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By Alex Angelo Vernacchia

Entitled

THE EFFECTS OF MICROBLOGGING IN THE CLASSROOM ON COMMUNICATION

For the degree of Master of Science

Is approved by the final examining committee:

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THE EFFECTS OF MICROBLOGGING IN THE CLASSROOM ON COMMUNICATION

A Thesis

Submitted to the Faculty

of

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Alex Angelo Vernacchia

In Partial Fulfillment of the

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of

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This is dedicated to my family. Without them I would be nothing.

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ABSTRACT

Vernacchia, Alex A. M.S., Purdue University, May 2012. Microblogging Use in the Classroom: Exploring Communication Apprehension. Computer Graphics Technology Professor: James Mohler.

This study explored the integration of a microblogging platform, Twitter, into higher education, and how it affected the perceived communication between students and their professors and amongst students. McCroskey (1977) states every individual has a different communication apprehension score, which is a level of anxiety or fear one experiences when communication is anticipated. This research aims to relate this score to the change in communication perception. Data was gathered via surveys, interviews, and observations and was then analyzed using grounded theory methods presented by Strauss and Corbin (1990). The theory generated suggests individuals with average and lower communication apprehension scores had a better experience using Twitter and experienced more of a positive change in perceived communication. This suggests Twitter can be an effective teaching tool in higher education.

CHAPTER 1 INTRODUCTION

This chapter provides an overview of the research project and the paper associated with it. The introduction's goal is to provide the scope of the research, the significance of this research project, and definitions crucial to understanding the research, in addition to assumptions, limitations, and delimitations of the research.

1.1 Scope

As social media begins to become more popular, many seem to be using it more. As I go to school almost 100% of the year, I started to wonder why social media had not been incorporated into the classroom prior. It seems it would be a good idea, which could help teachers and students alike. Most schools do not use social media to its full potential, and some even go as far as making it unacceptable to be used in the classroom, which is where the problem lies.

After realizing this the question became: how does the integration of microblogging into the classroom affect student's perceptions of communication? Student's perception of communication can be defined as the level of communication between the student and teacher and the level of communication amongst students before and after the microblogging application or software is incorporated into the classroom.

Participants in this study were from Purdue University and its College of Technology (CoT), more specifically the Computer Graphics Department (CGT). The CGT department's mission statement was to "prepare students to be the nation's best practitioners, managers and leaders of applied computer graphics" (Purdue/CGT, 2011). These students had varying backgrounds including design, programming, animation, construction drafting, etc. As the world is entering the age of digital natives, many people have grown up with technology and know how to use it to a certain extent. The extent of knowledge known may vary based on individual.

Eight students participated in interviews during this study, based on selection of candidates from designated classes in the CoT. Twenty-five to thirty-five students participated in the survey portion of this study.

1.2 Significance

It was hoped the research involved in this thesis would help teachers and students in higher education, communicate better with one another as well as enhance the learning process. This qualitative study took theories from the realm of social media and applied it to education in a way that such principles or technologies could be used in the learning process. The researcher helped add to the current, small knowledge base in education as well as the learning process based around social media, more specifically microblogging. I anticipated this experimental study to indicate that microblogging could be used effectively in higher education to better communication and facilitate the learning process; hopefully helping microblogging to become more accepted in higher education for the benefit of students.

1.3 Statement of Purpose

The purpose of this research is to evaluate how communication changes when microblogging is integrated into the classroom in higher education. This communication is between students and teachers and amongst students and it is measured before and after the microblogging application or software is introduced. One of the underlying causes in determining why individuals communicate poorly is communication apprehension (CA). Since CA is different for every individual, we can observe how microblogging helps students communicate more effectively even if their CA level affects them.

1.4 Definitions

Communication Apprehension (CA) is an individual's level of fear or anxiety associated with either real or anticipated communication with another person or persons (McCroskey, 1977).

Digital Native is defined as how young people's use of information and communication technology differentiates them from previous generations of students and from their teachers, and that the differences are so significant that the nature of education itself must fundamentally change to accommodate the skills and interests of these 'digital natives' (Prensky, 2001).

Micro-blogs are software or applications that allow users to exchange small elements of content such as short sentences, individual images, or video links (Kaplan & Haenlein 2011).

Twitter as a back-channel can be described as a channel of communication, which utilizes Twitter, used during an activity in the background to facilitate conversation about specific topics (Costa, Beham, Reinhard, & Sillaots, 2008).

1.5 Assumptions

The following assumptions were made throughout this study:

- Participants have been using computers for the majority of their lifetime.
- Participants are able to participate in a pre-survey to gather demographic information.
- Participants are able to participate in an interview properly, to the best of their abilities, and not just complete it as quickly as possible, or complete the post-survey in an effective manner.
- Participants have enrolled in CGT 256 or CGT 456 due to their interest in the Internet and web technologies.
- Participants have a general working knowledge of social media and how it applies to their life.
- The use of a qualitative study was appropriate to elicit the responses necessary to answer the research question.

1.6 Limitations

The following limitations were imposed throughout this study:

- This study was limited to participants who are in the enrolled in CGT 256 or CGT 456 offered by Purdue University, West Lafayette, Indiana in the spring of 2012.
- The study was limited to the availability of participants to complete the required surveys and interviews needed.
- The cooperation of the CGT department, and the instructors of CGT 256 and CGT 456 limited this study.
- This study will focus on the specific application of microblogging social media.

1.7 Delimitations

The following delimitations will be imposed throughout this study:

- Throughout this study, participants will not need an anonymous account, as no identifying information will be collected in either the surveys or interviews.
- This study will not be assessing the professor's perception of social media in higher education.
- This study will not be assessing the quality of information distributed to students through the use of microblogging.

1.8 Summary

The intent of this chapter was to provide a brief overview of the research to be conducted, which included scope, significance, definitions, assumptions, limitations, and delimitations. This study aims to focus on the change of communication one experiences when using microblogging in the classroom, and if this change helped them in their class.

The next chapter provides background information on social media, microblogging, the use of social media in education, and communication anxiety through a literature review. It will also point out the gap in said literature, of the student's perception of microblogging use in the classroom.

CHAPTER 2 REVIEW OF RELEVANT LITERATURE

The literature review discusses past scholarly work conducted about the subject of social media use in higher education. It aimed to find topic areas that have already been covered regarding this topic as well as find those that have not been researched previously.

Literature from various areas of academia were sought after in order to write this review. Papers from topics including social media in higher education, microblogging and its uses in higher education, microblogging uses, and mobile media usage were extracted. Educational databases such as ProQuest, World Cat, and Google Scholar assisted in helping to find relevant literature pertaining to the use of social media in higher education. Keywords that were used to find these scholarly papers and articles include *microblogging, higher education, wiki, social media, learning with technology, microblogging education, and blog education.*

Information on various topics will be provided in the following sections of this paper. First, higher education will be defined, relative to this study. Second, microblogging will be discussed in more detail. Third, communication apprehension is discussed, and its relevance to this study. Fourth, the choice of Twitter for use in this study will be explained. Lastly, past uses of microblogging in higher education will be discussed.

2.1 Higher Education Defined

It is necessary to assess who is included in higher education. Students enter college when they are still in their teens, which would validate the Nielsen report produced in 2009, which is discussed later. But when students graduate they are no longer teens. This could prove to be a problem when referencing the Nielsen report, yet I think habits do not change immediately. It is not as if every teen, when they turn 20, changes all their habits that they have had in their life up until that point in time. As time goes on the population becomes more and more saturated with digital natives; people who have grown up with technology their entire lives. This being said, most digital natives use technology every day and are accustomed to doing so.

During my undergraduate career, I have noticed college students are starting to use technology more than ever. It is important to understand how they are using it and how often they are using it. This shows how students are communicating with each other, which can then be used to determine if they would use it in a classroom.

2.2 Microblogging

Microblogging, a form of social media, is ever increasing in its usage. In the short span of five years, Twitter, a popular microblogging platform, has grown to have over 350 million users (Twitter, n.d.). It is important to understand what specifically social media and microblogging are. Social media is defined as a "group of Internet-based applications that build on the ideological foundations of Web 2.0, and that allow the creation and exchange of user-generated content" (Kaplan & Haenlein, 2011, p. 106). Microblogging is defined as "internet-based applications, … which allow users to

exchange small elements of content such as short sentences, individual images, or video links" (Kaplan & Haenlein, 2011, p. 106). Microblogging websites limit the number of characters to 140 when posting a message, because it was built based on Short Message Service (SMS) communication.

Because microblogging is based on SMS it is important to understand how much people use mobile media. The Nielsen Company did study on how teens use social media in 2009. This study concluded that 77% of teens have a mobile phone and 11% borrow one regularly from others; thus they are able to contribute to microblogging from just about anywhere. Of the percentage of teens who use mobile devices, it was found that 83% of them participate in sharing information using text messaging. This large percentage of teenagers is able to participate in microblogging with a simple text. This illustrates the idea that a sizeable amount of the population, in higher education, uses mobile media, which microblogging is built upon.

Even with increasing use of mobile media, students still seem to have problems communicating with their professors and peers, inside and outside of the classroom.

2.3 Communication Apprehension

Communication apprehension (CA) is defined as an "individual's level of fear or anxiety associated with either real or anticipated communication with another person or persons" (McCroskey, 1977). Many people suffer from communication apprehension and it has been readily apparent in my undergraduate career at Purdue University. Based on my personal experience, students in various classes have trouble communicating with their teacher and peers for some reason. This could be caused by past life experiences, the

way they were brought up, or they could be fearful of the situation and its outcomes. People with a high CA are said to be "reticent" individuals (Phillips, 1968). Phillips (1968) defines a reticent individual as one "for whom anxiety about participation in oral communication outweighs his (or her) projection of gain from the situation." Relating this to students in the classroom is relatively easy. Students will not participate in oral communication because they feel the outcome of the encounter is not sufficient enough for them to "put themselves out there." People identified as "reticent" do not think anything good will come from them communicating with others. The goal of this research is to identify if online communication can successfully help an individual with a high, or low, CA benefit more when compared to traditional communication methods. As oral communication is being replaced with online communication, I hope to help individuals, with varying levels of CA, communicate better with professors and their peers.

A microblogging platform will be integrated into classes and used as the main communication channel between professors and students and amongst fellow students throughout this research.

2.4 Platform Used in this Study

This section is divided into two sections. The first, details wikis uses in higher education and provides evidence of why wikis were not used. The second section will provide more information about microblogging in higher education.

2.4.1 Wikis

Parker and Chao (2007) state, “Wikis are one of the many Web2.0 components that can be used to enhance the learning process” (p. 57). They go on to define what a wiki is; “A wiki is a web communication and collaboration tool that can be used to engage students in learning with others within a collaborative environment” (Parker & Choa, 2007, p. 57). Basically a wiki is a place where various users can go to view information and edit it in a collaborative manner. One of the main drawbacks of a wiki is that the content editing can be done by anyone, thus the validity of the source can be questionable. One of the ways to solve this problem is with constant moderation, which only a handful of wikis actually do. Parker and Chao continue to define what wikis can be used for in education, some of which include research projects, summaries from assigned readings, presentation tools, knowledge bases, etc. They quote Guzdial, Rick, and Kehoe (2001) in saying “wikis can be used for classroom activities such as distributing information, collaborative artifact creation, and discussion and review” (p. 61). As the article continues they outline specific uses for wikis in different settings. These include single user wikis, lab book wikis, collaborative writing wikis, and knowledge base wikis (Parker & Chao, 2007). They think that wikis can be used to help facilitate the educational process.

Parker and Chao stated that wikis have various uses in education, but Ebner, Rickmeir-Rust, and Holzinger (2008) think differently. Ebner et al. published an article detailing the use of wikis in higher education when they are used voluntarily. The results were staggering to say the least. Ebner et al. designed a case study in which students were educated on wiki software the first day of class and then were told they could use it

however they choose (i.e., they were not forced to use the software). After concluding their study, Ebner et al. found that none of their subjects had either authored a new article or edited someone else's article. The study was conducted over a semester and Ebner et al. found that 95% of students had accessed the article once, yet this was all passive, or none had actively engaged themselves by editing or modifying the content. Various reasons these students did not actively engage in the usage of the wiki include problems editing articles, thinking there is no benefit, it required time, the wiki was too complicated, or they just did not try. As this study was voluntary, this shows that wikis can have little to no value if they are not utilized. They go on to say that students had "trust" issues when using wikis. Wikis are primarily made up of information provided by peers. If peers post wrong information that is not corrected, others are likely to use that information without knowing it is incorrect.

Because of these issues, I chose to use Twitter, a microblogging platform, throughout this study instead of wikis. Participants in this study are encouraged to use Twitter, but not forced to do so.

2.4.2 Twitter As A Microblogging Platform

As more and more people start to use the web more frequently from mobile devises, microblogging applications such as Twitter have started to arise. Twitter is a web-based application where users can post information, comments, and other things about themselves in 140 characters or less. Twitter is one of the main applications that researchers have studied, not only for its purpose in higher education, but also as a tool for conversation and collaboration.

In 2009, Honeycutt and Herring conducted a study that "analyze[d] a corpus of naturally occurring public Twitter messages (tweets), focusing on the functions and uses of the @ sign and the coherence of exchanges" (p. 1). Results from this study include English as the most dominant tweet language, the presence of the @ sign means the tweet is part of a conversation, and some conversations can be overlooked (Honeycutt & Herring, 2009). As they delved deeper into their data they found that 33% of tweets with an @ sign included were in regards to a conversation. They also found that 51% of tweets without an @ sign included were information about the tweeter. This study helps to show that Twitter, a microblogging platform, can be used for conversations. In regards to using Twitter for collaboration they found that exchanges of tweets between participants could range from two to thirty messages to accomplish a task or finish a conversation.

Twitter is a network of individuals who share information that can be further divided up into communities. These communities can encompass just about anyone, and a copious amount of information is likely to be shared about a topic.

Java, Song, Finn, and Tseng (2006) analyzed the different twitterers in communities and found that intentions of Twitter users can be divided up into four categories. First, there are the people who chat daily. They talk about what is going on in their lives. Second, there are people who want to have conversations. Third, there are people who share information. During this study it was found that around 13% of all posts have a URL in them, or a link to more information. Lastly, individuals report news.

Java et al. also established that there are three types of users. These include users who are an informational source, friends, and informational seeker (Java et al., 2006). Information seekers are the largest group of the three previously mentioned.

Java et al. (2006) also have determined there are three different types of queries used when individuals are looking for information. These include navigational, informational, and transactional. Of these queries, the informational type applies the most to use in higher education, as people will be looking for useful information.

These types of users can be related to higher education in the way in which a teacher is the information source, fellow students are friends, and students are informational seekers in relation to the teacher and other students.

For these reasons Twitter was chosen as the platform of communication for this study.

Twitter has been used in previous scholarly research and it is important to understand how it was used and what could have been done differently.

2.5 Twitter In Education

Various articles have stated that microblogging has many uses in higher education. First, Reinhardt, Wheeler, and Ebner (2010) detail how this can be accomplished through the use of Twitter. They start by comparing how microblogging has changed communication to how phones and email also changed communication just years ago. They go on to say Twitter can "spread news at the speed of light" (Reinhardt et al., 2010, p. 323). They relate this to how it has helped education as people now have information at their fingertips. They detail how twitter can be used in education and divide it up into three categories including language learning, in-class discussions, and facilitating process-oriented learning. In class, twitter can be used to provide instant feedback to students relating to a topic. Tweets are displayed in real-time, perfect for in-class

discussions. Reinhardt et al. (2010) found "94% of students stated they had the impression their English had improved with the help of Twitter" (p. 324). They also found that "small group discussions [were] the most fruitful way to stimulate constructive discussion and to generate the most interesting ideas" (p. 324). This means small group based learning should be utilized when trying to integrate Twitter into the classroom. The last part of their research found "large information streams lead to new way[s] of managing information, a new method of communication and new way[s] to self-document students' learning behaviours" (p. 325). This article helps show that Twitter can be successfully integrated into higher education with relative ease, yet they do outline best practices that should be followed when using Twitter. These will be discussed later when outlining the methodology of this research.

When social media is incorporated into education there are criteria that should be considered before doing so. These include whether can it create a sense of community, can individuals share files, does social media increase collaboration, does it help create an online social presence, and is pulling relevant content from the Web easy for students? (Robertson, Phillips, & Smith, 2010). Robertson's et al., 2010. study details the pedagogical benefits from answering yes to each of these. Some benefits include benefiting from others' experience, giving students a voice, the sharing of ideas and perspectives, providing a sense of place, and being able to quickly access and review content from a single location. This proceeding emphasizes that these answers are needed to facilitate learning using social media in higher education. Without them, students and teachers might not be able to effectively gain any knowledge.

Teachers have already started to use Twitter in academia. One of them published a blog article detailing how to use Twitter in education. Parry (2008) states there different ways that Twitter can be used in the classroom. First, Twitter increases "class chatter." Conversations can happen during class, and can continue outside of the class. This can happen when someone relates real world material to the material learned in class. Second, Twitter can help make the class community stronger. Instead of people knowing only information about one another gathered during class, which takes place a couple times a week, they can see posts from other students giving them a better interpretation of who those other students are (Parry, 2008). Third, users on Twitter can track a word. Using this function an individual can learn more about a specific topic from a knowledge base of over 20,000,000 users. Next, students can get instant feedback about any subject. Tweets are pushed to mobile devices, so students can get information on the go with ease. Parry (2010) found that tweeting could also help to improve grammar. He believes if the tweeter only has a limited amount of space to post something they think about what they are going to say. This means they try to formulate the best possible message in the shortest amount of space, while still getting their intended point across.

Another teacher actually did a study with students using Twitter. Barrett (2008) used Twitter in his class of fourth and fifth grade students to teach. The first study he carried out aimed at finding the differences in when people tweet. This was based on geographical location. Barrett tweeted a question to his followers and examined the time it took for people to respond. From this study he concluded during lessons, teachers need "to be time aware" (Barrett, 2008). Based on geographical location followers may not see your tweet, as it is night where they live. This means that not all your followers can

provide an accurate response in a time period that encompasses a lesson. He states, "allowing you network time to response is very important" (Barrett, 2008, p. 1). Because not everyone can see your tweet at the time you post it, tweets can "get lost in the torrent for many in your network" (Barrett, 2008, p. 1). This helps to show that information is at a constant flow on Twitter, but it may not be the information desired. Another tweet Barrett posted aimed at displaying the differences in language based on geographic location, which was referenced earlier when discussing Reinhardt's et al. topic of how Twitter can be used to teach languages. Lastly, a response to a tweet posted by Barrett found that lessons could be derived from responses of a specific tweet. Barrett used the example of a response that was tweeted saying, "…maybe a 1 in 4 chance…" when referring to whether or not it was going to snow the next day. He then had a lesson that focuses on that phrase and was able to teach students "1 in 4" is the equivalent of 25%. Although this topic was applied to fourth and fifth graders, it can also be applied to higher education in the same way.

Junco, Heiberger, and Loken (2011) conducted a study to assess how Twitter affects student engagement and grades when it is integrated into the classroom. While results indicated Twitter had positive effects on student engagement and grades, data was collected using the Twitter API and not from actual students.

2.6 Summary

The articles reviewed provided much insight regarding what forms of social media are the most useful in education, what microblogging is, and how Twitter can be integrated into the classroom effectively. The aim of this research is to determine how

microblogging facilitate better communication while still adding to the overall learning process. None of these studies have outlined how to facilitate better communication with a professor if you are a student, nor has any article explained what specific methods can be used to enhance learning in higher education from a student's perspective. This research will aim to explain these two ideas in detail utilizing two classes at Purdue University.

CHAPTER 3 FRAMEWORK AND METHODOLOGY

The intent of this research was to determine whether or not students perceive microblogging as an effective tool in higher education when integrated into the classroom. The research was meant to collect background information, communication apprehension levels, perceived changes in communication, and views regarding the integration of microblogging into the classroom. The research project was then designed to evaluate how the students perceived the effectiveness of microblogging in their class relative to how their communication was affected.

Due to the nature of the question, I was primarily focused on a qualitative study in addition to the collection of demographics. This chapter will describe the method of research, data collection, sample and population, and other details regarding the background of this study.

3.1 Framework

There have been other studies that attempt to assess the uses of microblogging in higher education. However, as described in the literature review, these studies fail to effectively observe how the student perceives the effects the integration of microblogging into the classroom.

It is my hope that a new teaching method, or a method to be used in conjunction with current methods, can come from this research. As a recent graduate, it was important for me to take in account what students think, as they are the ones receiving the education.

3.2 Researcher Bias Regarding Microblogging In Higher Education

It is in the interest of credibility and validity that I present my views on microblogging in higher education. I use various microblogging platforms, but I have never voluntarily or been forced to use one in my undergraduate education. Although this is true regarding my undergraduate education, I recently was required to use Twitter in the classroom for a graduate level class. This experience showed me that Twitter could be used effectively in the classroom. The communication I experienced with the professor of this class was unlike any other I had experienced with other professors. Using Twitter in this class made me want to experiment with other classes; to see if it could help others just like it helped me.

After this experience, I believe that there is a place for microblogging in the classroom. There is a need for communication not fulfilled by lectures, PowerPoint presentations, and email. In my undergraduate major, many students seemed to suffer from communication apprehension, or they are just very quiet. This may cause them to not answer questions, which would halt communication and hinder their learning.

I have been in school for the past 17 years of my life and have realized with the huge advances in technology, trying teaching approaches that differ from traditional methods are needed. This helped me incorporate microblogging into the classroom from

the perspective of a student, hoping to help meet student's needs. Doing this may stray from traditional methods, but it is the hope that it will help students in the process.

As I have been using microblogging platforms for a good amount of time, I selected Twitter as the platform on which to base this study. This may form a bias because it is the platform with which I am most comfortable. Yet, the previous chapter provides various reasons why Twitter is suitable for this study, in addition to the fact that Twitter is one of the largest public microblogging platforms on the Internet today with over 350 million users (Twitter, n.d.).

3.3 Methodology

What was the experience of these participants in this research study? Did they find the integration of microblogging into the classroom useful when learning? How did the use of microblogging help increase interaction with the teacher and the students? These were the basic questions for the research conducted.

The approach was perfectly suited for the use of qualitative research, utilizing grounded theory outlined by Strauss and Corbin (1990). Their process to generate a grounded theory follows three steps, and helped me determine if there was a change in an individual's perceived communication when microblogging was integrated into the classroom. If so, the goal of this research was to determine how these are related, and how an individual's communication apprehension level affected this change in perceived communication, if at all.

The expectations of professors when participating in this study are displayed in Appendix A. While professors may not be able meet all of the expectations, 70% of the expectations were followed.

3.4 Research Environment

This section describes the where, when, and who of this study in regards to the participants and location.

3.4.1 Study Location

The location for this study was at Purdue University, West Lafayette, Indiana. The selection of the location was based on the ease of the study. I am currently attending Purdue as a graduate student in the Department of Computer Graphic Technology (CGT). Purdue has a reputation for excellence in the areas of technology, engineering, and aviation. The sample was taken from the College of Technology, Department of CGT. Because of the small class size and the professor's interest in students in CGT, I feel the data gathered would hold more credibility than a case study or focus group in a different environment.

3.4.2 Study and Twitter Integration Duration

This study was conducted during the Spring 2012 semester. While each class was taught all semester, this study focuses primarily on the first two months of the class.

Professors of each class did not change their teaching methods for the first month. After a month, professors introduced Twitter into their classroom. When Twitter was introduced into the classroom students took a pre-survey.

Post-surveys and interviews were conducted a month after Twitter was introduced to the class. This demonstrates that participants used Twitter for the same amount of time that they did not use it.

3.4.3 Participants

Participants in this study were from Purdue University and its College of Technology (CoT), more specifically the Department of Computer Graphics Technology (CGT). Inside the CGT department, two classes were used for this study, all of which have ties to the Internet, and some social media.

The two classes chosen for this study were CGT 256 and CGT 456, which discuss topics of human computer interface and advanced web programming respectively. These classes were chosen because of the different topic base and the marginally different teaching styles of each professor.

The CGT department's mission statement is to "prepare students to be the nation's best practitioners, managers and leaders of applied computer graphics" (Purdue/CGT, 2011). These students have varying backgrounds including design, programming, animation, construction drafting, etc. As the world is entering the age of digital natives, people are starting to have grown up with technology and know how to use it to a certain extent. Extent of known technology may vary based on individual.

Eight students were selected for interviews, and 25-35 students participated in the survey portion of this study. The researcher chose participants for interviews based on their communication apprehension total score. An equal number of individuals were selected from both classes for interviews.

3.5 Approvals

Approvals were necessary in order to successfully conduct this research.

3.5.1 Department and Instructor Approvals

Approval to conduct this study was obtained from Professor Ronald Glotzbach and Dr. Mihaela Vorvoreanu. Participation in this study was voluntary. Students who participated in this study received a maximum of 3% extra credit towards their final grade. An alternate assignment, worth the same amount of extra credit, was available to students not wanting to participate in this study.

3.5.2 IRB Approval

IRB approval was also a necessary component involved in this research study due to the fact that this study involved human participants in the interviewing phase. I had to take all the necessary steps to insure the anonymity of the participants as well as have a system set up which allowed participants to withdraw at any time. The level of IRB approval sought was the exempt level as there is no threat to the well being of participants. The IRB approval obtained for this study is presented in Appendix B.

3.6 Data Collection

This section of the chapter will define how the participants were chosen, how the data was collected, and what tools were used for this particular study.

3.6.1 Interview Participant Selection

Students in CGT 256 and CGT 456 voluntarily completed a pre-survey and indicated if they were willing to participate in an interview. Students who indicated they were willing to participate in an interview were then chosen for an interview based on their communication apprehension (CA) score.

Four participants from each class were interviewed. Of these four individuals, two had high CA scores, and two had low CA scores.

3.6.2 Surveys

At the beginning of this research, a voluntary survey was administered to all students participating. Its goal was to collect the participant's demographic information and CA score, which was done using McCroskey's CA instrument. A unique identifier was used to protect the student's anonymity. A post-survey was given at the end of the study to all students, no matter if they had been selected for an interview or not. This survey gathered general information about what students thought about their experience with Twitter, but was not as comprehensive as the interview. The questions asked in both surveys are presented in Appendix C.

3.6.3 Interviews

Interviews were conducted at the conclusion of this study. Interviews took place at an independent location on Purdue University's campus. They were conducted in an informal setting in order to get the best information from the students who had participated. Interviews were recorded via electronic capture, and no names were spoken of during this time.

Data collected was then transcribed for use throughout the rest of this paper. Interview questions are presented in Appendix D.

3.7 Analysis

The analysis was conducted through a review of all research data, which included both survey and interview data. Interview data was collected via electronic recorder and transcribed by an outside source. Grounded theory was used in this study, using the methods defined by Strauss and Corbin (1990).

First, open coding was used to identify, categorize, and describe the phenomena observed in the surveys and interviews. Second, codes, which consist of categories and properties, were related to one another in order to determine if causal relationships exist within the data. Lastly, one core concept, or code, was determined to be the main driving force behind the phenomena this research observed, and other phenomena were related to this core concept.

3.8 Data Validation

In order to validate the data collected throughout this research, validation techniques were a necessity.

3.8.1 Triangulation

In addition to the collection of data through surveys and interviews, I observed multiple class periods throughout the semester, in which microblogging was utilized. This provided another source of data, which was compared to the data collected from interviews (Maxwell, 2005).

Tweets from both classes were closely monitored in order to provide another source of data to help validate the results collected in the surveys and interviews.

3.8.2 Data Saturation

Interviews were concluded until data saturation was reached. This happened when different participants provided the same information repeatedly and failed to form ideas that had not been presented prior (Sekaran & Bougie, 2009).

3.9 Credibility of the Researcher

The goal of research should be to produce results, which are valid and reliable. With that being said, the credibility of the researcher should be addressed to show the reliability of the data. According to Patton (2002), (1) the reactions participants had to me while I observed their classes, (2) biases, predispositions, or selective perceptions I had, and (3) my incompetence are important factors in determining researcher credibility.

I have received a Bachelor of Science from Purdue University and am very familiar with the workings of the CGT department. I know individuals from both classes and am treated as part of the class when present for observations; meaning classes proceeded as usual when I attended. This addressed the first issue stated prior.

This research is my own, and I did not receive and grants or financial assistance while working on it. A professor asked me to include two questions in my interviews. After reviewing these questions, they were included because they aligned with the goals of the research and provided more data to form a theory. In addition to this, triangulation was also conducted during this study, and elevates the second concern stated prior.

The interviews were crucial in obtaining data. In order to increase my level of competence when conducting these, I practiced interviewing multiple individuals prior to conducting interviews with the participants of the study.

Lastly, communication apprehension levels are discussed in great depth throughout this study. My communication apprehension score is 68, which I provide for even more transparency.

3.10 Summary

This chapter provided the framework and methodology used in this research study. The next chapters will present the collected data, analysis of that data, and the findings of this research.

CHAPTER 4 RESULTS

This chapter presents background information for context in addition to the results collected during the experimentation of this study.

Before the results are presented, it is important to understand how Twitter was used in each of the two classes as well as the demographics of the participants.

4.1 Twitter Use in Classes

After not using Twitter for a month, Twitter was incorporated into two courses at Purdue University, CGT 256 and CGT 456, for a period of a month. To determine how Twitter was used in each class survey data, interview data, and observations, both inside and outside of class, were compiled together.

4.1.1 Twitter Use in CGT 256

In CGT 256, the professor used Twitter to communicate with students. Topics of discussion could be anything; based on the message the professor was responding to, or what she was researching at that point in time. In addition to this, the professor also shared information relating to her field of study. The following tweets illustrate this: "#cgt256 Nice overview at this point in the semester: Design Principles/UX Philosophy

by @twitteruser: slidesha.re/xnVqoI" and "#cgt256 so, who's doing #FollowFriday today? Don't know what that is? Explained here: on.mash.to/q8HqG4."

Students in CGT 256 primarily used Twitter to connect with professionals in their field of study, as tasked by their professor. The data made it apparent that students also used Twitter to communicate with their professor, the class's teaching assistant, and fellow students about general topics as well as assignments and class updates. This can be seen in the following tweets from students respectively: "@professor checkout this job posting! #cgt256 is a nice prereq for this job! #wireframes @company: UI Designer…," @teaching_assistant Is there room for another show and tell during lab today?," and "@teaching_assistant @professor What chapters from the text BGW does the midterm cover?"

Lastly, I was able to attend a class period where a presentation, by an outside speaker, was given to the class. During this presentation, Twitter was used as a backchannel, and the data gathered will be presented in a later section.

4.1.2 Twitter Use in CGT 456

Throughout this study, the professor of CGT 456 would tweet about class assignments and potential job postings. For example, the professor tweeted "Creating a new WPF assignment description for a lab07 in #cgt456" and "Remember reps from CIA will attend #cgt456 #cgt353 #cgt356 today to discuss web dev opportunities."

In addition to this, his teaching assistant and him would respond to questions students had regarding assignments. The professor tweeted "the #cgt456 project 1 will be due Wednesday at 11pm, one week from today. @student" to remind students when their

project was due. “@student the same way you specify hex in CSS. #RRGGBB red green and blue. Combine the 3. #cgt456” was tweeted in response to a question a student had about a project.

Students primarily used Twitter to ask quick questions, check on assignment due dates, and get help on assignments if needed. This is supported by tweets from students and can be seen in the following tweets: “@professor I am currently working on project 1 for 456 but when I go to test in the browser it says I don't have permission... #cgt456,” “Is project 1 still due Sunday at 11pm? #cgt456 @professor,” and “@professor when are labs due for #cgt456 again? #forgotalready.”

At no time during this class was Twitter used as a backchannel.

4.2 Communication Apprehension Level Interpretation

The following data presents the communication apprehension level of individuals, and it is important to define what these different levels mean. McCroskey (1977) defines low communication apprehension scores as any score 50 or below, high communication apprehension scores as any score above 80, and any score in between is an average communication apprehension score.

Individuals with lower scores experience a lower level of anxiety when involved in real communication or when they anticipate communication. These individuals tend to participate more in conversations because of this lower level of anxiety. The opposite is true for individuals with higher communication apprehension levels. They tend to not to participate in conversations because of this anxiety, or they think the outcome of the conversation is not worth their participation in it.

Now that the levels of communication apprehension have been presented and interpreted, the data collected from this study is presented.

4.3 Survey Data Results

This section discusses the demographics of the survey participants and the results obtained from the pre-survey and post-survey.

4.3.1 Survey Participant Demographics

Twelve individuals in the CGT 256 class completed the pre-survey and post-survey. Eight individuals in the CGT 456 class completed the pre-survey and post-survey. Their results are represented in Table 4.1. All individuals were CGT majors in Purdue University's CoT.

Table 4.1 *Survey Demographics*

	CGT 256 (N = 12)	CGT 456 (N = 8)
Age	Mean = 21 Standard Deviation = 1.76	Mean = 22.25 Standard Deviation = 1.28
Race	Caucasian: 8 (67%) Asian: 2 (16%) African American: 2 (16%)	Caucasian: 5 (62.5%) Asian: 2 (25%) Other: 1 (12.5%)
Time using Internet	5-10 years: 5 (42%) 10-15 years: 6 (50%) 15+ years: 1 (8%)	10-15 years: 6 (75%) 15+ years: 2 (25%)
Time using Social Media	3-4 years: 2 (16%) 4-5 years: 4 (33%) 5+ years: 6 (50%)	4-5 years: 3 (62.5%) 5+ years: 5 (37.5%)
Comfort using social networking sites (1-10)	Mean = 8.66 Standard Deviation = 0.88	Mean = 8.63 Standard Deviation = 1.3
CA Score	Mean = 64 Standard Deviation = 12.68 Minimum = 46 Maximum = 84	Mean = 65.63 Standard Deviation = 16.19 Minimum = 51 Maximum = 90

4.3.2 Survey Results

The post-survey asked students questions about their experience using Twitter during their class, communication with their professor and fellow classmates, their experience using Twitter as a backchannel, and whether or not they thought Twitter should be integrated into other courses.

When participants from both classes were asked about their Twitter experience, four main categories emerged from their responses. They used Twitter (1) to quickly communicate with their professor, (2) discuss class topics, (3) interact socially with others, and (4) for nothing. Participants stated, "We used twitter to communicate with Professor ###### [...]," "I did like tweeting to my teachers to ask simple questions because they responded right away," and "it was an easy way to contact students and teachers." Participants who did not use Twitter much during the study tended to have a higher communication apprehension level (CAL), while participants who had average and lower CALs used Twitter for the first three categories.

Participants were then asked how communication changed with their professor since the integration of Twitter. Three main categories emerged for both classes: (1) it became easier to ask questions, (2) professor responded quicker, (3) and nothing. The first two categories show that an increase in communication occurred between their professor and them. Participants who stated no change occurred, admitted to not using Twitter much during the class and tended to have higher CALs. The opposite is true for participants who saw an increase in communication; they had average to lower CAL's and used Twitter frequently during the course.

Of the eighteen participants, fourteen stated their communication with fellow classmates did not change. The other four participants stated it was easier for them to contact their classmates, and they were able to learn more about them. These four participants had average to low CALs, while the majority had average to high CALs. Two participants did not answer the question.

CGT 256 participants were asked to reflect on their class period where Twitter was utilized as a backchannel. Two main, opposing categories: (1) it was distracting and harder to pay attention to presentation and (2) it was good for side conversations and information sharing during the presentation. Participants with higher CALs seemed to find the backchannel distracting, while participants with lower CALs, with the exception of one participant with a CAL of 84, had a positive view on their backchannel experience.

Lastly, participants were asked if other professors should integrate Twitter into their classes. Of the twenty participants, eighteen stated they thought other professors should utilize Twitter. One participant stated they did not have a preference, and the last participant, who had a CAL of 71, stated other professors should not integrate Twitter into their classes, but admitted to not using Twitter much during the class on the survey prior.

4.4 Interview Data Results

This section presents the demographics of the interview participants and the data collected during interviews.

4.4.1 Interview Participant Demographics

Four individuals were interviewed from each class. The participant's demographic information is presented in Table 4.2 and Table 4.3. All participants were CGT majors and enrolled in Purdue University's CoT.

Table 4.2 *CGT 256 Interview Participants*

	Participant 1	Participant 2	Participant 3	Participant 4
Age	22	19	21	20
Race	Caucasian	Caucasian	Caucasian	Caucasian
Time using Internet	10-15 years	10-15 years	5-10 years	10-15 years
Time using Social Media	5+ years	1-2 years	4-5 years	5+ years
Comfort using social networking sites (1-10)	10	4	8	8
CA Score	55	109	54	92

Table 4.3 *CGT 456 Interview Participants*

	Participant 1	Participant 2	Participant 3	Participant 4
Age	21	22	24	24
Race	Caucasian	Caucasian	Caucasian	Asian
Time using Internet	15+ years	5-10 years	15+ years	10-15 years
Time using Social Media	4-5 years	5+ years	5+ years	4-5 years
Comfort using social networking sites (1-10)	10	10	8	8
CA Score	29	36	69	71

4.4.2 Interview Results

Interview participants were asked about their experience using Twitter throughout the course, communication with their professors and classmates, their experience using Twitter as a backchannel, what they thought was beneficial and detrimental when using Twitter, and if they thought Twitter should be integrated into other courses. Interviews were necessary as the post-survey provided limited data. The interviews allowed participants to explain themselves in more detail.

When participants were asked about their overall experience using Twitter during class, the primary categories that emerged showed Twitter was used for (1) gathering information and (2) asking the professor questions. One participant stated, "[…] every once in awhile they [referring to the professor] post some links and stuff that help us with like assignments and stuff…" and another participant stated, "whenever someone gets in trouble [relating to assignments] usually they just Twitter him and then he just sends out a mass email or something […] to answer the question." While most participants shared the same view on Twitter as stated prior, Participant 4 in CGT 256, who had a high CAL, stated they preferred traditional methods of communication, such as email, more.

It should be noted, in the CGT 256 class Participant 2 admitted to not using Twitter much throughout the class, meaning no substantial information was gathered from them throughout the remainder of the data discussed.

Participants were then asked if and how communication had changed with their professor since starting to use Twitter. The consensus amongst most of the participants was that (1) Twitter was faster than email, (2) it was easier to communicate with the professor, (3) and communication seemed more personal. One of the participants stated,

"[…] I felt it was easier than talking to them face-to-face or I don't know. I was just friendlier." These participants had average to low CALs, comparatively speaking. While most of the participants indicated some change in communication with their professor, two felt there was no change, and one felt traditional communication, such as email, was still a better option. These participants had higher CALs than the other participants.

Half of all the participants indicated communication had changed between them and their classmates when Twitter was used in the class. Three of these participants were in CGT 256 and were Participant 1, Participant 3, and Participant 4. Participant 1 from CGT 456 shared the same views as these CGT 256 participants. One participant stated, "I've met some classmates on Twitter that I haven't actually talked to in class before then. But now I've talked to them, so it's kind of easy to break the ice, I guess." In CGT 456 three of the participants, all except Participant 1, stated no change had occurred. Because the CALs of these participants in each category differed greatly, it is not plausible to state the CAL affected the communication amongst students.

The participants of CGT 256 were then asked about their experience in which Twitter was used as a backchannel during a presentation. Unlike the survey results, all interview participants found the overall experience beneficial, saying it was good to be able to ask questions while the presentation was happening and they liked how they could get more information about the topic being presented. One participant stated, "It was easy because you could sit there and read it [Twitter feed] without disrupting what he was saying." Another participant stated, "It was pretty cool to see like what everybody was thinking at certain times, like the questions they had." It did not seem that CAL affected how students perceived the benefits of the backchannel exercise.

Two distinct categories emerged when participants were asked what was beneficial about using Twitter: (1) professors responded quicker than email and (2) seeing the information posted by their professor was beneficial. “He would post like a link to an example of something that we were talking about in class […], which was beneficial I thought,” stated one participant. While most participants felt something was beneficial, Participant 4 in CGT 256 and Participant 2 in CGT 456 felt nothing was beneficial. These participants represent the opposite spectrums of CALs, with Participant 4 having a high CAL and Participant 2 having a very low CAL in CGT 256 and CGT 456 respectively. While Participant 2 in CGT 456 did not offer an explanation, Participant 4 in CGT 256 stated, “For actual, like, technical terms and learning basics, like, I don’t like the basis of learning of it.”

Three participants in CGT 456, all except Participant 3, thought there was nothing unhelpful or detrimental during their Twitter experience. These participants had CALs of 36, 29, and 71. Participant 3 in CGT 456, who had a CAL of 69, thought the character limit of Twitter was the only detrimental aspect when using Twitter. Three participants in CGT 256 thought there was some detriment to using Twitter in some cases. Participant 3 stated Twitter could be distracting at times, while Participant 4 and Participant 1 stated they did not like the information overload experience. This information overload relates to Twitter bots, spam, and how following so many people “blows out my Twitter feed […]” as stated by Participant 4 in CGT 256.

Lastly, participants were asked if they thought other professors should integrate Twitter into their classes. Participant 4 in CGT 256, who had a CAL of 92, was the only participant that did not think other professors should integrate it with their class, stating

they felt more comfortable with the traditional methods of communication, such as email. While almost all participants thought Twitter should be integrated into other classes, they stressed that it should be done only if it can be incorporated effectively. CALs of participants varied, and made it implausible to determine if CAL affected the responses.

4.5 Analysis of Backchannel Data

This section analyzes the observations I made while attending a CGT 256 class where Twitter was utilized as a backchannel. As stated prior, the CGT 456 class did not use Twitter as a backchannel during a class session.

During the CGT 256 class session, a professional in the field of game development spoke to the class about usability testing via Skype. At the beginning of the presentation few students were using the backchannel, but as the presentation progressed student participation increased.

The professor asked questions that students posted on Twitter, provided information about the general topic being discussed at the current point in the presentation, and helped to facilitate the presentation. Students were tweeting questions, sharing links they found about topics or the presenter, looking for information the presenter was talking about elsewhere on the Web, and responding to each other's tweets.

After the analysis of the observations, the backchannel (1) made it easier to ask the presenter questions, (2) easier to understand the main topics being discussed, and (3) it facilitated the sharing of information between participating individuals.

4.6 Data Analysis Using Grounded Theory

Survey and interview data were analyzed in order to generate a theory. The survey results were analyzed first and the interview results second. The survey and interview results were then analyzed together in order to generate the theory presented in this section.

A theory was generated from this data set using the steps outlined by Strauss and Corbin (1990). This process is comprised of three parts: (1) open coding, (2) axial coding, (3) and selective coding (Strauss & Corbin, 1990). These steps generate codes and categories about the phenomena observed, related these phenomena to each other, and determined the core concept to which all phenomena relate, respectively.

4.6.1 Open Coding

Open coding aims to determine what the data is about (Strauss & Corbin, 1990). Four main categories of information emerged when the data was analyzed.

First, survey questions gathered information about participants communication apprehension score. While students were not asked about their communication apprehension score, it was used to relate other information gathered.

The second category emerged when participants answered survey and interview questions relating to communication with their professor and fellow students, and was the student's perception of a change in communication.

The introduction of microblogging, Twitter, into the classroom was the third category that emerged. While the survey and interview participants did not explicitly state this, the questions asked them to share their experiences after Twitter was integrated

into their class. It is important to remember that students did not use Twitter for a period of four weeks before it was integrated into their class. When participants talked about this, two sub-categories emerged, and include the benefits and detriments of using Twitter in the classroom.

The last category that emerged discussed the integration of Twitter into other professor's classrooms. This data was taken from participant responses to the last question on both the post-survey and interview.

As the observed phenomena have been determined, the next step in the theory generation process related these to one another.

4.6.2 Axial Coding

Axial coding aims to relate the categories determined from the previous section to one another (Strauss & Corbin, 1990).

Data suggested there is a relationship between the student's perceived communication with their teacher and the introduction of microblogging, Twitter, into the classroom, but it does not suggest Twitter integration is related to a change in perceived communication amongst students. The phenomenon of interest in this relationship is the student's perceived change of communication between their professor and themselves. The casual condition, or the events that led to the occurrence of the phenomenon, of this relationship was the introduction of Twitter info the classroom. The action strategy, or goal-oriented activities that participants performed in response to the phenomenon, was the way the students communicated with their professor after the introduction of Twitter in their class. Data indicated students perceived an increase in communication between

their professor and them after Twitter was integrated into their class, and this was the consequence of this relationship.

Second, a relationship existed between the communication apprehension level (CAL) of an individual and the student's perceived change of communication between their professor and themselves. The phenomenon of interest in this relationship is student's perceived change of communication between their professor and themselves. The causal condition of this relationship was students communicating with their professor and class, and seeking information after Twitter was integrated into the class. The action strategy of this relationship was the way students had to communicate with their professor, and the way they gathered information utilizing Twitter. This relationship also has an intervening condition, which is the CAL of the individual. This condition affected how students used Twitter throughout their class, which in turn affected the change in communication they perceived. Data suggested students with average to lower CALs perceived more of an increase in communication than individuals with higher CALs, and this was the consequence of this relationship.

Third, a relationship between an individual's CAL and the introduction of Twitter into their classroom exists. The phenomenon of interest in this relationship is the student's perceived experience using Twitter in the classroom. The causal condition of this relationship was how students had to use Twitter to communicate with their professor, the class, in addition to seeking information. The action strategy of this relationship was the way that students used Twitter in and outside of the classroom for communication and information gathering purposes. This relationship also has an intervening condition similar to the previous relationship, and it was the CAL of the individual. This condition

affected how students used Twitter throughout their class, which in turn affected the change in communication they perceived. Data suggested individuals with a lower CALs had a better experience using Twitter, while individuals with a higher CAL tended to prefer the traditional methods of communication, email, better or they did not use Twitter in a way that could be beneficial to themselves. These were the consequences of this relationship.

Lastly, the student's perceived change in communication with their professor relates to the participant's thoughts about other professors using Twitter. In this relationship, the phenomenon of interest was the use of Twitter in other classes. The causal condition of this relationship was how students used Twitter during their class, which in turn affected their perceived change in communication. The action strategy for this relationship was the way students used Twitter in and outside of class for communication and information gathering purposes. After a month of using Twitter, the majority of participants thought it would be beneficial if other professors used Twitter as a teaching tool in their classes.

A diagram outlining how the phenomena relate to one another is presented in Figure 4.1.

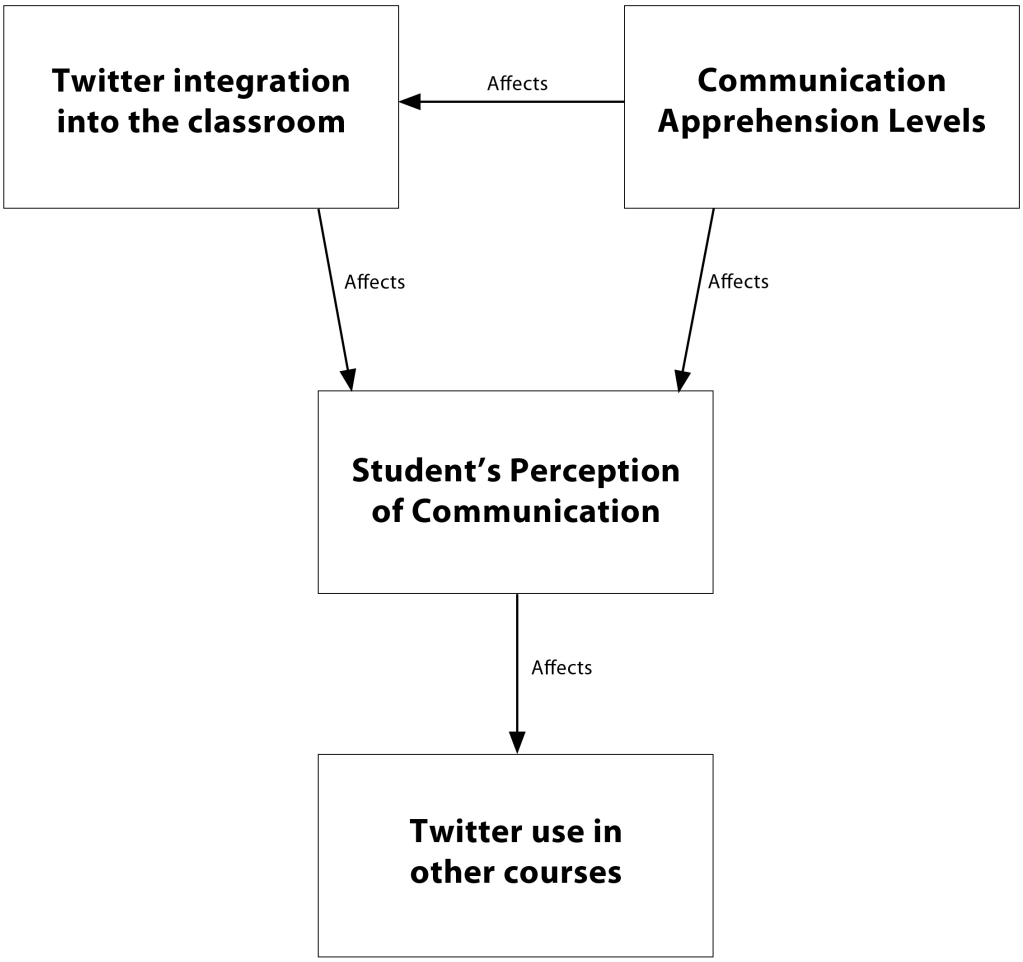

Figure 4.1 *Axial Coding Model*

4.6.3 Selective Coding

Once the relationships between categories are determined, selective coding is conducted and aims to relate all categories to one core concept (Strauss & Corbin, 1990). All categories will be related to the student's perception of communication change after

Twitter was integrated into the class, more specifically the communication between the professor and their students. This is the core concept that emerged from this data.

First, the communication apprehension level affected both the student's perception of communication change and the benefits perceived by the student from using Twitter after the integration of Twitter into the classroom occurred. Second, the perceived benefits of using Twitter also affected the student's perception relative to the change in communication after starting to use Twitter in the classroom. Lastly, The student's perception of the change in communication influenced their thoughts on whether or not other professors should utilize Twitter in their courses.

4.7 Summary

This chapter presented the results of the data collected during this study and the analysis of this data. Results were collected using surveys, interviews, observations of classroom activities, and tweets from students and professors. Data was analyzed using the grounded theory methods outlined by Strauss and Corbin (1990).

Results indicated Twitter was primarily used for the asking of questions and checking on assignment updates. In addition to this, most participants felt there had been a positive change in their perception of communication between their professor and them. These individuals tended to have average to low CALs, while individuals who did not use Twitter or did not see a change in perceived communication tended to have higher CALs.

Students who participated in the backchannel exercise were divided in thinking the backchannel was beneficial. Some believed it was distracting, while others believed it was a useful information-gathering tool.

The majority of participants found Twitter was useful because it was quicker than email and communication with their professor seemed friendlier. The few participants who did not find Twitter useful tended to have higher CALs and stated it was distracting, they preferred email, or the character limit inhibited effective communication.

All but one participant stated they thought other professors should use Twitter in their classes. This was, again, due to the fact that they preferred email to Twitter. This individual had a CAL of 92.

Four phenomena emerged from the data collected: (1) communication apprehension level, (2) student's perception of communication change, (3) the introduction of Twitter into the classroom, and (4) the introduction of Twitter into other courses.

These categories were then related to one another. Communication apprehension levels affected both the student's perception on the change of communication after using Twitter in their class, and the perceived benefits of using Twitter in their class. The integration of Twitter into the classroom affected the student's perception on the change of communication after starting to use Twitter. Lastly, the student's perception of communication change affected whether they thought other professors should integrate it into their courses.

The core concept that all these phenomena related to was the student's perception of communication change after the introduction of Twitter.

The next chapter will present conclusions formed from the data obtained and potential future research that could be conducted.

CHAPTER 5 CONCLUSIONS

This chapter presents the conclusions drawn from the data presented in the previous chapter and potential future research opportunities.

5.1 Conclusions

This section presents the conclusions I have formed from the data and the analysis of this data.

5.1.1 Communication Apprehension

The data collected during this study indicated that student's perception of communication change and the perceived benefits from using Twitter were affected by the individual's communication apprehension level (CAL).

First, data suggested that individuals with lower CALs perceived more of a change in communication between their professor and themselves. This communication change was a positive change, meaning they saw communication increase or communication was better than it had been before. Data suggested the opposite is true for individuals with higher CALs.

These results could have been due to the level of anxiety an individual has when participating in communication or anticipating communication, but this study did not investigate this in-depth.

Second, individuals with lower CALs tended to perceive more benefits from using Twitter for communication. The opposite is true for individuals with higher CALs. This could have been due to the fact that the individuals with lower CALs frequently used Twitter. I could have also been due to the way these individuals used Twitter. Most individuals with lower CALs used Twitter for communication and gathering information, while individuals with higher CALs, who actually used Twitter, used it mainly for brief communication.

5.1.2 Twitter Integration into the Classroom

This study gathered data from two classes that introduced Twitter as a communication tool mid-semester. While Twitter was used almost the same way in these classes, some differences existed.

The professor of CGT 256 used Twitter more than the professor of CGT 456. It seemed that the CGT 256 professor would go out of their way to interact with students on just about any topic. This led students of this class to use Twitter more than students in CGT 456, and is supported by the analyzed tweet data from both classes.

While students of both classes felt communication increased, after conducting the interviews, it felt as if students of CGT 256 talked about their experiences more in-depth, which could have been influenced by the way the professor integrated Twitter into their class.

5.1.3 Twitter Integration into Other Courses

Almost all students, despite their varying CALs, thought other professors should integrate Twitter into their courses. It should be noted that grounded theory is specific to the dataset it represents. This means the theory generated and the results obtained from this study should only be generalized after careful consideration. While I feel Twitter should be used in other classes, the professor needs to determine if they can introduce Twitter in a way that will be helpful to students.

5.2 Future Research

This study suggests individuals with higher CALs tended not to receive much benefit from using Twitter in their classes, but it did not explore why this is. Another study could be conducted specifically on individuals with higher CALs to determine the reasons why Twitter was not beneficial, or why it was not used as it should have been.

In addition, a different study could be conducted in which professors integrate Twitter into classes in very different ways. It could then be determined what the most effective method of Twitter classroom integration is, and would be beneficial to determine the method that helps students the most.

5.3 Summary

This chapter discussed the conclusions made from the data gathered and theory generated as well as possible future research.

It presented how CALs affected individuals and what could have caused this, how the professor could have influenced a change in perceived communication, and cautioned the integration of Twitter into other courses without careful consideration first.

Even though this study was conducted at Purdue University on a select group of students, because every individual has a different CAL and is affected by different methods of communication, the results could relate to students at different universities with like class sizes and like classroom integration of Twitter.

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APPENDICES

Appendix A

Teachers will be expected to follow most of the following. Teachers will:

1. Have a Twitter account
2. Be active on their Twitter account
    a. Post relevant information to class
    b. Interact with students
    c. Answer questions related to assignments, labs, and projects
    d. Effectively use hashtags in relation to assignments, labs, and projects
        i. Ex) #cgt353_a1, #cgt256_l1, #cgt456_p1, etc.
3. Create a Twitter list for every class participating in this study
    a. Can be done by myself at the beginning of study after obtaining all subject's Twitter names
4. Use Twitter as a back-channel at least once, if not more, during the course of the experiment
5. Encourage class to use Twitter outside of class
    a. Collaboration on group projects and presentations
    b. Interaction with other students and industry leaders

Appendix B

PURDUE UNIVERSITY

HUMAN RESEARCH PROTECTION PROGRAM
INSTITUTIONAL REVIEW BOARDS

To:	JAMES MOHLER KNOY 347
From:	JEANNIE DICLEMENTI, Chair Social Science IRB
Date:	12/06/2011
Committee Action:	**Exemption Granted**
IRB Action Date:	12/05/2011
IRB Protocol #:	1111011584
Study Title:	Microbloggint use in the Classroom: Exploring Communication Apprehension

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(2) .

If you wish to revise or amend the protocol, please submit a new exemption request. Please refer to our guidance "Minor Changes Not Requiring Review" on our website. Please contact our office if you have any questions.

We wish you good luck with your work. Please retain copy of this letter for your records.

Below is a list of best practices that you should be aware of and keep in mind when conducting your research.

Category 1

- Written permission from preschools, primary and/or secondary schools should be obtained prior to the investigator engaging in research, such as recruitment and conducting research procedures. If the written permission was not submitted with the protocol at the time of IRB review (e.g., the school would not issue the letter without proof of IRB approval), the investigator must submit the written permission to the IRB office immediately upon receipt from the school. This is an institutional requirement.

Categories 2 and 3

- Surveys and data collection instruments should note that only participants 18 years of age and over are eligible to participate in the research, state that participation is voluntary and that any questions may be skipped, and include the investigator's name and contact information.
- Investigators should explain to participants the amount of time required to participate. Additionally, they should explain to participants how confidentiality will be maintained or if it will not be maintained.
- When conducting focus group research, investigators cannot guarantee that all participants in the focus group will maintain the confidentiality of other group participants. The investigator should make participants aware of this potential for breach of confidentiality.
- Written permission from businesses, preschools, primary and/or secondary schools should be obtained prior to the investigator engaging in research, such as recruitment and conducting research procedures. If the written

permission was not submitted with the protocol at the time of IRB review (e.g., the school would not issue the letter without proof of IRB approval), the investigator must submit the written permission to the IRB office immediately upon receipt from the school. This is an institutional requirement.

Category 6

- Surveys and data collection instruments should note that participation is voluntary.
- Surveys and data collection instruments should note that participants may skip any questions.
- When taste testing foods which are highly allergenic (e.g., peanuts, milk, etc.) investigators should disclose the possibility of a reaction to potential subjects.

General

- To recruit from Purdue University classrooms, the instructor and all others associated with conduct of the course (e.g., teaching assistants) must not be present during announcement of the research opportunity or any recruitment activity. This may be accomplished by announcing, in advance, that class will either start later than usual or end earlier than usual so this activity may occur. It should be emphasized that attendance at the announcement and recruitment are voluntary and the students attendance and enrollment decision will not be known by those administering the course.
- When conducting human subjects research at non-Purdue colleges and universities, investigators are urged to contact that institution's IRB to determine requirements for conducting research at that institution.
- When conducting human subjects research in places of business, investigators must obtain written permission from an appropriate authority from the business prior to engaging in research activities such as recruitment or conducting study procedures. This is an institutional requirement.

Appendix C

Pre-survey Questions

1. What is the PIN assigned to you by the researcher?
2. How old are you?
3. What is your race?
4. What college are you currently enrolled in?
5. What is your current major?
6. How long have you been using the Internet?
7. How long have you been using social media (blogs, Facebook, Twitter, Flickr, etc.)
8. On a scale of 1-10, how comfortable are you using social networking sites?
9. Communication apprehension is an "individual's fear or anxiety associated with either real or anticipated communication with another person or persons" (McCroskey, 1978). In order to determine how well, if at all, this study will benefit you, we need to know your communication apprehension score. Please take the test at the following URL (will be replaced once final test is determined) and enter your score below.
10. Are you willing to participate in an interview after the study has been conducted?

Post-survey Questions

1. What is the PIN assigned to you by the researcher?
2. Briefly describe your experience using Twitter in this course.
3. How did communication change with your professor after you started using Twitter in this course?
4. How did communication change with your fellow students after you started using twitter in this course?
5. Was Twitter being used as a back-channel beneficial? If so, why?
6. Should other college professors use Twitter in their course?

Appendix D

Interview Questions.

1. Please describe the course (topic, level, enrollment).
2. Please describe your experience using Twitter in this course.
3. How did communication between you and your professor change after you started using Twitter in the classroom?
4. How did communication between you and the other students change after you started using Twitter in the classroom?
5. Please describe your experience using Twitter as a back-channel during class.
6. Overall, what about using Twitter in this course did you find beneficial?
7. Overall, what about using Twitter in this course did you find unhelpful or detrimental?
8. Would you recommend that other college instructors use microblogging in their classes?

Information about you

1. How old are you?
2. What is your race?
3. What college are you in?
4. What year of school are you in?