497-498). Nimer (2009) found that the cohort model "allowed for direct communication and socialization between faculty, students, and members of the other cohorts, which leads to more feelings of inclusion, mutual respect, support and understanding" (p. 1373). Studies have indicated that the support that cohort members received from their classmates have been beneficial for older, part-time students, married students, and students who are parents with home and childcare responsibilities (Sax, 2008; Tokuno, 2008). A study conducted by Bista and Cox (2014) cited the friendships and family-like atmosphere developed in one cohort model as assets to the approach. These social factors play an important role in student success as well as the overall success of cohort models.

While plenty of benefits to a cohort model exist, research has also suggested some drawbacks. McPhail et al. (2008) found that "dominant group members, traditional instructional modalities, and inadequate facilities negatively impacted perceptions of the cohort experience" (p. 362). Personality differences between classmates that might only last a class or semester, can endure over the duration of a program due to its structure. Another drawback to an accelerated cohort model is the limited face-to-face time for students and faculty. In an effort to ensure timely graduation, researchers have cited a lack of face-to-face interaction in accelerated cohort model programs (Bernaueret et al., 2013). As technology improves the speed, convenience, and distance capabilities of communication, it is certain to hold an important role in shaping doctoral cohort education moving forward.

Reducing Isolation in Students through New Technologies

According to *Analysis of Baseline Program Data* from the Ph.D. Completion Project, which examined both private and public institutions nationally, the completion rate ten years after students begin their doctoral program remains critically low at 56.6% (Sowell et al., 2008). These low completion rates can impose a myriad of societal concerns that range from wasted government and private funding to the financial and emotional tolls on students who have invested deeply into

failed attempts at doctoral study (Gardner, 2009; Smallwood, 2004). Studies have pointed to social isolation as one potential symptom of the problem with doctoral dropout rates (Ali & Kohun, 2006; Hawley, 2003; Lovitts, 2001).

Social isolation has been described as *lack of meaningful relationships* (Hortulanus, Machielse, & Meeuwesen, 2006) and is referenced frequently in research related to doctoral studies. Perceived social isolation, often described as loneliness, has been referred to as "a chronic distress without redeeming features" (Weiss, 1973, p. 15). Cacioppo and Cacioppo (2014) reported that while loneliness heightened sensitivity to social threats and motivated the renewal of social connections, it also had negative physical health consequences including impaired executive functioning and decreased sleep, mental, and physical well-being. All of these issues may have lasting impacts on the quality of life of both graduates and non-graduates.

Research has shown that infusing technology into distance learning may reduce isolation in doctoral students. Rockinson-Szapkiw (2011) found that by using Microsoft Share-Point, an online collaborative workspace, distance doctoral students were able to communicate effectively with their dissertation faculty advisors. Berman and Ames (2015) highlighted an online community where doctoral learners regularly accessed a private dissertation workspace, communicated more frequently with their dissertation committee, and have reduced feelings of isolation. While incorporating technologies has been shown to be beneficial to connecting doctoral constituents, it is not without its challenges. Winter, Cotton, Gavin, and Yorke (2010) observed that graduate students in online learning environments often toggled between learning and non-learning activities. Likewise, Leon and Pigg (2011) reported that 'graduate students struggle with the tension between using resources like social media for pleasure and for work' (p. 4). Additionally, considering the demographics of the students within any academic program when incorporating technology may be important.

Acceptance of Technology by Varying Demographics

A variety of factors contribute to an individual's willingness to accept technology. Porter and Donthu (2006) found that age, education, income and race are associated differentially with beliefs about the Internet. All of those factors also play a role in one key ingredient to technology acceptance. If someone has been exposed to a type of technology, or has a frame of reference from which to draw similar experiences with technology, they will be more likely to accept that technology. While access barriers are important, Porter and Donthu also found that a consumer's perceptions regarding ease of use and usefulness had a stronger effect on their acceptance. A study by Chung, Park, Wang, Fulk, and McLaughlin (2010) found that "baby boomers" perceived mobile data services as more useful, yet more difficult to use, than members of "generation X". In addition to age, gender may play a role in determining a consumer's acceptance of technology. Men's perceptions of usefulness influenced their use of technology; whereas women's perceptions of ease of use influenced their use of technology (Venkatesh & Morris, 2000).

Income level is an important factor in terms of access to technology. A Pew Report entitled "Digital Differences" (Zickuhr & Smith, 2012) found that only 62% of people in households making less than $30,000 a year used the internet, while in those making $50,000-74,999 approximately 90% of people used it. The report also points to smart phones as a possible bridge for the divide, as they are able to provide Internet access to populations previously at a digital disadvantage. Furthermore, the Pew Report found that young adults, minorities, those with no college experience, and those with lower household income levels are more likely to access the internet primarily through their smart phones. As smart phones continue to make Internet access more realistic for low-income students, social media is another resource that could help bridge the digital divide. Social networks have the capability to connect people across the world through instant digital communication.

Social Media in Education

Social media has changed the world drastically over the past decade as it continues to explode in popularity and global use. According to statistics from Twitter in July 2015, the platform boasts over 302 million monthly active users, of which 80% are active on mobile devices. Twitter differs from Facebook and other social media networks because it serves as a micro blogging tool (Kieslinger, Ebner, & Wiesenhofer, 2011). Twitter is unique in a number of ways. From a social relationship perspective, the most important difference is the ability to "re-tweet" a friend or followed user's tweet. A re-tweet promotes affirmation of other users' comments and serves as encouragement for a producer of Twitter content. Boyd, Golder, and, Lotan (2010) found that re-tweeting provided broader sharing of information and a method for attracting new followers to a given Twitter account.

Several studies have tried to determine if Twitter can create more engagement in students when incorporated in the classroom. Welch and Bonnan-White (2012) found that students who reported enjoying using Twitter would perceive of themselves as more engaged in class than those who did not enjoy Twitter. In a study conducted by Junco et al. (2011), students who used Twitter had a significantly greater increase in engagement than the control group, as well as higher semester grade point averages. Jacquemin, Smelser, and Bernot (2014) reported that students, as compared to faculty, who used social media more frequently in their personal lives were more amenable to including social media in their academic lives.

Limited research on social media usage in adult education and doctoral programs has shown that potential benefits might exist. Citing informal communities of graduate students such as those using the hashtag *#phdchat*, Bennett and Folley (2014) advocated that social media tools provide access to a community of doctoral students and knowledgeable others which reduces isolation. Furthermore, LeNoue, Hall, and Eighmy (2011) had a valuable insight for adult educators, "Although many desirable social software tools are very easy to learn and use, instructors must be ready with systems of support and plans for scaffolding that will help all course participants get the maximum benefit from the learning opportunities being presented" (p. 8). The efficacy of Twitter in the doctoral program as an instructional tool or a tool to increase student engagement remains a question. Given the relative novelty of this kind of implementation, the literature to this point remains inconclusive, hinting only at the potential benefit of these kinds of tools. Moreover, as LeNoue et al. (2011) affirmed, the implementation of a tool like Twitter into a doctoral curriculum is only the starting point, and there remains significant subsequent work to be done by the educator to get the most out of the novel implementation of a new tool.

Research Methodology

Utilizing a descriptive case study design we implemented a primarily quantitative survey methodology by distributing a modified version of the First Year Engagement Questionnaire (mFYEQ; Appendix A) to five past and current IML PhD cohorts. We modified the FYEQ to elicit from students details related to how they used Twitter within the program. Our choice to use a descriptive case study design was largely motivated by genesis of this study being the desire of one program faculty member to understand how students used Twitter and subsequently to assess this pattern of behavior to adjust how he would incorporate Twitter into future courses. As such, we were not interested in collecting prospective data or data from other institutions. Looking toward a longer-term investigation of Twitter's utility in the doctoral curriculum we chose to describe and understand how Twitter had been used thus far.

Furthermore, our use of quantitative survey methodology as the primary means to gather data was a function of the original motivation of the study. To elicit responses from the largest sample possible from among the five doctoral cohorts that had used Twitter in the doctoral curriculum we

chose to limit the kind of data collected to Likert-type items and other quantitative survey items and to distribute the mFYEQ via email. In this, our initial exploration of how doctoral students use Twitter, we wanted a breadth of information. Survey methodology was the means by which we could gather a great deal of information from a relatively large number of people in a relatively short period of time.

Instrument

Welch and Bonnan-White (2012) modified Krause and Coates (2008) First Year Engagement Questionnaire (FYEQ) and developed an instrument to measure engagement in students using Twitter, utilizing four engagement category scales (Academic, Peer, Intellectual, and Beyond-Class). The Academic Engagement Scale assessed the level of agency a student feels to be able to manage one's time, organize study needs, and develop successful study strategies, as well as a student's self-awareness within an academic setting. The Peer Engagement Scale measured collaborative activities that require interaction with other student peers. The Intellectual Engagement Scale explored students' perceptions of the stimulation and challenge offered by their subjects. The Beyond-Class Engagement scale measured perceptions of student involvement in extracurricular activities and social connections outside of the classroom environment.

We further modified Welch and Bonnan-White's (2012) instrument and developed the modified FYEQ (mFYEQ) based on feedback from class discussion, Twitter interactions, and written responses from students to create a 19 items instrument including items about the frequency of Twitter usage, Likert-type items about about Twitter, and demographic items. The survey was created in QuestionPro and distributed via a link sent through an email from the IML PhD program director to the five cohorts who had completed the course requiring the creation of a Twitter account.

Research Questions

1. What does the incorporation of Twitter into the IML PhD curriculum look like in practice?
    a. Did the students use Twitter?
    b. If they used Twitter, how frequently did they use it?
    c. If they used Twitter, for what purpose(s) did they use it?
    d. If they used Twitter, did differences in the students' pattern of Twitter use exist?
2. Is Twitter a legitimate instructional tool?
3. Is the active use of Twitter a mechanism by which doctoral students can mitigate the isolation they often feel?

Participants

The researcher-modified survey instrument was created in QuestionPro and distributed via email by the IML program director to a total of 77 students, all from cohorts that completed the course in which using Twitter was required. Overall, 50 (64.9%) respondents clicked through the link sent to them via email and opened the survey. The effective sample size for this study was 42 (54.5%) as 8 respondents opened the survey but reported no information. Additionally, respondents were able to skip items. The N therefore, varied by analysis. Thirty-six (85.7%) of the 42 respondents identified their cohort. Approximately half (55.6%) of the respondents were members of cohorts that had completed their course work by spring 2015. Most of the respondents (72.2%) were 44 years of age or younger and were female (59.5%).

Results and Analysis

To describe how doctoral students used Twitter in an accelerated cohort based doctoral program, we evaluated mFYEQ responses using SPSS v23 for all descriptive and inferential analyses from students of five RMU IML PhD cohorts. Frequencies, percentages and basic descriptive statistics primarily demonstrated how cohort-based doctoral students used Twitter. Additional statistical methods such as correlation (relationship between Twitter use and age), t-tests (comparison between male/female and experienced/novice Twitter users), and ANOVA (the pattern of Twitter use among experienced/novice and actively maintaining/not maintaining users) also provided a glimpse of Twitter use in the cohorts. Though this was a relatively small overall sample size, given the case study design of the study the methods of analysis chosen were robust enough to find statistical significance across analyses.

How actively do cohort-based doctoral students use Twitter?

As a course requirement, all IML doctoral students created a Twitter account. Only 17 (40.5%) of the 42 respondents had a Twitter account prior to enrolling in the course. However, the majority (71.4%) reported that they maintained their Twitter account through the course, including 14 of 17 (82.4%) students who reported previously having a Twitter account. Despite the self-reported maintenance of their Twitter accounts, relatively few respondents used Twitter at least daily to share information (11.9%) while in the program (23.8%) or after (31.8%).

For what purpose(s) do cohort-based doctoral students use Twitter?

The instrument (mFYEQ; Appendix) adapted from Welch and Bonnan-White (2012) included 19 items. Respondents were asked to indicate to what extent they agreed or disagreed with statements about how they used Twitter. Responses on a Likert-type scale ranged from 1 - strongly disagree to 5 - strongly agree. We modified Welch and Bonnan-White's (2012) instrument based on feedback from class discussion, Twitter interactions, and written responses from students to create a 19 item instrument including items about the frequency of Twitter usage, Likert-type items about Twitter, and demographic items. The survey was created in QuestionPro and distributed via a link sent through an email from the IML PhD program director to the five cohorts who had completed the course requiring the creation of a Twitter account. Overall, the mFYEQ had good reliability, $\alpha = 0.952$.

Students reported using Twitter relatively infrequently. In addition, overall they disagreed more often than agreed for most kinds of use. The mean score was >3.0 (neither agree nor disagree) for only three items. Students most strongly agreed that they used Twitter as a source of gathering news and timely information (M = 3.36, SD = 1.50). Additionally they agreed approximately equally that they used Twitter to follow experts in their field (M = 3.15, SD = 1.44) and that they were able to find interactions on Twitter that were intellectually stimulating (M = 3.15, SD = 1.30). The respondents in the current sample disagreed most strongly that they used Twitter as a means to monitor their spouse (M = 1.60, SD = 1.29). Table 1 includes descriptive statistics, including the mean (M) standard deviation (SD), median (Med), and limits of the interquartile range (IQR; 25th / 75th) for all items.

Table 1: Survey item descriptive statistics						
Item	N	M	SD	Med	25th	75th
I used Twitter as a source of gathering news and timely information.	42	3.36	1.50	4	2	5
I used Twitter to follow experts in my field or research area on Twitter.	41	3.15	1.44	4	2	4
I was able to find interactions on Twitter that were intellectually stimulating to me.	41	3.15	1.30	3	2	4
I used Twitter to find out what others were up to.	42	2.95	1.43	4	1	4
I was able to find supplementary reading and information relevant to my coursework on Twitter.	42	2.86	1.35	3	2	4
I used Twitter to gain advice and assistance in my field or research area.	42	2.81	1.45	3	1	4
I used Twitter to interact informally with friends and/or classmates.	41	2.80	1.49	2	1	4
I used Twitter for professional networking.	42	2.74	1.61	3	1	4
I used Twitter to celebrate accomplishments with friends and classmates.	42	2.67	1.59	3	1	4
I used Twitter to spread and share in school or community spirit.	42	2.64	1.64	2	1	4
I used Twitter to find out information about conferences and calls for scholarly articles.	42	2.50	1.42	2	1	4
I used Twitter to "live tweet" at a conference or event.	42	2.40	1.53	2	1	4
I used Twitter as a vehicle to make announcers about my status.	42	2.38	1.50	2	1	4
I used Twitter to stay up to date on activities at my school or workplace.	42	2.33	1.51	2	1	4
I used Twitter as a platform to market myself professionally.	42	2.31	1.44	2	1	3
I used Twitter to solicit answers to questions I had.	42	2.29	1.35	2	1	3
I used Twitter to organize social gatherings for others to join.	41	1.88	1.21	1	1	3
I used Twitter to find out when assignments were due.	42	1.69	1.16	1	1	2
I used Twitter to keep tabs on my spouse or children.	42	1.60	1.29	1	1	1

Is gender or age related to cohort-based doctoral students' use of Twitter?

Male and female students reported using Twitter for approximately the same purposes. There were 2 exceptions. Of the 19 survey items, men more than women agreed that they used Twitter as a vehicle to make announcements about their status (Male – M = 2.93 SD = 1.49; Female – M = 1.91 SD = 1.34), *t(35) = 2.182, p = 0.036* and to market themselves professionally (Male = 3.00 SD = 1.65; Female – M = 1.73 SD = 1.16), *t(23.322) = 2.585, p = 0.016.*

Age had a greater impact on Twitter use. Age was collected via the mFYEQ and was collected as a categorical variable in six categories, ranked from 1 (24 years or younger) to 6 (65 years or older). Subsequently, Spearman correlation coefficients were calculated on the relationship between age category and student responses across the 19 items on Twitter usage. The results of these cor-

relations are summarized in Table 2. For every item but one, and for every significant correlation, the relationship between age and Twitter use is negative, meaning that as age increases Twitter use decreases.

Table 2: Spearman correlations between age category and Twitter usage			
Item	N	ρ	Sig
Average of Twitter Items	36	-0.433	**0.008**
I used Twitter to celebrate accomplishments with friends and classmates.	36	-0.422	**0.010**
I was able to find interactions on Twitter that were intellectually stimulating to me.	35	-0.394	**0.019**
I used Twitter to follow experts in my field or research area.	35	-0.388	**0.021**
I used Twitter to solicit answers to questions I had.	36	-0.384	**0.021**
I used Twitter to find out information about conferences and calls for scholarly articles.	36	-0.356	**0.033**
I used Twitter to gain advice and assistance in my field or research area.	36	-0.349	**0.037**
I used Twitter for professional networking.	36	-0.329	**0.050**
I used Twitter to find out when assignments were due.	36	-0.325	0.053
I used Twitter as a source of gathering news and timely information.	36	-0.319	0.058
I used Twitter to stay up to date on activities at my school or workplace.	36	-0.302	0.073
I used Twitter to live tweet at a conference or event.	36	-0.299	0.077
I used Twitter as a platform to market myself professionally.	36	-0.265	0.118
I used Twitter to find out what others were up to.	36	-0.260	0.126
I used Twitter as a vehicle to make announcers about my status.	36	-0.254	0.135
I used Twitter to interact informally with friends and/or classmates.	35	-0.247	0.153
I used Twitter to organize social gatherings for others to join.	35	-0.230	0.184
I used Twitter to spread and share in school or community spirit.	36	-0.227	0.183
I was able to find supplementary reading and information relevant to my coursework on Twitter.	36	-0.180	0.294
I used Twitter to keep tabs on my spouse or children.	36	0.290	0.086

How is Twitter experience reflected in current use?

To determine to what extent having had a Twitter account prior to the IML course in which it was required influenced Twitter use, we compared the mean values on each survey item between the group of students who had (n = 17) and those who had not (n = 25) previously had a Twitter account. In general, experienced Twitter users subsequently reported more agreement across the Survey items. The mean differences between experienced and novice Twitter users reached significance for nearly half of the items (47.4%). For every item, experienced Twitter users reported more agreement with various uses for Twitter than the novice users. Individual item means and the independent samples t-test results comparing experienced versus novice users is found in Table 3.

Table 3. Comparison between experienced and novice Twitter users
in a cohort-based doctoral program

Item	Twitter Experience	N	M	SD	t	df	Sig.
I used Twitter as a source of gathering news and timely information.	Experienced	17	4.12	1.11	3.146	39.727	**0.003**
	Novice	25	2.84	1.52			
I was able to find interactions on Twitter that were intellectually stimulating to me.	Experienced	17	3.82	1.13	3.107	39	**0.004**
	Novice	24	2.67	1.20			
I used Twitter to live tweet at a conference or event.	Experienced	17	3.18	1.55	2.933	40	**0.006**
	Novice	25	1.88	1.30			
I used Twitter to celebrate accomplishments with friends and classmates.	Experienced	17	3.41	1.50	2.693	40	**0.010**
	Novice	25	2.16	1.46			
I used Twitter to interact informally with friends.	Experienced	16	3.50	1.55	2.555	39	**0.015**
	Novice	25	2.36	1.29			
I used Twitter to find out when assignments were due.	Experienced	17	2.24	1.52	2.348	19.733	**0.029**
	Novice	25	1.32	0.63			
I used Twitter to solicit answers to questions I had.	Experienced	17	2.82	1.47	2.232	40	**0.031**
	Novice	25	1.92	1.15			
I used Twitter to organize social gatherings for others to join.	Experienced	16	2.38	1.20	2.206	39	**0.033**
	Novice	25	1.56	1.12			
I used Twitter as a vehicle to make announcements about my status.	Experienced	17	2.94	1.43	2.079	40	**0.044**
	Novice	25	2.00	1.44			
I used Twitter to find out information about conferences and calls for scholarly articles.	Experienced	17	3.00	1.32	1.947	40	0.059
	Novice	25	2.16	1.40			
I used Twitter to spread and share in school or community spirit.	Experienced	17	3.18	1.51	1.790	40	0.081
	Novice	25	2.28	1.65			
I used Twitter to follow experts in my field or research area.	Experienced	17	3.59	1.18	1.772	38.773	0.084
	Novice	24	2.83	1.55			

Item	Twitter Experience	N	M	SD	t	df	Sig.
I used Twitter to find out what others were up to.	Experienced	17	3.41	1.37	1.759	40	0.086
	Novice	25	2.64	1.41			
I used Twitter to stay up to date on activities at my school or workplace.	Experienced	17	2.76	1.52	1.554	40	0.128
	Novice	25	2.04	1.46			
I used Twitter to keep tabs on my spouse or child.	Experienced	17	1.94	1.48	1.377	27.962	0.179
	Novice	25	1.36	1.11			
I was able to find supplementary reading and information relevant to my coursework on Twitter.	Experienced	17	3.18	1.33	1.270	40	0.211
	Novice	25	2.64	1.35			
I used Twitter for professional networking.	Experienced	17	3.06	1.43	1.067	40	0.292
	Novice	25	2.52	1.71			
I used Twitter as a platform to market myself professionally.	Experienced	17	2.59	1.37	1.036	40	0.307
	Novice	25	2.12	1.48			
I used Twitter to gain advice and assistance in my field or research area.	Experienced	17	2.88	1.45	0.265	40	0.792
	Novice	25	2.76	1.48			

Most respondents (59.5%) did not have a Twitter account prior to enrolling in the course for which Twitter membership was required, but most (71.4%) did report that they maintained their account throughout the course. To examine what effect Twitter experience and the active maintenance of a Twitter account had on the overall reported use of Twitter by cohort based doctoral students, we performed a 2 (experienced / novice) x 2 (maintained / not maintained) analysis of variance. The outcome measure was the average agreement score across all completed items on the survey for each respondent. All completed items were summed and then divided by the total number of completed items. Individual average agreement scores ranged from 1 (strongly disagree) to 4.89 (5 - strongly agree). Overall, across 42 respondents, the mean average agreement for Twitter use items was M = 2.56 (between 2 - disagree and 3 - neither disagree nor agree; SD = 1.06).

We identified a significant main effect of Twitter experience, $F (1, 38) = 4.387, p = .043$, partial $\eta^2 = .103$ and Twitter maintenance, $F (1, 38) = 14.009, p = .001$, partial $\eta^2 = .269$ on the reported average agreement across Twitter use items. Experienced users (M = 2.70, SE = 0.27) agreed significantly more to using Twitter for different purposes than novice users (M = 2.04, SE = 0.18). Similarly, respondents who maintained their Twitter accounts for the length of the course (M = 2.97, SE = 0.15) agreed significantly more to using Twitter than respondents who reported that they did not maintain their accounts (M = 1.78, SE = 0.28). The interaction between Twitter experience and maintenance was not significant, $F (1, 38) = 0.111, p = .741$, partial $\eta^2 = .003$.

Discussion

While the higher education marketplace continues to adjust to the needs of a growing population of adult learners, these learners may be carrying with them traditional approaches to learning and engagement as they navigate the modern, accelerated, cohort-based doctoral program. In such a marketplace, novel instructional methods are implemented, revised, or even dropped at an accel-

erated rate. Though Twitter has reached a level of relative maturity as an information-sharing platform, the evidence of its usefulness, and therefore its utilization in higher education, is still very much in its infancy.

Our study demonstrated that a minority of adult learners enrolled in an accelerated, cohort based doctoral program entered the program as active Twitter users. Despite the novelty of integrating Twitter into the classroom, most of these learners reported *maintaining* their Twitter accounts (newly created or previously created). Moreover, and unsurprisingly, experienced Twitter users and students who reported maintaining their Twitter accounts through the course used Twitter significantly more than novice users or those who did not maintain their accounts. However, overall frequency and variety of Twitter use were relatively low.

Only 11.9% of our students reported using Twitter to share information daily, and only three survey items had a mean value of greater than 3 (neither disagree nor agree). However, when examining these three items (Twitter as a source of gathering news and timely information; using Twitter to follow experts in their field; finding interactions on Twitter that were intellectually stimulating) and accounting for the increase in Twitter use following the course (23.8% during versus 31.8% after) we find that adult learners are increasingly using Twitter for very specific purposes. These students are using Twitter as a source of content-relevant, intellectually engaging information. This use pattern may be markedly different from other types of users, not least of which, the traditional college student.

One relatively surprising result obtained from this study was how little students reported using Twitter, even while most of them reported *maintaining* their accounts. A person's interaction with Twitter exists on a continuum from passive to active. On average, our doctoral students were infrequent, passive Twitter users, aggregating content-relevant information and discussions to supplement course instruction and not explicitly using the platform to connect to peers and reduce feelings of isolation. How then should we interpret the apparent contradiction evident in the fact that the majority of our sample reported maintaining their accounts while simultaneously reporting relatively infrequent use of Twitter for most purposes? We intend to direct future research toward examining ways to increase actual student interactions with the Twitter platform and will work to explicitly define the nature of these interactions and how they are related to course material.

Finally, the impact of age as a moderator in students' use of Twitter is especially compelling. A natural dichotomy exists among adult learners. For students approximately 40 years and younger, technology, and the subsequent integration of technology in the classroom has matured as they have. These students were often among the first classes of elementary school students to have computers in the classroom and as such have spent a lifetime learning and adopting new technology as the technology develops. For many of the students older than 40 years of age, technology and the adoption of different prevailing technologies has been a case of learning after the fact and catching up when compelled to do so. The findings in this study support the findings of Chung et al. (2010) that reported older users were more reluctant to accept new technology than their younger counterparts. Similarities exist, however; by definition these students are adults aged 25 or greater, and for most the motivation to pursue an additional degree is directly related to professional goals necessitating an additional or terminal academic credential to advance or change careers. Given our limited design, relatively small sample size, and the way age was collected we need additional data to say definitely how age interacts with or moderates the adoption of new technology among doctoral students.

Delimitations

Given the retrospective, descriptive case study design of our research, the results obtained are necessarily limited in their generalizability. To the extent that the institution, students, and curriculum of other accelerated cohort-based doctoral programs are similar to ours, the results we have found may be similar elsewhere. Moreover, we have chosen to report our results after only three years of implementation, thus limiting the potential sample size for analysis because we wished to better understand how our students were using Twitter and use this knowledge to inform subsequent curricular changes.

Finally, the choices we made in modifying the survey instrument, including the limited collection of demographic information, and the construction of the items to collect that demographic information limits the generalizability of our study while also providing evidence for the need for future work. For example, while we were able to provide evidence of the negative relationship between age and Twitter use, we were unable to provide evidence of the dichotomy related to age and technology adoption. Given that age was a categorical variable we were unable to find an appropriate and statistically significant point at which to split the respondents based on age. Perhaps if we had collected age as actual years, rather than preemptively aggregating respondents, we could have learned more about how age moderates Twitter use among these students.

Conclusions

Adult learners in an accelerated, cohort-based doctoral program are under substantial personal, professional and time pressure. Female and male students used Twitter similarly. Younger students used Twitter more actively than older students. Familiarity with the platform is a potential moderating factor in how actively students will use Twitter for any purpose. The most apparent benefit of using Twitter in the classroom is not as a social tool, but as a highly modifiable information aggregator. In fact, most of our doctoral students used Twitter in exactly this manner, passively, aggregating content-relevant information and discussions to supplement course instruction and not to connect to peers or reduce feelings of isolation. Twitter, at a minimum is a legitimate additional instructional tool.

For Twitter to be a mechanism by which doctoral students can mitigate their isolation, the educator needs to implement Twitter into a curriculum in a specifically prescribed way to motivate the students to actively engage with the other users of the platform and go beyond the passive aggregation and collection of purely content-relevant information. The efficacy of Twitter in the doctoral program beyond an additional instructional tool or as a novelty remains a question. The implementation of a tool like Twitter into a doctoral curriculum is only the starting point. The educator of the adult learner faces a significant challenge to transform Twitter from novelty to necessity.

References

Ali, A., & Kohun, F. (2006). Dealing with isolation feelings in IS doctoral programs. *International Journal of Doctoral Studies*, *1*(1), 21-33. Retrieved from http://ijds.org/Volume1/IJDSv1p021-033Ali13.pdf

Bennett, L., & Folley, S. (2014). A tale of two doctoral students: social media tools and hybridised identities. *Research in Learning Technology*, 22.

Berman, R., & Ames, C. (2015). Private online workspaces for doctoral learners – Enhanced communication and reduced isolation. *Proceedings of Informing Science & IT Education Conference (InSITE) 2015,* 101-112. Retrieved from http://Proceedings.InformingScience.org/InSITE2015/InSITE15p101-112Berman1773.pdf

Bernauer, J. A., Semich, G., Klentzin, J. C., & Holdan, E. G. (2013). Themes of tension surrounding research methodologies education in an accelerated, cohort-based doctoral program. *International Journal of Doctoral Studies*, *8*, 173-193. Retrieved from http://ijds.org/Volume8/IJDSv8p173-193Bernauer0397.pdf

Bess, J. L. (1978). Anticipatory socialization of graduate students. *Research in Higher Education*, *8*(4), 289- 317.

Bista, K., & Cox, D. (2014). Cohort-based doctoral programs: What we have learned over the last 18 years. *International Journal of Doctoral Studies*, *9*, 1-20. Retrieved from http://ijds.org/Volume9/IJDSv9p001-020Bista0425.pdf

Boyd, D., Golder, S., & Lotan, G. (2010, January). Tweet, tweet, retweet: Conversational aspects of retweeting on Twitter. *In System Sciences (HICSS)*, 43rd Hawaii International Conference on System Sciences, 1-10. doi: 10.1109/HICSS.2010.412

Buzzelli, A., Bissell, J., & Holdan, G. (2015). Analyzing Twitter's impact on student engagement in college instruction. *International Journal of Information and Communication Technology Education*, *12*(2), 3-14. Retrieved from http://www.itdl.org/Journal/Feb_15/Feb15.pdf

Cacioppo, J. T., & Cacioppo, S. (2014). Social relationships and health: The toxic effects of perceived social isolation. *Social and personality psychology compass*, *8*(2), 58-72. doi:10.1111/spc3.12087

Chung, J. E., Park, N., Wang, H., Fulk, J., & McLaughlin, M. (2010). Age differences in perceptions of online community participation among non-users: An extension of the Technology Acceptance Model. *Computers in Human Behavior*, *26*(6), 1674-1684. doi:10.1016/j.chb.2010.06.016

Clarke, T. B., & Nelson, C. L. (2012). Classroom Community, Pedagogical Effectiveness, and Learning Outcomes Associated with Twitter Use in Undergraduate Marketing Courses. *Journal for Advancement of Marketing Education*, *20*(2), 29. Retrieved from http://www.mmaglobal.org/publications/JAME/JAME-Issues/JAME-2012-Vol20-Issue2/JAME-2012-Vol20-Issue2-Clarke-Nelson-pp29-38.pdf

Deem, R., & Brehony, K. (2000). Doctoral students' access to research cultures: Are some more equal than others? *Studies in Higher Education*, *25*(*2*), 149–167. Retrieved from http://www.cpedinitiative.org/files/Access_to_Research_Cultures.pdf

Delbanko, A. (2012). *College, what it was, is, and should be*. Princeton, NJ: Princeton University Press.

Erickson, J. L., Howard, R. D., Borland, K. W., & Baker, L. (2004). *Full-time leaders: Part-time learners*. Lanham, MD, USA: Scarecrow Education.

Gardner, S. K. (2009). Student and faculty attributions of attrition in high and low-completing doctoral programs in the United States. *Higher Education*, *58*(1), 97-112. doi: 10.1007/s10734-008-9184-7

Hadjioannou, X., Shelton, N.R, Fu, D., & Dhanarattigannon, J. (2007). The road to a doctoral degree: Co-Travelers through a perilous passage. *College Student Journa*l, *41*(1), 160-177.

Hawlery, P. (2003). *Being bright is not enough*. Springfield, IL: Charles C Thomas.

Hortulanus, R., Machielse, A., & Meeuwesen, L. (2006). *Social isolation in modern society* (Vol. 10). Routledge.

Jacquemin, S. J., Smelser, L. K., & Bernot, M. J. (2014). Twitter in the higher education classroom: A student and faculty assessment of use and perception. *Journal of College Science Teaching*, *43*(6), 2-9. Retrieved from http://www.jstor.org/stable/43631755

Junco, R., Heiberger, G., & Loken, E. (2011). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning*, *27*(*2*), 119-132. doi: 10.1111/j.1365-2729.2010.00387.x

Kassens-Noor, E. (2012). Twitter as a teaching practice to enhance active and informal learning in higher education: The case of sustainable tweets. *Active Learning in Higher Education, 13,* 9-21. doi: 10.1177/1469787411429190

Kieslinger, B., Ebner, M., & Wiesenhofer, H. (2011). Microblogging practices of scientists in e-learning: A qualitative approach. *International Journal of Emerging Technologies in Learning (iJET), 6*(4), 31-39. Retrieved from https://www.editlib.org/p/45118/

Krause, K. L., & Coates, H. (2008). Students' engagement in first-year university. *Assessment & Evaluation in Higher Education*, *33*(5), 493-505. doi:10.1080/02602930701698892

Lei, S., Gorelick, D., Short, K., Smallwood, L., & Wright-Porter, K. (2011). Academic cohorts: Benefits and drawbacks of being a member of a community of learners. *Education, 131*(3), 497-504. Retrieved from http://eric.ed.gov/?id=EJ996368

LeNoue, M., Hall, T., & Eighmy, M. A. (2011). Adult education and the social media revolution. *Adult learning, 22*(2), 4. doi: 10.1177/104515951102200201

Leon, K. & Pigg, S. (2011) Graduate students professionalizing in digital time/space: a view from "down below", *Computers and Composition*, *28*(1), pp. 3–13. doi:10.1016/j.compcom.2010.12.002

Lovitts, B. E. (2001). Leaving the Ivory Tower: The causes and consequences of departure from doctoral study. Lanham, MD: Rowman & Littlefield. doi: 10.1353/rhe.2003.0032

Lovitts, B. E., & Nelson, C. (2000). The hidden crisis in graduate education: Attrition from Ph.D. programs. *Academe, 86*(6), 44-50. Retrieved from https://reddog.rmu.edu/login?url=http://search.proquest.com/docview/232305010?accountid=28365

McPhail, C. J., Robinson, M., & Scott, H. (2008). The cohort leadership development model: Student perspectives. *Community College Journal of Research and Practice*, *32*(4-6), 362-374. doi: 10.1080/10668920701884539

Nimer, M. (2009) The doctoral cohort model: Increasing opportunities for success. *College Student Journal, 43*(*3*), 1373-1379. Retrieved from http://search.proquest.com/docview/236595193?accountid=28365

Porter, C. E., & Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics. *Journal of business research*, *59*(9), 999-1007. doi:10.1016/j.jbusres.2006.06.003

Rockinson-Szapkiw, A. J. (2011). Improving doctoral candidates' persistence in the online dissertation process. *Faculty Publications and Presentations*. Paper 184.

Retrieved from http://digitalcommons.liberty.edu/educ_fac_pubs/184

Sax, L. J. (2008). The gender gap in college: The developmental maximizing potential of women and men. San Francisco, CA: Jossey-Bass.

Smallwood, S. (2004). Doctor dropout. *The chronicle of higher education*, *50*(19), A10.

Sowell, R., Zhang, T., Redd, K. & King, M. (2008). Ph.D. completion and attrition: Analysis of baseline program data from the Ph.D. Completion Project. Council of Graduate Schools: Washington, D.C.

Tokuno, K. A. (2008). Theories relating to the transition into graduate study. In K. A. Tokuno (Ed.), Graduate students in transition: Assisting students through the first year (Monograph No. 50, pp. 27- 46). Columbia, SC: University of South Carolina, National Resource Center for the First-Year Experience and Students in Transition.

Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. MIS quarterly, 115-139. doi:10.2307/3250981

Welch, B. K., & Bonnan-White, J. (2012). Twittering to increase student engagement in the university classroom. *Knowledge Management & E-Learning: An International Journal (KM&EL)*, *4*(*3*), 325-345. Retrieved from http://kmel-journal.org/ojs/index.php/online-publication/article/viewArticle/201

Weiss R. (1973) Loneliness: The experience of Emotional and Social Isolation. Cambridge, MA: MIT Press.

Winter, J., Cotton, D., Gavin, J., & Yorke, D. (2010) 'Effective e-learning? Multi-tasking, distractions and boundary management by graduate students in an online environment', *Research in Learning Technology*, *18*(1), 71–83. Retrieved from http://eric.ed.gov/?id=EJ880177

Zickuhr, K., & Smith, A. (2012). Digital differences. Pew Internet & American Life Project. *Pew Internet Research Project, April*, *13*.

Appendix

IML Student Twitter Usage Questionnaire

Hello: You are invited to participate in our survey regarding Twitter usage among IML PhD Students at RMU. Respondents will be asked to complete a survey that asks questions about their use of Twitter. It will take approximately 10 minutes to complete the questionnaire. Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is very important for us to learn your opinions. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Dr. E. Gregory Holdan at holdan@rmu.edu or Dr. Armand Buzzelli at buzzelli@rmu.edu. Thank you very much for your time and support. Please start with the survey now by clicking on the Continue button below.

Did you have a Twitter account prior to starting the doctoral program?
1. Yes
2. No

Did you maintain your Twitter account throughout the doctoral program? (If current student, are you still maintaining your Twitter account?)
1. Yes
2. No

Choose the answer which best describes how often you utilized Twitter while in the doctoral program?
1. More than once per day
2. Daily
3. 1 - 5 times per week
4. A few times per month
5. Never

Choose the answer which best describes how often you utilized Twitter after completing the doctoral program?
1. More than once per day
2. Daily
3. 1 - 5 times per week
4. A few times per month
5. Never
6. Not Applicable

Choose the answer which best describes how often you share information (Tweeted) on Twitter.
1. More than once per day
2. Daily
3. 1 - 5 times per week
4. A few times per month
5. Never

For the following set of questions, please indicate your agreement with the following statements in terms of your experience while in the doctoral program.
I used Twitter to follow experts in my field or research area on Twitter.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

I used Twitter to gain advice and assistance in my field or research area.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

I was able to find supplementary reading and information relevant to my coursework on Twitter.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

I used Twitter as a source of gathering news and timely information.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

I was able to find interactions on Twitter that were intellectually stimulating to me.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

I used Twitter to solicit answers to questions I had.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

I used Twitter to find out when assignments were due.
1.	Strongly disagree
2.	Somewhat disagree
3.	Neither agree nor disagree
4.	Somewhat agree
5.	Strongly agree

I used Twitter to find out what others were up to.
1.	Strongly disagree
2.	Somewhat disagree
3.	Neither agree nor disagree
4.	Somewhat agree
5.	Strongly agree

I used Twitter to organize social gatherings for others to join.
1.	Strongly disagree
2.	Somewhat disagree
3.	Neither agree nor disagree
4.	Somewhat agree
5.	Strongly agree

I used Twitter to keep tabs on my spouse or children.
1.	Strongly disagree
2.	Somewhat disagree
3.	Neither agree nor disagree
4.	Somewhat agree
5.	Strongly agree

I used Twitter as a vehicle to make announcers about my status.
1.	Strongly disagree
2.	Somewhat disagree
3.	Neither agree nor disagree
4.	Somewhat agree
5.	Strongly agree

I used Twitter to celebrate accomplishments with friends and classmates.
1.	Strongly disagree
2.	Somewhat disagree
3.	Neither agree nor disagree
4.	Somewhat agree
5.	Strongly agree

I used Twitter to interact informally with friends and/or classmates.
1.	Strongly disagree
2.	Somewhat disagree
3.	Neither agree nor disagree
4.	Somewhat agree
5.	Strongly agree

I used Twitter to stay up to date on activities at my school or workplace.
1.	Strongly disagree
2.	Somewhat disagree
3.	Neither agree nor disagree
4.	Somewhat agree
5.	Strongly agree

I used Twitter as a platform to market myself professionally.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

I used Twitter for professional networking.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

I used Twitter to find out information about conferences and calls for scholarly articles.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

I used Twitter to live tweet at a conference or event.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

I used Twitter to spread and share in school or community spirit.
1. Strongly disagree
2. Somewhat disagree
3. Neither agree nor disagree
4. Somewhat agree
5. Strongly agree

THE FOLLOWING QUESTIONS ARE FOR CLASSIFICATION PURPOSES ONLY.

What is your gender?
1. Male
2. Female

What is your age range?
1. 24 or under
2. 25-34
3. 35-44
4. 45-54
5. 55-64
6. 65+

Please indicate your cohort number.
1.   1
2.   2
3.   3
4.   4
5.   5
6.   6
7.   7
8.   8a
9.   8b
10.   9
11.   10
12.   11
13.   12
14.   Other

Biographies

Jason A. Draper is a research associate with the Instructional Management & Leadership Ph.D. program in the School of Education and Social Sciences at Robert Morris University. His professional career, across numerous roles such as data analyst, project manager, research specialist, and research associate, has been as an active member of various funded and unfunded research efforts across content areas, including the social sciences, education, and medicine.

Armand A. Buzzelli is an adjunct instructor and Director of Campus Recreation at Robert Morris University. In addition to his professional interests in student affairs and recreation, Buzzelli has focused his research on utilizing social media to enhance instruction. While serving in his current position, Buzzelli went on to earn his Ph.D. in Instructional Leadership and Management at RMU.

E. Gregory Holdan is an Associate Professor of Mathematics and Education at Robert Morris University. He is coordinator of secondary mathematics teacher certification, teaches undergraduate mathematics and graduate education. He earned his MA in Mathematics and a PhD in Curriculum & Instruction from The Pennsylvania State University. He is on the doctoral faculty at RMU, where he teaches quantitative research methods and chairs several doctoral committees each year.