

Tweet the Teacher: Using Twitter as a Mechanism to Increase Classroom Engagement

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Abstract

This paper presents details on a trial of the use of the Twitter social networking tool as a mechanism to engage students in the classroom, following on from a successful implementation trial last year which was reported on at ISANA 2011 (Novak & Cowling, 2011). Through the use of technology, students were able to tweet the lecturer during their class from their own device and have their queries appear on the lecture slides. Preliminary data analysis of survey data collected at the end of term shows that staff buy-in was a significant factor in the uptake of the technology in the classroom, with many students indicating that the use of the technology was not encouraged. Lessons learnt from the data analysis are presented along with theories on this lack of staff buy-in and suggestions to encourage these staff to engage with the technology.

Keywords

digital natives, twitter, social networking, student participation, engagement, classroom feedback, mobile computing.

Introduction

Over the last 10 years, the term “digital native” has been coined to describe those who grew up with technology, not knowing a world where technology was not a part of people’s everyday lives. These digital natives see the world differently than the previous digital immigrants and are involved daily with the use of social networking tools and technological mobile devices that keep them constantly connected to a global communications network. In fact, Smith and Caruso (2010) conducted a longitudinal research into the use of technology amongst USA undergraduate students and found that 93.5 % of 18 year olds and 95.4% of 19 year olds used social networking on a regular basis.

Further, a frequent complaint from academic staff is that undergraduate students are “passengers” in their classroom. While they attend, these students struggle to interact with the teacher and often pretend that they understand so as not to offend. This phenomenon is particularly apparent for international students, where cultural and social issues such as a desire not to contradict an authority figure or speak out for fear of reprisal are often blamed for their lack of participation. This research project surmises that this lack of participation by students in their chosen courses is resulting in a subpar understanding of the course content, therefore resulting in poor grades.

Using social networking tools, this project hopes to enable these “passengers” to become more active participants in their learning. Through the use of technology, students were able to tweet the lecturer during their class from their own device and have their queries appear on the lecture slides. After a successful implementation trial last year which was reported on at ISANA 2011 (Novak & Cowling, 2011), this model was rolled out to a course running on eight campuses of CQUniversity at the beginning of 2012.

A stratified survey was then conducted at the end of the term to collate data from staff & students and the data analysed. Details of the results of this survey are presented below, along with the theoretical model used and the literature it is based on.

Literature Review

There has been considerable international and national interest in recent years in developing learning and teaching initiatives to improve retention and progression, especially in regard to the engagement of students, particularly international students and distance students (Crosling et al., 2009).

In general, it is viewed that these international students are frequently passengers in class, not participating and engaging in learning activities (Ballard & Clanchy 1991, 1997). Similarly, distance students are seen to rarely interact with other students or the lecturers in their chosen course. It has been noted in the literature that effective, online learning (as experienced by distance students) must provide students with the opportunity to engage with lecturers and other students in the course to facilitate the learning process (Dunlap and Lowenthal, 2009).

In recent years there has also been considerable international and national interest in the academic literature about the integration of Information and communication technology (ICT) into an education setting. Moreover, there has been significant interest during 2011 in how ICT assists in the development of learning and teaching initiatives to improve retention and progression, especially in regard to the engagement of students, particularly international students and distance students (Crosling et al., 2009).

Coupled with this is the growth of ICT in all industries as a result of the information age. Due to this, the importance of online learning and the use of ICT in education sector and in general business has increased. Over the last 5 years there has been a substantial growth in the use of ICT among Australian students, in particularly the use of broadband and mobile devices that are used whilst networking at home or in an education setting. According to the Australian Bureau of Statistics (2011), in 2006 13.8% of students could not access the Internet at home and only 0.034% of all students had access to the Internet via mobile phones. However, by the next census in 2011, these statistics had changed dramatically, with 78.2% of all students accessing the Internet via broadband connection and 12.1% of all students accessing the Internet via mobile phones. This represents an increase of over 355% on the 2006 figures.

Combining this view of international students as “passengers” with this recent interest in technology provides an opportunity to address engagement with ICT. Technology such as Twitter has the ability to provide a new engagement paradigm in real time. Grosbeck and Holotescu (2007), Taylor, (2008), Bell & Kuon, (2009), and Skiba (2008) have all suggested that twitter can create greater conversations amongst students and facilitate an environment to ask questions, breaking down barriers that may exist in a class setting and enabling dialogue and collaboration among students (Robbins-Bell 2008; Monahan et al. 2008). Research also shows a high usage of this technology by students. Smith and Caruso (2010) conducted a longitudinal research into the use of technology amongst undergraduate students and found that 87.1% of students used social networking sites outside of the university environment. This correlates with the general population, where 93.5 % of 18 year olds and 95.4% of 19 year olds in the USA were found to use social networking on a regular basis.

However, despite this positive trend it appears to be contrary to what lecturers are doing in the classroom. It was determined that less than 8% of these students had access to this medium in a class setting (Taylor, 2008; Faculty Focus, 2009). This is despite more than 52.1% of academics in 2010 indicating that they have used Twitter (Smith and Caruso, 2010). The declining usage by lecturers and near nonexistent usage of social networking in the class setting is surprising as it is estimated that over 470 universities worldwide are using social networks such as ‘Facebook’ and ‘Twitter’ to communicate with students (Jucevičienė and Valinevičienė, 2010; Smith and Caruso, 2010). In fact, despite this positive investment in technology and the Internet there is an argument in the literature that the higher education sector has not effectively been using this technology in the engagement of students, rather technology has been utilized for administration purposes in the implementation of such things as e-mails and access to course material (Fung, 2004; Kirkwood, 2007).

These low numbers in the implementation of technology in the classroom may be a result of the lack of formal training and development that universities give academic staff in the area of ICT. What training has been provided has been traditionally based on short courses and little time is spent on didactical courses to educate teachers to use ICT (Awouters & Jans, 2009). The role of training and development in developing employees skills, competencies and capabilities is crucial to the success of any programs and moreover, training and development is of critical importance in developing a highly skilled workforce that can utilise technology, which subsequently enables businesses like those in the higher education sector to compete more effectively in today’s environment (Jones, 2005).

Formal training and development is imperative as lecturers and teachers begin to be confronted with a slew of new technologies that can have an impact on learning such as mobile devices, iPads, mobile computers and a persistent

Internet connection in every classroom. It is clear that the higher education sector and education sector along with staff will require some new strategies for teaching and learning (Harper, 2008).

Given this lack of use of social networking in the classroom, and despite the importance of engaging students for their positive development and retention, there is still a significant gap in the literature when drawing the correlation between using mediums such as Twitter for the retention and progression of students and increasing student participation through the feedback process in the class (Jucevičienė & Valinevičienė 2010). Nonetheless, the literature reveals that there is growing discussion about the positive and negative aspects of the use of social networking in the classroom (Derossi, 2007, Berg et al., 2007)

For instance, a review of the literature finds the common concern that social networking can be distracting for students and that students might use social networking tools to interact with friends rather than focusing on the course content (Grosbeck and Holotescu, 2008). The literature also reveals that many academics see 'Twitter' as a driver for a less intellectually demanding society and are therefore wary of the technology as a whole (Jucevičienė and Valinevičienė, 2010).

On the other side of the coin, the academic community argues that Twitter has some important characteristics for those who are participants in the class. These include its use as a student support feature; the ability for students to use social networking anywhere at any time on any computer with internet connection; the ability to share information with peers; the use as a real-time news source; and the assistance in building a picture of the content that is been discussed (Plaza et al. 2009; Selwyn 2009a, 2009b; Madge et al. 2009). Similarly other studies into social networking have found that it is a convenient tool for academic services (Berg et al 2007) that creates a student-centric environment that requires less control by the lecturer (Reynard 2008).

Overall, taking all of this into account, it's clear that universities have embraced social networking for other uses, but that the academic community only indicates cautious support for social networking in the classroom. It is also clear that some academics do not understand the technology or how it might fit into the traditional classroom model. These factors lead to a clear need for an overarching theoretical framework to define not only the technology, but how this technology might fit in with existing teaching and training & development practices.

Theoretical Framework

As mentioned above, whilst there are models and frameworks to evaluate educational software and quality in the academic literature (for example Jucevičienė and Valinevičienė (2010), Reynard (2008), Plaza et al. (2009) and Kennelly (2009)), all of these models looked at the use of social networking from the perspective of implementation of the system at the organizational level. In contrast, the focus of this work is different, looking at the use of social networking at a classroom level, as a tool to improve the progression and retention of students. Thus, a new theoretical framework has been developed to support this work (see Figure 1 and 2 below).

This theoretical framework is based on the training/learning & development process in the Human Resources discipline. Most theorists and practitioners agree that this framework has at least four steps or phases (see Figure 1). These include i) needs analysis, ii) delivery design, iii) delivery/lecture and iv) evaluation & feedback. From this, it can be seen that the success of a training/learning activity depends on correct execution of each stage of the process but it is the evaluation & feedback phase that affects what is attempted in the future (Huerta, Audet & Peregort 2006).

In general, evaluation of the training program is usually conducted at the end of the program (Al-Khayyat & Elgamal 1997; Smith, 1998). In doing so, Smith (1998) believes that the time to remedy any issues or shortfalls that arise from the evaluation may have passed. It is also viewed that often, training/learning programs fail due to the lack of ongoing evaluating and seeking feedback (Abdelgadir & Elbadri 2001). This research could help overcome these issues by utilizing Twitter to provide the students another avenue to give instant feedback, opinions or to ask questions at the time of the lecture/class. This therefore could aid in the engagement, progression and retention of the students and help in improving the performance of all stakeholders.

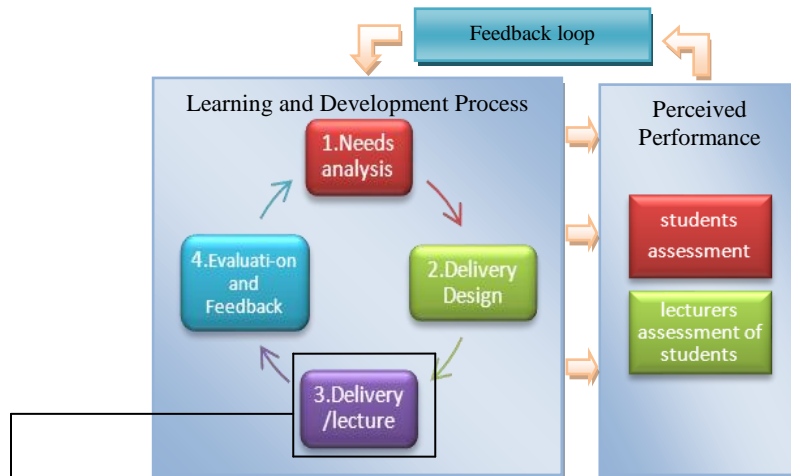


Figure 1. The Training/Learning & Development Process.
(Developed by Novak (2010).
Adapted from Al-Khayyat & Elgamal 1997; Smith 2006)

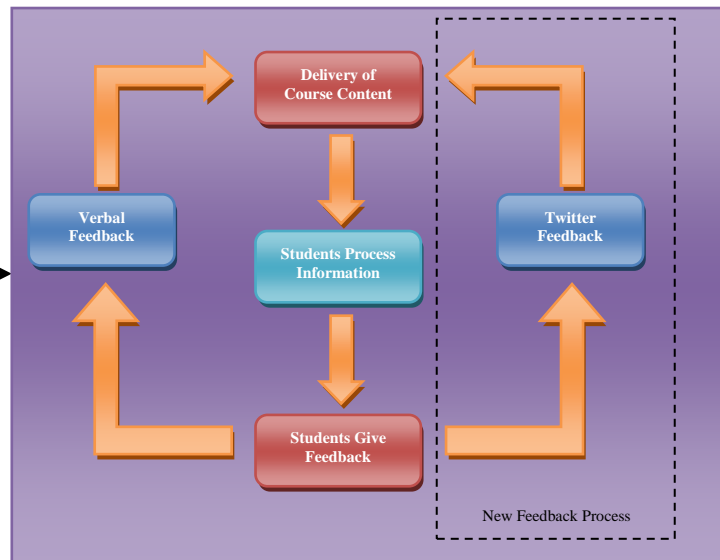


Figure 2. The inclusion of Twitter in the Delivery of a Lecture.
(Model developed by Novak & Cowling (2011))

Implementation

Following an initial implementation trial of this work across all four CQUniversity Metropolitan campuses, namely Brisbane, Gold Coast, Sydney, Melbourne in the course MGMT11165, delivered to Diploma students (reported on in Novak & Cowling, 2011), a subsequent trial was then conducted across eight campuses of the university, which included both campuses in Metropolitan areas as well as Regional Central Queensland campuses. On each of these campuses, the twitter tool was integrated into a first-year management course in Term 1, 2012 (MGMT11109). This course is studied by students in their first year, providing a good opportunity to trial the technology on students that have only just started their university studies. Support to conduct this research in this course was given by the Course Coordinator, the Dean of School and the Executive Dean of the Faculty.

Implementation was a challenge as this course is lectured by different staff members at each location and coordinated by a staff member on the Rockhampton campus. Lecturers on each campus were asked if they wished to be involved in the trial. Lecture slides were provided that included the twitter components and lecturers were instructed on their use. Twitter functionality in the lecture slides was achieved using a freely available product from enterprise solution organization SAP (<http://www.sapweb20.com/blog/powerpoint-twitter-tools/>). This product is written using Adobe

Flash and works under most common operating system and Microsoft Powerpoint combinations. An Internet connection is required for the SAP tool to operate successfully. The specifics components used from the SAP tool were the “PowerPoint Twitter Ticker Bar” and the “PowerPoint Twitter Feedback Slide”. More details on how these components were used is included in the methodology section below.

Methodology

It is important to note that the purpose of this project was not to analyse the individual tweets received from students, but rather to increase overall classroom participation and feedback within the classroom. While the tweets can (and should) be delivered to the course coordinator as a tool for improvement of course material, the protocols and research design methodology outlined below focus primarily on this goal of increased feedback and removing the student “passenger”. With this in mind, the main focus of any protocols developed should be on how to handle in-class feedback and manage the use of the twitter tools in the classroom. The following approach was taken:

1. Students were advised during the start of each class on how they can use the twitter tool. They were also asked to include a hash tag on each tweet (ie. #s1s2651) so that it will be displayed on the slides (note that it’s possible to filter tweets automatically for language using this process, but this didn’t prove to be necessary). A summary of this process was distributed as a presentation to staff by the course coordinator for staff to use.

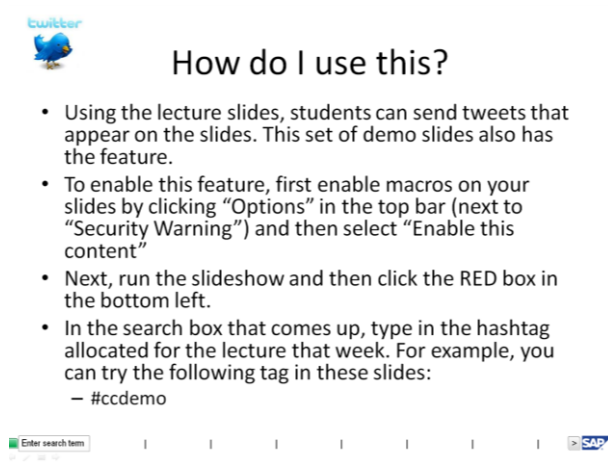


Figure 3. PowerPoint Instructions to Staff

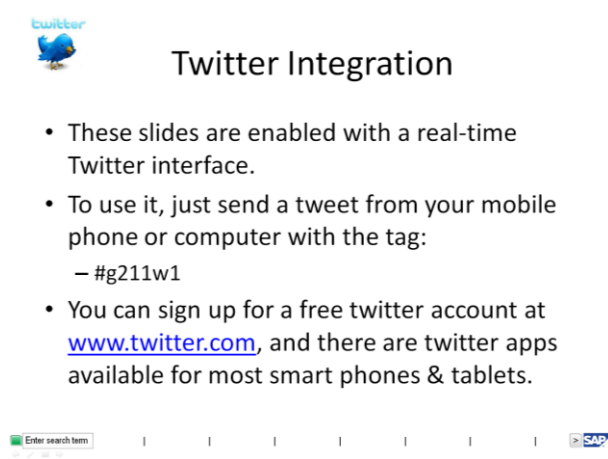


Figure 4. PowerPoint Instructions to Students

2. As students tweeted, these were displayed in the rolling “ticker” on the lecture slides (see below). Staff were then able to integrate this feedback into their lecture delivery, either by revising concepts again, or by stopping specifically to answer a question posed.



Figure 5. An example of the Twitter Bar on a slide

3. At the end of the lecture, staff would display a summary slide of all questions asked during the lecture (see below). They were advised to use this slide to check with students that all questions had been answered and concerns dealt with before concluding the lecture (N.B. the ticker remains at the bottom of the slides for the remainder of the presentation so that this can be done via twitter).

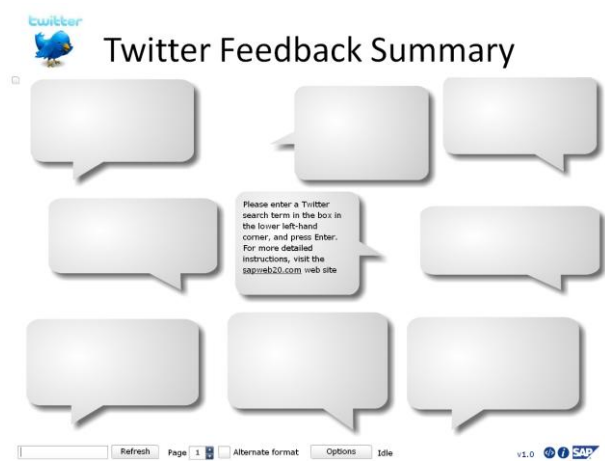


Figure 6. The Twitter Feedback slide

Data Collection

At the end of the semester, a stratified survey was conducted to collect data from students on their experience with the use of Twitter in the classroom. Students provided biographical and campus data as well as answers to questions relating to their enjoyment in the use of twitter and experience in the classroom. The data collection was done on a 5-point likert scale with students answering 16 questions and lecturers answering 22 questions in total. In addition, lecturers were also given the opportunity to provide free-form open comments in the form of an open-ended question at the end of the survey. A hardcopy of the survey was distributed to campuses, followed by an electronic version to students that had missed the hardcopy version due to non-attendance at class etc. Data from this stratified survey will be presented in the results section.

Results & Discussion

Results of the stratified survey are presented below. Analysis of this data is ongoing, but sufficient analysis has been performed to provide some insight into the hypotheses posed by this work. In particular, data has been analysed around the themes identified in the previous paper of i) Technology Competency of Staff; ii) Technology Competency of Students; iii) Resistance to Change. Data will be presented from both the staff and student survey, starting with the staff survey.

Staff Survey Results

Out of the eight campuses involved in this research only five lecturers distributed the survey amongst students. The three lecturers that did not distribute surveys also did not complete and return the lecturers surveys. This was unsurprising given that a review of the communications between these lecturers and the research team finds that there was only one way communication and these lecturers demonstrated high resistance to the use of this technology in the classroom. This is consistent with findings of the previous implementation trial (Novak & Cowling, 2011).

Further, examination of these three campuses finds that two campuses were those who had campus directors that did not want the research to go ahead in the previous study conducted. While it's unclear whether this was a factor in this implementation, it's notable that while staff were different, results from these campuses still could not be obtained. Finally, it should be pointed out that the last campus had a staff member that fell ill at the beginning of this research and subsequent lecturers did not receive a handover outlining this research. As the researchers were not informed of this change of staff, training was not provided to the new staff member.

Of the five campus staff members who did return the student and lecturer surveys the following results were obtained.

The demographics of the lecturers participating in this research finds that all academics were casual employees, four were female and one was male, all were in the age bracket of 41 to 50 years of age, and all but one had used social networking prior to this research. Two out of the five lecturers said that they encouraged the students to participate in the use of Twitter in the classroom, with two of the other three lecturers explicitly stating that they did not and the final lecturer stating that they did not encourage or discourage the use of Twitter in the classroom.

Further analysis of the data finds that four lecturers indicated that they did not enjoy using Twitter in the classroom, with only one saying that they enjoyed it. All lecturers strongly disagreed that the use of Twitter encouraged the students to ask questions verbally or helped some students communicate better with the lecturer, and they did not think that it helped students engage in the subject. Despite this view two out of the five lecturers said that having Twitter available was a good idea, two said it was not, and one was neutral.

One area that was highlighted from the implementation trial was that some lecturers said that they were distracted by the use of Twitter therefore lecturers were probed to gauge their response in this area. Only one of the five lecturers highlighted that they were distracted by the use of the ticker bar on the PowerPoint slides during class; however, this appears to be an isolated case as the other four said that they were not.

When lecturers were asked would they like to see Twitter implemented into other lectures only one said that they would. This was also reflective of the four lecturers as only one said that they enjoyed using Twitter in the classroom. From the data analysis it could be said overall lecturers did not encourage the use of Twitter in the classroom nor did they see the value of it to communicate with shy and international students. As a result one could conclude that the buy in of the lecturer was contingent to the encouragement portrayed to the students.

Student Survey Results

A total of 43 students completed the survey across six of the eight campuses (see above regarding the remaining two campuses). A review of the demographic data from the students finds that 65.1% (N=28) of participants were female and 34.9% (N=15) were male. The age demographics finds that there were 72.1% (N=31) 15 to 25, 9.3% (N=4) 26 to 30, 11.6% (N=5) from 31 to 40, 4.7% (N=2) 41 to 50 years of age and there were no people above 61 years of age and above (see Figure 7). 59.1% (N=25) of assessors were international students and 39.5% (N=17) identified themselves as domestic students.

From the students that participated in this survey 83.7% (N=36) identified that they had used social networking before the commencement of the subject however, interestingly only 18.6% (N=8) of participants highlighted that they had a

Twitter account (see Figure 8). Although a small sample size, this data supports the findings of Smith and Caruso (2010) that showed around 90% of USA undergraduate students had used social networking before, but also demonstrates the assumption that social networking usage equates to Twitter usage is potentially flawed. In further work it would be interesting to investigate the types of social networking students are referring to when they indicate that they have used social networking, as this would inform how social networking might be used in the classroom, with an additional barrier of entry for students into this study clearly being the need for many to create a Twitter account in order to participate.

When it came to the use of social media in an education setting 4.7% (N=2) said that they had used it at high school; 2.3% (N=1) said that they have used the medium at a tertiary college (TAFE or a similar RTO); with no student identifying that they have used it in a university sector. This is consistent with statistics presented by Taylor (2008) and Faculty Focus (2009) indicating that only 8% of students had used social networking in a classroom setting. However, interestingly, this also goes against statistics provided by Smith & Curuso (2010) and Jucevičienė & Valinevičienė (2010) that indicated that over 470 universities worldwide use social networking. It could be the case that this shows a difference between Australia and other countries in the use of social networking in tertiary education settings, but further work would be required to tease out these details further.

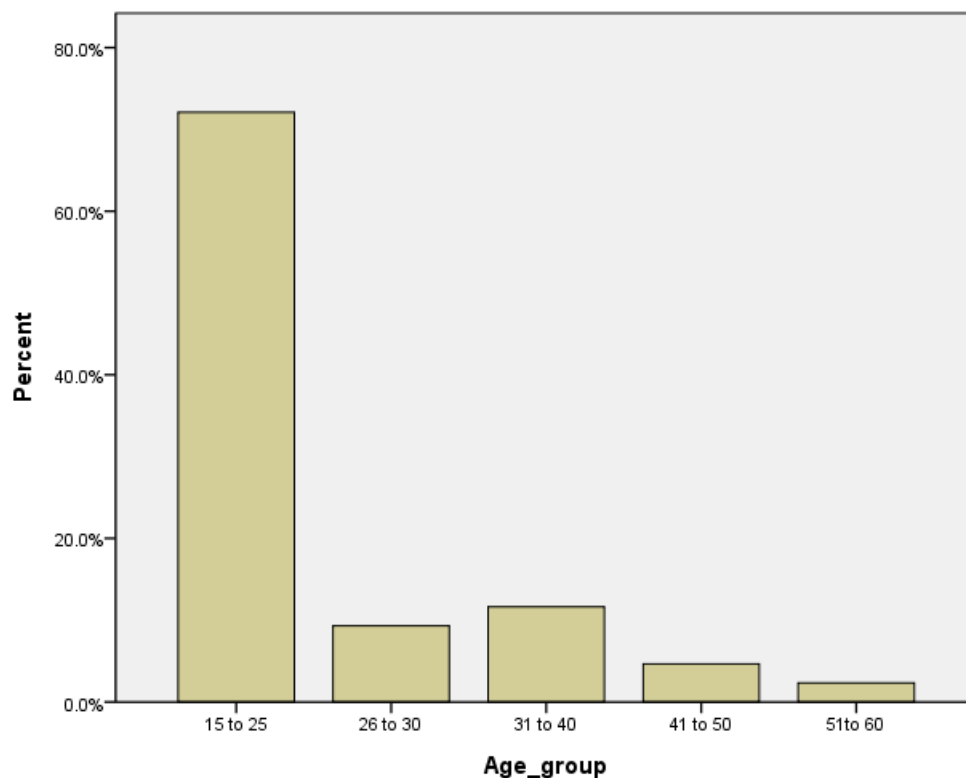


Figure 7. Student Age Demographic Information

When it came to the use of Twitter in the classroom for this research 14% of students (N=6) said that they did use Twitter during class, while 86% of students (N=37) said that they did not. This is in contrast to the previous implementation trial that had a much greater uptake of the technology and may possibly be attributed to the level of students studying this course or the semester it was being studied in. Alternatively, engagement of staff with the Twitter feedback method (as outlined in the section on staff surveys above) may have also been a factor.

Of the students that identified that they used Twitter in the classroom, only one student indicated that they did not enjoy using Twitter; with the other five agreeing to strongly agreeing to the question posed. These five students found that it helped them communicate better, with all five highlighting that it gave them confidence in asking questions verbally and four strongly agreeing. In addition to this, all five students highlighted that it helped with their studies. It therefore could be stated that the students that participated in the use of Twitter in the classroom had an overall

positive experience and that, moreover, the technology helped them engage in the class in both mediums of verbal communication and in text format, with the end result being a perceived improvement in their studies.

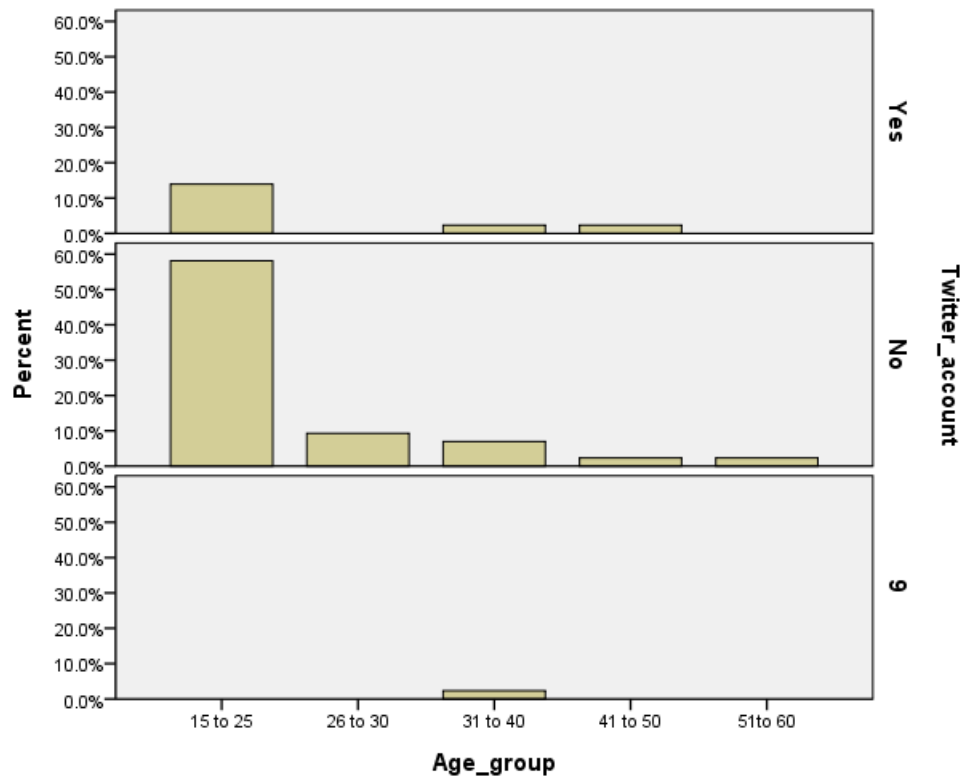


Figure 8. Possession of a Twitter Account by Age

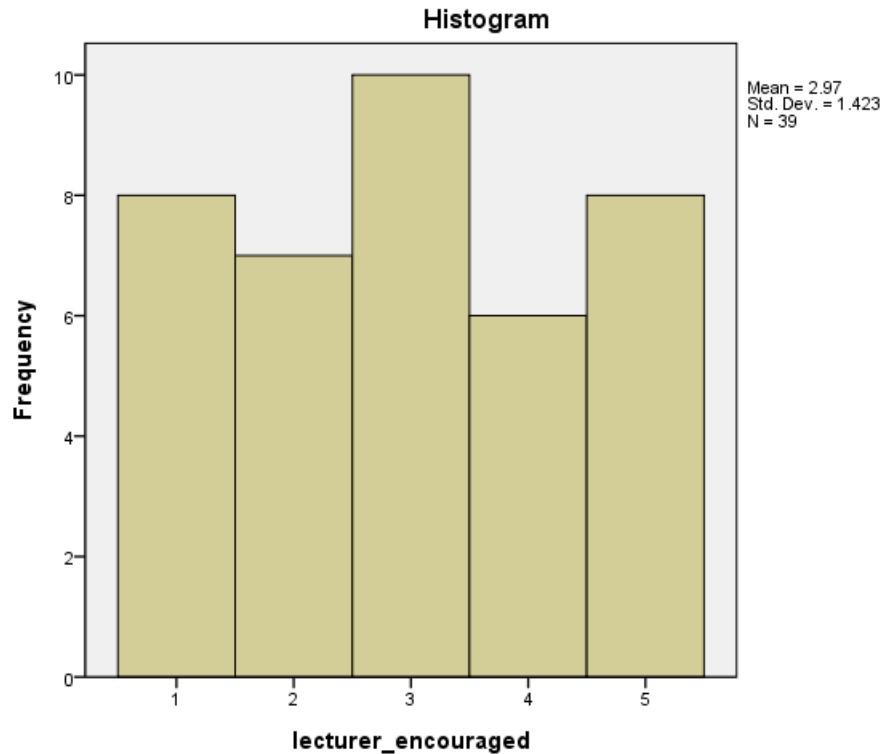


Figure 9. Lecturer Encouragement on the Use of Twitter

All students were asked whether they thought having Twitter available was a good idea. 16.3% (N=7) of students strongly disagreed 25.6% (N=11) disagreed, 37.2% (N=16) were neutral, 11.6% (N=5) agree, and 7% (N=3) strongly agree. The question about the implementation of twitter into other lectures promoted similar responses. When asked if the use of Twitter in the classroom distracted them results indicated that 55.0% (N=23) of participants said that it did not distract them during class and 44.2% (N=19) said that it did.

Finally, when it came to the perception of students on the lecturer encouraging the use of Twitter in the classroom 16.3% (N=7) strongly disagreed, 32.6% (N=14) cent disagreed, 25.6% (N=11) were neutral, 9.3% (N=4) agreed, and 9.3% (N=4) strongly agreed (see Figure 9). A bivariate correlation was undertaken between Twitter use in the classroom and the perceived encouragement of the lecturer. It was hypothesised that a positive relationship exists between these two variables. The results of the correlation indicate that higher participation scores are associated with encouragement of the lecturer ($r=.109$, $p>.05$).

Discussion

Results from this study strongly support those indicated during the implementation trial in 2011. In particular, staff engagement with the technology continued to appear to be a problem during this implementation, with the majority of staff indicating that they either did not use the technology or did not feel that the technology would be helpful to students. This is supported by the literature, with the study by Awouters & Jans (2009) indicating a lack of formal training and development of staff in the use of ICT resources. Work such as that by Harper (2008) also correlates with this need to educate teachers for the digital world in order to get them to buy in to this new technology. Further, anecdotal evidence suggests that campus resistance to change is still a factor, although this was not investigated explicitly in this study.

From a student perspective, it is clear from these results that the majority of students are “digital natives” and are comfortable with technology and with social networking, consistent with the results from Smith & Caruso (2010). However, an interesting outcome of this study is that despite a high-uptake of social networking amongst these students, uptake of the Twitter tool especially is quite low. This challenges the assumption made by the researchers that Twitter was common amongst digital natives and further investigation would need to be undertaken to determine if this was a significant driver of the results. In particular, it would be interesting to investigate whether the need to adopt a new social networking technology is a significant barrier of entry for digital native students to use social networking to engage in the classroom.

Finally, the results around the use of Twitter as an engagement tool are mixed. Those students that used Twitter to provide feedback universally reported a positive experience that they feel helped them to communicate with staff better, gave them more confidence and ultimately helped them with their studies. However, amongst the survey group a large number of students still did not engage with the technology. It’s unclear whether this is due to the lack of engagement by staff, the unfamiliarity with the technology or other factors that have not been identified. However, through the correlation analysis, it is clear that staff encouragement plays a large factor in the uptake and use of the technology. It would therefore appear that staff using and encouraging the technology is an important consideration.

Conclusions

Interestingly, initial conclusions from this work mirror those of the work done in 2011. It is now clear from the survey results that students are comfortable with the technology and willing to adopt it. However, it is also clear that a significant amount of work remains to be done to make sure that staff adopt the technology and encourage its use in the classroom. Campus resistance also continues to appear to be a factor.

Nonetheless, the researchers still believe that the use of social networking in the classroom provides a mechanism that will encourage contact between students and Faculty. This initial implementation shows that as children of the 21st century, most of our students are already firmly entrenched in the social networking paradigm (through facebook, myspace, twitter etc), so the use of a technology that is specifically from their existing suite of familiarity creates the potential for significant uptake by students (Smith and Caruso, 2010). While this work may show that not as many students use Twitter as previously thought, it is clear that the majority of students are digital natives and are very comfortable with the use of technology and it should be incorporated into the classroom as much as possible.

In the conclusion to the previous paper, the authors postulated that the problem was one of technology competency, with staff not being comfortable with the technology and therefore hesitant to use it. However, the results of this survey suggest that the problem is broader than a technology competency problem and is actually more related to technology culture. While students are predominantly digital natives, the staff teaching them are “digital immigrants”, not used to the use of technology in the classroom. The survey results support this position, with staff predominantly unwilling to implement the technology in their class. Further work should therefore focus on how a technology culture can be encouraged in these digital immigrant staff so that they will take up this technology and use it in their classroom to educate students that are clearly ready to work with ICT.

References

- Abdelgadir N & Elbadri, A 2001, 'Training practices of Polish companies: an appraisal and agenda for improvement', *Journal of European Industrial Training*, vol. 25, no. 2, pp. 69-79.
- Al-Khayyat, RM & Elgamal, MA 1997, 'A macro model of training and development: validation', *Journal of European Industrial Training*, vol. 21, no. 3, pp. 87-101.
- Australian Bureau of Statistics, Business use of information technology, 2009 -10, 2011, Australian Bureau of Statistics, Australian Bureau of Statistics, Canberra.
- Awouters, V & Jans, S 2009, 'E-Learning Competencies for Teachers in Secondary and Higher Education', *International Journal of Technologies in Learning*, vol. 4, no. 2, 2009. Australian Bureau of Statistics, Education and Work, Australia, 2011a, Australian Bureau of Statistics, Australian Bureau of Statistics, Canberra.
- Ballard, B & Clanchy, J 1991, *Teaching Students from Overseas*, Longman, Melbourne.
- Ballard, B & Clanchy, J 1997, *Study Abroad: a manual for Asian students*, 2nd edn, Kuala Lumpur.
- Bell, M.A. & Kuon, T. 2009. Home alone! Still collaborating. *Knowledge Quest*, vol. 37, no. 4, pp. 52-55
- Berg, J., Berquam, L. & Christoph, K. 2007. Social Networking Technologies: a "Poke" for Campus Services *Educause Review- Educause*, vol. 2, pp. 52-55.
- Crosling, G, M. Heagney & L.Thomas 2009. Improving student retention in higher education, *Improving Teaching and Learning Australian Universities Review*, vol. 51, no. 2. pp. 95-101
- Derossi, L. 2007. Online Social Networking And Education: Study Reports On New Generations Social And Creative Interconnected Lifestyles Robin Hood. - The National School Boards Association.
- Dunlap, J. C. & Lowenthal, P. R. 2009. Tweeting the Night Away: Using Twitter to Enhance Social Presence. . *Journal of Information Systems Education*, vol. 20, pp. 129-136.
- Faculty Focus 2009. Twitter in Higher Education: Usage Habits and Trends of Today's College Faculty. Retrieved January 2010, from Faculty Focus: <http://www.scribd.com/doc/19253028>.
- Fung, YH 2004, 'Collaborative Online Learning: Interaction patterns and limiting factors', *Open Learning*, vol. 19, no. 2, pp. 135-49
- Grossek, G. & Holotescu, C. 2008. Can we use twitter for educational activities? The 4th International Scientific Conference eLSE "eLearning and Software for Education". Bucharest.
- Harper, D 2008, *Education for a Digital World, Advice, Guidelines and Effective Practice from Around the Globe*, 2008, BCampus and Commonwealth of Learning, Vancouver, Canada.
- Huerta, ME, Audet, XL & Peregort, OP 2006, 'In-company training in Catalonia: organizational structure, funding, evaluation and economic impact', *International Journal of Training and Development*, vol. 10, no. 2, pp. 140-65
- Jones, J 2005, 'The determinants of training in Australian manufacturing SMEs', *Education and Training*, vol. 47, no. 8/9, pp. 605-15
- Jucevičienė, P. & Valinevičienė, G. 2010. A Conceptual Model of Social Networking in Higher Education. *Technological Sciences*, vol.102, no. 6.

- Kennelly, P. 2009. An Online Social Networking Approach to Reinforce Learning of Rocks and Minerals. *Journal of Geoscience Education*, vol. 57, no. 1, pp. 33-40
- Kirkwood, J 2007, 'Igniting the entrepreneurial spirit: is the role parents play gendered?', *International Journal of Entrepreneurial Behaviour & Research*, vol. 13, no. 1, pp. 39 - 59
- Madge, C., Meek, J., Wellens, J. & Hooley, T. 2009, Facebook, social integration and informal learning at university: 'It is more for socializing and talking to friends about work than for actually doing work'. *Learning, Media and Technology*, 34(2), 141-155.
- Monahan T., McArdle G., Bertolotto M. 2008. 'Virtual reality for collaborative e-learning,' *Computers & Education*. – Pergamon Press, 2009. vol 4, no. 50, pp. 1339–1353
- Novak J. P & Cowling, M. A, 2011. "The Implementation of Social Networking as a Tool for Improving Student Participation in the Classroom", *Proceedings of ISANA International Education Association 22nd Annual Conference*, Hobart, TAS, 29th November – 2nd December, 2011.
- Novak, J. P. 2010, 'Training and development in Queensland SMEs', in J Cottor (ed.), *Research methodology*, University of Southern Queensland, Former, vol. 3.
- Plaza, I., Igual, R., Marcuello, J. J., Sanchez, S. & Arcega, F. (2009) Proposal of a Quality Model for Educational Software European Association for Education in Electrical and Information Engineering Conference Proceedings.
- Reynard, R. 2008. Social Networking: Learning Theory in Action. *The Journal Transforming Education Through Technology*, vol. 1, no. 1, pp. 2-5.
- Robbins-Bell, S. 2008 "Higher Education as Virtual Conversation" *EDUCAUSE Review*, vol. 43, no. 5
- Selwyn, N. 2009a, Face working: exploring students' education-related use of Facebook. *Learning, Media and Technology*, vol. 34, no. 2, pp. 157-174.
- Selwyn, N 2009b, 'The digital native – myth and reality', *Aslib Proceedings*, vol. 61, no. 4, pp. 364 - 79
- Smith, A 1998, *Training and Development in Australia*, 2nd edn, Butterworths, Sydney.
- Smith, A 2006, 'The development of employer training in Australia', *Education and Training*, vol. 48, no. 4, pp. 252-61
- Smith, S. D. & Caruso, J. B. (2010) *The ECAR Study of Undergraduate Students and Information Technology*. Bolder ECAR and University of Wisconsin-Madison.
- Skiba, D. J. 2008. Nursing education 2.0: Twitter & tweets. Can you post a nugget of knowledge in 140 characters or less? *Nurs Educ Perspect*, vol. 29, no. 2, pp. 110–112
- Taylor, D. 2008, Winter2008.. Connect you to humanity? *Phi Kappa Phi Forum*, vol. 88, no. 4, pp. 18-21.

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