Barriers to the adoption of Twitter as a communication tool in a third-level institute

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Declaration

I declare that the work described in this dissertation is, except where otherwise stated, entirely my own work, and has not been submitted as an exercise for a degree at this or any other university. I further declare that this research has been carried out in full compliance with the ethical research requirements of the School of Computer Science and Statistics.

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Abstract

Relevant communication notices in third level institutes can be limiting media, which are typically restricted to email and website notice boards. This can be frustrating for staff and students in terms of the timeliness and convenience. Relevant examples of this include a late cancellation of a meeting or class, a timetable or room change.

This dissertation investigates the adoption of Twitter as a communication tool in a third-level institute and barriers to its adoption. The motivation behind the introduction of Twitter as a communication tool between staff and students is to overcome current shortfalls in existing communication methods. Social media has become pervasive in people's lives and mediums like Twitter are becoming more and more mainstream. Twitter affords third-level institutes a new medium for engagement between students and staff. Its devolved, transparent and synchronous nature makes Twitter worthy of investigation as a specific purpose communication tool in a third level institute. While potential benefits can be derived by the addition of Twitter to a third-level institute's communication framework, barriers to its adoption by staff may exist.

This study used the UTAUT technology adoption model to identify potential barriers that may exist in the adoption of Twitter. Fifteen participants took part in this research, each of whom took part in a usability test experiment using Twitter for predefined tasks and answered all questions in a pre-experiment and post-experiment questionnaires. The questionnaire was based on four determinants from the UTAUT technology acceptance model. The pre-experiment questionnaire identified nine potential barriers to the adoption of Twitter. Findings in the post-experiment survey showed no potential barriers for participants, giving weight to the theory that an introduction to a particular technology can alleviate potential barriers to its adoption.

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List of Abbreviations

PEOU	Perceived Ease of Use
PU	Perceived Usefulness
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
TTF	Task-Technology Fit
UTAUT	Unified Theory of Acceptance and Use of Technology
ITU	Intention to Use
API	Application Programming Interface
IS	Information Systems
ICT	Information Communication Technology
IT	Information Technology
CTA	Continual Think Aloud
SUS	System Usability Scales

Twitter Terms

Tweet	140 character status update on Twitter.
At- Reply	A conversation with a follower which is done by preceding your message with @username.
Re-Tweet (RT)	Used to re-share a message or status update by someone you are following.
Direct Message	A private message between yourself and one of your followers, this can only be done if you are following someone on Twitter and they are following you.
Hashtag	A hashtag is a word or an abbreviation added to a Twitter update based on the subject being discussed in the update. The word is preceded by #. For example if you are discussing Physics in Trinity College, the tweet might read “#InterestingPhysics in #trinitycollegedublin. This tagging in Twitter allows other users to follow all mentions of specific topics of interest. Anyone can create a topic of interest.

1 Introduction

"Twitter is a lightweight, easy form of communication that enables users to broadcast and share information about their activities, opinions and status" (Java et al., 2007). Twitter's use is documented extensively in crisis communication, and emergency response, (Campiolo et al, 2013; Freberg, 2012; Ah Nee, 2013), however, its role in education communication has been largely overlooked, (Chamberlin and Lehmann, 2011). This research looks at how Twitter can be used as a communication tool between administrative staff and students in a third level institute, and examines the possible barriers in adopting it.

Evidence by (Naismith, 2007; Hussey, 2011; Osbourne, 2011; Chu & Du, 2013) suggests that higher education institutes can derive major benefits from adopting a microblogging service. These benefits include increased transparency, open dialogue, news and event amplification, all of which lead to a more connected and informed student body with increased student satisfaction. According to Hussey (2011), Twitter can connect people in real-time and in ways that email simply cannot, one pertinent example being the ability to distribute mobile SMS messages from a Twitter feed. Twitter posts, known as tweets can be distributed by instant messages via mobile phones, email or on the Internet.
Twitter has become increasingly popular, with average numbers of active monthly users on Twitter at 255 million as of March 31st, 2014, this is an increase of 25% year-over-year, Twitter.com (2014). Its usage demographic is relatively constant across ages with 75% of students in Europe admitting to using Twitter all the time, (QS topuniversities.com, 2013).

1.1 Research Background

Using Twitter can alleviate shortcomings in current communication methods by enabling administrative staff with an easy method of posting and receiving messages. All of this is done in a transparent manner where subscribers to the Twitter feed see all the communications going back and forth. This can give students a sense of inclusion and the institute a more transparent communication medium, Osborne (2011). Research evidence in the Literature Review suggests that students and more increasingly staff expect to see more meaningful social media integration in third level institutes.

1.2 **Research Question**

In order to investigate the adoption of Twitter as a communication tool in a third level institute, the following questions are examined in this dissertation;

What are the barriers to the adoption of Twitter as a communication tool between students and administrative staff in a higher-level institute?

Assuming barriers do exist this study also looks at a sub-question on overcoming these possible barriers in adopting Twitter.

Can barriers to the adoption of Twitter be overcome by usability testing the platform?

1.3 **Scope of this research**

Communication in third-level institutes generally deal with media relations, publications, announcements and community wide news, however this study has a narrower focus. This study concentrates on internal school relevant announcements and course specific discourse. Using Twitter as a communication tool for class and course announcements can benefit staff and students alike through the immediacy of messaging with open and transparent dialogue.

The scope of this research is determined by the available access to resources and is limited by time constraints. This study focuses on the introduction of Twitter to administrative staff in the School of Physics, Trinity College Dublin and CRANN, a Physics and Chemistry research institute in Trinity College Dublin. Participants will take part in a usability test experiment on Twitter usage, this experiment will entail logging into Twitter and carrying out pre-defined scenario based exercises.

In order to identify potential barriers to the adoption of Twitter as a communication tool, the unified theory of acceptance and use of technology (UTAUT) model, (Venkatesh et al., 2003). Participants will also a complete pre-experiment questionnaire and a post-experiment questionnaire. This will measure behavioural intention towards using the system against actual use of Twitter, all of which will give a greater insight into the potential barriers.

1.4 Research Relevance

New communication tools are evolving and becoming more and more mainstream. Social media is used pervasively throughout people's private lives and increases notification immediacy, notifications which the user has chosen to receive. Staff and more importantly students are beginning to expect a certain level of communication in third level institutes. Tools such as Twitter are freely available to people who want to stay informed about their friends, interests, hobbies or even their favourite sports team. Twitter can be used for much more than this, it can offer a third-level institute a rich communication medium which can ably support communicative operations.

The inescapable rise of social media means that delivering Twitter as a service is now more possible than ever. The results and lessons of this study will go some way toward informing a Twitter implementation strategy in a third level educational institute, by identifying barriers to its successful adoption and making recommendations on how these barriers might be overcome.

1.5 **Dissertation Outline**

Chapter 1 - Introduction

This chapter frames the research questions and direction the dissertation takes in attempting to answer it. The background to the research and scope is also discussed.

Chapter 2 - Literature Review

Understanding how Twitter can benefit people in everyday life can go some way toward informing us how it can be of value in a third level education institute. Seminal literature is also examined to give a broad sense of social media and the possibilities it offers in communication. The literature review looks at papers in current administrative communication, Twitter in business, limitations of Twitter adoption barriers and technology acceptance models, the literature review informs the methodology.

Chapter 3 - Methodology and Fieldwork

This chapter looks at the various methodologies available for carrying out the research, surveys and experiment. This chapter is structured around Saunders' et al (2009) Research Onion. The construction of the pre-experiment and post-experiment questionnaires are discussed along with the usability test experiment with Twitter. The quantitative analysis techniques are also examined.

Chapter 4 - Findings and Analysis

This chapter looks at the results of the quantitative and qualitative data taken from the surveys, experiment and participant feedback. The analysis of the pre-experiment and post-experiment questionnaire results were illustrated in graphical formats along with the questions answered in both surveys.

Chapter 5 - Conclusions and Future Work

The results from the findings and analysis chapter are presented to support this studies position on the research questions. The limitations of the study are also showed along with possible future applications of Twitter in a third-level institute.

2 Literature Review

2.1 Introduction

School relevant communication notices in third level institutes are typically restricted to email and website notice boards. This chapter reviews these current communication methods and how social media could be leveraged into complementing them, with particular emphasis being placed on Twitter. Social media has the potential to enhance communication through effective implementation. Twitter in business and its limitations are looked at in detail, with a focus on two particularly successful projects. An investigation of technology acceptance through various iterations of the Technology Acceptance Model is carried out.

2.2 Social Media

Social media has become almost ubiquitous in everyday life for all generations. “The Web has undergone drastic changes in the last number of years as it transitioned from a location that users would visit to retrieve information posted by a small group of content experts (Web 1.0), to a ‘read-and-write’ platform (Web 2.0) that enables content contribution, sharing and participatory practices” (Veletsianos, 2012, p.2). “Social media employ mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content,” (Kietzmann et al., 2011, p. 241).

Social Media are defined by Kaplan and Haenlein, (p.59, 2010) as “technology which groups applications currently subsumed under the generalised term into more specific categories by characteristic: collaborative projects, blogs, content communities, social networking sites, virtual game worlds, and virtual social worlds.” Social software is increasingly being used in higher and further education to support teaching processes, (Schroeder et al., 2010, p.159). A study by Seaman and Tinti-Kane, (2013, p.19) showed that personal use of social media is at 70% while professional use is at 55% of teaching faculty in higher education. The growing diversity of web 2.0 applications is moving at an alarming rate but the main bulk of the functionality is starting to standardise across the various platforms, these include blogging, data repositories, image banks, instant messaging, groups, news feeds and events. Students, who primarily are digital natives, have come to expect this level of functionality. ‘Survey results identified that students experienced higher levels of perceived social interaction and course community and, overall, had high levels of satisfaction with online social networking software’, (Thoms and Erylimaz, 2014, p.112).

“Social media resources can be divided into three distinct categories, content sharing, and content creation while the third category includes social network sites like Facebook, Ning, MySpace and Twitter that serve as online communities” (Rutherford, 2010, p.2). “Today’s college students have grown up with the internet and regularly engage with instant messaging and blogging” (Top, 2012, p.112). The term digital natives comes from Marc Prensky, (2001, p.1) who describes the latest generations as having being “the first generations to grow up with this new technology”.

A study by Rutherford (2010, p.703) indicates “a positive correlation between student use of social media and how students perceive their relationships with their fellow students

and instructors as well as how they describe the overall quality of their educational experience." Having established that social media can have a positive effect on students in third-level institutes, Blogging and Microblogging are now looked at as communication tools.

2.2.1 **Blogging**

"Web logs known as blogs are popular social media that have powerful potential as communication tools and are used commonly in higher education" (Top, 2012, p.28). Blogs are easy tools to use, they "allow average computer users to be able to publish on the internet without having to know complex computer technical knowledge" (Cakir, 2013, p.244) According to Deng and Yuen (2011, p.441) "blogs allow people with little technical knowledge to quickly publish their thoughts, opinions, and emotions online, and share their writings with their peers."

Blogs can provide a forum for meaningful discussions by like-minded peers in their communities, they are the ideal platform for information dissemination and can easily be customised to suit many uses. Well-structured content can determine the direction and theme that a blog can hold.

2.2.2 **Microblogging**

"Microblogging is a new form of communication in which users can describe their current status in short posts distributed by instant messages, mobile phones, email or the Web," (Java et al., 2007, p.56). Twitter is a microblogging software. "The architecture of Twitter makes the question 'what's happening?' the cornerstone of information exchange" (Kirilenko and Stepchenkova, 2013, p.1). With 646 million users, Twitter is undoubtedly the world's most popular micro-blog, "which allow users to exchange small elements of content such as short sentences, individual images, or video links" (Kaplan and Haenlein, 2011, p.106). The most popular microblogging platform is Twitter, its benefits and limitations are outlined below.

2.2.3 **Twitter**

Twitter is an online social networking and microblogging service that provides users with a means for "microblogging" through frequent posting of short status updates or "tweets", (Rybalko and Seltzer, 2010, p.337). Tweets are text messages limited to 140 characters, where registered users can read and post tweets, unregistered users can only read them. Twitter offers a unique mechanism of disseminating information by allowing each user to

receive all messages from those whom he/she chooses to follow, (Kim and Shim, 2014, p.59). According to Twitter.com “Twitter is a service for friends, family, and co–workers to communicate and stay connected through the exchange of quick, frequent answers to one simple question: What are you doing?.” In an engaged community Twitter can provide users with a fast and instinctive communication method and provide an element of demarcation in conversations. There are 600,000 daily users of Twitter in Ireland, sending on average, 1 million tweets each day, (digitaltimes.ie, 2013).

Twitter’s use in keeping people informed and constantly updated is well known. Its pervasive manner has now entered education. One such practical example is The Swedish Twitter University where ‘in exactly 25 tweets, where each tweet should also be a complete sentence/thought/question in and of itself, “the lecturer presents provocative ideas and arguments, the lecturers can also stay online to entertain questions from other Twitters” (Joy, 2013).

“Students, faculty, and other university personnel including librarians are using Twitter to communicate both inside the classroom and beyond” (Chamberlin and Lehmann, 2011, p.375). According to Kietzmann et al. (2011, p.244) “Twitter is more about conversation than identity.” While Facebook is used more by younger groups, Twitter is relatively constant across ages with 75% of students in Europe admitting to using Twitter all the time, QS topuniversities.com (2013).

2.2.4 **Twitter as a communication tool**

The people who participate in the Twitter community use it for more than providing updates on their current status. “In 140 characters or less, people share ideas and resources, ask and answer questions, and collaborate on problems,” (Dunlap and Lowenthal, 2009, p.46). Twitter is being increasingly used to mobilise efforts in crisis situations. Its suitability for these situations was outlined by Campiolo et al. (2013) in their study on Twitter as a source of security alerts, which revealed that a high rate of important messages about computer security were disseminated via Twitter, and not traditional communication channels. The viral nature of social media means that posts can be retweeted quickly and spread over the web. According to Freberg (2012, p.1) “the urgency of providing reliable information to the public is important during a crisis, this viral spread of information on social media could be viewed as an advantage to crisis professionals who must reach the public as quickly as possible.” Advantages of using Twitter over traditional communication methods, including email and websites consist of immediacy of

receiving the message and the end user advantages including filtering and re-tweets (RT). End users and administrators can also subscribe to Twitter to receive an SMS message every time an important Tweet is posted, the end user can also reply to these messages and post questions to the Twitter feed. If security is a concern, a Twitter profile can be kept private, which allows for only approved followers to see tweets, private lists can also be created (Schouten, 2011, p.127).

In a study by Schultz et al. (2011, p.20) on the role that new media plays in crisis situations found that “the medium matters more than the message”. An important part of the ‘communicative strategy’ of using Twitter is noted by Auer, (2011, p.717) as the empowerment of Twitter users, who can feel part of the political process by being able to partake in debate and news filtering.

Twitter played a pivotal role in political unrest following Iran’s national election in 2009. US government officials requested that Twitter delay scheduled maintenance of its global network during protests, a move which would have cut off the service, while protesters were using Twitter to inform the outside world about the unrest in Tehran. According to Kierkegaard, (2010, p.578) these “events established the credibility of Twitter as an important tool in reporting and sharing breaking news.” “Twitter has a rapid-response attribute allowing people to receive immediate and instantaneous responses” (Ah Nee, 2013, p.1). Apart from political and crisis communication Twitter is being embraced by organisations as a mechanism for spreading their brand and engage consumers.

2.2.5 **Twitter in Business**

Businesses can use Twitter to engage customers in many ways. According to Culnan et al. (2010, p.243). “To gain business value, organisations need to incorporate community building as part of the implementation of social media.” Social Media and in particular Twitter present organisations with a new way of communicating with customers, suppliers and stakeholders.

Two essential characteristics of an effective social media implementation include: (Culnan et al., 2010, p.254).

- The firm attracts a critical mass of participants who form a community and who engage with the firm or other community members on an ongoing basis
- The firm develops processes to benefit from the content created by its customers.

The second point is currently being trialled by Dell who are actively using Twitter for technical support. “Social media’s rapid explosion makes it unsurprising that public organizations are following the trend and deploying sites to reach people where they are” (Zavattaro, 2013).

Business adoption of Twitter is no more prevalent than at major events. An example of this was when “Adidas UK combined offline and online efforts during the 2012 Olympics to create a multi- channel, 360 degree marketing experience. All print, outdoor and television activity prominently featured the @adidasUK hashtags to drive fans to the Twitter conversation” (Twitter, 2014). This approach resulted in “30.8% promoted trend engagement rate, 17 million impressions during promoted trend and six times the average daily mentions of @adidasUK” (Twitter, 2014). This blended approach of integrating Twitter identity elements throughout online and printed media would need to be adopted throughout a third-level institute to increase visibility and engagement. Another pertinent example of industry adopting a Twitter strategy was Blackboard, the education software company who utilised Twitter successfully to “encourage adoption of digital content by higher education institutions and their faculty members” (Twitter, 2013). This resulted in a 78% increase in brand mentions and it exceeded the contest goal by 50%.

In education, Twitters reach is shown to increase conference engagement. In the USA “Twitter was used to disseminate content from regional and national medical conferences. Now conference live tweeting has continued to increase in popularity, with an increase to 1,332 individual tweeters at the 2013 American College of Emergency Physicians Scientific Assembly from only 294 at the 2012 meeting” (Scott et al. 2014, p.3).

These tangible examples show how Twitter can be effectively integrated into existing infrastructural and communication processes to successfully engage customers and make their brand even stronger. Technically, Twitter is easy to integrate into existing systems by using its application programming interface (API), which is freely available to registered users. The API allows you to create Twitter programs like website embed scripts which makes Twitter all the more seamless to use in existing systems. However beneficial Twitter has proved itself to be or can be in educational institutes and industry, it does have its limitations, these limitations are put forward in the next section.

2.2.6 **Limitations of Twitter**

Twitter also has its limitations, it has a character limitation of 140 characters which could lead to miscommunication in different circumstances if a critical message has to be broken up. Twitter offers a URL shortening service which can overcome this, but this takes you away from the platform. A very relevant limitation in a third-level institute would be the assimilation of crowd knowledge, where class discourse on Twitter may be incorrect or misleading. This "popular wisdom may overwhelm the importance of well-designed investigations and the dissemination of related findings with valid contributions to disciplines and society" (Wilson et al., 2014, p.115).

Overcoming this would require moderation which may be beyond your typical level moderator, whom is usually a representative peer of the group. Private list creation would require administrative overhead, this is as much about controlling the group as avoiding unwanted trolls from communicating on the forum. "Despite the commentary in popular print and vision media, trolls are little more than a mild annoyance to those who use their Twitter accounts" (Wilson et al., 2014, p.115).

There is also potential for Tweets to be 'buried' in the list of Tweets, this may lead to messages being missed out on, unless there is a member of administrative staff regularly monitoring the Twitter feed. This could be especially problematic if dealing with multiple feeds. This could become an issue around busy periods in the school calendar, for example around exams or registration.

While Twitter is technically simple to use, the concept of how it works can be difficult for users to grasp, Allen (2013). This can be compounded by managing multiple Twitter channels at the same time. Overcoming this will require training and support, all of which cost time and personnel. A macro issue with Twitter is the fact that's it's an external company which offers its service for free, meaning that Twitter could take strategic decisions which may alter the delivery of its service in the future. This could be a major concern to a third-level institute whom invests a lot of time and effort in embedding Twitter into its communication strategy and procedures.

"When an IT innovation such as social media gains a high public profile, organisations can feel that they must urgently jump on the bandwagon, particularly given the ease and relatively low initial costs of rolling out some of these cloud-based applications" (Culnan 2010, p. 246). There is a tendency to throw technology at potential gaps in performance in

an institution. New technologies like Twitter can offer infinite opportunities which may cloud the reality of implementing them.

Hype surrounding new technology can be measured using Gartner's Hype Cycle. According to Van Lente et al. (2013, p.2), "consultancy firms offer technological hype cycle models to determine the state of development of technological fields in order to facilitate strategic investment decisions." Gartner's hype cycle is a graphical representation over five life cycle stages that a particular technology goes through from conception to maturity and widespread adoption, Rouse (2013). It is used by organisations as a reference as to where a particular technology is at in their life cycle and hence what risk is attached to adapting it. As of 2013 Twitter is reaching maturity on the cycle, see Figure 2.1.

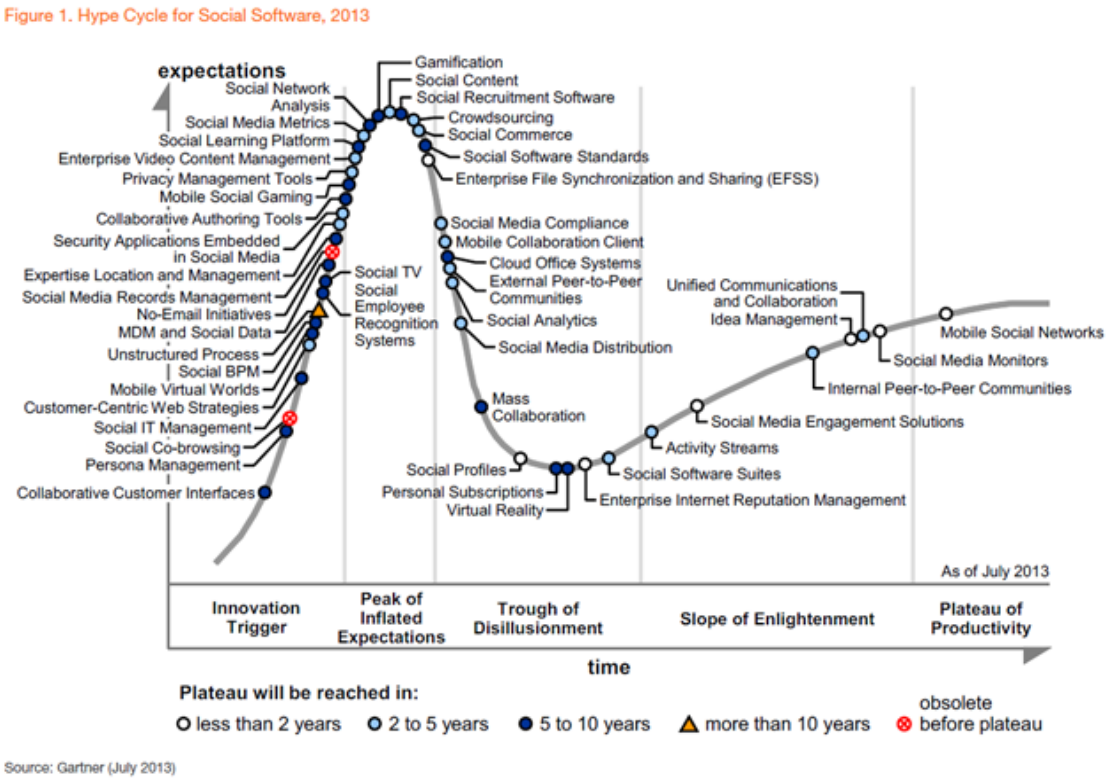

Figure 2.1: Hype Cycle for Social Software (Van der Meulen and Rivera, 2013)

2.2.7 **Twitter Dashboard Applications**

In order for administrators to manage multiple Twitter feeds in an efficient manner, they can use a Twitter dashboard application that can manage multiple feeds. These accounts can be centrally managed by using popular Twitter dashboard applications, Hoot Suite and TweetDeck are examples of these applications. Both applications are free and are

easy to setup and use. Tweetdeck “allows multiple users to manage multiple Twitter accounts within a desktop application,” (Hussey, 2011, p.254).

A Tweetdeck account is free, and multiple people can share the stream, which allows more than one staff member to take on the responsibility of updating the Twitter feed and monitoring the account. Multiple accounts can be updated at once, (Sump-Crethar, 2012, p.350). Hoot Suite is an online application, which runs in a web browser. You can easily manage multiple Twitter accounts with Hoot Suite and you can also schedule Tweets, this allows administrators to forward plan for events and announcements. Utilising one of these applications can allow Twitter to become a seamless member of the administrator’s office suite.

2.2.8 Twitter Content Strategy

A Twitter content strategy can avoid communication overload. This strategy will include recommendations on notifications which should be restricted to notices with particular importance to course specific topics that require immediate action. Examples of this would be class cancellations, lecture room change or important events. An issue that 140 characters are often too few to explain a topic in sufficient detail is overcome by, linking to web pages or traditional blogs where more information is available. “In order to avoid using up too much space by sending out a URL, these tweets use URL shortening services,” (Kaplan and Haenlein, 2011, p.107).

2.3 Current Communication in Administration

Current local communication in higher educational institutes can be surmised as announcements, notices, deadlines and general news items. Communication mechanisms are traditionally email, websites, digital signage and letters. The communication process in a third-level institute is typically managed by the Head of School, School Administrator or course administrators. In order to communicate with staff or students the structures in place mean that you would need to go through one of the aforementioned contacts to email out a message to a distribution list. In some cases these distribution lists have an approver, which is more overhead for staff. This process is not very effective if you need to contact people immediately. Email does not have the immediacy of an SMS message, which could be sent via Twitter.

However, email is a good communication enabler, it is reliable and quick, but people use email too much, leading to communication overload. Email clients make it easy for end-

users to reply, forward and add multiple contacts to messages which can lead to email overload. “This ease of communication leads to an augmentation of sent and received emails” (Soucek and Moser, 2010, P.1458). “The consequence of this increased quantity of emails is obvious: Inboxes become jam-packed and result in a confusing mixture of relevant and irrelevant emails.” (Soucek and Moser, 2010, P.1458). In their work on personality and email overload, Reinke and Chamorro-Premuzic (2014, p. 502) suggest that “email overload is not only related to productivity but also to burnout and work engagement.” Without a clear code of conduct with emails within an organisation, non-business critical email communication can lead to increased levels of email overload, (Sumecki et al., 2011, p.407).

While relatively effective, these mediums can be seen as archaic and at times frustrating due to poor timeliness and accessibility. There is evidence to suggest that students prefer to interact with university departments via online means, and use “social media mainly to seek out information that is not provided by traditional forms of communication from universities,” (Palmer, 2013, P.334).

2.3.1 Twitter use in higher education

Social media use in higher education has been common place in various ad-hoc forms. Examples of this include, the use of social media in the marketing department of the University of Ulster which used social media to communicate with students while they were still making their choices about where they would study, (Griffiths and Wall, 2011, P.49). Another interesting example of Twitter in education is The Swedish Twitter University, this initiative meant that seminars were run through Twitter, ‘in exactly 25 tweets, where each tweet should also be a complete sentence/thought/question, the lecturer presents provocative ideas and arguments, the lecturers can also stay online to entertain questions from other Twitters, (Joy, 2013). “Students will tweet for help if something has gone wrong, or a prospective student will tweet a question about the requirements for a course and expect an immediate response,” (Philipson, 2014). Third-level institutes in the UK and US have adopted Twitter but the statistics show that it is not being used extensively, with number one in the list, Plymouth University in the UK only sending out an average of 7.2 Tweets per day, Parr (2014).

Higher education communication is moving to a decentralised publishing and communication model, with schools and departments having autonomy to create and manage their own news feeds. “The onus is now on university communications

departments to manage this content, making sure that the message is consistent in tone, quality, style and brand identity," (Hussey, 2011, p.256).Twitter can connect university administration and staff with students in ways that email and websites simply cannot. According to Professor Sir Steve Smith, the vice-chancellor of Exeter University, who states that "there is no point in emailing students any more, they get in touch with us by social media, especially Twitter, and we've had to employ people to reply that way," (Woolcock, 2014). Exeter University are shown to be progressive in using social media to complement email and websites as communication tools in this article.

Libraries are now using social media to disseminate information, market services and the promoting of new book releases, (Chu and Du, 2013, p.64). According to Akeriwa et al. (2014, p.2) "the use of social media applications and mobile devices are two of the latest technologies that academic libraries are leveraging to enhance their overall service delivery". In Academia, librarians have found social media to be very efficient for answering queries and to generally communicate with users.
Chu and Du, (2013, p.72) outlined the following benefits and challenges associated with using social networking tools in academic libraries, they are as follows;

Benefits/advantages	**Challenges**
Promotes library services	Requires time and manpower costs
Disseminates news quickly	Demands mastery of new and evolving technology
Enhances interactions with users	Needs to attract users to take part in different platforms
Reaches out and engages users	Reluctant staff
Helps gather users' feedback	Relatively unengaged users
Enhances reference services	
Enhances internal staff communication	
Minimal acquisition costs	

*Figure 2.2 - Benefits and Challenges associated with using social media communication (*Chu and Du, 2013, p.72)

"Libraries worldwide are therefore increasingly adopting a variety of social technologies and mobile platforms/interfaces and applications in order to deliver more effective and accessible services to their clients," (Akeriwa et al., 2014, p.2). Results from a study on the introduction of short messaging into a university by Naismith, (2007, p.155) showed that "Students reported high satisfaction with text messages and tutors reported changes in behaviour that were directly attributable to the use of text messaging." These behaviour

changes included an increased sense of belonging and actually increased attendance, Naismith, (2007, p.155) also noted that “short messaging must be effectively integrated into both the student and staff experience” to guarantee success. This is a potential barrier for third-level institutes if Twitter is not integrated efficiently into everyday communication procedures.

The challenge for disseminating academic information is to convey it in a simple yet effective manner. “The ubiquity of social media is no more apparent than at the university where the technology is transforming the ways students communicate” (Tess, 2013, p. 60). The utilisation of social media could streamline this communication process. Social media and mobile devices have converged and ease of access is at an all time high.

2.4 Ease of Access

The ubiquitous nature of social media and the penetration of smartphone technology have made access to Twitter seamless. Smart phones' emerging capabilities are fuelling a rise in the use of mobile phones as input devices, Ballagas et al. (2006, p.1). As of June 2013 54% of the Irish population has a smartphone this is forecasted to rise to 62% by June 2014, Red C Pool (2013).

Computing is converging, in almost all aspects of Information technology, allowing information access from anywhere, anytime and from any device. This unwired world is making it increasingly easy for people to stay connected in everyday life, (Zheng and Ni, 2010, p.260). “The capabilities of mobile devices such as smart phones has considerably increased, opening up new ways to communicate and share content. In particular it is becoming feasible that mobile devices can directly share content such as micro-blogs without Internet infrastructure,” (Allen et al., P. 1570, 2012). Alomari et al. (2013, p.120) noted “The need for fast, free, and reliable communication channel is increasing as more educational institutions are using the latest electronic communication devices.”

2.5 Barriers to adoption of technology in Education administration

Barriers to technology adoption is a complex area with determinants changing to reflect the environments. Educational institutes have a different set of demands to other workplaces. Rogers, (2000, p.8) “categorised barriers to adoption of ICT in educational institutes as Availability and Accessibility, Technical and Institutional support and Stakeholder Development.”

Barriers to successful adoption of technology have internal and external sources. Internal barriers can be summarised as “teacher attitude” or “perceptions” about a technology, in addition to a person’s actual competency level with any technology” (Rogers, P.8, 2000). External barriers include the availability and accessibility of necessary hardware and software, the presence of technical personnel and institutional support, and a program for staff development and skill building”. Other barriers that cross internal and external sources are lack of time and funding and the unique culture of the institution.

A study on ICT adoption by Foley et al. (2002, p.20) highlighted the following barriers;

- Lack of awareness, understating and acceptance
- Negative attitude to social media as a barrier
- Access barriers

Enablers to enhance adoption included;

- Training material and mentoring
- Enhanced awareness
- Ease of access

Adopting social media as a communication tool requires all stakeholders to change how they think about communication. This includes their perception of social media and in particular Twitter, and how Twitter can be a communication enabler and not just for passive participation. Social Media can overcome unnecessary layers of communication between administration and students, this can be achieved by getting the message directly to the student or staff member. The instantly recognisable functionality of blogging and social media will go some way in overcoming any learning bridges. Overcoming these outlined barriers will be pivotal in the success on delivering the technology.

2.6 Technology Acceptance

The lack of user acceptance of technology can be a waste of money, time and resources, (Hossain and de Silva, 2009, p.1). The acceptance and usage of information systems is critical to their success. According to Davis and Venkatesh, (1996, p.20) “Emerging information technologies cannot deliver improved organisational effectiveness if they are not accepted and used by potential users.” Various models can be applied to try and explain, predict and increase user acceptance of information systems, these include Technology Acceptance model (TAM), (Davis, 1989), Technology Acceptance model (TAM2), (Davis and Venkatesh, 2000) and The Unified Theory of Acceptance and Use of Technology Model (UTAUT), (Venkatesh et al. 2003).

2.6.1 **Technology Acceptance Model**

The technology acceptance model (TAM) developed by Davis (1989) is an information systems theory that looks at how users, use and accept a technology. TAM is an adaption of Theory of Reasoned Action (TRA) model by Ajzen and Fishbein (1980). TRA is a model used for the prediction of behavioural intention.

TAM uses TRA as "a theoretical basis for specifying the casual linkages between two key beliefs: perceived usefulness and perceived ease of use and users attitudes intentions and actual computer adoption behaviour," (Davis et al., 1989, p.983). External variables can also effect acceptance, "influencing attitude, subjective norms, or influencing perceived usefulness and perceived ease of use" (Legris et al., 2003, p.193).

TAM consists of two distinct areas, these are 1) Perceived ease of use and 2) Perceived usefulness. Perceived ease of use is defined by Davis (1989, p.985) as "the degree to which a person believes that using a particular system would be free from effort". Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance". TAM considers technology acceptance at the level of the whole system, (Schoonenboom, 2014, p.249). User acceptance is defined as "the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support," (Dillon and Morris, 1996, p.2).

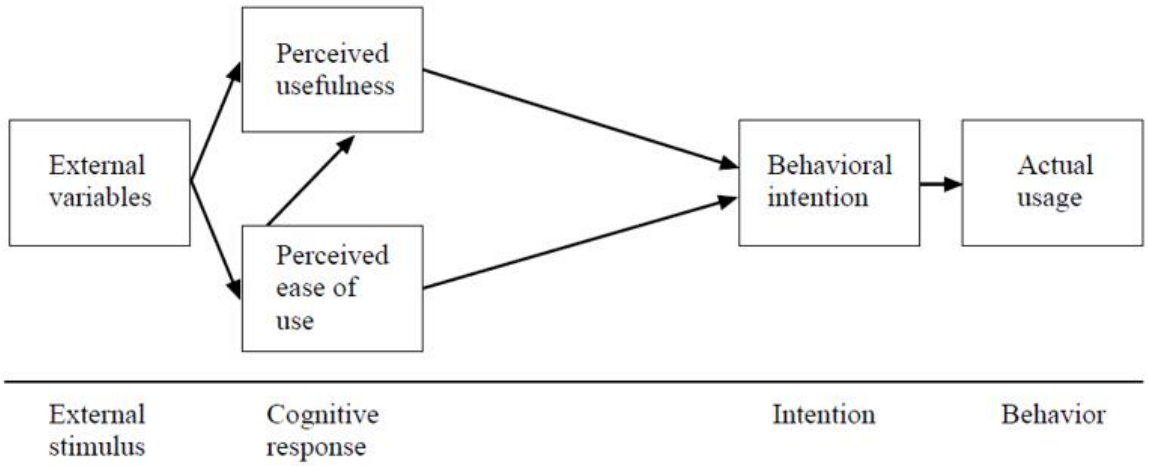

Figure 2.3 - Technology Acceptance Model (Davis, 1989, p.985)

2.6.2 **TAM2**

TAM2 which extended the TAM model by examining the role of social influences and the determinants of perceived usefulness. The goal of TAM2 was to give "A better

understanding of how the determinants of perceived usefulness would enable us to design organisational interventions, that would increase user acceptance and usage of new systems," (Venkatesh and Davis, 2000, p.187). TAM2 showed that "both social influence process (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use) significantly influenced user acceptance. These go some way toward explaining 'the effects of the various determinants on perceived usefulness and behavioural intention," (Venkatesh and Bala, 2008, p.277). The extended model tested in four organisations, accounted for 40%- 60% of the variance in usefulness perceptions and 34%-52% of the variance in usage intentions.

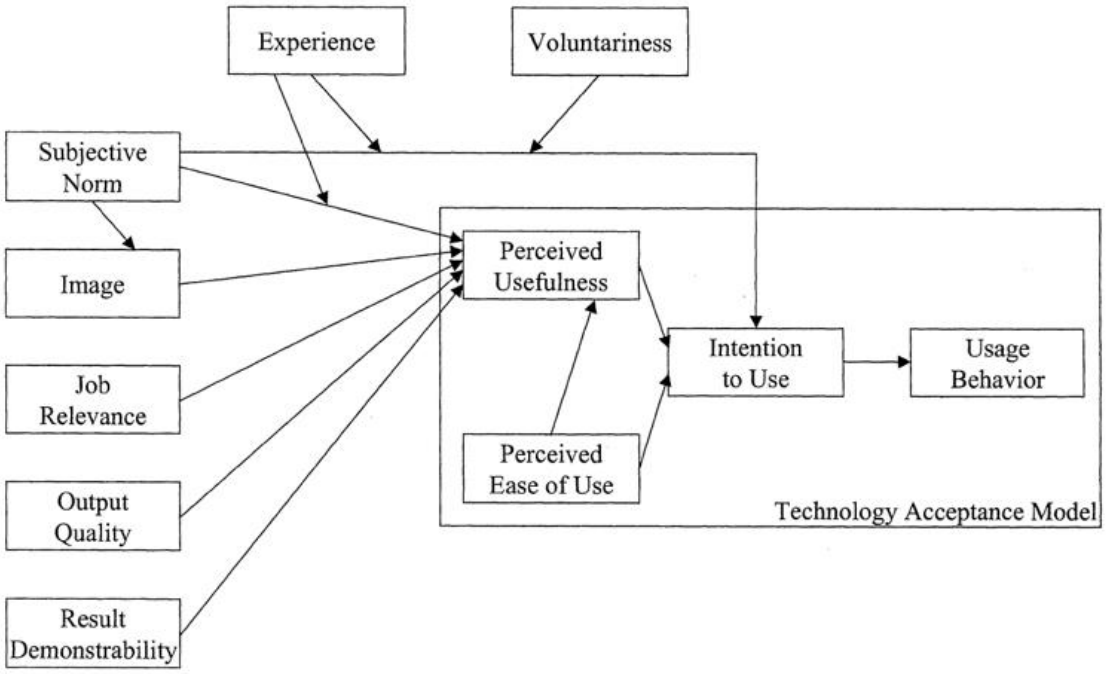

Figure 2.4 - TAM2- Extension of the Technology Acceptance Model, (Davis and Venkatesh, 2000, p.188)

2.6.3 **The Unified Theory of Acceptance and Use of Technology Model**

Integrating elements of the prominent acceptance models, Venkatesh et al. (2003) proposed the Unified Theory of Acceptance and Use of Technology Model (UTAUT). Results from Venkatesh and Davis, (2000, p.186) showed that TAM2, "accounted for 34%-52% of the variance in usage intentions' whereas improvements with UTAUT showed 70% of the variance behavioral intention and 50% in usage intentions."

According to Thomas et al. (2013, p.73) show how the UTAUT model consists of four constructs, this include;

- Performance Expectancy: The degree to which the individuals believe that the use of the technologies will results in performance gains. This may also be viewed as the perceived usefulness of the technologies.
- Effort Expectancy: The ease of use of the technologies.
- Social Factors: The extent to which the individuals believe that important others believe that they should use the technologies.
- Facilitating Conditions: The perceived extent to which the organisational and technical infrastructure required for the support of the technologies exist.

The model also includes four moderating variables: age, gender, education and voluntariness of use.

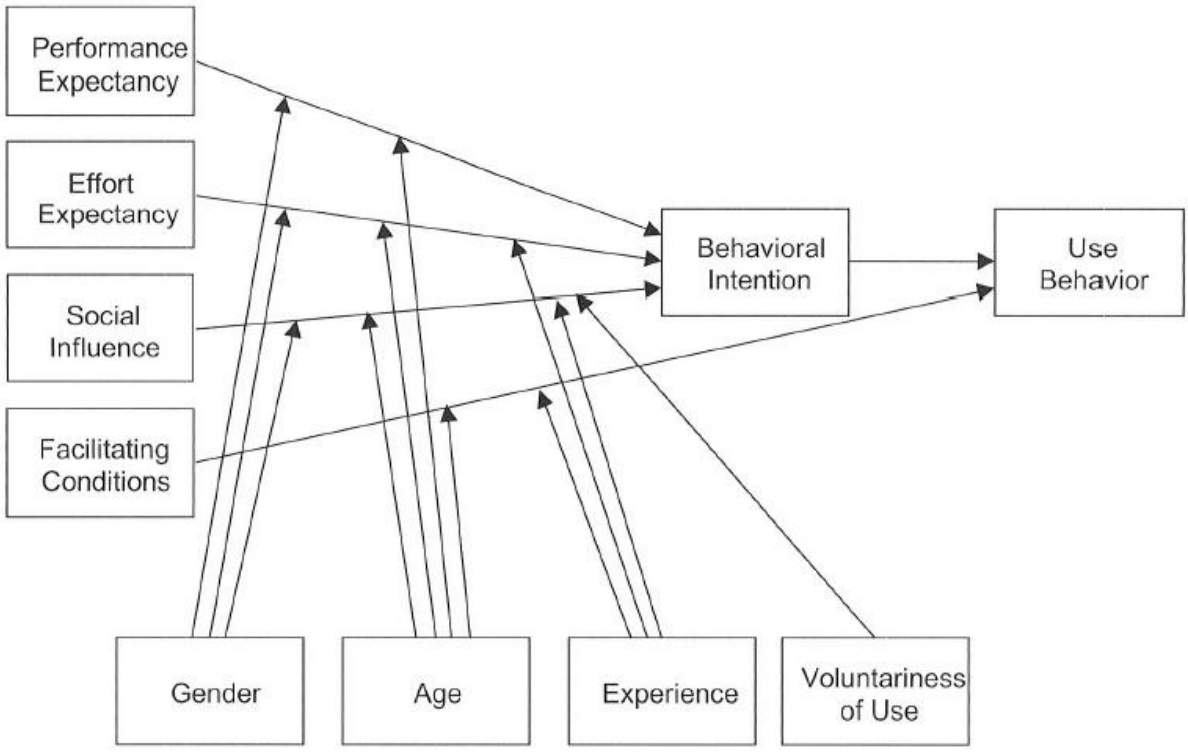

Figure 2.5 - Unified Theory of Acceptance and Use of Technology Model (UTAUT) (Venkatash et al., 2003)

2.7 Usability Testing

Usability testing, typically consists of evaluating a product or system on users to identify problems. Qualitative and quantitative data can then be collected from this testing and analysed. Usability is defined by (Rubin and Chisnell, 2008, p.4) as "when a product is truly usable, the user can do what he or she wants to do the way he or she expects to be able to do it". The usability testing of Twitter for this research is concerned with introducing the platform to participants with a view to completing various scenario based tasks. There are several methods to test usability, the method applied in this research will be Think Aloud.

2.7.1 Concurrent Think Aloud (CTA)

"Think-aloud protocols are commonly used for the usability testing of instructional documents, web sites and interfaces," (Haak et al., 2003, p.285). "Concurrent thinking-aloud, has a clear benefit in that it allows insight into the participants' thinking process. This would seem to result in a more complete overview of user problems encountered," (Haak et al., 2003, p.339). The pros and cons of Concurrent Think Aloud are outlined in figure 2.6.

Technique	**Pros**	**Cons**
Concurrent Think Aloud (CTA)	• Understand participants' thoughts as they occur and as they attempt to work through issues they encounter • Elicit real-time feedback and emotional responses	• Can interfere with usability metrics, such as accuracy and time on task

Figure 2.7 Concurrent Think Aloud (CTA), Usability.gov (2014)

2.8 Conclusion

This research proposes the use of Twitter as a communication tool in a third-level institute, its role for specific communication tasks is put forward. Twitter would be used to disseminate internal school relevant announcements and course specific discourse. Students would be encouraged to register for Twitter with their smart phones in order to receive SMS text messages from specific postings to Twitter. A certain importance level would be attached to these messages, so as not to saturate or dilute the medium. Students and administrative staff will then attach more importance to receiving messages in this format as opposed to email or web noticeboards. The work of Naismith (2007) outlined how successful SMS text messaging has been in a third-level institute and how student satisfaction levels increased by using service.

Situations that necessitate this level of immediacy wold include, a late class cancellation or room change or a notable seminar or emergency notice. The benefit of using Twitter in this way is highlighted in its use in crisis situations. The use of Twitter in industry was outlined in two examples with Adidas UK and Blackboard educational software. The limitations of Twitter are also put forward.

The ubiquitous rise of social media has ensured that social technology is not strange anymore to the majority of end users, but a rollout of this software would still present challenges. In order to achieve a greater likelihood of success in implementing a new system and overcome these challenges, the evolution of technology acceptance was examined, through iterations of the Technology Acceptance Model.
This literature review looked at the following areas;

- Existing communication methods in higher education
- Empirical view of social media
- Twitter as a communication tool
- Possible barriers to ICT adoption in higher education
- Technology acceptance models

3 Methodology and Fieldwork

3.1 Introduction

This chapter looks at the choice of research philosophies and methodologies and justifies the decision to use a mixed method approach. The research onion (Saunders et al. p138, 2009) is continually referenced throughout the chapter in order to keep the methodology in a framework. Research design is a key section where survey and experiment measurement techniques and methods are outlined.

3.2 Research Objectives

The purpose of this study is to answer the research questions which are as follows;

What are the barriers to the adoption of Twitter as a communication tool between students and administrative staff in a higher-level institute?

Can barriers to the adoption of Twitter be overcome by usability testing the platform?

3.3 Research Philosophies

Research is a process of steps used to collect and analyse information that increase our understanding of a topic or issue, (Creswell, 2002, p.3). Research philosophy is concerned about how particular data should be gathered, analysed and interpreted, using this data to turn what is believed into what is known. “Epistemology concerns what constitutes acceptable knowledge in a field of study,” (Saunders et al., 2009, p.112). According to Scotland, (2012, p.9), “Epistemological assumptions are concerned with how knowledge can be created, acquired and communicated, in other words what it means to know.” Methodology can be viewed as consisting of three major components according to Papatsoutsos, (2001, p.8), these are as follows;

A. A work breakdown structure that provides guidelines of what to do and when to do it.
B. Techniques on how to do what needs to be done
C. Advice on how to manage the quality of the results

At a general level, research consists of three steps:

1. Pose a question.
2. Collect data to answer the question.
3. Present an answer to the question.

Philosophies which were considered for possible use in this project include Positivism, Interpretivism and Pragmatism. Saunders et al. (2009, p.138), Research Onion, outlined in Figure 3.1 was an influence in framing this research. The layers of this onion are Philosphy, Approach, Strategy, Choice, Time and Data collection.

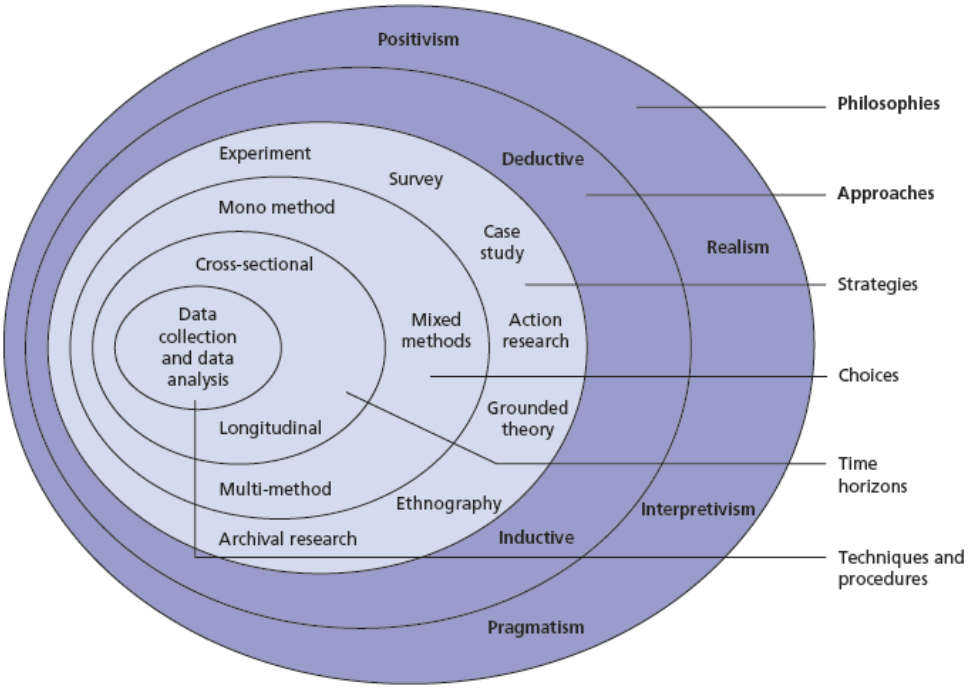

Figure 3.1 Research Onion Saunders et al. (2009)

3.3.1 **Positivism**

Positivist research, which is also sometimes referred to as quantitative research, “is based on the notion that research can be objective, that the researcher is independent and that the results are valid, reliable and replicable,” (Pather and Remenyi, 2004, p.142). Positivists employ quantitative techniques, which “include an emphasis on the quantification of constructs and assigning values to the perceived quality of things” (Babbie, 2012).

3.3.2 **Interpretivism**

Interpretivism is the opposite of positivism, it takes a layered view of research and affirms how complex research cannot be understood effectively only by quantitative methods. “Interpretivism is important when the research revolves around subjects from different cultural contexts and also taking into account different perspectives of professionals in

different organisations" (Johari, 2009, p.26). "Interpretivists believe that phenomena are time and context bound and, thus, they seek idiographic descriptive knowledge," (Ozanne and Anderson Hudson, 1989, p.4).

3.3.3 **Pragmatism**

Pragmatists use both subjective and objective viewpoints, both biased and unbiased, when collecting and analysing data. "The pragmatic approach to science involves using the method which appears best suited to the research problem and not getting caught up in philosophical debates about which is the best approach," (Moksha, 2013, p.35).

Pragmatism is a mixed-methods approach which, generally speaking, is an approach to knowledge that attempts to consider multiple viewpoints, perspectives, positions, and standpoints. "Pragmatism offers an epistemological justification and combination of methods and ideas that helps to frame, address, and provide tentative answers to research questions," (Johnson et al., 2007, p.125).

3.4 Research Strategy

The benefits of using Twitter as a communication tool were outline in Chapter two, this chapter looks at the collection of primary data and its analysis. This data is collected using a survey strategy and Experiment.

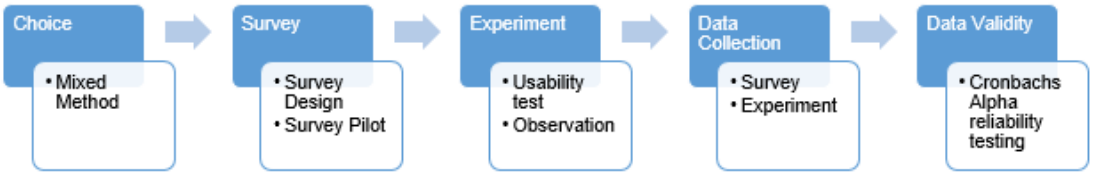

Figure 3.2 Methodology Framework

3.5 Choice

A mixed-method including quantitative and structured observation was the choice for this research. This method was chosen as it gives more depth of understanding against just using one method. This method also gives a more holistic view of the research being carried out. The quantitative data will be used for understanding potential barriers in Twitter use, while qualitative data feedback and experiment observation will be used in evaluating actual Twitter use. In mixed method quantitative designs the researcher uses

more than one quantitative data collection technique with associated statistical analysis procedures, (Saunders and Tosey, 2012).

3.6 Time

Time horizons according to Saunders et al. (2009, p.155) can be 'snapshot' time horizon which is cross-sectional while the longer 'diary' perspective is longitudinal. This research is longitudinal as opposed to snapshot because it uses pre-experiment and post-experiment questionnaires.

3.7 Data Collection

Creswell, (2002, p.11) gives three approaches to research, these are as follows; i) Quantitative, ii) Qualitative and iii) Mixed methods. Data can be primary or secondary. Primary data is collected primarily for the research while secondary data is data which has been collected in other studies.

3.7.1 Qualitative and Quantitative Data

Qualitative research at a fundamental level is based around the studies of empirical data, content analysis, focus groups and interviews. A quantitative research approach is based on statistical methods and is grounded in numbers and statistics. "Exponents of positivist traditions utilise mainly quantitative techniques," (Pather and Remenyi, 2004, p.143) whereas qualitative concentrates on discourse analysis, leaving results open to interpretation.

A qualitative approach is one in which the inquirer often makes knowledge claims based primarily on constructivist perspectives. It also uses strategies of inquiry such as narratives, grounded theory studies, or case studies. The researcher collects open-ended, emerging data with the primary intent of developing themes from the data, (Creswell, 2002). "Qualitative research is a multifaceted approach that investigates culture, society and behaviour through an analysis and synthesis of people's words and actions," (Hogan et al., 2009, p.3). In general, qualitative researchers claim that their aim is to provide a "rich description so as to achieve deep understanding of a topic," as opposed to quantitative analysts whom just aim for a "mere prediction" (Sechrest and Sidani, 1995, p.79).

"Quantitative research is essentially about collecting numerical data to explain a particular phenomenon," (Muijs, 2011, p.2). According to Creswell, (2002, p.21) a quantitative approach is one in which the investigator "primarily uses post positivist claims for developing knowledge and employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield statistical data." The strengths of using a quantitative approach is with its basis in statistics, whereby results are less open to interpretation and bias than with a qualitative approach. However its limitations may be exposed with a badly constructed method of inquiry or with a small set of participants.

3.8 Research Design

Two questionnaires with UTAUT related constructs will be given to a cross section of users in various departments of a third level institute. These questionnaires will be given pre-experiment and post-experiment with using Twitter. Each targeted participant taking part in the research is responsible for communication with staff and students in their own area. "The determinants identified in the UTAUT model relate to participants reactions to technology such as expectations, assessed social influence, and other influencing factors, that are known to drive the intention to use technology and in turn their actual use behaviour," (Wild et al., 2011, p.40). The barriers preventing users adopting Twitter as a communication tool will be identified by their behavioural intention towards use.

The determinants of the UTAUT model Venkatesh et al. (2003) break down into the following areas;

1. Performance expectancy (PE):
2. Effort expectancy (EE):
3. Social influence (SI):
4. Facilitating conditions (FC):

3.8.1 Survey

Survey research uses predefined and structured questionnaires to capture data from individuals. Normally, the questionnaires are done online, Palvia et al. (2007). A survey is a method of gathering information using identical procedures with each participant, types of survey question include close-ended questions where questions are given with a choice of answers, open-ended questions that allow respondent to give their own answer and scale response questions.

According to Groves et al. (2004, p.3) surveys have the following characteristics:

I. Information is gathered primarily by asking people questions.
II. Information is collected from only a subset of the population, described as a sample rather than all its members.

The most common method of survey is a questionnaire, where a set of questions are given to a sample set and the answers are interpreted.

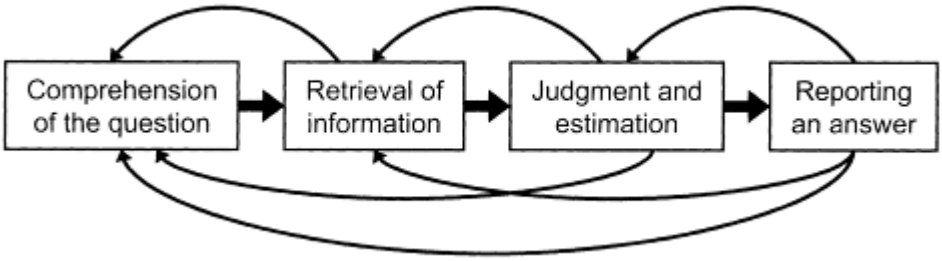

Figure 3.3: A simple model of the Survey Response Process, Groves et al. (2004).

"This descriptive research, undertaken using attitude and opinion questionnaires and questionnaires of organisational practices, help to identify and describe the variability in different phenomena" (Saunders et al. 2009, p.362). In this research an online survey method was chosen because of its ease of access for participants. All participants are fully IT proficient so an online survey will not present any learning curves for participants.

Questions for the survey for this research were chosen under four detriment headings of the UTAUT model, the determinants are as follows;

1. Performance Expectancy.
2. Effort Expectancy.
3. Social influence.
4. Facilitating Conditions.

The questions for the survey were cross referenced with the findings from the work of Butler and Sellbom (2002) in technology adoption. These questions were selected based on the highest mean average of adoption barriers from their survey findings on faculty and staff. The questions are as follows;

Performance Expectancy (PE): "is the degree to which an individual believes that using the system will help him or her to attain gains in job performance," (Venkatesh et al., P. 447 2003).

Items	Question
PE	I would find Twitter useful in my job.
PE	Using Twitter would enable me to accomplish communication tasks more quickly.
PE	Using Twitter will increase my productivity.
PE	Using Twitter will make me more efficient at my job.

Effort Expectancy (EE): “Is the degree of ease associated with use of the system,” (Venkatesh et al., P. 450, 2003).

Items	Question
EE1	My interaction with Twitter would be clear and understandable.
EE2	It would be easy for me to become skilful at using Twitter.
EE3	I would find Twitter easy to use.
EE4	Learning to operate Twitter is easy for me.

Social Influence (SI): “is the degree to which an individual perceives that important others believe he or she should use the new system,” (Venkatesh et al., p. 451, 2003).

Items	Question
SI1	My work colleagues would influence my use of Twitter.
SI2	Other people using Twitter would make me use it more.
SI3	The senior management in my institution are generally supportive with the use of new applications.
SI4	I would promote the use of Twitter in my office/school.

Facilitating Conditions (FC): “is the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system,” (Venkatesh et al., P. 453, 2003).

Items	Question
FC	I have the resources necessary to use Twitter.
FC	I have the knowledge necessary to use Twitter.
FC	I have access to a smart phone to handle communications remotely.
FC	Technical support is available for assistance with Twitter difficulties that I may experience.

3.8.2 Survey Pilot

A pilot survey and data analyses was tested on work colleagues and friends before being finalised. The survey had no outliers in the questions and had a Cronbachs Alpha of .948 in the pre-experiment survey and .926 in the post-experiment survey. Cronbachs Alpha ensures internal consistency in the questionnaire.

3.8.3 Likert Scale Measurement

The questionnaire was developed with five point Likert scale answers. These are as follows;

1. Strongly agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

3.8.4 Usability Test Experiment

In research an experiment can be carried out to test a hypostasis, verify results or to study the cause and effect that a particular method or system has on a group or groups. “The simplest experiments are concerned with whether there is a link between two variables, Experiments therefore tend to be used in exploratory and explanatory research to answer ‘how’ and ‘why’ questions”, (Saunders et al., P. 142, 2009).

According to Saunders et al. (2009), a classic experiment consists of two groups, a control group and an experimental group, each treated to different conditions and both tested the same. For this research only one group is used.

Participants in the Twitter experiment will be encouraged to Think-Aloud as they run through the experiment. This will immediately capture each participant's thoughts and responses to the various tasks they are undertaking. It is a fast and effective method of recording the participant's experience of using the tool without affecting how they us it. According to McDonald and Petrie, P. 2941, (2013), "It is critical that the techniques we use to measure users' reactions to interactive systems do not, in themselves, create changes in users' behaviour."

In order to effectively record the think-aloud feedback from participants, the System Usability Scale (Brooke, 1996) will be used to structure questions. According to Brooke, (1996, p.3) the "The System Usability Scale (SUS) is a simple, ten-item scale giving a global view of subjective assessments of usability." These questions will be put to the participants throughout the experiment to encourage Think-Aloud interaction. System Usability Scale scores, which provide a numerical score out of 100, (Condit Fagan et al., 2012) can be calculated to interpret how usable a system might be. The SUS will be used in this research merely to structure the tone and depth of questioning, and to stimulate participants during the experiment. Each participant will get various questions posed in random order, the results will be recorded as qualitative feedback.

System Usability questions are as follows;

1. Would you use Twitter frequently?
2. Do you find Twitter unnecessarily complex?
3. Do you think Twitter is easy to use?
4. Would you need the support of a technical person to be able to use Twitter?
5. Do you find Twitter functional?
6. Do you find any inconsistencies in Twitter?
7. Would you find it easy to learn how to use Twitter?
8. Do you find Twitter cumbersome to use?
9. Do you feel confident using Twitter?
10. Do you feel that you would have to learn a lot of things before you could get going with Twitter?

3.8.5 Twitter Experiment

Participants will be given pre-created Twitter accounts to log into Twitter with. Once they are logged in each participant will be assigned a set of tasks to complete, these are as follows;

1. Post Updates
2. Follow Someone/Organisation on Twitter
3. Re-Tweet RT
4. Setup A Hashtag #

Each participant is given the exact same list of tasks, but using different Twitter accounts. The object of this exercise is to walk participants through the different functionality available to them. Instructions on how to carry out each task will be given to each contributor', see appendices for instructions.
This element of the research will be observed throughout. Measures of success will include attempted or completed tasks and not the quality of the actual content being posted.

Scenarios include;

- Late Classroom change
- Lecture Cancellation
- Class Announcement
- Event Reminder
- Safety Announcement
- Assignment Deadline Reminder
- Student Poll

3.8.6 **Flow of Events in experiment.**

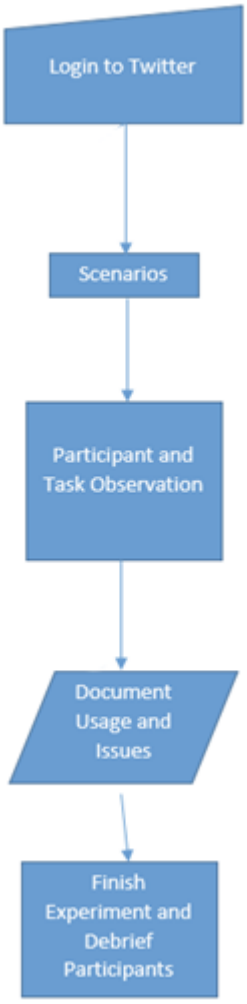

Figure 3.4 Experiment Flow

3.8.7 **Observation**

Observing users interacting with Twitter will give a qualitative insight into actual tool use. This observation will include asking structured questions from the system usability questionnaire and recording the answers. According to Saunders et al. P. 288, (2009) observation is both a rewarding and enlightening task to pursue and, adds considerably to the richness of the research data. “Using an observation approach to data collection leads to richer understanding of the social context of research and its participants,” Kawulich (2005). Primary observation will be used to collect data on actual Twitter use and how users interacted with the tool. Data validity through observation will be high as this observed data is not open to interpretation.

3.8.8 Research Participants

Convenience sampling was used to select participants for this research. This was used primarily because of time constraints and participant availability. The targeted research subjects are work colleagues, which are administrative staff from the School of Physics, Trinity College Dublin and CRANN in Trinity College Dublin. Selection criteria was based on their availability and their prior experience in communicating with students and academic staff.

3.9 Data Validity

"What definitely characterises pre-test and post-test data is that the two measurements are made on the same experimental unit, with one measurement before and one measurement afterwards," (Bonate, 2000, p.2). The data analysis for this research will be tested for reliability with Cronbachs alpha in SPSS 20. "Cronbach's alpha is a statistic that measures the internal consistency among a set of survey items," Trobia (2008). The internal consistency of the survey questions were tested in the pilot survey to ensure that no outliers are contained in the questionnaire. The participants will be given a questionnaire pre-Twitter experiment, the mean results will then be compared with the post-test results by the same participants. The difference in results will be outlined in Chapter four.

3.10 Ethical Considerations

The research and questionnaire had to meet a set of criteria laid out by the ethics committee in Trinity College Dublin. Participants in this study received an information sheet on the research and a debriefing sheet with contact information. All data was anonymised so as to ensure confidentiality, which will lead to more honest and insightful opinions from participants.

3.11 Limitations

The number of participants is a limitation of the study. Although it represents a good cross section of persons working in this area, the numbers are too low to make any major generalisations about acceptance of Twitter in higher education institutes. Availability of resources and time constraints were other limiting factors. Convenience sampling was used in the research which according to Saunders et al. (2009, p.241), "is prone to bias

and influences that are beyond your control, as the cases appear in the sample only because of the ease of obtaining them."

3.12 Conclusion

This chapter examined the research objectives and how they could best be achieved by utilising the various research approaches. The survey results will identify potential barriers in lieu with UTAUT determinants, these pre and post experiment mean scores will look to validate the research design in chapter four.

Layer	Adopted Method
Philosophy	Pragmatism
Approach	Deductive
Strategy	Survey and Experiment
Choice	Mixed Method
Time Horizon	Longitudinal
Data Collection Methods	Survey and Observation

Figure 3.5 Research Onion Layers and Research Choice

4 Findings and Analysis

4.1 Introduction

In order to identify potential barriers to the adoption of Twitter as a communication tool, an experiment with pre-experiment survey and a post-experiment survey was conducted. This chapter presents the findings and analysis of the survey data. The experiment consisted of specific task based usability testing of Twitter. The surveys were based on four UTAUT determinants. An ethics requirement for this research meant that all data was anonymised, each participant was given a number and these were randomised so as not to go in order of participation. Fifteen participants took part in this research.

4.2 Data Analysis

The pre-experiment and post-experiment surveys were the main source of data for this research. This data was gathered using the online survey tool Survey Monkey, each survey was completed before and after the experiment. Fifteen participants took part, with each one answering every question and each one taking a full part in the experiment. During the experiment participants were encouraged to think aloud while running through each task, any notable feedback or comment was recorded by the researcher. This method gave an invaluable qualitative insight into the actual use of Twitter as a communication tool and the participant's thoughts on potential usage and barriers to usage of Twitter.

4.3 Data Clean-up

The quantitative data from the surveys was input into Microsoft Excel and from here it was imported into SPSS 20. The answers were coded with numerical representations of Likert scale values, this allowed for the seamless import of data from Excel into SPSS. The values that were assigned were as follows;

6. Strongly agree was given a value of 5.0
7. Agree was given a value of 4.0
8. Neutral was given a value of 3.0
9. Disagree was given a value of 2.0
10. Strongly Disagree was given a value of 1.0

The analysis techniques used in SPSS included Cronbachs Alpha which calculated the internal consistency of the data. Cronbachs Alpha is applied "when items are used to form a scale, they need to have internal consistency. The items should all measure the same thing, so they should be correlated with one another", (Bland and Altman, 1997, p. 572).

A Cronbachs Alpha score of between 0.7 and 0.9 is rated as good. The mean average for each question and each determinant was also calculated in SPSS. Calculating the mean in the pre-experiment and post –experiment questionnaire gave invaluable insight into how an introduction to a technology, could break down any preconceived ideas that people might have on using it. In this research the mean average rose in each UTAUT determinant after the Twitter experiment, these increases are outlined in Table 4.1.

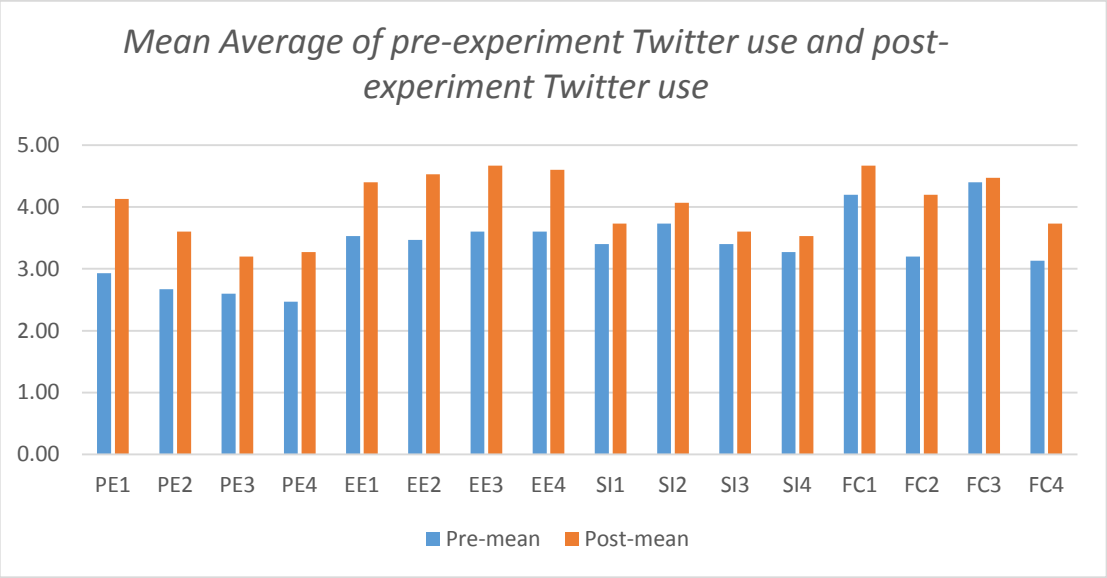

Table 4.1 Mean Average of pre-experiment Twitter use and post-experiment Twitter use.

4.3.1 Participants

Eighteen Participants were asked to take part in the survey and experiment, fifteen responded and fully took part in both surveys and the experiment. All the survey questions were answered and all tasks in the experiment were carried out successfully. The surveys and experiment were completed over three days. Each participant works in a third-level institute and has experience in communicating with staff and students via traditional methods, including email and website postings.

4.4 Quantitative Analyses

The pre-experiment and post-experiment questionnaire were each composed of the exact same questions. The survey was structured in four parts. These were based around the four determinants in the UTAUT model. These determinants are Performance Expectation (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating conditions (FC). The survey results of each determinant are outlined below.

4.4.1 Performance Expectancy

According to Venkatesh et al. (2003, p.447), performance expectancy is defined as "the degree to which an individual believes that using a particular system will help them attain gains in job performance". There was a notable difference between pre-experiment Twitter use and post-experiment Twitter use, indicating that the introduction of Twitter to the participant had a positive effect on alleviating potential barriers to adopting Twitter. An introduction to Twitter clearly made a huge improvement in the participant's performance expectations, this mean rise is outlined in table 4.2 and illustrated in table 4.3 and 4.4.

Pre Twitter Use			**Post Twitter Use**		
	N	**Mean**		**N**	**Mean**
PE1	15	2.93	**PE1**	15	4.13
PE2	15	2.67	**PE2**	15	3.60
PE3	15	2.60	**PE3**	15	3.20
PE4	15	2.47	**PE4**	15	3.27

Table 4.2 Mean Average of pre-experiment Twitter use and post-experiment Twitter use.

Reliability Statistics

Cronbach's Alpha	N of Items
.939	4

Figure: 4.1 The internal consistency for Pre Experiment Performance Expectancy

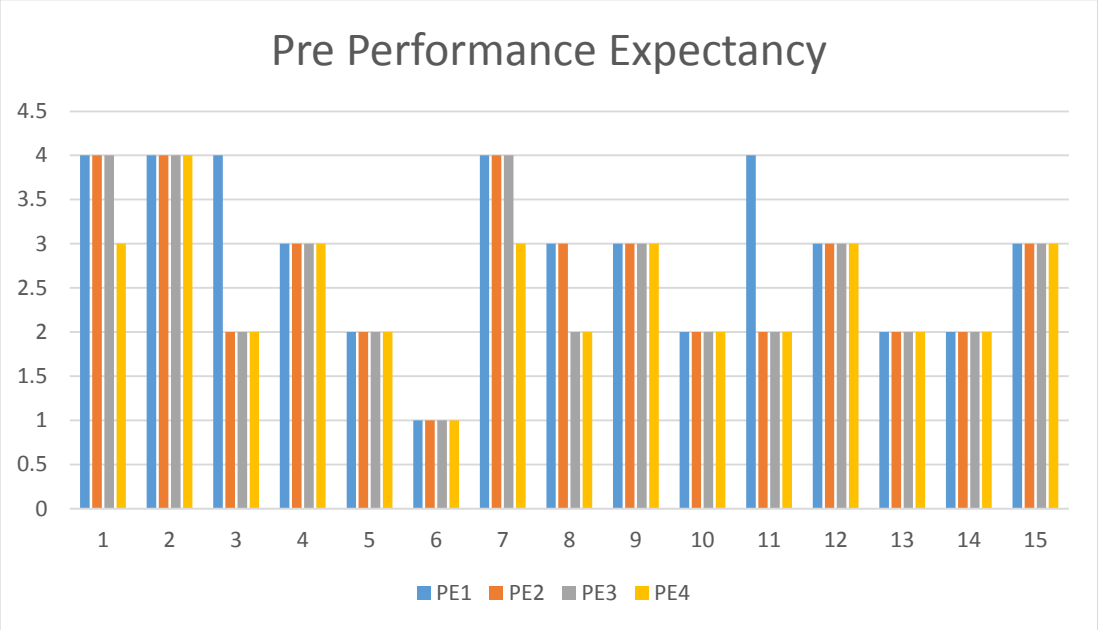

Table 4.3 Pre-experiment Performance Expectancy Twitter use graph

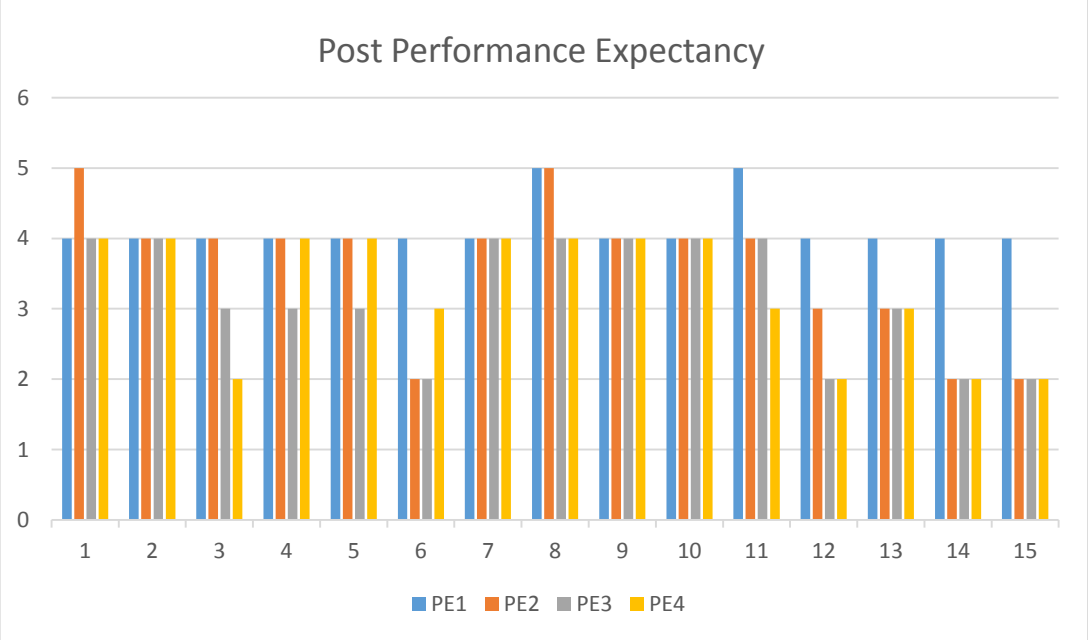

Table 4.4 Post-experiment Performance Expectancy Twitter use graph

With mean averages of under 2.5, Performance Expectancy is a potential barrier to the adoption of Twitter, these scores shown in table 4.4, however there is a clear improvement in post-experiment. Thinking-aloud evidence from participants before the experiment also concurred with these results. One notable comment from a participant that used Twitter previously was, “I cannot see Twitter being any better than email at communicating with students”. However after running through the tasks, their attitude

towards Twitter became more positive. In general participant feedback was more positive after running through the scenario based tasks.

4.4.2 **Effort Expectancy**

Effort Expectancy is described as “the degree of ease associated with the use of a system”, (Venkatesh et al., 2003, p.447). This determinant was not seen to be a barrier for participants with the mean rising significantly between pre-experiment Twitter use and post-experiment Twitter use as seen in Table 4.5. Feedback on effort expectancy was not as bad as expected, generally social media was accepted as being easy to use by nearly all the participants. However, one participant was particularly vocal about the time it would take to become skilful at using Twitter, and how time was already at a premium for everyone in their office. This was noted as a potential barrier but it wasn’t evident from other participants across the survey results. The rise in post-experiment mean scores indicated that Twitter was easy to use for the tasks in the experiment.

Pre Twitter Use				**Post Twitter Use**		
		N	**Mean**		**N**	**Mean**
EE1		15	3.53	**EE1**	15	4.40
EE2		15	3.47	**EE2**	15	4.53
EE3		15	3.60	**EE3**	15	4.67
EE4		15	3.60	**EE4**	15	4.60

Table 4.5 Mean Average of pre-experiment Twitter use and post-experiment Twitter use

Reliability Statistics

Cronbach's Alpha	N of Items
.948	4

Figure: 4.2 The internal consistency for Pre Experiment Effort Expectancy

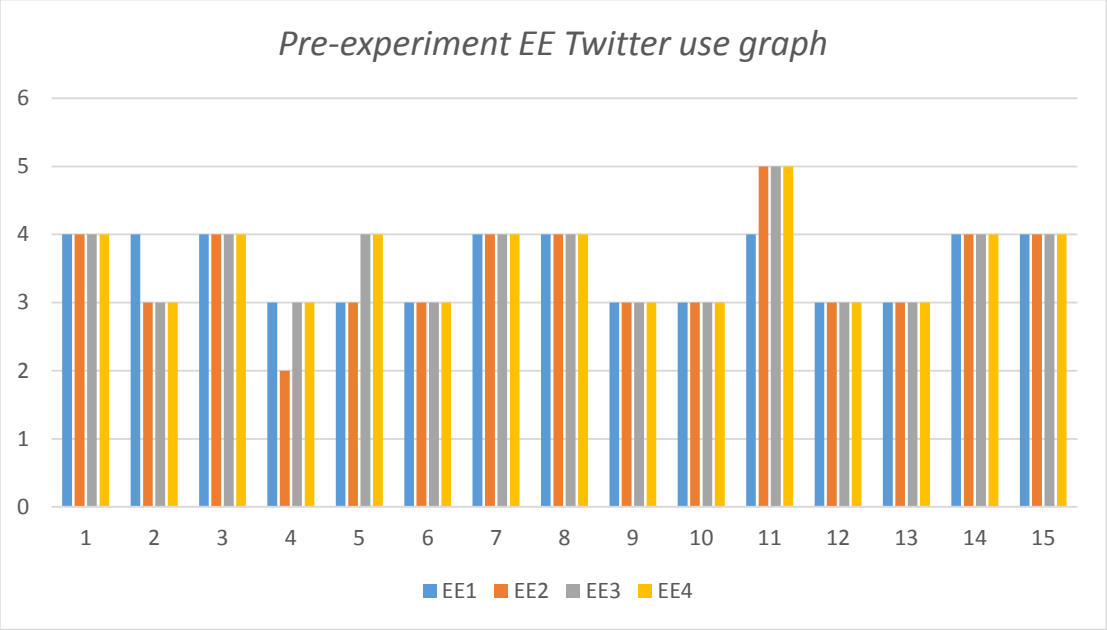

Table 4.6 Pre-experiment Effort Expectancy Twitter use graph

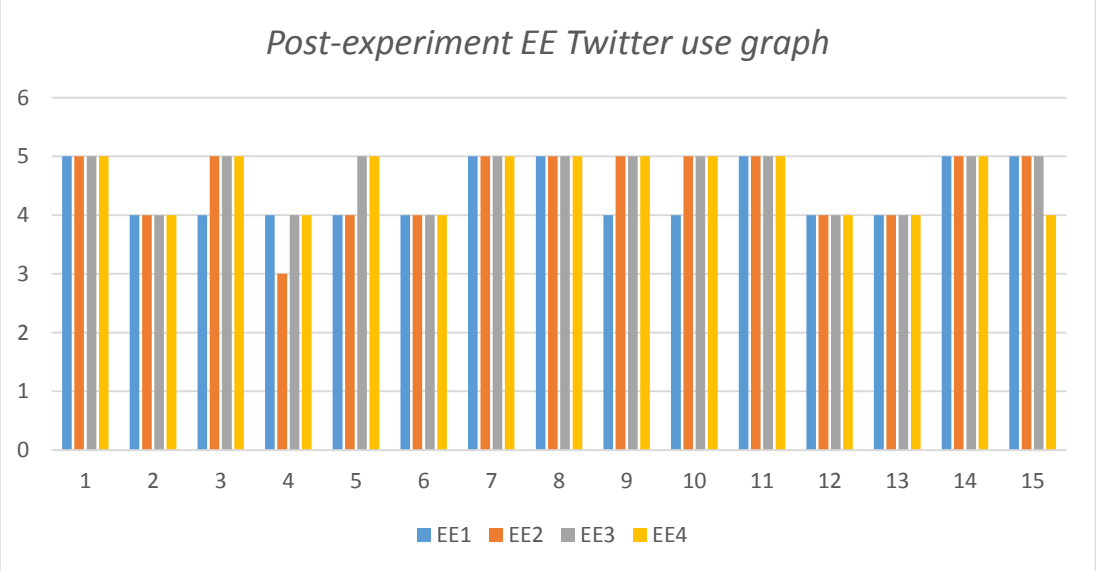

Table 4.7 Post-experiment Effort Expectancy Twitter use graph

4.4.3 **Social Influence**

Social Influence is where your peers in a work situation have a direct effect on your system use and behaviour. Social Influence is defined by Venkatesh et al. P. (2003, p.451) as “the degree to which an individual perceives that important others believe that they should use a new system”. Although no barriers were identified in the pre-experiment Twitter use and post-experiment Twitter use, the think-aloud encouragement during the experiment highlighted a few points of interest. These points of note included “if students

don't use it, I can't see administration using it", also of concern was "how much management pushed the use of Twitter", and "if all schools were using it, it would make it more successful project".

Pre Twitter Use				Post Twitter Use		
	N	Mean			N	Mean
SI1	15	3.40	SI1		15	3.73
SI2	15	3.73	SI2		15	4.07
SI3	15	3.40	SI3		15	3.60
SI4	15	3.27	SI4		15	3.53

Table 4.8 Mean Average of Social Influence pre-experiment Twitter use and post-experiment Twitter use.

Reliability Statistics

Cronbach's Alpha	N of Items
.948	4

Figure: 4.3 The internal consistency for Pre Experiment Social Influence

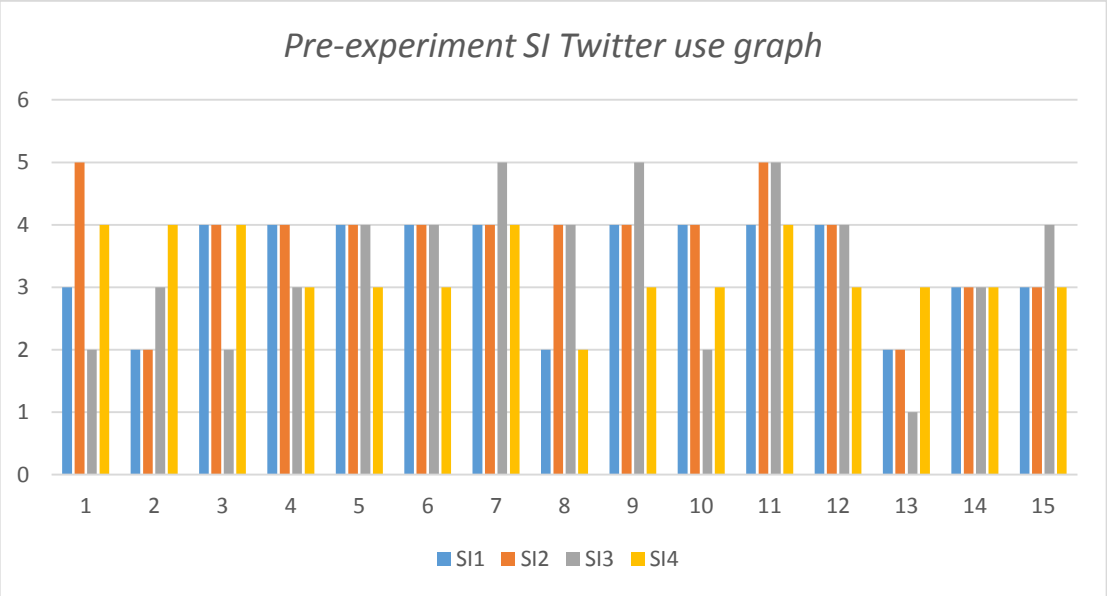

Table 4.9 Pre-experiment Social Influence *Twitter use graph*

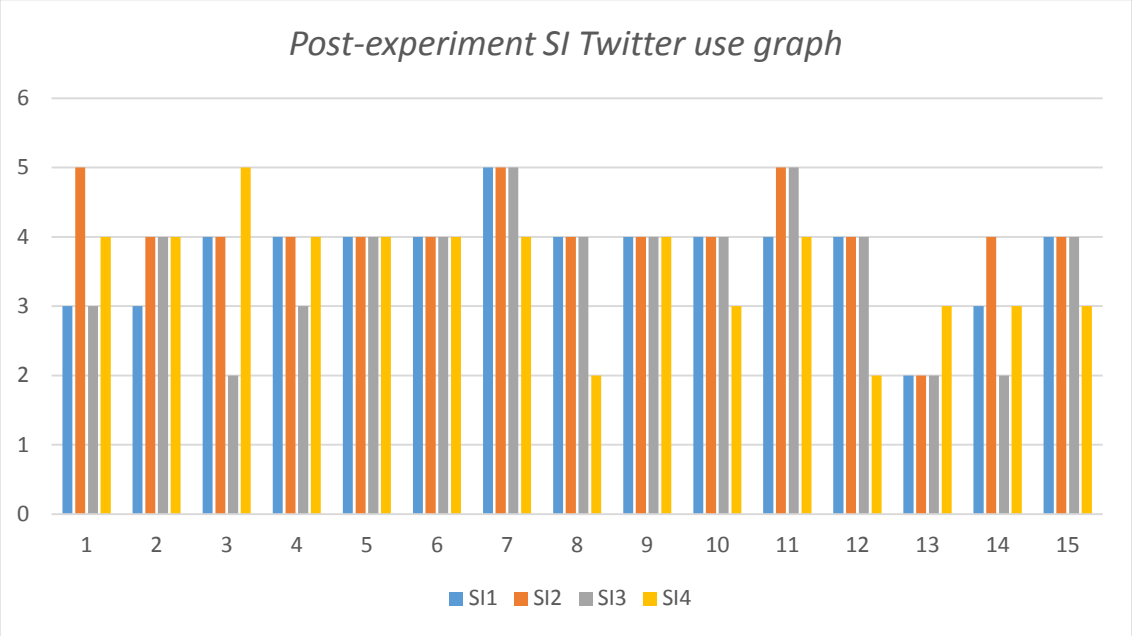

Table 4.10 Post-experiment Social Influence *Twitter use graph*

4.4.4 **Facilitating Conditions**

Facilitating Conditions include the level of support including technical and managerial that Twitter users would receive. Facilitating Conditions is defined by Venkatesh et al. (2003, p.453) as "the degree to which an individual believes that an organisation and technical infrastructure exists to support the use of the system". The response to this determinant was positive in both the pre-experiment Twitter use and post-experiment Twitter use. Think-aloud comments from participants reflected that in a third-level institute technical support, IT equipment and network access are readily available to all administration staff. The work role of the researcher may have biased the participant's opinion on technical support, but each participant was assured that there was no conflict of interest with their answers.

Pre Twitter Use				**Post Twitter Use**		
	N	**Mean**			**N**	**Mean**
FC1	15	4.20		**FC1**	15	4.67
FC2	15	3.20		**FC2**	15	4.20
FC3	15	4.40		**FC3**	15	4.47
FC4	15	3.13		**FC4**	15	3.73

Table 4.11 Mean Average of pre-experiment Twitter use and post-experiment Twitter use.

Reliability Statistics

Cronbach's Alpha	N of Items
.622	4

Figure: 4.4 The internal consistency for Pre Experiment Facilitating Conditions

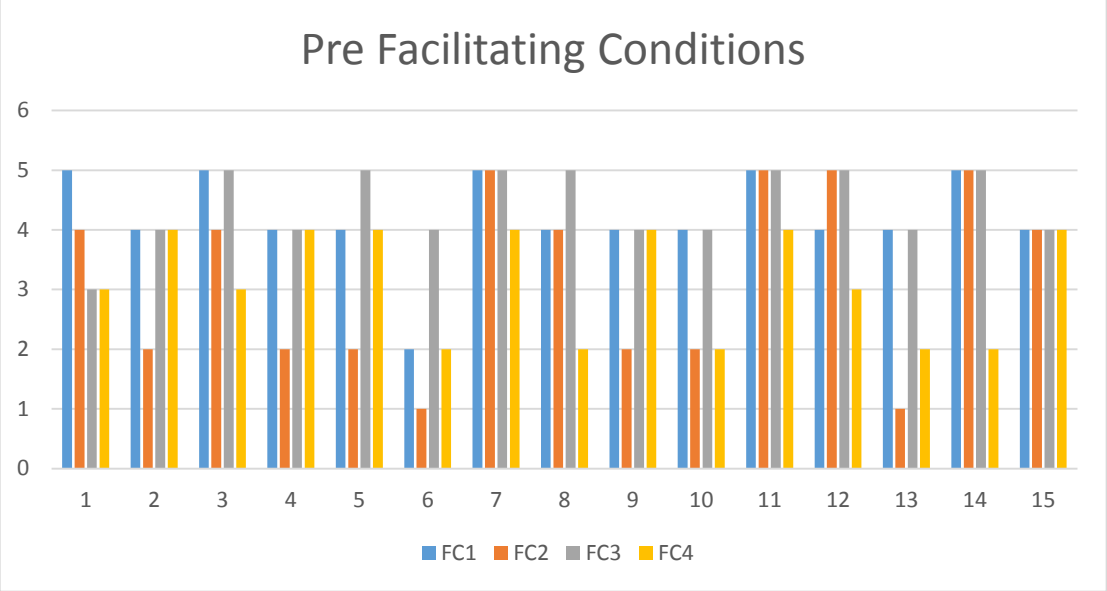

Table 4.11 Pre-experiment Facilitating Conditions Twitter use graph

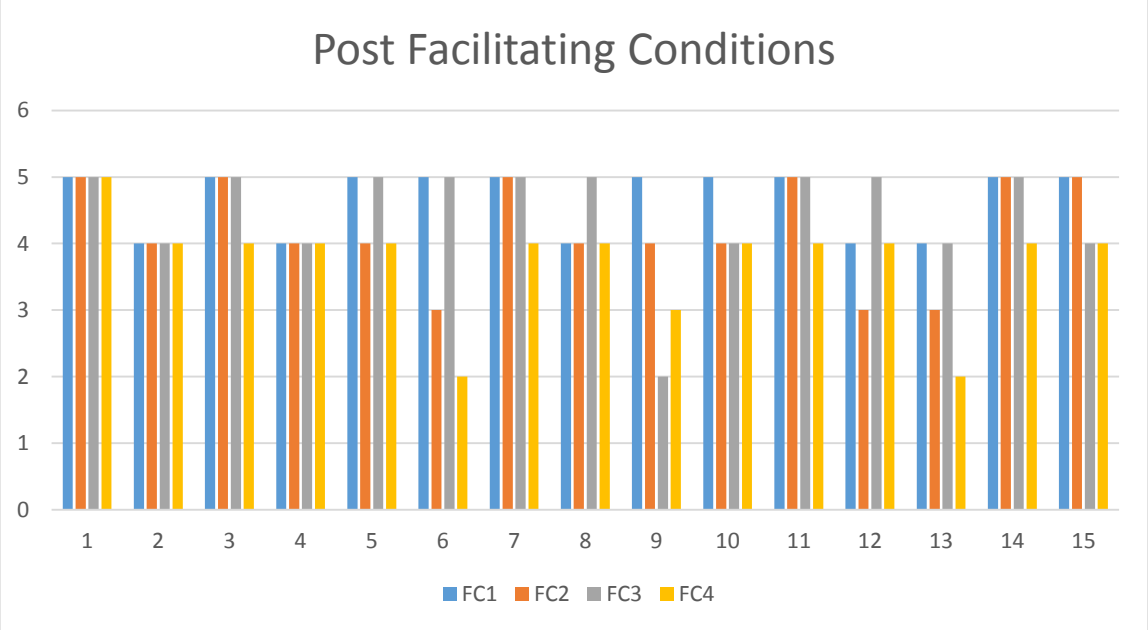

Table 4.12 Post-experiment Facilitating Conditions Twitter use graph

4.5 Experiment

The experiment was a usability test on using Twitter for a specific purpose. Of the fifteen participants that took part only five had used Twitter before the experiment and none of the five had used it regularly. Each participant was given the same four tasks to complete, these tasks included the following steps;

1. Sending an update Tweet that a class had been cancelled.
2. Following another TCD user on Twitter.
3. Re-Tweeting (RT) news on Twitter.
4. Setting up a hashtag (#) and running through searching on the Hashtag.

The Twitter accounts were created before the experiment and given to the participants, these accounts have since been deactivated.

Participants were encouraged to think aloud while running through the tasks, this ensured that they were getting through each task easily and that they were aware of the goals at all times. All notable comments and questions emanating from the experiment were noted down. The general tone and feedback on Twitter being used as a communication tool was positive, with at least 2 participants expressing interest in pursuing the concept further.

4.6 Potential Barriers Identified

The following shows each determinant of the UTAUT model and shows the barriers and potential barriers to Twitter adoption. All barriers were identified the pre-experiment survey results Each Likert scale item was given a score value and rated as a barrier or a potential barrier based on these scores, these are shown in figure 4.16.

Likert Scale	**Score**	**Barrier**
Strongly agree	5	Not a Barrier
Agree	4	Not a Barrier
Neutral	3	Potential Barrier
Disagree	2	Barrier
Strongly Disagree	1	Barrier

Table 4.13 Likert Ratings and Barrier Labels

4.6.1 Performance Expectancy Barriers

The low scoring in Performance Expectancy was due to participants having a negative perception of Twitter and how it could be used to improve current communication suites.

One participant commented along the lines of “keep social media, social and not for work related situations”, another made the point that “using social media blurred the lines between their social lives and work lives”.

Reliability Statistics

Cronbach's Alpha	N of Items
.836	4

Figure: 4.5 The internal consistency for Post Experiment Performance Expectancy

The following statements scored negatively in the pre-experiment questionnaire.

- PE1 - I would find Twitter useful in my job.
- PE2 - Using Twitter would enable me to accomplish communication tasks more quickly.
- PE3 - Using Twitter will increase my productivity.
- PE4 - Using Twitter will make me more efficient at my job.

	Pre Test		**Post Test**
PE1	Potential Barrier	***PE1***	Not a Barrier
PE2	Potential Barrier	***PE2***	Not a Barrier
PE3	Potential Barrier	***PE3***	Not a Barrier
PE4	Potential Barrier	***PE4***	Not a Barrier

Table 4.14 Performance Expectancy Barriers

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Total**
I would find Twitter useful in my job.	6.67% 1	26.67% 4	33.33% 5	33.33% 5	0.00% 0	15
Using Twitter would enable me to accomplish communication tasks more quickly.	6.67% 1	33.33% 5	40.00% 6	20.00% 3	0.00% 0	15
Using Twitter will increase my productivity.	6.67% 1	40.00% 6	33.33% 5	20.00% 3	0.00% 0	15
Using Twitter will make me more efficient at my job.	6.67% 1	40.00% 6	46.67% 7	6.67% 1	0.00% 0	15

Table 4.15 Performance Expectancy Answer Percentages of pre-experiment Twitter use and post-experiment Twitter use.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
I would find Twitter useful in my job.	0.00% 0	0.00% 0	0.00% 0	86.67% 13	13.33% 2	15
Using Twitter would enable me to accomplish communication tasks more quickly.	0.00% 0	20.00% 3	13.33% 2	53.33% 8	13.33% 2	15
Using Twitter will increase my productivity.	0.00% 0	26.67% 4	26.67% 4	46.67% 7	0.00% 0	15
Using Twitter will make me more efficient at my job.	0.00% 0	26.67% 4	20.00% 3	53.33% 8	0.00% 0	15

Table 4.16 Performance Expectancy Answer Percentages of post-experiment Twitter use.

4.6.2 **Effort Expectancy Barriers**

Adding more software to an already bloated application suite was a common concern amongst participants. The main apprehensions about using Twitter, were from participants who hadn't used Twitter or any other social media before. These fears were alleviated once they used the tool in the experiment. The point below was seen as a potential barrier.

- EE2 - It would be easy for me to become skilful at using Twitter.

Reliability Statistics

Cronbach's Alpha	N of Items
.885	4

Figure: 4.6 The internal consistency for Post Experiment Effort Expectancy

	Pre Test		Post Test
EE1	Not a Barrier	***EE1***	Not a Barrier
EE2	Potential Barrier	***EE2***	Not a Barrier
EE3	Not a Barrier	***EE3***	Not a Barrier
EE4	Not a Barrier	***EE4***	Not a Barrier

Table 4.17 Effort Expectancy Barriers

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
My interaction with Twitter would be clear and understandable.	0.00% 0	0.00% 0	46.67% 7	53.33% 8	0.00% 0	15
It would be easy for me to become skilful at using Twitter.	0.00% 0	6.67% 1	46.67% 7	40.00% 6	6.67% 1	15
I would find Twitter easy to use.	0.00% 0	0.00% 0	46.67% 7	46.67% 7	6.67% 1	15
Learning to operate Twitter is easy for me.	0.00% 0	0.00% 0	46.67% 7	46.67% 7	6.67% 1	15

Table 4.18 Effort Expectancy answer Percentages of pre-experiment Twitter use and post-experiment Twitter use.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
My interaction with Twitter would be clear and understandable.	0.00% 0	0.00% 0	0.00% 0	60.00% 9	40.00% 6	15
It would be easy for me to become skilful at using Twitter.	0.00% 0	0.00% 0	6.67% 1	33.33% 5	60.00% 9	15
I would find Twitter easy to use.	0.00% 0	0.00% 0	0.00% 0	33.33% 5	66.67% 10	15
Learning to operate Twitter is easy for me.	0.00% 0	0.00% 0	0.00% 0	40.00% 6	60.00% 9	15

Table 4.18 Effort Expectancy Answer Percentages of post-experiment Twitter use.

4.6.3 Social Influence Barriers

The mean average for Social Influence did not rise significantly between the pre and post experiment surveys. Participants were not strongly influenced by their peers or did they feel supported with new application us by senior management in their positions. This would be a big barrier to use of the tool when projects are not been driven by management

- SI1 - My work colleagues would influence my use of Twitter.
- SI3 - The senior management in my institution are generally supportive with the use of new applications.
- SI4 - I would promote the use of Twitter in my office/school.

Reliability Statistics

Cronbach's Alpha	N of Items
.671	4

Figure: 4.7 The internal consistency for Post Experiment Social Influence

	Pre Test		Post Test
SI 1	Potential Barrier	***SI 1***	Not a Barrier
SI 2	Not a Barrier	***SI 2***	Not a Barrier
SI 3	Potential Barrier	***SI 3***	Not a Barrier
SI 4	Potential Barrier	***SI 4***	Not a Barrier

Table 4.19 Social Influence Barriers

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Total**
My work colleagues would influence my use of Twitter.	0.00% 0	20.00% 3	20.00% 3	60.00% 9	0.00% 0	15
Other people using Twitter would make me use it more.	0.00% 0	13.33% 2	13.33% 2	60.00% 9	13.33% 2	15
The senior management in my institution are generally supportive with the use of new applications.	6.67% 1	20.00% 3	20.00% 3	33.33% 5	20.00% 3	15
I would promote the use of Twitter in my office/school.	0.00% 0	6.67% 1	60.00% 9	33.33% 5	0.00% 0	15

Table 4.20 Social Influence answer percentages of pre-experiment Twitter use and post-experiment Twitter use.

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Total**
My work colleagues would influence my use of Twitter.	0.00% 0	6.67% 1	20.00% 3	66.67% 10	6.67% 1	15
Other people using Twitter would make me use it more.	0.00% 0	6.67% 1	0.00% 0	73.33% 11	20.00% 3	15
The senior management in my institution are generally supportive with the use of new applications.	0.00% 0	20.00% 3	13.33% 2	53.33% 8	13.33% 2	15
I would promote the use of Twitter in my office/school.	0.00% 0	13.33% 2	26.67% 4	53.33% 8	6.67% 1	15

Table 4.21 Social Influence answer percentages of post-experiment Twitter use.

4.6.4 **Facilitating Conditions Barriers**

Having the requisite knowledge to use Twitter was a barrier with the non-social media using participants. This was overcome after an introduction to Twitter in the experiment. Also

- FC 2 - I have the knowledge necessary to use Twitter.
- FC3 - I have access to a smart phone to handle communications remotely.

Reliability Statistics

Cronbach's Alpha	N of Items
.646	4

Figure: 4.8 The internal consistency for Post Experiment Facilitating Conditions

	Pre Test		Post Test
FC 1	Not a Barrier	***FC 1***	Not a Barrier
FC 2	Potential Barrier	***FC 2***	Not a Barrier
FC 3	Not a Barrier	***FC 3***	Not a Barrier
FC 4	Potential Barrier	***FC 4***	Not a Barrier

Table 4.22 Facilitating Conditions Barriers

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
I have the resources necessary to use Twitter.	0.00% 0	6.67% 1	0.00% 0	60.00% 9	33.33% 5	15
I have the knowledge necessary to use Twitter.	20.00% 3	33.33% 5	0.00% 0	26.67% 4	20.00% 3	15
I have access to a smart phone to handle communications remotely.	13.33% 2	0.00% 0	6.67% 1	46.67% 7	33.33% 5	15
Technical support is available for assistance with Twitter difficulties that I may experience.	0.00% 0	33.33% 5	20.00% 3	46.67% 7	0.00% 0	15

Table 4.23 Facilitating Conditions answer percentages of pre-experiment Twitter use.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
I have the resources necessary to use Twitter.	0.00% 0	0.00% 0	0.00% 0	33.33% 5	66.67% 10	15
I have the knowledge necessary to use Twitter.	0.00% 0	0.00% 0	20.00% 3	40.00% 6	40.00% 6	15
I have access to a smart phone to handle communications remotely.	13.33% 2	6.67% 1	0.00% 0	33.33% 5	46.67% 7	15
Technical support is available for assistance with Twitter difficulties that I may experience.	0.00% 0	13.33% 2	6.67% 1	73.33% 11	6.67% 1	15

Table 4.24 Facilitating Conditions answer percentages of post-experiment Twitter use.

4.7 **Conclusion**

Proposing recommendations that might reduce or eliminate barriers to Twitter adoption in a third-level institute is the overarching theme in this research. The pre-experiment survey and post-experiment survey showed significant differences across all determinants of the UTAUT model. The introduction to Twitter alleviated many of the concerns that participants in using Twitter for communicating with students and staff. This was apparent through improved scores across all questions in pre and post experiment details.

5 Findings and Conclusions

5.1 Introduction

Traditional communication in higher education, however effective, needs to change to a transparent, synchronous, decentralised model. The almost ubiquitous nature of Twitter makes it the ideal media for these communications. There are obvious monetary savings to be made, as Twitter does not charge for its service, the savings would not only be on the platform itself but also the hardware and infrastructural upgrade, which would be required to host a less effective in-house SMS solution. There would also be significant time savings in training for administration and student staff, as social media platforms has instantly recognisable and intuitive functionality that users will largely be familiar with, helping to overcome potential barriers.

5.2 Research Findings

The findings from the literature review showed how pervasive social media has become and the influence it has had on everyone's life. The popularity of blogging and in particular microblogging is on a constant upwards curve. Twitter is unnervingly popular and highly influential in everyday life, with over 600,000 daily users in Ireland alone, (digitaltimes.ie, 2013). The real value with Twitter is its simple functionality, it is a highly efficient way of communicating and is cross platform and device independent. Its use in crisis communication is very evident from the examples laid out in Chapter Two. Twitter does however have limitations, these would need to be addressed if being adopted as a communication tool.

Twitter can be easily managed as a communication tool through various Twitter application suites which allow the management of multiple Twitter feeds at same time. Its role in education is becoming more prevalent as third-level institutes move to decentralised publishing models with departments and schools having autonomy over the message and its delivery. Libraries have also been early adopters of Twitter.

5.2.1 Research Questions

The objectives of this study was to answer the research questions, the first of which was:

What are the barriers to the adoption of Twitter as a communication tool between students and staff in a higher-level institute?

This research question was answered through two survey questionnaires which were outlined in Chapter Three, the results of which are outlined below;

5.2.2 **Adoption Barriers Identified**

Technology acceptance to the adoption of Twitter as a communication tool in a higher-level institute was the theme of this study. The research questions were addressed by identifying barriers to adoption in the pre-experiment and post-experiment questionnaires. The questions for the survey based on the UTAUT model were cross referenced with the findings from Butler and Sellbom (2002) on technology adoption. Each question was chosen based on the highest mean average of adoption barriers from their survey findings on faculty and staff in higher education.

The pre-experiment and post-experiment questionnaire were made up of the same questions, based around the four determinants in the UTAUT model. In Performance Expectancy all four questions scored as possible barriers to adoption, this was completely over hauled in post-experiment survey results with usage of Twitter alleviating all concerns. This was a common theme with the other three determinants.

Effort Expectancy only had one potential barrier in the pre-experiment survey and none in the post-experiment survey. The negative score was for the statement ‘It would become easy for me to become skilful at using Twitter’. Participant feedback, exhibited that users that had not used Twitter previously scored negatively on this. Participants scored more decisively on this question in the post-experiment after using Twitter. Overall Effort Expectancy scored positively with most participants giving positive feedback on the simple interface and overall concept of Twitter.

Social Influence had three potential barriers identified in the pre-experiment, and again all of these potential barriers nullified after using Twitter. For this determinant none of the participants strongly disagreed with any of the statements or were particularly negative in their feedback. There was a strong peer influence related to this section with ten participants agreeing that they would be influenced by their peers using Twitter. This point was also put across strongly by participants in think-aloud feedback, points of note held a common theme of “unless everyone is using Twitter it would not be used at all”.

In Facilitating Conditions only two items were seen as potential barriers, these were related to having the requisite knowledge to use Twitter and having a smart phone to use

Twitter. The barrier relating to having a smartphone proved to be ambiguous as some participants commenting that they own a smartphone but “work do not pay for it, so I wouldn’t use it for Twitter in work,” other participants just didn’t own a smartphone. Once this question was explained to participants during the experiment, the results changed to become more positive.

Qualitative feedback through the think-aloud in the experiment proved to be valuable in terms of getting feedback and also giving the researcher a chance to explain the concept in more detail. Participants enjoyed using Twitter and definitely saw value in using Twitter as a communication tool in their private lives. In the main, participants in the survey gave positive feedback on Twitter’s usability and its suitability as a communication tool.

This feedback is in lieu with research by Arifoglio et al. (2010), who in their paper on Twitter acceptance, found that when Twitter was used to balance work and social life, users were more motivated to use it. They perceived Twitter to be enjoyable and useful and were therefore motivated to use it. The connection between enjoyment and perceived usefulness, is also hypostasised by Yi and Hwang, P. 446, (2003) who state that “We found that application-specific self-efficacy has a direct and powerful effect on actual use over and above user intention to use the system. Enjoyment was found to positively influence usefulness, ease of use, and application-specific self-efficacy.”

The second objective of this research investigated the following question:

Can barriers to the adoption of Twitter be overcome by usability testing the platform?

This question was answered by the usability test experiment. This experiment was on scenario based tasks on using Twitter for a specific reason. This quick introduction to Twitter relieved any concerns that participants had in using Twitter as a communication tool in a third-level institute. Each participant works in a third-level institute and regularly communicates with staff and students with school related matters via traditional methods. This part of the research was successful in that, all of the identified barriers in the pre-experiment questionnaire were overcome by an introduction to the software. This also afforded the researcher with an opportunity to get qualitative feedback on using Twitter.

5.2.3 **Research Comments**

Identifying the barriers to adoption of ICT in educational institutes is critical to their success. A higher level educational institute will be a particular challenging area with staff numbers being cut and workloads increasing across all sectors. Educational institutes also have a different set of demands to other workplaces, so discovering what potential barriers that may exist would help a project implementation in this area run smoother and ultimately become more successful.

The practical application of Twitter as a communication tool in a third level setting would need not only buy-in from staff but also students. The barriers identified in the pre-experiment questionnaire can be overcome by the introduction of the Twitter to staff. This is still only one side of the argument, students would also need to be willing to be part of the framework by actively registering and following their associated courses and schools on Twitter. The statistics for students using Twitter and having access to a mobile phone is very high, with over 75% of students across Europe active Twitter users, however it's still not at 100%. The barriers identified in the pre-experiment usability test and the uses of Twitter from the literature review have informed the following recommendations, for a practical rollout of Twitter in a Third-level institute;

Getting Started with Twitter:

- Create a naming convention before opening accounts, a unique identifier like a course could would be a good starting point. (Hussey, 2011)
- Create training material for Administration staff to overcome issues, (Allen, 2013).
- Learn the Twitter language, abbreviations and current trends with Twitter, (Hussey, 2011).
- Create Private Lists, (Schouten, 2011).
- Be inovative and open minded for Twitter use, (Joy, 2013).
- Integrate Twitter as part of the school advertising comunication material, (Twitter, 2013; Twitter, 2014; Scott et al, 2014)

Why Tweet:

- To network with Students and potential students, (Griffiths and Wall, 2011).
- To communicate more effectively, (Kim and Shim, 2014; Ah Nee, 2013).
- To have messages reach students and staff faster than email, (Freberg, 2012).
- So that students will always feel connected to their schools, (Naismith, 2007).

- To communicate emergency messages, (Schultz et al, 2011; Freberg, 2012; Kierkegaard, 2010).

Publishing Tweets:

- Use a dashboard application to manage, schedule and post Tweets from multiple Twitter accounts, (Sump-Crethar, 2012; Hussey, 2011).
- Promote the use of smart phones to staff and students to use Twitter with, (Ballagas et al. 2006; Alomari et al. 2013).
- Use URL shortening services to maximise character use, (Kaplan and Haenlein, 2011).

When to Tweet:

- Class cancellations.
- Lecture room change.
- Notable Class announcements.
- Emergency messages.
- End of year/Term Survey.
- Conference or Seminar (Scott et al., 2014).

The headings were adapted from Guide to Twitter Use by (Wilson et al., 2014).

5.3 Limitations of the Study

While this study answered the research questions that were posed, it has its limitations in terms of low numbers of participants and a lack of student feedback. The usability test experiment only looked at four areas of Twitter, it mainly served as an introduction to the platform and a run through of its main features. The case made in the literature review for microblogging as an effective communication tool only concentrated on Twitter, this is also a limitation to the study. The questionnaire had general questions which lead to some neutral answers with some questions. There was also no controls for participants with prior experience of using Twitter in place. This could have been overcome by having a larger sample of participants.

Convenience sampling was used to recruit participants in this research, all participants are work colleagues which in itself is a limitation of the study. Sampling from a wider selection of participants would have given a broader opinion of Twitter adoption. The fact that all participants came from similar working backgrounds attests to this point. The researchers close working relationship with participants may also have influenced answers given in the

questionnaires, regardless of guaranteed anonymity. The observer-expectancy effect where a researcher can unconsciously influence participants during an experiment may have had an influence during the Twitter usability test due to think-aloud encouragement, where the researcher directly observed and engaged with participants throughout the experiment. Every effort was made not to influence the participants by following the system usability scale questions. Statistically the lack of significance testing was also a drawback on the conclusions made from the research.

5.4 Future Work

Twitter has a lot of scope for use in education, especially as an emergency communication tool. As of yet there is no communication tool which commands more immediacy than an SMS text message. With Twitter, students and staff can register their mobile phones with Twitter and receive an SMS when specific Tweets are sent out. This in itself is a step forward on email. The use of Twitter as an educational tool is also gaining traction, the Swedish Twitter university story outlined in Chapter Two is only one of several case studies available.

The use of Twitter as a polling software is now being used extensively, examples like Poll Everywhere will soon have open source equivalents which could be used in class room situations or as an end of term appraisal tool.

More student involvement in the broadcasting of Tweets would increase student engagement either in the classroom or as an extra-curricular activity. This would significantly increase student engagement with staff and their peers. A third-level institute could reap the benefits of having a more connected student and staff body.

The practicalities of implementing Twitter in a third level institute need to take the current communication suite into consideration. If Twitter can be aligned with the communication strategies already established in a third-level institute. The predominant communication medium between staff and students is email. Email is no longer sustainable with information overload becoming an issue for many users, this overload is leading end users into a state of “partial attention,” (Stone, 2009). Partial attention is explained by Stone (2009) as when end users are “motivated by a desire not to miss anything,” and in turn end up missing things.

This is symptomatic of having a saturated email inbox, messages become diluted and important messages can often be missed. Email basically supports the communication

process, whereas “Twitter doesn't just facilitate, but also fosters communication,” (Duffy, 2011). It fosters communication in a synchronous transparent manner in a way that email cannot, all communication can be seen by stakeholders in the conversations.
In order for Twitter to fit in, it would need to fit into existing business process structures, in a defined manner. In third-level institutes, schools typically have their own bespoke processes in place with how they communicate with staff and students. The creation of a clear communications strategy including Twitter as a recognised medium for a particular level of message. These messages would have a level of importance which would generally have a direct impact on the receiver. Reasons for this level of immediacy might be a late lecture cancellation or room change or an important timetable change.

The rollout of Twitter would require all stakeholders in the communication process to have buy-in at all levels. Rolling out Twitter “should be approached with the same level of organisation and analysis as any another university wide project,” (Hussey, 2011, P.253). Twitter account and list creations would need a specific and relevant naming structure and also an element of branding. Staff would need to be trained and students would need to be informed of the move to Twitter through class announcements or local advertising. Some of this work may entail holding a workshop on Twitter usage or the creation of training material. All of these measures that need to be taken require a lot of effort across departments in order for it to be successful.

Administrators responsible for the role out of Twitter would need to be sensitive to the barriers that were identified in the pre-experiment survey. An introduction to Twitter alleviated all of these barriers in this experiment, but this might not be the case for a larger group of administrators as the sample size of participants in this study was relatively small.

6 References

1. AH NEE, C. 2013. Twitter as a Communication and Information Gathering Tool for Educators . ETEC 690.
2. AJZEN, I. & FISHBEIN, M. 1980. Understanding Attitudes and Predicting Social Behavior, Prentice Hall.
3. AKERIWA, M., PENZHORN, C. & HOLMNER, M. 2014. Using mobile technologies for social media based library services at the University of Development Studies Library, Ghana. Information Development.
4. ALIAGA, M. & GUNDERSON, B. 2000. Interactive Statistics. Saddle River.
5. ALLEN, M. 2013. Don't Be Intimidated By Twitter's Learning Curve.
6. ALLEN, S. M., CHORLEY, M. J., COLOMBO, G. B. & WHITAKER, R. M. 2012. Opportunistic social dissemination of micro-blogs. Ad Hoc Networks, 10, 1570-1585.
7. ALOMARI, M., ABUSAIMEH, H., SHAHIN, S. & JOUDEH, R. 2013. Postat: A Cross-Platform, RSS-based Advertising and Event Notification System for Educational Institutions. Procedia - Social and Behavioral Sciences, 73, 120-127.
8. ARIFOGLIO, R., BLACK, S. & METALLO, C. 2010. Twitter Acceptance: The Role of Intrinsic Motivation. Sprouts: Working Papers on Information Systems, 10.
9. AUER, M. R. 2011. The Policy Sciences of Social Media. Policy Studies Journal, Vol. 39, pp. 709-736.
10. BABBIE, E. 2012. The Practice of Social Research, Wadsworth Publishing.
11. BALLAGAS, R., BORCHERS, J., ROHS, M. & SHERIDAN, J. G. 2006. The Smart Phone: A Ubiquitous Input Device. IEEE Pervasive Computing, 5, 70-77.
12. BLAND, J. M. & ALTMAN, D. G. 1997. Statistics notes: Cronbach's alpha.
13. BONATE, P. 2000. Analysis of Pretest-Posttest Designs.
14. BROOKE, J. 1996. “SUS: A ‘Quick and Dirty’ Usability Scale,” in Usability Evaluation in Industry. London: Taylor & Francis.
15. BUTLER, D. & SELLBOM, M. 2002. Barriers to Adopting Technology. EDUCAUSE QUARTERLY, 2.
16. CAMPIOLO, R., SANTOS, L. A. F., BATISTA, D. M. D., AUR, M. & GEROSA, L. 2013. Evaluating the utilization of Twitter messages as a source of security alerts. Proceedings of the 28th Annual ACM Symposium on Applied Computing. Coimbra, Portugal: ACM.

17. CAKIR, H. 2013. Use of blogs in pre-service teacher education to improve student engagement. Computers & Education, 68, 244-252.
18. CHAMBERLIN, L. & LEHMANN, K. 2011. Twitter in higher education. Cutting-edge Technologies in Higher Education, 1, 375-391.
19. CHU, S. K.-W. & DU, H. S. 2013. Social networking tools for academic libraries. Journal of Librarianship and Information Science, 45, 64-75.
20. CRESWELL, J. 2002. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (2nd Edition), Sage Publications, Inc.
21. CULNAN, M. J., MCHUGH, P. J. & ZUBILLAGA, J. I. 2010. HOW LARGE U.S. COMPANIES CAN USE TWITTER AND OTHER SOCIAL MEDIA TO GAIN BUSINESS VALUE. *MIS Quarterly Executive,* 9**,** 243-259.
22. DAVIS, F. 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Q., 13, 319-340.
23. DAVIS, F., BAGOZZI, R., & WARSHAW, P. 1989. User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. Management Science, 35, 982-1003.
24. DAVIS, F. & VENKATESH, V. 1996. A critical assessment of potential measurement biases in the technology acceptance model: three experiments. International Journal of Human-Computer Studies, 45, 19-45.
25. DENG, L. & YUEN, A. H. K. 2011. Towards a framework for educational affordances of blogs. *Computers & Education,* 56**,** 441-451.
26. DIGITALTIMES.IE 2013. http://www.digitaltimes.ie/digitalmedia/Twitter-stats-for-ireland/.
27. DILLON, A. & MORRIS, M. 1996. User acceptance of new information technology: theories and models. In: WILLIAMS, M. & WILLIAMS, M. (eds.) Annual Review of Information Science and Technology.
28. DUFFY, J. 2011. Why Twitter Is Better Than Email for Employee Communication. PC Magazine,.
29. DUNLAP, J. C. & LOWENTHAL, P. R. 2009. Instructional uses of Twitter. The CU online handbook, 45.
30. FOLEY, P., ALFONSO, X. & GHANI, S. 2002. The digital divide in a world city IECRC and Citizens Online for the Greater London Authority, LondonConnects and the London Development Agency
31. FREBERG, K. 2012. Intention to comply with crisis messages communicated via social media. Public Relations Review, 38, 416-421.

32. GRIFFITHS, P. & WALL, A. 2011. Higher education administration: Social media use by enrolment management. Cutting-edge Technologies in Higher Education,, 2.
33. GROVES, R., FLOYD, COUPER, M., LEPKOWSKI, J., SINGER, E. & TOURANGEAU, R. 2004. Survey Methodology (Wiley Series in Survey Methodology), Wiley-Interscience.
34. HAAK, M., DE JONG, M. & SCHELLENS, P. 2003. Retrospective vs. concurrent think-aloud protocols: Testing the usability of an online library catalogue. Behaviour & Information Technology, 22, 339-351.
35. HOGAN, J., DOLAN, P. & DONNELLY, P. 2009. Approaches to Qualitative Research: Theory and Its Practical Application. Dublin Institute of Technology, ARROW@DIT Cork: Oak Tree Press, 1-18.
36. HOSSAIN, L. & DE SILVA, A. 2009. Exploring user acceptance of technology using social networks. The Journal of High Technology Management Research, 20, 1-18.
37. HUSSEY, J. 2011. Twitter in higher education: From application to alumni relations. Higher Education Administration with Social Media: Cutting-edge Technologies in Higher Education, 2, pp.249-272.
38. JAVA, A., SONG, X., FININ, T. & TSENG, B. 2007. Why we Twitter: understanding microblogging usage and communities. Proceedings of the 9th WebKDD and 1st SNA-KDD 2007 workshop on Web mining and social network analysis. San Jose, California: ACM.
39. JOHARI, J. 2009. Interpretivism in Information System (IS) Research. Integration & Dissemination, 425-27. .
40. JOHNSON, B., ONWUEGBUZIE, A. & TURNER, L. 2007. Toward a Definition of Mixed Methods Research. Journal of Mixed Methods Research 1.
41. JOY, E. 2013. Swedish Twitter University Lecture: Eileen (again) on Object-Oriented Reading Modes.
42. KAPLAN, A. M. & HAENLEIN, M. 2010. Users of the world, unite! The challenges and opportunities of Social Media. Business Horizons, 53, 59-68.
43. KAPLAN, A. M. & HAENLEIN, M. 2011. The early bird catches the news: Nine things you should know about micro-blogging. Business Horizons, 54, 105-113.
44. KAWULICH, B. B. 2005. Participant Observation as a Data Collection Method.
45. KIERKEGAARD, S. 2010. Twitter thou doeth? Computer Law & Security Review, 26, 577-594.

46. KIETZMANN, J. H., HERMKENS, K., MCCARTHY, I. P. & SILVESTRE, B. S. 2011. Social media? Get serious! Understanding the functional building blocks of social media. Business Horizons, 54, 241-251.
47. KIM, Y. & SHIM, K. 2014. TWILITE: A recommendation system for Twitter using a probabilistic model based on latent Dirichlet allocation. Information Systems, 42, 59-77.
48. KIRILENKO, A. P. & STEPCHENKOVA, S. O. 2013. Public microblogging on climate change: One year of Twitter worldwide. Global Environmental Change.
49. LEGRIS, P., INGHAM, J. & COLLERETTE, P. 2003. Why do people use information technology? A critical review of the technology acceptance model. Information & Management, 40, 191-204.
50. MCDONALD, S. & PETRIE, H. 2013. The effect of global instructions on think-aloud testing. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. Paris, France: ACM.
51. MOKSHA, S. 2013. Theorizing Middle-Way Research Approach. International Journal of Scientific Research and Reviews, 2, 22 - 56.
52. MUIJS, D. 2011. Doing Quantitative Research in Education with SPSS.
53. NAISMITH, L. 2007. Using text messaging to support administrative communication in higher education. Active Learning in Higher Education, 8, 155-171.
54. OSBORNE, N. 2011. Amplification and Analysis of Academic Events through Social Media: A Case Study of the 2009 Beyond the Repository Fringe Event. . Wankel C. and Wankel L. (eds.) Higher Education Administration with Social Media Including Applications in Student Affairs, Enrollment Management, Alumni Relations, and Career Centers., pp. 167-190.
55. OZANNE, J. & ANDERSON HUDSON, L. 1989. Exploring Diversity in Consumer Research. Interpretive Consumer Research, eds. Elizabeth C. Hirschman, Provo, UT : Association for Consumer Research, 1-9.
56. PALMER, S. 2013. Characterisation of the use of Twitter by Australian Universities. Journal of Higher Education Policy and Management, 35, 333-344.
57. PALVIA, P., PINJANI, P. & SIBLEY, E. H. 2007. A profile of information systems research published in Information & Management. Information & Management, 44, 1-11.
58. PAPATSOUTSOS, D. 2001. Information Systems Development Methodologies in the Age of Digital Economy. University of Athens Department of Informatics.

59. PARR, C. 2014. Top 100 most influential UK and US universities on Twitter. Times Higher Education Online.
60. PATHER, S. & REMENYI, D. 2004. Some of the philosophical issues underpinning research in information systems: from positivism to critical realism. Proceedings of the 2004 annual research conference of the South African institute of computer scientists and information technologists on IT research in developing countries. Stellenbosch, Western Cape, South Africa: South African Institute for Computer Scientists and Information Technologists.
61. REINKE, K. & CHAMORRO-PREMUZIC, T. 2014. When email use gets out of control: Understanding the relationship between personality and email overload and their impact on burnout and work engagement. *Computers in Human Behavior,* 36**,** 502-509
62. PHILIPSON, A. 2014. Email is dead for today's students who prefer Twitter, universities say.
63. RED C POLL, 2013. A Mobile Future. RED C Research & Marketing Ltd.
64. ROUSE, M. 2013. Gartner hype cycle.
65. PRENSKY, M. 2001. Digital Natives, Digital Immigrants. On the Horizon MCB University Press, 9.
66. ROGERS, P. 2000. Barriers to Adopting Emerging Technologies in Education. Journal of Educational Computing Research, 22.
67. RUBIN, J. & CHISNELL, D. 2008. Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests. Wiley Publishing.
68. RUTHERFORD, C. 2010. Using Online Social Media to Support Preservice Student Engagement. MERLOT Journal of Online Learning and Teaching 6.
69. RYBALKO, S. & SELTZER, T. 2010. Dialogic communication in 140 characters or less: How Fortune 500 companies engage stakeholders using Twitter. Public Relations Review, 36, 336-341.
70. SAUNDERS, M., LEWIS, P. & THORNHILL, A. 2009. Research methods for business students Pearson Education Limited.
71. SAUNDERS, M. & TOSEY, P. 2012. The Layers of Research Design. Rapport, 30, 58-59.
72. SCHOONENBOOM, J. 2014. Using an adapted, task-level technology acceptance model to explain why instructors in higher education intend to use some learning management system tools more than others. Computers & Education, 71, 247-256.

73. SCHOUTEN, P. 2011. Using Social Media in Study Abroad. Cutting-edge Technologies in Higher Education,, 4.
74. SCOTT, K. R., HSU, C. H., JOHNSON, N. J., MAMTANI, M., CONLON, L. W. & DEROOS, F. J. 2014. Integration of Social Media in Emergency Medicine Residency Curriculum. *Annals of Emergency Medicine*.
75. SCHROEDER, A., MINOCHA, S. & SCHNEIDER, C. 2010. The strengths, weaknesses, opportunities and threats of using social software in higher and further education teaching and learning JOURNAL OF COMPUTER ASSISTED LEARNING, 26, 159-174.
76. SCHULTZ, F., UTZ, S. & GÖRITZ, A. 2011. Is the medium the message? Perceptions of and reactions to crisis communication via Twitter, blogs and traditional media. Public Relations Review, 37, 20-27.
77. SCOTLAND, J. 2012. Exploring the Philosophical Underpinnings of Research: Relating Ontology and Epistemology to the Methodology and Methods of the Scientific, Interpretive, and Critical Research paradigms. English Language Teaching, 5.
78. SEAMAN, J. & TINTI-KANE, H. 2013. Social Media for Teaching and Learning. Pearson Learning Group.
79. SECHREST, L. & SIDANI, S. 1995. Quantitative and qualitative methods:: Is There an Alternative? Evaluation and Program Planning, 18, 77-87.
80. SOUCEK, R. & MOSER, K. 2010. Coping with information overload in email communication: Evaluation of a training intervention. *Computers in Human Behavior,* 26**,** 1458-1466.
81. STONE, L. 2009. Beyond Simple Multi-Tasking: Continuous Partial Attention.
82. SUMECKI, D., CHIPULU, M. & OJIAKO, U. 2011. Email overload: Exploring the moderating role of the perception of email as a 'business critical' tool. *International Journal of Information Management,* 31**,** 407-414.
83. SUMP-CRETHAR, A. N. 2012. Making the Most of Twitter. The Reference Librarian, 53, 349-354.
84. TESS, P. A. 2013. The role of social media in higher education classes (real and virtual) – A literature review. Computers in Human Behavior, 29, A60-A68.
85. THOMAS, T. D., SINGH, L. & GAFFAR, K. 2013. The utility of the UTAUT model in explaining mobile learning adoption in higher education in Guyana. International Journal of Education and Development using Information and Communication Technology (IJEDICT), 9, pp. 71-85.

86. THOMS, B. & ERYLIMAZ, E. 2014. How Media Choice Affects Learner Interactions in Distance Learning Classes. Computers & Education.
87. TOP, E. 2012. Blogging as a social medium in undergraduate courses: Sense of community best predictor of perceived learning. The Internet and Higher Education, 15, 24-28.
88. TOPUNIVERSITIES.COM, Q. 2013. Students' Online Usage.
89. TROBIA , A. 2008. Encyclopedia of Survey Research Methods. Sage Research Methods.
90. TWITTER.COM 2014. Twitter First Quarter 2014 Results. https://investor.Twitterinc.com/releasedetail.cfm?ReleaseID=843245
91. TWITTER 2013. How does an education software company increase participation in an online contest to drive partner software downloads? *Twitter Case Studies*.
92. TWITTER 2014. How does a sporting goods brand maximise a sponsorship? *Twitter Case Studies*.
93. USABILITY.GOV 2014. Usability Testing.
94. VAN DER MEULEN, R. & RIVERA, J. 2013. Gartner 2013 Hype Cycle for Social Software Reveals a Wealth of Emerging Innovations. *Gartner*.
95. VAN LENTE, H., SPITTERS, C. & PEINE, A. 2013. Comparing technological hype cycles: Towards a theory. *Technological Forecasting and Social Change*.
96. VELETSIANOS, G. 2012. Higher education scholars' participation and practices on {Twitter}. Journal of Computer Assisted Learning, 28, 336-349.
97. VENKATESH, V. & BALA, H. 2008. Technology Acceptance Model 3 and a Research Agenda on Interventions. Decision Sciences, 39, 273-315.
98. VENKATESH, V. & DAVIS, F. 2000. A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. Management Science, 46, 186-204.
99. VENKATESH, V., MORRIS, M., DAVIS, G. & DAVIS, F. 2003. User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27, 425-478.
100. WILD, F. U., THOMAS; , SCOTT, P., REBEDEA, T. & HOISL, B. 2011. Applicability of the technology acceptance model for widget-based personal learning environments. 1st Workshop on Exploring Fitness and Evolvability of Personal Learning Environments.
101. WILSON, R., RANSE, J., CASHIN, A. & MCNAMARA, P. 2014. Nurses and Twitter: The good, the bad, and the reluctant. *Collegian,* 21**,** 111-119.
102. WOOLCOCK, N. 2014. Email is dead for class of 2014, say universities. The Times Education Supplement.

103. YI, M. & HWANG, Y. 2003. Predicting the use of web-based information systems: self-efficacy, enjoyment, learning goal orientation, and the technology acceptance model. International Journal of Human-Computer Studies, 59, 431-449.

104. ZAVATTARO, S. M. 2013. Social Media in Public Administration's Future: A Response to Farazmand. *Administration & Society,* 45**,** 242-255.

105. ZHENG, P. & NI, L. 2010. Smart Phone and Next Generation Mobile Computing.

7 Appendices

TRINITY COLLEGE DUBLIN

INFORMATION SHEET FOR PARTICIPANTS

You are invited to participate in this research project “Understanding the barriers in adopting Twitter as an announcement tool in a higher education institute”. Your participation is voluntary. Before you decide to participate please read this information sheet to understand why the research is being done and what it will involve. You were selected as a participant for this research because of your experience in administration and your knowledge of communication tools in a third-level institute.

I am an MSc student on the Management of Information Systems course at Trinity College in Dublin. I am working towards a dissertation under the supervision of Dr Simon McGinnes.

The primary aim of this research is to recognise the barriers to adoption of Twitter in a higher education institution. In order to achieve this, the unified theory of acceptance and use of technology (UTAUT) model will be applied to identify these barriers

- You will be provided with an information sheet that describes the main procedures of this research.
- I will ask for permission for observing you.
- Your participation is voluntary.
- You may withdraw at any time and for any reason without penalty.
- You can omit from answering any questions if you do not wish to answer.
- All data will be treated with full confidentiality and that, if published, it will not be identifiable.
- On request, an electronic version of this research will be available after September 2nd, 2014.
- You must be 18 years or older and competent to supply consent.
- If you or anyone in their family has a history of epilepsy then you are proceeding at your own risk
- Declarations of conflicts of interest;

    - As a work colleague, there is potential for conflict of interest, please note that you can opt-out of this research at any stage.
- In the extremely unlikely event that illicit activity is reported to me during the study I will be obliged to report it to appropriate authorities.
- I will act in accordance with the information provided.
- I have received a copy of this agreement.

Declarations of conflicts of interest;

- As a work colleague, there is potential for conflict of interest, please note that you can opt-out of this research at any stage.

TRINITY COLLEGE DUBLIN

Informed consent sheet

COURSE TITLE: MSc in Management of Information Systems.

LEAD RESEARCHER: *Alan O'Meara*

BACKGROUND OF RESEARCH: *The primary aim of this research is to recognise the barriers to adoption of microblogging in a higher education institution. In order to achieve this, the unified theory of acceptance and use of technology (UTAUT) model was used to frame a questionnaire, which was aimed at administration and teaching staff in a higher level education institute.*

PROCEDURES OF THIS STUDY: *The research will include an experiment with using Twitter and a pre and post experiment questionnaire based around technology acceptance with Likert scale ratings applied. Completion of each survey should take no more than 5 minutes. Completion of the experiment should take no more than 15 minutes.*

PUBLICATION: All data collected from observing participants and in the questionnaires will be anonymised. All the data will be analysed and only used for the completion of the dissertation.

DECLARATION:

- You will be provided with an information sheet that describes the main procedures of this research.
- I will ask for permission for observing you.
- Your participation is voluntary.
- You may withdraw at any time and for any reason without penalty.
- You can omit from answering any questions if you do not wish to answer.
- All data will be treated with full confidentiality and that, if published, it will not be identifiable.
- On request, an electronic version of this research will be available after September 2nd, 2014.
- You must be 18 years or older and competent to supply consent.

- If you or anyone in their family has a history of epilepsy then you are proceeding at your own risk.
- Declarations of conflicts of interest;
    - As a work colleague, there is potential for conflict of interest, please note that you can opt-out of this research at any stage.
- In the extremely unlikely event that illicit activity is reported to me during the study I will be obliged to report it to appropriate authorities.
- I will act in accordance with the information provided.
- I have received a copy of this agreement.

PARTICIPANT'S NAME:

PARTICIPANT'S SIGNATURE:

Date:

Statement of investigator's responsibility: I have explained the nature and purpose of this research study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

RESEARCHERS CONTACT DETAILS:

omearaal@tcd.ie
0872911347
018963862

INVESTIGATOR'S SIGNATURE:

Date:

Questionnaire

1. Performance Expectancy PE

I would find Twitter useful in my job.

Using Twitter would enable me to accomplish communication tasks more quickly.

Using Twitter will increase my productivity.

Using Twitter will make me more efficient at my job.

2. Effort Expectancy EE

My interaction with Twitter would be clear and understandable.

It would be easy for me to become skilful at using Twitter.

I would find Twitter easy to use.

Learning to operate Twitter is easy for me.

3. Social Influence SI

My work colleagues would influence my use of Twitter.

Other people using Twitter would make me use it more.

The senior management in my institution are generally supportive with the use of new applications.

I would promote the use of Twitter in my office/school.

4. Facilitating Conditions FC

I have the resources necessary to use Twitter.

I have the knowledge necessary to use Twitter.

I have access to a smart phone to handle communications remotely.

Technical support is available for assistance with Twitter difficulties that I may experience.

Likert Scale Values

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree