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The academic journey of university students on Facebook: an analysis of informal academic-related activity over a semester

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This paper reports on an observation of 70 university students' use of their personal social network site (SNS), Facebook, over a 22-week university study period. The study sought to determine the extent that university students use their personal SNSs to support learning by exploring frequencies of academic-related content and topics being discussed. The findings reported in the paper reveal that students used their personal SNSs to discuss academic-related topics, particularly to share experiences about doing work or procrastinating, course content and grades. Mapping academic-related activity frequencies over the 22 weeks illustrated that around certain points in the academic calendar, particularly times when students' assignments or exams were nearing, academic activity increased, suggesting that SNSs may play an important role in a students' academic experience.

The findings suggest that many students today may be leaving traces of their academic journey online and that academics should be aware that these interactions may also exist in their own students' online social spaces. This study offers opportunities for future research, particularly research which seeks to determine differences between individuals' academic activity, the extent that intensive SNSs use supports or distracts students from learning, as well as the extent to which universities should or can harness SNSs to improve the student experience.

Keywords: informal learning; social networking; Facebook; university students; social network sites

Introduction

Social network sites (SNSs) have increasingly become an important part of students' everyday lives, however, to what extent are they playing a role in the academic lives of university students? University students are frequent users of social media; yet, limited research has applied in-depth investigations into the extent that students are embracing certain social media for informal learning. Understanding how students are using SNSs outside of the conventional classroom context to support learning may provide guidance about how social media could be integrated into the formal university context.

This study was part of a PhD project, whereby the researcher adopted a mixed-method approach, inclusive of a survey, Facebook observation and a focus group

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to understand how students were using their personal SNSs to support their learning experience at university. This paper reports on the aspect of this PhD study pertaining to the Facebook observation by reporting on the frequencies of students' academic activity and the topics students discuss. The goal is to explore the extent that students are using their social network space for academic purposes.

Review of related literature

Prior to discussing the methodology and results, this section presents the literature about university students' use of SNSs, with a particular focus on Facebook.

University students' use of SNSs

Research demonstrates that students are using their personal SNSs to support their learning (Corrin, Bennett, and Lockyer 2010; Corrin, Lockyer, and Bennett 2010; Jones *et al.* 2010; Lampe *et al.* 2011; Madge *et al.* 2009; Mazman and Usluel 2010; McEwan 2011; Selwyn 2009). Facebook use is global, and informal use of Facebook to support learning has been demonstrated by the literature thus far across a number of contexts. In the United States, a survey of 283 college students revealed they were primarily using their SNSs for informal learning purposes, which involved student to student interactions about non-required course content (Towner and Muñoz 2011). In one UK study (Jones *et al.* 2010), researchers found that 30.4% of university students reported using SNSs for course-related conversations, and in another 46% (22% monthly) of students reported using their SNS daily or weekly to informally discuss academic coursework (Madge *et al.* 2009). Although, small in sample size ($n=42$), a case study of UK students reported that if they had a single choice, they would prefer to use email for communication between teachers and peers, but most students were active Facebook users (79%) and were still open to the idea of using Facebook for academic communication (45%; Reed 2013). In Australia (Corrin, Bennett, and Lockyer 2010, p. 393; Corrin, Lockyer, and Bennett 2010, p. 648), about 60% of first-year university students reported using SNSs for academic purposes. Both UK and Australian studies were conducted in 2008, warranting further studies into academic use of Facebook, to determine if academic usage has changed since. Further, both studies adopted surveys and, therefore, the language and survey questions as well as the perception by students as what constitutes 'informal learning' or 'academic activity' may differ. It may be that students do not always recognise or recall academic activities on their sites.

Student use of SNSs for academic practices includes using the site to organise group meetings; revision; coursework enquiries; social support about academic matters; venting about coursework and tutors (Madge *et al.* 2009; Selwyn 2009). Within SNSs, students have been found to create groups and discussion spaces accessible through their personal accounts (Bateman and Willems 2012). Additionally, members in the SNS were engaging in the practice of 'peer tutoring' whereby students assisted one another through the learning process and provided help where necessary (Bateman and Willems 2012, p. 60). In a similar method to this study, Selwyn identified five themes that emerged from observation of education-related interaction on UK university students' Facebook profiles. These academic-related interactions included the following themes: '(1) recounting and reflecting on the

university experience; (2) exchange of practical information; (3) exchange of academic information; (4) displays of supplication and/or disengagement; and (5) "banter"'(Selwyn 2009, p. 161).

However, what relationship does social Facebook use have with academic-related use? An examination of a popular German SNS, StudiVZ, revealed those who are more frequently using the SNS, in general, also had a higher interest in the use of the site for study-related exchanges (Wodzicki, Schwämmlein, and Moskaliuk 2012). This was also the case where Lampe *et al.* (2011) discovered that the intensity of students' personal Facebook activity correlated significantly with their reported Facebook use for academic purposes, suggesting that as students use the SNSs more frequently in their lives for social purposes, so too are they likely to engage in academic-related use of their sites. UK researchers surveying first-year British students found that students generally report an increase in academic activity towards the end of the semester (Madge *et al.* 2009) and that, interestingly, as Facebook use became more embedded into their everyday university life and students were organising group work and activities, they tended to report increased use. The researchers noticed that student use of the site had developed from using it as an SNS to also using the site as an 'informational educational' network.

Impact on academic performance and experience

Some studies have expressed concerns that SNSs can be potentially detrimental to study habits (Junco 2012; Kirschner and Karpinski 2010) because Facebook use was found to correlate with lower Grade Point Average (GPA) results (Junco 2012) and because some students have expressed that Facebook can be distracting to their studies (Kirschner and Karpinski 2010; Yu *et al*. 2010b). However, this has been challenged by other studies that have found students' online social networking practices were not significantly related to GPA scores (Yu *et al*. 2010b) nor to have any generalisable impact on grades, even over a 2-year period (Pasek, More, and Hargittai 2009).

Although there may be cause for concern, SNSs do provide students with an alternative means to seek academic support from peers and develop university relationships (McEwan 2011). Studies have supported claims that the use of SNSs can have positive impact on a student's social university experience and psychological well-being (Ellison, Steinfield, and Lampe 2006, 2007; Greenhow and Burton 2011; Manago, Taylor, and Greenfield 2012; Stutzman 2011; Yu *et al.* 2010a, 2010b). Specifically, one study of 187 students from Hong Kong, Mainland China and the US revealed engagement with SNSs was linked to higher self-esteem, satisfaction with university life and performance proficiency (Yu *et al.* 2010a, p. 1499). Further, Stutzman, Capra, and Thompson (2011) investigated students' network behaviour as they transitioned into a US college and discovered that SNSs were a valuable technology that supported transition into college: socially and academically. Examination of students' structural networks during transition demonstrated that supportive and social-informational uses of SNSs in transition exert a direct and mediated positive effect on overall adaptation. Moreover, interviews with 15 freshmen (first-year university students) revealed that SNSs were useful to the students in pre-transition preparation, for social adaptation, and for academic support throughout the transition.

Although the literature reveals thus far that university students are adopting SNSs to support informal learning and that there are a number of benefits to the university experience in doing so, a number of these studies have investigated students' use of SNSs via self-reporting surveys and although these are valuable, self-reporting is not always reliable (Muijs 2011). Further there are issues with what students perceive as 'informal' or 'non-formal' learning activities to involve. Academic learning can take place across a range of contexts and, therefore, academic boundaries are often ambiguous (Kaplan 2008). The boundaries between formal and informal learning are not mutually exclusive (Anderson, Lucas, and Ginns 2003; Colley, Hodkinson, and Malcolm 2002; Trinder *et al.* 2008), are often blurred and cannot easily be separated (Trinder *et al.* 2008). This makes it difficult not only for students to possibly imagine and articulate their learning activities but also for researchers to identify and classify 'academic activities'.

This study expands on the approach adopted by Selwyn (2009) by observing actual Facebook activity of students at a fine-grained level: coding each post and each piece of activity on their walls as either academic or social, and categorising them by topic over a semester. Furthermore, this study takes an ethnographic approach, where the researcher has technically become a node in the students' online social network web, therefore being able to observe the interactions taking place as a network 'friend' without the need to interfere.

Although there are numerous social media sites available, Facebook is a significantly popular site. Students, from developed countries, are reportedly using the site up to several times a day (Bicen and Cavus 2011; Corrin, Bennett, and Lockyer 2010; Ellison, Steinfield, and Lampe 2007; Jones *et al.* 2010; Junco 2011; Manago, Taylor, and Greenfield 2012; Mazman and Usluel 2010; Miller, Parsons, and Lifer 2010; Pempek, Yermolayeva, and Calvert 2009; Shambare 2012; Steinfield, Ellison, and Lampe 2008; Yu *et al.* 2010a). In a pre-survey associated with this study, the participants reported that Facebook was the most used and preferred SNS by students at the university (Vivian and Barnes 2010). As a result, this study chose to follow students' Facebook use, and the results reported in this study are acknowledged as being specific to the Facebook context and the context of the University of South Australia. However, other similar universities and researchers in this field will find these results of value.

Method

The entire PhD project involved a mixed-method study including an online survey of 812 students at the University of South Australia, observation of students' Facebook activity and an online focus group. The observation involved the collection and analysis of 70 university students' personal Facebook site activity over a period of 22 weeks. Lastly, the study included a focus group, hosted within a Facebook 'group', which involved 15 students sharing their perceptions and experiences with using SNSs to support learning. The results reported in this paper are derived from the observation of students' Facebook activity.

The observation of Facebook activity involved the adoption of a *virtual ethnographic* approach. An ethnographic approach involves 'recording the life of a particular group and thus entails sustained participation and observation in their milieu, community or social world' (Charmaz 2006, p. 21), and in this context, the community was online. The role of the researcher in this study was that of

participant-observer. The researcher needed to become involved in the context setting as this allows for optimal views of the participants in question (Creswell 2008). Although Creswell (2008) discusses the role of the participant-observer in terms of physical settings, the same can be applied to a virtual environment. The researcher in this study immersed herself into the participants' personal SNS and took on the role as an *inside observer* (Creswell 2008). The researcher took notes, recorded participant activity and was able to interact with participants, when the participants initiated the interaction with the researcher. Some examples being, when a participant would message the researcher to let them know about a student Facebook group that they were part of or if the participant shared an article or link about Facebook use on the researcher's site. The researcher did not initiate any interactions with participants directly or with participant Facebook activity, unless it was to advertise a conference paper or presentation, to thank participants or to invite participants to the focus group. These activities would always be posted on the researcher's profile page as a general announcement rather than directly to individuals.

Ethics approval

For each stage of this study, considerations were made about how to protect the rights of the participants involved in regard to 'human dignity, autonomy, pro-tection, safety, [and the] maximization of benefits and minimization of harms' (Markham, Buchanan, and AOIR Ethics Working Committee 2012, p. 4). This is especially important in Internet research because, as outlined in the AOIR Ethics Working Committee recommendations, human subjects, private/public, and data/persons are some of the three most discussed issues. Careful considerations were made in each stage to ensure issues such as these were carefully addressed. Ethical issues were carefully outlined, and submission was made to the University of South Australia Human Research Ethics Committee and approval was granted prior to commencement.

Context and sample

The researcher investigated university students at the University of South Australia and their use of SNSs and so non-probability purposive sampling was used to recruit participants. Purposive sampling is gathered with a purpose in mind, but without randomness (Creswell 2008; Vogt 2007). The approach involved volunteer sampling, whereby the researcher advertised and promoted the research to potential participants and those who were willing to volunteer constituted the sample (Muijs 2011). The study also involved convenience sampling, which is where the researcher selects participants because they are willing to be studied and are available (Creswell 2008).

The first stage of this PhD study involved a survey, which was advertised via the University of South Australia student portal and by an emailed university careers newsletter. At the end of the survey, students were asked to tick a box and enter their email address if they were interested in participating in the second stage of the project, whereby a researcher would observe education-related use of their SNS activity. Information letters, consent letters and a link requesting the researcher as a Facebook 'friend' were sent to the email address of those who volunteered. Students

were asked to state in the 'friend request' that they consent to the research and provide details about their year of enrolment and program of study.

Of the 812 survey participants, just over 100 students volunteered. Due to time limitations and the magnitude of data in Facebook activity, only those who had completed the online survey were included in the SNS observation, resulting in a total of 70 students. Within the sample, 75.7% were female, 24.3% were male and a majority of participants (88.6%) were reportedly local students (11.4% international). Some 85.7% students were studying full-time (14.3% part-time) and 78.6% studied internally, yet 60% had some form of employment. The sample comprised 37.1% of students studying in the division of education, arts and social sciences, 38.6% studying within health sciences, 12.9% from IT and engineering and 11.4% from business.

Data collection and analysis

The SNS observation commenced 2 weeks prior to Study Period 5, which ran from 12 July 2010 until 12 December 2010 (see Appendix A). This period was selected for observation because it covered the university study period, as well as 2 weeks prior and 2 weeks after.

NVivo 9 was used to organise and analyse the Facebook data. Each student was created as a 'case' in NVivo, and his or her Facebook activity for each week (for the 22 weeks) was copied and pasted into a document, which was imported to NVivo and linked to the particular participant. Folders were created for each week of the study period so that the researcher could track activity over time. Each student's activity was coded according to:

(1) Type of Facebook activity: (a) status updates; (b) posts to the individual's wall; (c) shared content to the individuals' wall or shared publicly by the individual; and (d) other instances of activity recorded, for example, that the individual commented, wrote or shared content on another's wall.
(2) The activity was also coded as 'academic', 'social' or both 'social and academic' in nature.
(3) Activity that was 'academic' or 'social and academic' was also coded according to the topic, for example, if it was about 'exams'or 'assignment deadlines'.

NVivo frequency counts for the occurrence of the aforementioned data were exported to an Excel spreadsheet and then SPSS for statistical analysis. Additionally, data about academic-related activity were explored further in NVivo. Combining both quantitative and qualitative data strengthened the study; the findings are reported in the following section.

Results

This section reports the findings from the study in three sections: the overall frequency of students' Facebook activity, the representation of frequency of Facebook use over a university study period and, lastly, the types of academic topics discussed by students on their Facebook pages over the university study period.
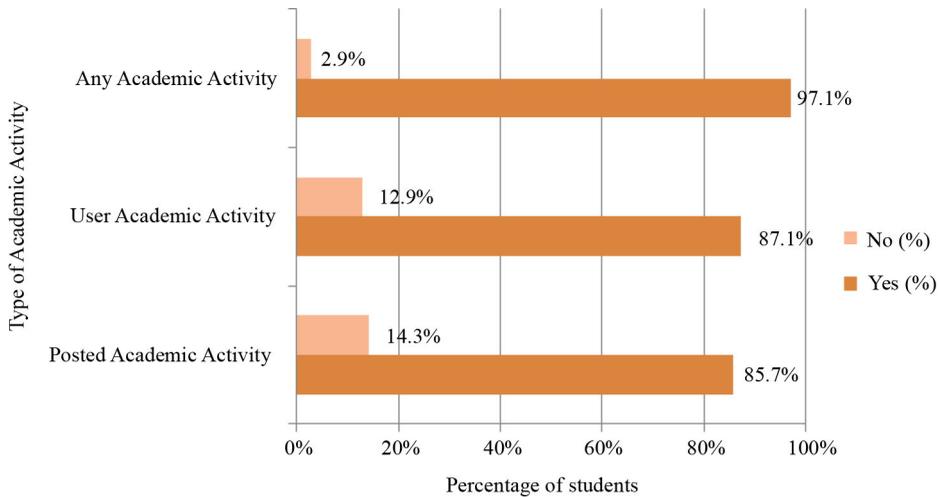
Figure 1.   Percentage of students who had academic-related activity present on their social network site.

Frequency of Facebook activity

Observation of 70 students' SNS activity revealed that overall, 97.1% ($n = 68$) of students had some type of public academic-related activity on their SNS profile (Figure 1). This activity was initiated either by the user's published content or text, or by content or text published by a network friend. Only 2.9% ($n = 2$) of students did not have any academic-related content. However, students who had no academic activity on their Facebook profiles may have been using private applications with their network to discuss academic matters.

Whether the activity was initiated by content posted on the user's wall (a *post* by a network friend) or whether that academic activity was initiated by content published by the user (via a *status update*) was found to be very similar. An example of an academic status update with thread comments is presented in Figure 2.

To provide an overall context of the types of activity present on student walls, the total weekly mean of activity results for each type are presented in Table 1. To clarify, a 'post' (or 'posted academic activity') is content posted by a user's network friend
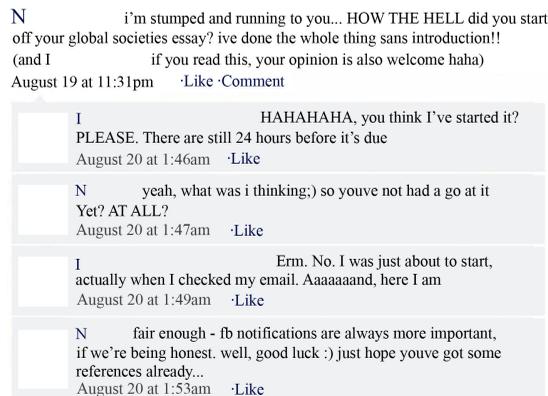

Figure 2.   Example of an 'academic' status update with thread comments.

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Table 1. Weekly mean of student activity types.

Type of activity	Total	Weekly mean
Status	5,176	3.4
Commented	4,288	2.8
Posts	3,000	1.9
Shared	2,003	1.3
Wrote	1,538	1.0
Tagged in a photo	485	0.3
Posted a link to another wall	269	0.2
Friend shared	228	0.1

onto the user's Facebook profile and a 'status update' (or 'user academic activity') is activity or content posted by a user on his or her own wall for others to see in their newsfeed. On inspection of the table, it appears that a large proportion of student Facebook profile pages consist of status updates (5,176 in total). Content posted (3,000 in total) by network friends and content shared (2,003 in total) by the user also contributed a large portion of wall activity. Results published about the pre-survey associated with this study (Vivian and Barnes 2010) showed that the two applications with the highest agreement of usefulness for academic purposes were private embedded-applications (private messages and instant chat). However, the three embedded-applications with the next highest levels of observed activity were status updates, commenting and posting (Table 1). This is interesting as it highlights that although this study is observing public embedded-applications, students are likely to be using private embedded-applications for academic-related exchanges that this study could not observe.

Further, activity was broken down into 'types': whether it was academic, social or both. Table 2 presents the overall coding summary of the posts, user shares, shares by friends, and status updates for the conversation types.

Inspection of the Table 2 reveals that, although the majority of Facebook activity was social in nature, students are also using their personal SNS to discuss academic-related matters. Conversations solely academic in nature were more frequently occurring on status updates ($n = 975$; 18.8%), whereas, when academic activity were also social in their nature, they were more likely to occur on postings ($n = 206$; 6.9%).

Between individual students, the frequency of status updates and posts varied, with some students having no activity at all, to others publishing status updates (academic or social) on a weekly or daily basis. The comments on status updates and posts varied, from no response to several comments. Some threads contained 'conversations' between the user and their network friends, whereas other threads were more of a 'broadcast' or announcement to their network, which received little or

Table 2. Descriptives for type of activity by type of conversation.

	Academic		Academic and social		Uni social		Social		Total
	N	%	N	%	N	%	N	%	N
Status	975	18.8	150	2.9	37	0.7	4,014	77.6	5,176
Posts	330	11.0	206	6.9	42	1.4	2,422	80.7	3,000
Shared	61	3.0	9	0.4	19	0.9	1,914	95.6	2,003
Friend shared	5	2.2	0	0.0	0	0.0	223	97.8	228

no activity. The researcher observed one exceptional case, which involved students communicating about an assignment via a status update, with a result of 300 comments in the one single thread. These findings confirm that academic discussions are, to some extent, entering students' social spaces and that students are using their SNSs to discuss topics related to their experience as a university student. However, there are opportunities for future research to explore differences between students and the response and reactions students receive to certain academic activity.

Facebook use over time

It is evident that students are using their personal SNS to discuss academic-related content. However, do students' use of Facebook for social and academic purposes change over the university semester?

Figure 3 presents a comparison between the weekly mean of *social* and *academic* activity for status updates and posts over the study period in a line graph. The results illustrate that student activity in Facebook – both academic and social – fluctuates over the 22 weeks. The charts show the superposition of variations in student academic activity over an almost constant background. A regression fit shows the constant background for status updates at 0.66 per week (status updates $= 0.664 +$ week$*0.006$, $t(70) = 4.978$, $p < 0.001$) and for posts at 0.34 per week (posts $= 0.339 +$ week$*0.001$, $t(70) = 5.822$, $p < 0.001$).These compare with social statuses that had a constant underlying mean of 2.748; social posts had a constant underlying mean of 1.555. The weekly mean was averaged between the 70 students, with some students having no activity at all and others having more activity. Although the frequencies are low, what is interesting to note is that there appears to be a pattern in usage over the 22 weeks. However, further research is required to explore individuals and their academic activity over the course of a semester and how and why some students are using the site more or less than others and how they are managing their use.
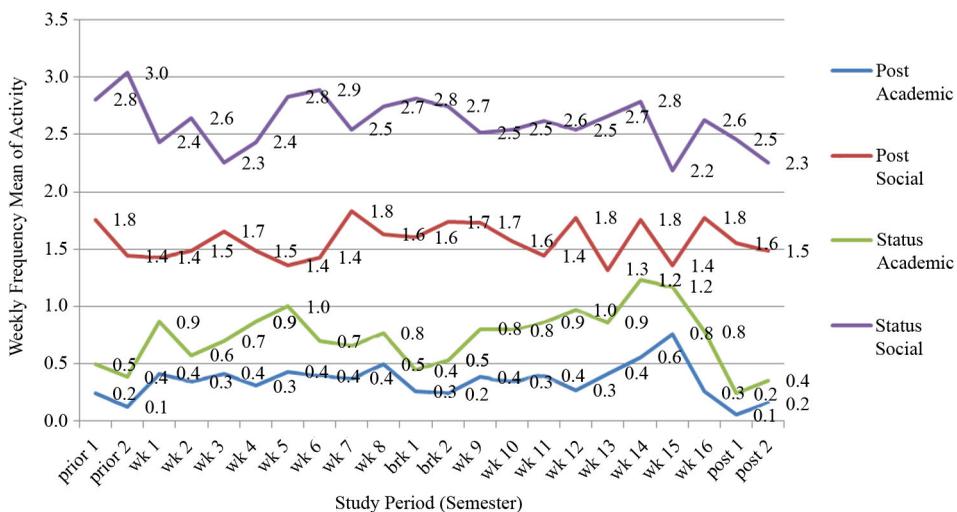

Figure 3. Comparison of academic and social activity over the university study period (semester) according to weekly mean for all students.

The graph demonstrates the intimate connection of Facebook activity to the academic life of students. Many of the rises and falls in academic activity correspond to key points in the student's academic calendar. Generally, academic activity on Facebook starts low prior to the commencement of the study period, rises during the study period, drops in the semester break, and rises again near the end of the study period when assignments are falling due. Status updates are at their highest in week 14 (on average, 1.2 times per week) and week 15 (on average, 1.2 times per week). This time of the study period is the examination period for many students (see Appendix A), or a time when final assessments are due. It may be that students are using their status update to talk about their experiences with studying for, and doing exams and assignments. At certain points throughout the study period, as academic conversation increased, social activity decreased and vice versa, suggesting that academic activity take precedence in students online social spaces. For example, social activity appears to decrease from week 14 to 15, and academic activity appears to increase from around week 13 to 15.

This activity is the same for postings by the user's friends. Most academic postings occurred in week 15 (on average, 0.8 times per week). These weeks are both before the university break and the end of the university semester, a time that is usually more intense for final assessments. Academic status updates are at their lowest (on average 0.2 times per week), the first week after the study period concludes. This is also a similar trend for academic postings. In all weeks, the sharing of academic-related content via the share application was relatively low.

As the study period concludes, academic-related activity is reduced, suggesting that other social topics take prominence. Interestingly, there is a slight increase in the weekly mean frequency after the study period concludes from post 1 to post 2. Post 2 begins on the week starting of December 6th. Student results are officially released on the first Saturday of December (being the first in 2010). Therefore, it is possible that a slight increase in academic activity is due to students conversing about their results. Similarly, 'Prior 1', in the graph, shows that the mean of academic frequency was slightly higher than the following week. The dates in Prior 1 coincide with the release of results for the previous study period. Whatever its detailed interpretation, Facebook activity of an academic nature reflects formal academic life.

These findings are consistent with the findings from a survey of first-year British students in which researchers identified that students generally report an increase in academic activity towards the end of the semester (Madge *et al.* 2009). This was certainly the case for the tracking of activity over the 22 weeks; however, although the weekly mean of activity increased prior to the end of the semester, it also increased and decreased at points throughout the university study period. These results suggest that there are changes in the mean frequency of academic and social activity over the university study period. Academic activity increased and decreased significantly at certain points in the university study period, and these changes coincided with events on the academic calendar. Although it is possible that these changes are occurring due to specific events on the academic calendar, the frequencies do not reveal why these changes occur. Content analysis of students' academic activity may confirm if these weekly mean changes in academic activity are reflecting key events in the academic calendar. Further examination of particular cohorts within university programs may reveal more insight as to when student activity increases and decreases in relation to key course assessment.

Exploring academic-related topics within Facebook

Content analysis was applied to students' *status updates* and *posts* on Facebook to determine what topics students were discussing across the university semester (non-academic activity were not categorised). Within SNSs, students alternated between many different topics, and at times one status update or post may cover several different topics. SNSs are complex spaces, and one limitation is that it is difficult to code data into categories because of the reliance on researcher interpretations of de-codifying data. When categorising the data, codes were made to the most prominent category of the conversation. At times, there were too many different categories in a single conversation, and hence a small number of statuses or posts were omitted from being categorised. These instances accounted for less than 2% of total posts and statuses, thus unlikely to make a substantial difference to the total figures.

Table 3 presents the total frequency of topics, broken down across the university study period (weeks are grouped for ease of viewing). A matrix table was created in NVivo, producing a table presenting the frequency of topics discussed by students on their Facebook wall. In the table, the two most frequent topics for each banding are represented in bold and a number of topics where notable changes have occurred have been represented in italic.

The results from categorisation of students' Facebook activity in this study also identified a series of conversation categories similar to research findings by Selwyn (2009), as many of these topics also relate to one's life as a student. In Table 3, what we see is that, before the study period begins, students are discussing grades from the previous study period. Then, during the first 4 weeks, there is an increase in topics relating to doing work, procrastinating and levels of motivation. Students continue to share their experiences of doing work and course content throughout the study

Table 3. Academic topics discussed according to time in the study period.

Topic/time during semester	Pre-SP	Week 1–4	Week 5–8	SP Break	Week 9–12	Week 13–16	Post-SP	Total
Doing work/ procrastinating/ motivation	8	**113**	**163**	**57**	**158**	**190**	8	697
Content	2	**53**	**38**	**13**	**49**	**48**	4	207
Grades	**38**	*7*	*19*	7	*17*	*22*	**28**	138
Emotional	2	*17*	15	3	*17*	*21*	1	76
Uni schedule	4	16	14	2	14	15	3	68
Checking peer progress	4	*22*	11	4	12	12	1	66
Uni social	4	*20*	12	3	7	*16*	1	63
Holiday and breaks	**12**	9	11	4	5	17	2	60
Supporting peers	0	2	5	0	9	*38*	2	56
University, system, or staff	4	8	14	1	16	6	5	54
Time and meetings	2	*21*	8	1	9	9	2	52
Exams/assessment	0	7	5	2	4	*15*	0	33
Resources	5	7	8	2	4	6	0	32
Courses and tutorials	1	5	8	1	10	6	0	31
Communication	4	5	4	2	3	0	0	18
Seeking help	1	3	4	1	4	3	0	16
Career	0	*8*	2	0	0	1	0	11
Total in period	91	323	341	103	338	425	57	1,678

period time, with a slight decrease in the mid-semester break. The topics identified in this table illuminate and support the fluctuations in students' academic SNS activity and highlight academic topics that may be of concern and importance to students and their experience. Seldom are students discussing topics such as careers; however, topics like 'placements' and 'careers' may very well depend on the stage of their academic program (degree) and the type of program they are enrolled in, warranting further research into types of topics discussed according to programs and year level.

Discussion

The results in this paper indicate that some students are leaving traces of their academic journey in online environments and that educators and institutions should be aware that students in their own contexts may be using SNSs for academic-related purposes. A limitation of the study is that only a small sample of students was observed and that the study included existing Facebook users without including students who were not Facebook users. Therefore, the results reported in this paper are only indicative of the students in the sample and those using Facebook. Further, the results presented are for all 70 students in the sample, without taking into account individual use of Facebook and differences between students. There are opportunities to compare individuals, contexts, users' and non-users' experiences and preferences as well as student use across a range of different programs. Further, this study investigated students' use of SNSs; however, there are many technologies and software available, and exploring how SNS use fits within students' use of other technologies for informal learning may expand our understanding of how students are supporting their university experience and communicating with peers.

The increase in academic-related activity around exam and major assessment periods suggests that students are potentially seeking help or wanting to share their academic experience and could benefit from having opportunities to connect with peers in online spaces during these times. This paper reveals that topics such as 'course content' and 'talking about doing work' and 'grades' are prominent; however, more detailed analysis of these interactions, coupled with invitations for students to reflect on their use, may reveal how they are using their SNS during particular points in the academic semester and how they perceive their use of SNSs to impact on their learning experience. Moreover, some courses adopt student forums where students can seek and provide support about course-related issues, however, how do conversations and topics in formal course spaces compare with informal spaces? Do formal course forums also have increased usage during exam and assessment periods and what topics are they discussing? Some universities have created institutional profiles to engage with the wider public, and a similar analysis approach to this study with student interactions with public institutional SNS profiles and formal course forums may reveal what types of interactions are occurring, the topics being discussed and how personal SNS academic-related use differs. Such analysis may help to identify if interactions intensify at particular points throughout the semester and the types of support individuals are seeking.

The integration of SNSs into learning management systems may provide another 'informal' space where students can socialise, maintain peer relationships and seek and provide ad-hoc support, which could be particularly helpful to off-campus students or for students that undergo course placement. However, authors, like Reed (2013), suggest that forcing SNS use on students may not be appropriate and a

number of concerns arise regarding student privacy, student–academic relationships, student preferences and consideration towards students who are not using SNSs. While it may be possible for lecturers to find ways to include SNSs without needing to be connected to students, such as by creating Facebook 'groups' or encouraging students to create their own groups, is it the role of universities to initiate informal student spaces or should students be left to initiate their own learning in social spaces, if they require it? Regardless, the issues surrounding privacy, student-to-teacher relationships and the use of SNSs for formal learning need to be explored further and that clear guidelines around appropriate institution use and practice need to be developed.

Another aspect for research development in this area relates to the collection and analysis of social media data. The processes used to collect students' SNS data in this PhD project was time consuming and therefore restricted to one university in South Australia and with 70 students. There would be significant value in educational researchers to work with computer scientists to develop algorithms and programs for automated data mining and analysis of students' SNS activity, particularly targeted at academic activity. With an increasing interest in learning analytics among educational researchers, finding ways to efficiently and effectively mine and monitor student behaviour and data in social spaces with minimal effort and interference may provide great insight into their learning experiences and learning processes.

Conclusion

This paper demonstrates that, within this particular sample, academic Facebook activity and the frequency of particular academic-related topics fluctuate at certain points in the academic semester. As technology is increasingly ubiquitous, it appears that some students may be leaving traces of their university experience in their personal online spaces and that these traces may provide valuable insight into understanding students' learning processes, their experiences and interactions in social spaces.

Technologies, and particularly SNSs, receive a negative portrayal in the media for being disruptive to learning, which brings us to ask whether students' use increases in frequency because students are procrastinating during study or whether students increase use of SNSs during these periods to support learning. The findings from this study call for a need to further investigate how students use SNSs, particularly around critical points in the academic study period, and how SNS practices fit in relation to other communication methods and the student experience.

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References

Anderson, D., Lucas, K. & Ginns, I. (2003) 'Theoretical perspectives on learning in an informal setting', *Journal of Research in Science Teaching*, vol. 40, no. 2, pp. 177–199.
Bateman, D. & Willems, J. (2012) 'Facing off: Facebook and higher education', in *Misbehaviour Online in Higher Education: Cutting-edge Technologies in Higher Education*, vol. 5, eds. L. Wankel & C. Wankel, Emerald Group Publishing, Bingley, UK, pp. 53–79.

Bicen, H. & Cavus, N. (2011) 'Social network sites usage habits of undergraduate students: case study of Facebook', *Procedia – Social and Behavioral Sciences*, vol. 28, no. 0, pp. 943–947.

Charmaz, K. (2006) *Constructing Grounded Theory*, Sage, London.

Colley, H., Hodkinson, P. & Malcolm, J. (2002) 'Non-formal learning: mapping the conceptual terrain', A Consultation Report, University of Leeds Lifelong Learning Institute, Leeds, United Kingdom, pp. 1–47.

Corrin, L., Bennett, S. & Lockyer, L. (2010) 'Digital natives: everyday life versus academic study', *Seventh International Conference on Networked Learning*, Aalborg, Denmark, pp. 643–650.

Corrin, L., Lockyer, L. & Bennett, S. (2010) 'Technological diversity: an investigation of students' technology use in everyday life and academic study', *Learning Media and Technology*, vol. 35, no. 4, pp. 387–401.

Creswell, J. (2008) *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*, 3rd edn, Pearson Education, Upper Saddle River.

Ellison, N., Steinfield, C. & Lampe, C. (2006) 'Spatially bounded online social networks and social capital: the role of Facebook', *59th Annual Conference of the International Communication Association*, Dresden, Germany, pp. 1–36.

Ellison, N., Steinfield, C. & Lampe, C. (2007) 'The benefits of Facebook "friends": social capital and college students' use of online social network sites', *Journal of Computer-Mediated Communication*, vol. 12, no. 4, pp. 1143–1168.

Greenhow, C. & Burton, L. (2011) 'Help from my "friends": social capital in the social network sites of low-income students', *Journal of Educational Computing Research*, vol. 45, no. 2, pp. 223–245.

Jones, C., *et al.*, (2010) 'Net generation or digital natives: is there a distinct new generation entering university?', *Computers and Education*, vol. 54, no. 3, pp. 722–732.

Junco, R. (2011) 'The relationship between frequency of Facebook use, participation in Facebook activities, and student engagement', *Computers and Education*, vol. 58, no. 1, pp. 162–171.

Junco, R. (2012) 'Too much face and not enough books: the relationship between multiple indices of Facebook use and academic performance', *Computers in Human Behavior*, vol. 28, no. 1, pp. 187–198.

Kaplan, A. (2008) 'Clarifying metacognition, self-regulation, and self-regulated learning: what's the purpose?', *Educational Psychology Review*, vol. 20, no. 4, pp. 477–484.

Kirschner, P. & Karpinski, A. (2010) 'Facebook and academic performance', *Computers in Human Behaviour*, vol. 26, no. 6, pp. 1237–1245.

Lampe, C., *et al.*, (2011) 'Student use of Facebook for organizing collaborative classroom activities', *International Journal of Computer-Supported Collaborative Learning*, vol. 6, no. 3, pp. 329–347.

Madge, C., *et al.*, (2009) 'Facebook, social integration and informal learning at university: "it is more for socialising and talking to friends about work than for actually doing work"', *Learning Media and Technology*, vol. 34, no. 2, pp. 141–155.

Manago, A., Taylor, T. & Greenfield, P. (2012) 'Me and my 400 friends: the anatomy of college students' Facebook networks, their communication patterns, and well-being', *Developmental Psychology*, vol. 48, no. 2, pp. 369–380.

Markham, A., Buchanan, E. & AOIR Ethics Working Committee. (2012) *Ethical Decision-Making and Internet Research: Version 2.0*, [online] Available at: http://aoir.org/reports/ethics2.pdf

Mazman, S. & Usluel, Y. (2010) 'Modeling educational usage of Facebook', *Computers and Education*, vol. 55, no. 2, pp. 444–453.

McEwan, B. (2011) 'Hybrid engagement: how Facebook helps and hinders students' social integration', in *Higher Education Administration with Social Media: Including Applications in Student Affairs, Enrollment Management, Alumni Relations, and Career Centers*, vol. 2, GBR Emerald Group, Bradford, pp. 3–23.

Miller, R., Parsons, K. & Lifer, D. (2010) 'Students and social networking sites: the posting paradox', *Behaviour and Information Technology*, vol. 29, no. 4, pp. 377–382.

Muijs, D. (2011) *Doing Quantitative Research in Education with SPSS*, Sage, London.

Pasek, J., More, E. & Hargittai, E. (2009) 'Facebook and academic performance: reconciling a media sensation with data', *First Monday*, vol. 14, no. 5, [online] Available at: http://www.firstmonday.org/ojs/index.php/fm/article/view/2498/2181

Pempek, T., Yermolayeva, Y. & Calvert, S. (2009) "College students' social networking experiences on Facebook', *Journal of Applied Developmental Psychology*, vol. 30, no. 3, pp. 227–238.

Reed, P. (2013) 'Hash tags and retweets: using Twitter to aid Community, Communication and Causal (informal) learning', *Research in Learning Technology*, vol. 21, no. 19692, pp. 1–21.

Selwyn, N. (2009) 'Faceworking: exploring students' education-related use of Facebook', Learning, Media', *and Technology*, vol. 34, no. 2, pp. 157–174.

Shambare, R. (2012) 'Social networking habits among students', *African Journal of Business Management*, vol. 6, no. 2, pp. 578–585.

Steinfield, C., Ellison, N. & Lampe, C. (2008) 'Social capital, self-esteem, and use of online social network sites: a longitudinal analysis', *Journal of Applied Developmental Psychology*, vol. 29, no. 6, pp. 434–445.

Stutzman, F. (2011) *Networked Information Behaviour in Life Transition*, PhD Dissertation, University of North Carolina, Chapel Hill.

Stutzman, F., Capra, R. & Thompson, J. (2011) 'Factors mediating disclosure in social network sites', *Computers in Human Behavior*, vol. 27, no. 1, pp. 590–598.

Towner, T. & Muñoz, C. (2011) 'Facebook and education: a classroom connection?' in *Cutting-Edge Technologies in Higher Education: Educating Educators with Social Media*, ed. C. Wankel, vol. 1, Emerald Group, Bradford, pp. 33–57.

Trinder, K., *et al.*, (2008) *Learning from Digital Natives: Bridging Formal and Informal Learning*, pp. 1–57, [online] Available at: http://www.academy.gcal.ac.uk/ldn/LDNFinalReport.pdf

Vivian, R. & Barnes, A. (2010) 'Social networking: from living technology to learning technology?' *Australiasian Society for Computers in Learning and Teaching Conference (ASCILITE)*, Sydney, pp. 1007–1019, [online] Available at: www.ascilite.org.au/conferences/sydney10/Ascilite conference proceedings 2010/Vivian-full.pdf

Vogt, W. (2007) *Quantitative Research Methods for Professionals*, Pearson Education, New York.

Wodzicki, K., Schwämmlein, E. & Moskaliuk, J. (2012) ''Actually, I wanted to learn'': study-related knowledge exchange on social networking sites', *The Internet and Higher Education*, vol. 15, no. 1, pp. 9–14.

Yu, A., *et al.*, (2010a) 'Can learning be virtually boosted? An investigation of online social networking impacts', *Computers and Education*, vol. 55, no. 4, pp. 1494–1503.

Yu, A., *et al.*, (2010b) 'Embedded social learning in online social networking', *ICIS Proceedings 2010*, Available at: http://aisel.aisnet.org/icis2010_submissions/100

Appendix

Appendix A: University of South Australia academic calendar for study period (semester) 5, 2010.

	Holidays	
12-Jul-10	Mid-break	Prior 1
19-Jul-10	Mid-break	Prior 2
26-Jul-10		Week 1
02-Aug-10		Week 2
09-Aug-10		Week 3
16-Aug-10		week 4
23-Aug-10		Week 5
30-Aug-10		Week 6
06-Sep-10		Week 7
13-Sep-10		Week 8
20-Sep-10	Mid-break	Break 1
27-Sep-10	Mid-break	Break 2
04-Oct-10		Week 9
11-Oct-10		Week 10
18-Oct-10		Week 11
25-Oct-10		Week 12
01-Nov-10		Week 13
08-Nov-10	SWOT-VAC	Week 14
15-Nov-10	Exams	Week 15
22-Nov-10	Exams	Week 16
29-Nov-10	Holidays	Post 1
06-Dec-10	Holidays	Post 2

Core teaching and assessment period 26 July 2010 to 26 November 2010.
SWOT-VAC = Study Without Teaching Vacation (Australia).
Dark gray/shading = teaching period; light gray/shading = breaks.