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Is Twitter for the Birds?
Using Twitter to Enhance Student Learning in a Marketing Course

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Is Twitter for the Birds?

Using Twitter to Enhance Student Learning in a Marketing Course

Abstract

Recent years have seen unprecedented possibilities for the use of different technologies to enhance learning in marketing courses. Given the rapid and widespread diffusion of these technologies, particularly within the demographic of the student population, it is pertinent to explore and examine how such technologies can benefit student learning. This article discusses and empirically evaluates students' experiences of using Twitter as a tool to facilitate learning in marketing courses. While Twitter's unique characteristics were used to enhance and facilitate the learning of marketing concepts, the use of Twitter also helped to illustrate marketers' use of innovative technologies, and therefore added valuable contemporary curriculum content. Using in-depth interviews, and a questionnaire to evaluate learning outcomes, this research concludes that students' perceptions of using Twitter were largely positive, though some anticipated and unanticipated barriers emerged to incorporating Twitter into marketing courses. Recommendations for adopting Twitter into the marketing curriculum are made, and future areas for research are identified.

Introduction: Technology and Learning in Business Schools

As technology proliferates educators have been able to experiment with new ways of communicating with students. For instance, recent research has examined the use of blogs as assessed items in marketing courses (Kaplan, Piskin and Bol, 2010), the development of "Wikis" to create interactive textbooks (Pitt et al, 2009; Cronin, 2009), the use of SMS messages to enhance and support student experiences (Jones, Edwards and Reid, 2009) and the use of Virtual Learning Environments (VLEs) to create interactivity and responsiveness in the learning environment (Paladino, 2008). Typically these technologies are attributed with enhancing experiential learning and the development of "soft skills" (i.e., student abilities to communicate, be creative and get involved in team work). However, as noted by Salmon (2005, p. 213), "Most of the newer widely used technologies… have not been developed for learning and need good understanding of potential teaching applications to be successful in new contexts". With rapid adoption of Web 2.0 technologies among the student population and a gap between student take up and academic take up of Web 2.0 technologies (Barnes and Tynan, 2007), it would seem pertinent to evaluate the learning benefits to students of using these new technologies within the classroom.

The research reported here begins to bridge this gap by illustrating how Twitter (http://twitter.com/), one of the world's fastest growing social networking services, can be used within a marketing course to enhance learning outcomes. Thus we address the question "Does the use of Twitter have positive learning outcomes in a marketing course?" Using qualitative and quantitative research we evaluate Twitter's contribution to learning in a marketing course and find it is perceived positively by students, although some issues with its adoption are also noted,

consistent with other research in the adoption of technology for learning purposes (Jones, Edwards and Reid, 2009; Sharples, Taylor and Vavoula, 2007). We conclude by presenting recommendations for the use of Twitter.

What is Twitter?

Twitter is a simple social networking tool designed to let users communicate "what am I doing now?" Akin to a text message, Twitter enables users to communicate messages of up to 140 characters to followers (people who have signed up to listen to a user's tweets). Despite being only 140 characters the tweets can be augmented by the use of URL shorteners which allow the Twitter user to shorten any web address to around 20 characters. For example with web tools such as http://bit.ly/ one may shorten a web address of any length to something such as http://bit.ly/dhe0kh. This significantly increases the robustness of Twitter for educational purposes and allows the user to direct followers to other resources (websites, journal articles, advertisements etc.). Twitter has grown exponentially recently (Google Trends, 2010) and is within the 10-20 most visited websites (Alexa.com, 2010), with over 1000% growth in the number of visitors during 2009 (McGiboney, 2009). Twitter is used extensively by individuals, organizations (e.g., http://twitter.com/MacysINC) and politicians (http://tweetcongress.org/, http://twitter.com/DowningStreet) to communicate concise and timely nuggets of information with others. However, recent research into Twitter has shown it to offer a variety of benefits in academic settings too (Cann et al, 2009), yet these remain largely unexplored because of Twitter's relative novelty.

Recent research shows Twitter is used by around 20% of internet users to provide status updates, and is a popular social networking site among younger age groups (Fox, Zickhur and

Smith, 2009). The research also shows the median age of Twitter users is lower than other popular social networking sites such as Facebook, suggesting its applicability to the student cohort.

Twitter is also an emerging business tool used by a variety of global brands including American Airlines, Tesco, Whole Foods Market, Starbucks and Marks & Spencer. As such it does not just provide a way to communicate with students, and its benefits are far more pervasive to marketing and business education in general. Businesses use Twitter to communicate promotional offers, post company news and perform important, timely public relations announcements, providing customer feedback. It is also an important channel to stimulate and track Electronic Word Of Mouth (EWOM). Consider for example the benefits to marketers of being able to track Twitter users' tweets, in real time, via sites such as Twitter Monitter (http://monitter.com/), during important events such as the launch of the film Avatar, or Toyota's recent car recalls. As such Twitter can also be used to enhance student learning of cutting edge marketing practices, and marketers' use of new technology.

Twitter: The Poor Man's Email?

Google CEO Eric Schmidt has referred to Twitter as the "… poor man's email…", primarily because applications such as Twitter share similarities to email but do not provide a full offering as email does (Frommer, 2009). As such, with the plethora of different technologies and social networking sites available, a natural question one may first ask is "why can't I just email students?" or "why can't I use Facebook?" Broadly speaking, Twitter is not a substitute for other learning technologies such as email, and research on the use of SMS messaging (Jones, Edward and Reid, 2009), an analogous but less powerful learning technology to Twitter, suggests that

such forms of communication, due to their conciseness, are best considered to be supplements within the learning environment. However, Twitter does offer a number of unique features which can add value to the student experience.

Conciseness: One of the key benefits of Twitter is the conciseness of the tweets. Writing the tweets forces the user to be focused and communicate important bursts of bite size information that are easily digestible. This means that students are more likely to read the short messages (just like a text message), rather than if separate emails were sent instead. As such researchers evaluating the use of SMS in conjunction with face-to-face methods have reported benefits in terms of gaining attention, creating accessibility and providing convenience (Jones, Edwards and Reid, 2009). Concise tweets are also easier and less burdensome for the academic because if, say, 40 tweets were sent in a course this would be much quicker than sending 40 emails – the tweets are quicker to write and do not need a list of phone numbers or email addresses. However, while conciseness is seen as a limitation by some (i.e., you can write so much more in an email), there are ways to overcome these limitations in Twitter to "link out" of the message.

Robustness: Thus, while maintaining many of the benefits of SMS messaging, Twitter is more powerful and more robust than SMS messaging. One important feature of Twitter is the use of URL shorteners such as http://bit.ly/ and http://tinyurl.com/. URL shorteners enable the user to link out to other material online. For example, one might read an article in The Financial Times and want to convey this to students by tweeting "Managing WOM when something bad happens. Maclaren and brand equity: http://bit.ly/3VF3OS".

Convenience: Twitter is more convenient than many other technologies and can be used on an individual's cell phone just like a text message (alternatively one can use a web enabled phone, and download a Twitter app). The user can tweet wherever and whenever they want,

subject to any costs charged by their mobile phone provider, as the service can be routed through a mobile phone and used just like a text message. This considerably enhances the flexibility and convenience of Twitter. For example, if one was walking around a local supermarket and wanted to raise the issue of differences in consumer response to different promotional offers in a supermarket by tweeting "Why do retailers use BOGOFs rather than discounts?" one could simply send a brief text message that would appear online instantaneously as a tweet

Non-intrusive: There are many other social networking sites which enable users to communicate exactly the same information as Twitter. For example, Facebook allows users to provide status updates in the same way as Twitter. However, sites such as Facebook link to other aspects of a user's social life and may be viewed to be intrusive in a classroom setting (Sharples, 2007, p. 25). Such concerns have also been reported by Rheingold (2004) and Markett et al (2006) where the use of mobile devices can become an extension into a student's social space and can blur conventional boundaries if interweaved with more conventional face-to-face interactions.

Twitter removes this potential intrusion (although can also allow it) because followers may simply follow the tweets of the course, thus there is no necessity for two-way interaction. However, two-way interaction is also possible without social intrusion through the use of hashtags. A hashtag is a popular way of providing users with targeted searching capabilities. For example if one wants to see what Twitter users are saying about the film Avatar one only needs to search for "Avatar" on Twitter's site. Within each tweet a user could include a unique search term preceded by a "#" symbol, for example, one's course code (let's say #MK101), and this will enable followers to simply search for any tweets relating to this hashtag. Thus followers can

follow all tweets relating to a course and the instructor can also see what people are tweeting about in regards to the course, without any need to become socially intrusive.

Students' Learning Habits: Using Twitter also provides other benefits and access to other information about students' learning habits. For example, bit.ly, the URL shortening service, enables tracking of how many people have clicked on a link, how many conversations were started about the tweet and other useful information.

Thus, tweeting is just as convenient and flexible as an SMS message, yet it is more powerful. It is also more convenient, less time consuming and easier than emailing, and overcomes the need to cross social barriers involved with sites such as Facebook. Twitter has other applications such as Twitpic (http://twitpic.com/) to make it even more robust and one can download a Tweetdeck (http://www.tweetdeck.com/) to make using and managing Twitter even more seamless. Finally, other useful analytical tools include tweet clouds (http://tweetcloud.com) which analyze users' tweets.

Anticipated Pedagogical Benefits of Twitter

We anticipate two broad pedagogical benefits to the use of Twitter in a marketing course. Primarily, Twitter provides educators with the ability to bring real-world marketing concepts to the class in a timely fashion. For example, as marketing stories unfold in the popular press concepts can be communicated to the class instantly, bringing fresh, contemporary examples as they occur. The tweets, supplemented by shortened web addresses, can enable the class to access up-to-date and relevant news stories instantaneously. One example to illustrate this was a tweet based upon a news story which was commenting on the need to tax cheap alcohol as a result of various social issues. The tweet read: "An example of the social implications of low prices

http://bit.ly/aNHt2E .... and we thought low prices were better!". Similarly one can tweet illustrative marketing concepts as and when they are seen. For instance, one tweet read "Just bought some kitchen knives - have been on "sale" for at least 12 months!! When is a sale a real sale? When is pricing deceptive?" Such tweets can either be used as the basis for subsequent class discussion or to provide illustrations of pertinent marketing concepts in practice, in this case to challenge students to think about the ethical issues of pricing and the degree to which consumers adapt to reference prices and other marketing information. As such we expect the use of Twitter to lead to benefits in regards to a more up-to-date course with better linking between theory and practice in a contemporary manner. However, Twitter also serves a secondary purpose by simultaneously allowing marketing concepts to be taught by the use of Twitter. For example, if one wanted to teach concepts in observational research or EWOM, one could use the Twitter Monitter site to analyze the Tweets in regards to popular themes and contrast this with other methods of data collection such as surveys. Thus Twitter can be used as an example in a variety of ways to illustrate different aspects of curriculum content. We also expected to see benefits in regards to interactivity between participants.

However, it should be noted that acceptance of new technology is an area of study in its own right, and the literature on diffusion of innovations (Rogers, 2003) and the Technology Acceptance Model (Davis, 1989) is suggestive of the strong influence of students' perceptions on the take up of new technologies in the learning environment. Reactions to new learning technologies have often been seen to be negative as well as positive (Sharples, 2007). For example, Horstmanshof (2004) suggests that new learning technologies can place further burdens on staff because new communication channels are added. Similarly, we expect some degree of resistance to the use of Twitter in the learning environment. Such concerns have been voiced in

regards to the adoption of other learning technologies. For example, Jones, Edwards and Reid (2009, p. 204) note "The introduction of mobile communication into an academic environment is not a panacea – it can bring problems as well as solutions". We expect there to be some degree of resistance to the adoption of yet another technology. Students are confronted with a variety of different technologies to assist them in their learning so they are likely to question the relevance and value of Twitter relative to other current alternatives.

Method

Assessing Twitter's Contribution to Student Learning

We implemented the project in a postgraduate marketing course of 123 students. Participation was entirely voluntary. Students were first introduced to Twitter and a "Twitter Briefing" was provided to students, outlining information about Twitter, how it would be used in the course, and how they should get started. Students were asked to follow the tweets of the course and 80 students did so (65%). Below are examples of the tweets which were designed to:

- Alert students to recent marketing events (e.g., "Will a downward stretch and a lower price point hurt the Jimmy Choo brand? http://bit.ly/6g3LBh")
- Disseminate further information on contemporary marketing issues (e.g., "See what McKinsey & Co have to say about pricing digital media: http://bit.ly/231A2H, this is a classic "reference price" issue")
- Disseminate timely examples of key concepts discussed in class (e.g., "Managing WOM when something bad happens. Maclaren and brand equity: http://bit.ly/3VF3OS")

- Raise issues based on concepts discussed in class to encourage introspection (e.g., "Why do retailers use BOGOFs rather than discounts?").

After eight weeks of tweeting to the class we then sought to examine student perceptions of Twitter as a pedagogical tool. Students' perceptions of Twitter in the marketing course were examined qualitatively, to initially provide unstructured, free flowing insight into students' experiences with Twitter, and to further develop a quantitative follow up study.

Exploratory Interviews

First we conducted semi-structured in-depth interviews to determine the main benefits and barriers to using Twitter and to refine the survey we planned to distribute. An email was sent out asking students if they were willing to be interviewed for up to one hour. From the initial email 10 students attended the appointments provided. The interviews were balanced with 5 followers, that is participants who followed the module tweets, and 5 non-followers. Followers were questioned around the themes of how they used Twitter during class, the degree to which they found Twitter useful and ways in which its application could be improved. Non-followers were questioned around the theme of why they did not use Twitter in class and what they thought were the main impediments to its use.

In general the followers found Twitter to be useful. For example Respondent 1 commented "…they make the marketing module more practical. Through the links you can relate what you have learnt in class to examples". Respondent 2 noted the relevance of Twitter and how it kept students current, stating "The tweets were useful and Twitter is experimental, it's good to keep up-to-date", with related comments from Respondent 4, "it did help us in a way get some extra

information and it is a novel tool". Respondent 3 saw the tweets as a way of keeping engaged with the module stating, "I have used it as a notice board to keep in touch with the course and used the links to articles and journals for research", with similar comments from Respondent 5, "It is my channel to go to other websites when the lecturer has posted so I can get more information about marketing". However, even among the followers, who would be expected to have a positive outlook towards Twitter, there were reservations about tweeting back with Respondent 4, for example, stating "Maybe they will not want other guys knowing what they ask, or I think asking professors in person will be more efficient".

As one would expect, the non-followers were more skeptical. For example, Respondent 6 commented "Twitter is just not important" and Respondent 7 commented "It is just another thing that you have got to learn and check on". Respondent 9 made comments which reinforced this view of Twitter being a further burden stating "I don't like to sign up to too much especially if the problem is already being addressed. I already use Facebook and update my status almost daily, and only really have interest in what those I socialize with have to say." This comment was echoed by Respondent 10 who stated "…most of my colleagues still use Moodle and I thought the information on Twitter should generally be the same as Moodle". A further comment that could explain the lack of interactivity came from Respondent 8 who commented on Twitter etiquette saying "It's kind of normal a lecturer tweeting to you but you would be crossing a line tweeting back". This comment is similar to that of Respondent 4, a Twitter follower, and shows the importance of the social context in which education operates.

Such concerns may explain the lack of tweeting for some of the students, and others, but Jones, Edwards and Reid (2009, p. 213), acknowledging the concerns of Sharples (2007), find and argue the opposite in relation to the use of SMS messaging, stating "We have argued that the

highly personal nature of texting as a communication medium can represent a powerful tool for enhancing traditional teacher immediacy strategy and thereby contribute to narrowing the psychological space between tutor and students".

Therefore, in summary followers found Twitter to be useful, novel, and it allowed them to relate classroom material to real-world examples. However, Twitter's main barriers appeared to be its relevance and popularity as a social networking tool, the necessity to learn and use a new technology and reluctance in regards to tweeting back.

The Survey

We then conducted a quantitative follow up study to ascertain the degree to which Twitter enhanced learning outcomes in the course. Those students who followed the tweets were surveyed using published learning outcome measures from the literature (Kaplan, Piskin and Bol, 2010), as well as some newly developed measures specific to this project. The new measures were designed to represent Twitter's unique context and were derived from the in-depth interviews (see Appendix for the final measures used). Respondents were asked to respond to 46 statements using Likert scales anchored from 1 (Strongly disagree) to 5 (Strongly agree). The questions exhibited good reliability indicated by a high Cronbach's alpha ($\alpha = .981$). Of those students who followed the tweets of the course, 37 (46%) responded to the first section. A separate section of the survey designed for followers and non-followers used questions from the Technology Acceptance Model (TAM) to ascertain key factors influencing usage (Davis 1989; Stern et al. 2008). Participants were asked to respond to statements on Likert scales anchored by 1 (Strongly disagree) and 7 (Strongly agree), to measure perceived usefulness (PU), perceived

ease of use (PEOU), and usage intention (UI). All measures indicated good reliability (α_{PEOU} = .884; α_{PU} = .979; α_{UI} = .939). In total, 51 followers and non-followers responded.

Results and Discussion

Take up of Twitter: In general, take up of Twitter was good with over 65% of the course voluntarily following the course's tweets. However, interactivity among students was limited and few tweeted back. It could be that, given the size of the course, and the newness of the communication medium, students were reluctant to tweet and become too involved. While Twitter can be anonymous if one has generated an anonymous username, many choose to identify themselves. Therefore, the lack of interactivity could also have occurred due to a lack of anonymity; in the same way that some students are more reluctant than others to participate in a conventional classroom setting. This might be exacerbated by the fact that active use of Twitter was new to some of the students.

Learning Outcomes for Followers: From the results in the Appendix, 93% of the means are above 3 (the scale point indicating neutrality or "no difference"). We used simple one-sample t-tests to statistically determine if the anticipated learning outcomes had been achieved through the use of Twitter. Of the 46 anticipated learning outcomes, 80% were statistically different from 3. This is a promising indication of Twitter's contribution to student learning outcomes in a marketing course. To summarize Twitter's different contributions to learning outcomes, the items were retrospectively classified into a summary of the broad benefits of using Twitter in a marketing course, which included enhanced learning about the subject of marketing, a more enjoyable module, concise and useful communication, timeliness, greater realism, great application of marketing theory to real-world examples, and career skills in the use of new

technology. It was also evident that the use of Twitter was not overly burdensome (see question 26) and did not introduce competitiveness among students (see question 46). For 20% of the items the mean was not statistically different from 3 indicating that Twitter had no effect on certain learning outcomes. Specifically, the statistically insignificant items indicated that Twitter was not considered to be a major part of the course and was certainly not intended to replace other learning methods such as lectures. For instance, students did not think it was "one of the best parts of this course" and did not think Twitter was "more enjoyable than listening to a lecture". As such, while Twitter was not a core part of the course, it seemed to be a useful, novel "add-on" that provided added value to students and encouraged new forms of learning. This is consistent with other studies in the learning technology literature. For example Thurlow (2003) and Kim et al (2007) suggest that SMS communication adds to, and supplements, face-to-face learning, but does not replace it.

Likewise, though surprisingly, the evidence here did not seem to illustrate a large degree of interaction. For instance, Twitter did not seem to help students to "better know my classmates" and students did not agree that "peer feedback", through Twitter, was a positive aspect of the course (this was also evident from the lack of responses to the tweets). It seemed that Twitter was a more passive form of communication, at least in the context studied. This was contrary to our initial expectation that Twitter would enhance interactivity. It could be that the relatively large class size was a factor in the degree of interactivity that took place.

Follower and Non-follower Perceptions of Twitter as a Learning Tool: Take up of Twitter was positive in the course with two-thirds of students electing to follow the tweets. Furthermore, 51% of followers indicated frequently accessing tweets. In light of the newness of Twitter as a pedagogical tool this seems to illustrate keen interest. However, it is unclear why Twitter was not

used by some students and why take up was minimal for some followers. To ascertain key reasons we applied the TAM to indicate the main drivers of acceptance. A parsimonious version of the TAM posits that consumer acceptance of IT interventions are a function of two specific beliefs; perceived usefulness and perceived ease of use. Using OLS regression to predict intention to use Twitter in future courses we found perceived usefulness of Twitter had the largest standardized beta coefficient ($\beta = 0.985$, $p = 0.000$) and the coefficient for perceived ease of use, though of the correct sign, was small and statistically insignificant ($\beta = -.148$, $p = 0.158$). These results, in terms of the relative strengths of the coefficients, are largely consistent with Davis (1989) and suggest that non-adopters need to be convinced about Twitter's usefulness in future courses, rather than educated about how to use Twitter. Students seemed to get to grips with using Twitter quite quickly and did not perceive it to be overly complex to use. This is contrary to other findings in the literature that shows take up of innovations is often a function of students' perceptions of technical difficulties. For instance, Cooper and McConnell (2000) identified one of students' least favorite aspects of using a new web based tool to be the technical issues involved. In the case of Twitter the quantitative results illustrate that this was not the case because perceived ease of use was statistically different from 4, indicating that respondents agreed Twitter was easy to use, on average ($M_{PEOU} = 4.41$, $t_{47} = 2.227$, $p = .031$). It could be that users' familiarity with the web and web based technologies has increased substantially since the Cooper and McConnell study took place, reducing the impact of learning a new technology.

In the qualitative research, some respondents perceived Twitter to have low incremental value relative to current technologies such as the VLE being used and email. However, on average, the quantitative results illustrated that respondents found Twitter was useful ($M_{PU} = 4.73$, $t_{47} = 2.227$, $p = .004$). There did seem to be some bimodality present in the data with some

respondents perceiving that Twitter was not useful, yet the majority did perceive Twitter to be useful. As such this suggests greater communication in regards to what students should expect and what students will gain from using Twitter.

Twitter within the E-Learning Environment

Based on this study, and our experiences of using Twitter within the marketing curriculum, we are continuing to use Twitter, and to test it in a variety of contexts. Although a variety of e-learning tools are currently being used, there still remains a lack of integration among the different tools available and it is currently unclear how these tools will be consolidated within the learning environment. We do not perceive Twitter to be a replacement to current e-learning technologies but we perceive it to be a refreshing, useful tool that can add value to the student learning experience by bringing real-world examples into the classroom in a timely fashion. One might think that Twitter is "just another thing to learn and employ". While there is a small amount of learning, once it is in use it provides other benefits to the instructor; namely that it is quicker than emailing students. As such our experiences were that using Twitter actually saved us time because we did not need to log in and retrieve email addresses from the University's system and the tweets were relatively short and concise. Furthermore, one does not need to be near a computer, vastly enhancing its robustness and flexibility.

Twitter's main benefit is that it cuts through clutter and gains attention with short "bursts" of information that followers can independently investigate. However, this and the fact that Twitter is an external social networking device, may leave instructors deterred from its use – but with the use of URL shorteners and hashtags these limitations can be overcome. Thus we feel that Twitter provides the best of both worlds by i) being able to contact students in a familiar and widely used

environment, ii) the ability to provide short, concise messages that students can either follow or disregard, and iii) the power of email and other full service applications with the ability to link out to the external environment, and with added convenience and flexibility.

A further point to note is that Twitter, as with other social media tools, is not controlled by an educational institution which presents problems if students tweet inappropriately. At a practical level this could be abusive tweets, possibly through using a misleading Twitter username.

However, Twitter is not without its limitations as a learning tool and these should be taken account of by instructors adopting Twitter. Some criticisms of Twitter might include the arbitrary nature of the tweets. For example some students may choose to tweet things that are personal in nature and not relevant to the course. This limitation can be overcome to some degree by the use of hashtags. Likewise, because Twitter is not moderated, student tweets about the course could be followed by the instructor, again by the use of hashtags. Any misinterpretations could be picked up by the instructor and issues could be followed up in subsequent classes or by other means, though this increases the burden on the instructor and could become time consuming. Twitter has also been criticized for encouraging poor writing habits due to the restrictiveness of the size of the tweets. However, others argue that this encourages brevity and the ability to assimilate key points of information, which in itself can enhance learning.

Lessons Learned and Ten Tips for Tweeting

Overall we had a positive experience with Twitter in a relatively large course of 123 students. Interestingly, despite our initial assumption that Twitter would enhance interactivity

(because it is a social networking tool), we found that students did not interact much with the tweets (few students tweeted about the course and responded to the tweets sent out). This could be because of the large numbers involved and a reluctance of students within larger classes to speak out. We speculate that interaction between students may increase in smaller courses but it still provided valuable benefits for large courses. Based on our learning in the project our main recommendations for implementing Twitter are as follows:

1. Provide a short Twitter briefing to introduce what is otherwise a new learning tool to the students (interested readers can contact the authors and use theirs)

2. Use a Twitter app (e.g., Blackberry's Uber Twitter or iPhone's Tweetstack), a tweet deck or route the tweets through a mobile phone. This will allow the use and management of tweets to become seamless and will enable interactions between other web tools (e.g., the setup of an RSS feed to monitor tweets as they occur)

3. Tweet around three to five times per week to arouse and stimulate interest and don't over tweet – over tweeting may cause information overload.

4. One can follow the tweets of users in class but this could be viewed as socially intrusive. A way to overcome this is to define a hashtag (e.g., such as #mk101) and use this in every tweet. That way followers can see the tweets but the instructor can also search for #mk101 on Twitter to see what is being tweeted

5. Continue to reinforce some of the tweets during lectures – that is, questions can be tweeted to the class and then discussed during class time to encourage class involvement

6. Tweets should be about stimulating thought and generating awareness of examples and contemporary issues in marketing. As such it is about sharing ideas and informing about practice

7. Apart from increasing the robustness of Twitter by enabling users to link out, URL shortening tools such as http://bit.ly/ provide a further benefit in regards to tracking what links have been clicked on

8. Tweets should follow the curriculum content and back up the material on a week-by-week basis – again, we see Twitter as a supplement and a way to enhance traditional and e-learning methods

9. Using Twitter in class is radically new so its rationale needs to be clearly communicated – regardless of the objective benefits of using Twitter, "perception is reality"

10. Make the tweets voluntary rather than assessing them – Twitter is an external tool and there are a number of complications to assessing use in class. For example, one may not be able to identify the Twitter user depending on the name they have given themselves

Limitations and Further Research

As with the implementation of many new technologies, acceptance is rarely universal and without resistance. The findings from this study should be used with care because of the small sample size. However, given the exploratory nature of this research, the statistically significant differences in means should be viewed as encouraging, and a clear sign that take up of Twitter was positive on the whole. These results should also be interpreted with caution due to the possibility of non-response bias. Students who did not use Twitter during the course were unable to respond to the learning outcomes implying that the measures evaluated in this study might be inflated to some degree. In this research our focus on users of Twitter is partly justified by the aim of the study which was to ascertain the degree to which Twitter has positive learning outcomes in a marketing course. However, future research should try to better understand

barriers to the use of social media such as Twitter by more comprehensively examining non-users and their reasons for non-use.

With the plethora of different technologies that exist (e.g., VLEs, social networking media, virtual worlds, email etc.) it is still too early to tell how these applications will be integrated and linked together. As such the jury is still out on a conclusive answer as to what technologies are going to be most important and, of course, we will see further innovations. However, Twitter offers a valid and useful tool to use in class to supplement other methods and, in certain situations, it shares a number of advantages over competing technologies such as email, SMS messaging and Facebook. A further complication is that educational institutions have VLEs such as Moodle and WebCT which have been the subject of considerable investment. These VLEs are usually seen as of strategic importance in teaching and learning and it follows that the use of Twitter and other technologies should be considered within such an institutional context. Therefore, further research is needed to show how these technologies fit together. Further research is also needed to show how these technologies work in different settings. One key setting that might affect how students respond to the technology might be class size. Interestingly, though we expected to see Twitter enhance interactivity in the course with students tweeting back, the results here indicated that Twitter was used in a more passive sense as a one-to-many communication tool. These findings could have been due to the relatively large class size. We anticipate that with smaller class sizes interactivity through tweeting back would increase because discussion about the tweets could also increase during class. However, further research is clearly needed to understand the limitations and advantages of using Twitter as a pedagogical tool.

Prior work into the diffusion of innovations has emphasized the importance of understanding adoption from the user's perspective (Rogers, 2003). The incorporation of new learning technologies into the classroom is no exception and understanding their adoption is analogous to understanding the success and failure of other innovations. As such it is critical to understand the adoption of Twitter and other learning technologies from the perspective of gatekeepers (e.g., teaching staff), influencers (e.g., learning technologists) and end users (e.g., the students). How does the willingness to adopt new learning technologies differ between relevant gatekeepers, influencers and end users? How many different communications platforms are too many for students to engage in? What are the key barriers to usage of learning technologies such as Twitter and Facebook? The answers to these questions remain unanswered, yet present important questions to the future use of innovative learning tools such as Web 2.0. As such future research should seek to understand i) which learning technologies do students prefer to interact with, ii) what are different stakeholders' attitudes and perceptions to the adoption of such technologies, and iii) what are the barriers and enablers towards the adoption of such these technologies.

A related but distinct research issue involves understanding more about the blurring of social boundaries between students and staff with the use of Web 2.0 technologies for learning. Given that technologies such as Facebook, Twitter and Second Life are primarily designed for social applications, then to what extent does the integration of such technologies into the classroom impinge on students' personal lives, and what ethical issues exist? Answers to such questions are important to understand before the widespread adoption of Web 2.0 applications in the classroom.

Conclusions

The results from the Twitter Project provide strong evidence that Twitter enhanced a variety of learning outcomes in the course for Twitter followers. The project was not assessed and followers tended to follow the tweets of the course enthusiastically. Examining the use of an innovative technology in a new setting also enabled us to learn a variety of new skills. Some were skeptical of the benefits of using Twitter and the usual technology paradoxes apply ("Why do I need to learn something else?" "This is just another unnecessary tool" etc.). As such, given the novelty of using Twitter in the educational environment students need to be convinced of the benefits and rationale for using it. Marketing modules are likely to be fruitful areas in which to examine the applicability of Twitter in a learning context because such courses benefit from engagement with the real world to illustrate key theories in action. However, these findings are potentially applicable to many courses within the university context, as long as there are benefits to using a variety of accessible learning resources. Twitter allows the educator to engage with the outside world by sending communications to the class in real time and should be viewed, not as a substitute for other learning technologies, but as an easy to use complement to integrate with existing learning technologies.

Appendix

Learning Outcomes	M^a	SD	p
1. Using Twitter for this class made marketing examples more accessible.	3.95	1.00	0.000
2. I believe that using Web technologies such as Twitter is enjoyable.	3.92	0.95	0.000
3. Using Twitter helped me to gain a wider perspective of marketing.	3.84	1.01	0.000
4. I felt this course was more up-to-date because of the use of Twitter.	3.84	1.04	0.000
5. Using Twitter enhances brevity of communication.	3.76	0.93	0.000
6. Using Twitter for this class made marketing examples more prominent.	3.76	0.98	0.000
7. Twitter was a concise way to communicate key examples to the class.	3.76	1.06	0.000
8. Because of using Twitter, I was unable to put enough effort on other courses.[R]	3.70	0.97	0.000
9. I found the conciseness of Tweets to be useful.	3.68	1.06	0.000
10. Using Twitter in this course made marketing more "real".	3.68	1.08	0.001
11. Twitter should be used in future classes.	3.65	0.98	0.000
12. Using Twitter enhances general observation skills.	3.65	1.03	0.001
13. Using Twitter for this class enhanced my ability to see the how theory linked to practice.	3.65	1.03	0.001
14. I felt capable of being able to use Twitter	3.65	1.09	0.001
15. Using Twitter did not help me to realize practical applications of marketing theory. [R]	3.62	0.92	0.000
16. Using Twitter increased my attention to the course in general.	3.59	1.07	0.001
17. I feel I have had access to more up-to-date information as a result of using Twitter	3.59	1.12	0.002
18. Using Twitter enhanced my understanding of marketing activities.	3.57	1.12	0.002
19. It was better to use Twitter than not to use Twitter.	3.57	1.26	0.005
20. Incorporating Twitter into a course is an efficient method in general.	3.54	1.04	0.002
21. Using Twitter gave me the opportunity to reach the instructor beyond class hours.	3.54	1.02	0.002
22. Using Twitter enhances self expression skills.	3.53	1.06	0.003
23. Using Twitter improved my overall knowledge of marketing.	3.51	1.24	0.008

24. I probably wouldn't have found equivalent examples had Twitter not been used	3.51	1.15	0.005
25. I found Twitter valuable to my learning in this course.	3.51	1.22	0.008
26. The learning experience provided by using Twitter was not worth the effort. [R]	3.51	1.17	0.006
27. I had the opportunity to integrate my knowledge from other courses into using Twitter.	3.49	1.07	0.005
28. Using Twitter increased my overall satisfaction with the course.	3.47	1.11	0.008
29. Using Twitter has enhanced my awareness of marketing.	3.46	1.24	0.015
30. Using Twitter enhances the skills needed to carry on unaided research.	3.46	1.10	0.008
31. I improved my skills of using web technologies throughout the use of Twitter.	3.46	1.22	0.014
32. Incorporating Twitter into this course is an ineffective method in general. [R]	3.43	1.12	0.012
33. Using Twitter has increased my self-confidence.	3.41	1.12	0.017
34. Using Twitter has enabled me to make better use of class time.	3.35	1.01	0.021
35. Compared to listening to a lecture, using Twitter has motivated me to study harder	3.32	1.18	0.052
36. Using Twitter enhances the skills for proper use of language.	3.32	1.00	0.029
37. Using Twitter helped me to feel valuable.	3.27	1.19	0.089
38. I put the knowledge I gained from using Twitter to use in other courses.	3.22	1.13	0.127
39. Using Twitter was one of the best parts of this course.	3.19	1.29	0.189
40. Using Twitter develops career skills.	3.17	1.16	0.197
41. Using Twitter helped me to better know my classmates.	3.14	1.21	0.250
42. Having peer feedback was a positive aspect of using Twitter.	3.08	0.83	0.278
43. As a learning experience, using Twitter was more productive than listening to a lecture.	3.05	1.10	0.384
44. As a learning experience, using Twitter was more enjoyable than listening to a lecture.	2.84	0.99	0.162
45. I did not put a great deal of effort into using Twitter. [R]	2.81	1.10	0.152
46. Using Twitter increases competitiveness between students.	2.49	1.04	0.003
a. Scale endpoints: 1 = Strong disagree and 5 = Strongly agree			

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