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Tweet vs Status Update: Exploring Ways to Promote Collaborative Argumentation in an Online Classroom Setting

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TWEET VS. STATUS UPDATE:
EXPLORING WAYS TO PROMOTE COLLABORATIVE ARGUMENTATION
IN AN ONLINE CLASSROOM SETTING

By

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Abstract

The focus of this study was to answer the following overarching question: How does a Twitter discussion format compare to a Facebook discussion format in terms of promoting collaborative argumentative discourse? Data analysis focused on the difference in amount of arguments, counter-arguments, reasons, and elaborations generated by participants between the two social media platforms. In addition, the impact of participant use of sentence openers on the amount of argument components was also examined. A Mann-Whitney statistical test was conducted to determine the differences between Twitter and Facebook groups in argument components across three small group discussion questions. The results of the test revealed there was a significant difference in the amount of argument components per discussion between Twitter and Facebook groups, with the Facebook groups including more argument components within their discourse. In addition, 15 participants were provided with a list of sentence openers. A content analysis was conducted on 319 tweets//postings. Although zero participants utilized the list, of the 15 participants provided sentence openers, 7 used variations (47%), with 5 in Facebook groups. Of the 12 participants not provided sentence openers, 4 used variations (33%), with 2 in Facebook groups. There was a small qualitative trend for the sentence opener groups to use variations, especially the Facebook participants. Based on these results, Facebook was identified as a viable tool to promote collaborative argumentation within an online discussion. What the results of this study determined is that the use of Facebook could be effectively incorporated into a full-semester online course.

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Dedication

I dedicate this work to my grandfather, Felix. His passion for learning was inspiring and is the driving force behind my success.

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Chapter 1: Introduction

Prior to modern psychology, people were interested in the way humans think. Thinking was a focus of the early philosophers such as Plato and Socrates (Kuhn, 1991). It was believed that at the center of thinking was being able to construct arguments; formal logic was the ideal model of thinking (Kuhn, 1991). From this point, using formal logic as the framework for constructing arguments evolved into the development of argumentation frameworks with more real-world applications (Kuhn, 1991; Toulmin, 2003; Walton, 1998). With the emergence of these new frameworks, argumentation has begun to find a foothold in classrooms to help promote critical thinking and problem-solving skills. This has been one way to facilitate learning through a social but still cognitive process, as well as within different formats (face-to-face, online, etc.).

Argumentation

The term argumentation elicits images of debates, but it is a process composed of many different types of discourse; debates being just one (Nussbaum, 2011; Walton, 1998). As a whole, argumentation involves conversations in which a person is persuaded of the adequacy or the inadequacy of another person's opinion or expression through a series of statements (Eemeren & Grootendorst, 1984). The underlying actions are the development and then critique of arguments (Voss & Means, 1991), which involves a social, as well as verbal and rational, interaction (Eemeren, Grootendorst, & Henkemans, 1996; Golanics & Nussbaum, 2008; Nussbaum, 2011). The required social interaction involves people following goal-directed and collaborative rules or expectations on which they have settled mutual adherence (Cohen, 1987; Walton, 1998). One person is attempting to convince the other person of a certain point, which

implies a difference of opinions. The key is a joint intent on finding a resolution to the difference of opinions (Eemeren & Grootendorst, 1984). This joint intent is an important factor.

With this in mind, self-efficacy (Bandura, 1986) can be a motivating factor when it comes to arguing. Self-efficacy is a system that individuals possess which allows them to enact a level of control over their actions, feelings, and thoughts (Bandura, 1986). The interaction of this system with external environmental factors results in self-reflection, which ultimately impacts behavior (Pajares, 1995). A person may feel that they are not able to or capable of adequately speaking their mind or opinion on a certain topic. This would in turn impact their motivation to argue.

As part of implementing argumentation into classroom discussion, instructors need to consider student motivation. In addition to promoting high self-efficacy, teachers must tap into a student's intrinsic motivation to complete a task, they need to make sure that the task is challenging, peaks the student's curiosity, and places the student in control of the situation (Lepper & Hodell, 1989; Schunk, Meece, & Pintrich, 2014). One way of doing this is to tap into students' intrinsic motivation to use social media.

Social Media and Learning

With the popularity of social media, instructors have begun to embrace websites like Facebook and Twitter to aid in the learning process. While the literature on argumentation within online environments has been extensive (Althaus, 1997; Cho & Jonassen, 2002; Clark, D'Angelo, & Menekse, 2009; Clark & Sampson, 2008; Clark & Sampson, 2007; Clark et al., 2007; Jeong & Joung, 2007; Nussbaum, Winsor, Aqui, & Poliquin, 2007), the focus has been on online discussions within a format such as a university Blackboard learning system. To date,

there has been little research evaluating the effectiveness of argumentation within social media websites like Facebook and Twitter.

Purpose of Study

The purpose of this study was to evaluate Facebook and Twitter as effective platforms for promoting collaborative argumentation within an online course. The impact of sentence openers on forming arguments was also investigated. A study like this has not been done before, making this a new and worthwhile contribution to the online argumentation literature. In addition, with the influx of attention surrounding social media, this study can provide instructors with a new avenue for providing information, completing classroom activities, etc.

Framework of Study

To critically evaluate the argumentative discourse that took place within Facebook and Twitter, Walton's (1989; 1996; 1998; 2000) argumentation framework was used to establish types of argument components present. Consistent with the goals of computer-supported collaborative learning, scaffolding through scripting was utilized to help ensure that effective argumentation was present within the online discussions. Specifically, the principles of the script theory of guidance (Fisher et al., 2013) were incorporated along with sentence openers to provide the script. Yiong-Hwee and Churchill's (2007) list of 29 sentence openers that support argumentation were used.

Based on the previous research reviewed, Walton's (1989; 1996; 1998; 2000) argumentation framework, and the script theory of guidance (Fisher et al., 2013), the present study had three main objectives. The first objective was to evaluate Twitter as a viable tool for promoting collaborative argumentation. The second objective was to determine if scripting through sentence openers promotes a greater number of arguments within online discussions.

The third objective was to compare Twitter to a different platform for promoting argumentation: Facebook.

The overarching question the present study aimed to answer was as follows: How does a Twitter discussion format compare to a Facebook discussion format in terms of promoting collaborative argumentative discourse? To answer this question, the number of claims, counter-claims, arguments, counter-arguments, elaborations, and reasons that students form within a Twitter discussion and a Facebook discussion were determined. In addition, the effect of sentence openers on these argumentation components was also explored.

Based on the aim of this study and previous research, it was hypothesized that students participating in discussions within Twitter would post a greater number of arguments and counter-arguments than students participating in discussions within Facebook. Students that participated in discussions within Facebook would post a greater number of elaborations and reasons than students that participated in discussions within Twitter. Lastly, students that were provided sentence openers would post a greater number of argument components than students who were not provided sentence openers, regardless of discussion platform.

No research studies were found that evaluated Twitter as a platform for argumentation. In addition, Twitter and Facebook have yet to be compared in terms of effectiveness for promoting argumentation. However, aspects of Twitter and Facebook support these hypotheses, specifically asynchronous and synchronous options as well as character limits.

Chapter 2: Review of Literature and Research

The scientific study of how people learn has evolved from focusing on operant conditioning and memorization techniques to learning with understanding. Striving to uncover the workings of the human mind when it comes to education, has led researchers on a long path from philosophy and theology, to behaviorism and now to cognitive science (for a comprehensive review please refer to Bransford, Brown, & Cocking, 2004). It is important for students not just to memorize facts, but also to make use of the knowledge they gain.

This educational evolution has contributed to the development of new comprehensive ways of understanding and transfer (Bransford et al., 2004). When students enter a classroom they walk in with a prior set of information, beliefs, and skills, which in turn impacts their learning experience. In addition to this prior knowledge, their learning also is impacted by goals, motivation, and the actual environment. Teaching needs to address these factors so that students are provided with the tools to learn.

The following chapter reviews the literature and research on argumentation and collaborative learning. To begin, learning is defined and explained within the context of argumentation. Collaborative argumentation specifically, is reviewed. An overview of how this type of argumentation can be facilitated within the frame of computer-supported collaborative learning and online learning environments is provided. Lastly, the possibility of utilizing social media to support collaborative argumentation in an online learning environment is explored.

Learning

Learning is defined - from a cognitive perspective - as a permanent cognitive change within a learner's knowledge that is due to their experience (Mayer, 2008). By experiencing a situation in which critical thinking and reasoning is required (argumentation), a student is able to

redefine or clarify their knowledge on a particular topic with proper scaffolding (Cho & Jonassen, 2002; Clark & Sampson, 2007). It is important to note that the definition of learning mentioned comes from a cognitive psychology perspective, which seeks to understand how and why instructional procedures influence the learner and their knowledge (Mayer, 2008).

Social cognitive or social learning theory (Bandura, 1971, 1986, 1997, 2001; Bandura & Walters, 1963) adds the important concepts of modeling and motivation to the cognitive psychology perspective. Social cognitive theory outlines three main assumptions to learning: 1) reciprocal interactions among the learner, the learning environment, and the learner's behavior; 2) motivation is a factor, in which learners may not demonstrate what they learn until they are motivated to do so; and lastly, 3) learning is both enactive (learning by doing) and vicarious (learning from models) (Schunk et al., 2014). From this perspective, learners take an active part in their own learning, with new knowledge being constructed from their past knowledge and experiences (Piaget, 1972). A person's learning is situated in experience.

Studying the interaction of a learner's beliefs, goals, and cognition, all developing within a social context, is an important part of education and educational psychology (Bruning et al., 2010). Bruning et al. (2010) outlined several themes relating to learning. While most of the themes address aspects of learning such as acquiring, adapting, and combining new information with existing background knowledge (Bruning et al., 2010), a few themes review aspects that are also integral parts of argumentation.

Bruning et al. (2010) proposed that metacognition (self-awareness and self-regulation), beliefs, and motivation are extremely important for a learner's cognition and mental growth. Researchers have explored the relationship between metacognition and argumentation, having discovered that engaging in and understanding the patterns of argumentation can aid in

developing metacognitive skills (Duschl, Ellenbogen, & Erduran, 1999; Mason & Santi, 1994; Tippet, 2009). People's learning strategies and whether or not they are able to reflect on what and how they learn (metacognition) can impact their beliefs about learning, as well as their motivation. Learning is more than acquiring new knowledge and cognitive skills.

In addition to metacognition, beliefs, and motivation, social interaction (Smagorinsky & Fly, 1993; Vygotsky, 1962; 1978) can help people learn more and differently from when they learn alone. When learners interact with other learners, they have an opportunity to experience perspectives and ideas that may not be the same as their own. These experiences help shape their learning and are more enriching than someone learning alone. Cognitive ability has potential to be shaped by these social interactions (Vygotsky, 1962; 1978). This is not to say that by the nature of working with a peer, a learner will completely benefit from collaboration.

Tudge (1992) determined that to benefit from peer collaboration, a learner should be partnered with someone at an advanced level who is able to incorporate higher level reasoning into the collaboration. Scaffolding is an example of partnering a learner with someone who can assist with higher level reasoning. It provides learners with the support they need to be able to internalize knowledge (Vygotsky, 1962; 1978). This can be in the form of initial support from an instructor with the support gradually lessening until the learner works independently (Bruner, 1975). How a person learns (strategy use, self-regulation, and self-awareness) is contextual. For learners to be a part of their own learning experience, the learning strategies they use need to be used correctly, at the right time, with peers able to engage in higher level reasoning.

While metacognition is essential to learning, without external support, research has shown that students are challenged to engage in self-reflective practice over an extended period of time (Harri-Augstein & Thomas, 1991; Laru, Naykki, & Jarvela, 2012; Xie, Fengfeng, &

Sharma, 2008). Because self-reflective practice requires active participation and effort from the learner, researchers have suggested strategies aimed at support and encouragement (Xie et al., 2008). Two such strategies, also found within argumentation, are journaling and peer feedback.

Both journaling and peer feedback allow learners to externalize thoughts and gain different perspectives on these thoughts, leading to reflection (Laru et al., 2012; Xie et al., 2008). However, the combination of journaling and peer feedback does not necessarily promote self-reflection (Xie et al., 2008). Factors such as the quality of the peer feedback and students censoring their writing when other people are going to read it, can negatively impact the reflection process (Xie et al., 2008).

Argumentation and Learning

When discussing argumentation in regards to learning, Toulmin's (2003, 1958) argumentation model framework has been utilized by many researchers (e.g., Cho & Jonassen, 2002; Erduran, Simon, & Osborne, 2004; Jimenez-Aleixandre, Rodriguez, & Duschl, 2000; Osborne, Erduran, & Simon, 2004). However, other researchers (e.g., Duschl, 2007; Duschl & Ellenbogen, 1999; Nussbaum, 2011) have begun to move towards adopting Walton's framework (2000; 1998; 1989). The reason behind this shift is while Toulmin's (2003; 1958) model provides a guideline to the components of an argument, Walton's (1989; 1996; 1998; 2000) framework, or dialogue theory, is more contemporary and comprehensive. Walton's framework breaks down argumentation into six different types of dialogue. These types of dialogue are further evaluated by argumentation schemes and critical questions attached to each scheme. The resulting critical thinking may lead to a deeper understanding and learning of what is being discussed. The following is a brief overview of each argumentation perspective (for a complete review of these two perspectives, please refer to Nussbaum, 2011).

Toulmin Model of Argumentation

Within the latest edition of Toulmin's (2003) seminal book on argumentation, the preface explains that it was never his intention to develop an analytical model for informal argumentation. In fact, the main purpose of *The Uses of Argument* was to put forth a philosophical criticism of the belief that any argument could be put in a formal format as if a part of Euclidean geometry (Toulmin, 2003). From this criticism came a framework for informal argumentation, which has been applied to the field of education.

The Toulmin Model begins with a series of definitions to explain the basic components of an argument. An argument can consist of six main components: claim, grounds, warrants, qualifiers, backings, and rebuttals (Toulmin, 1958; 2003). A *claim* is an assertion, or statement, about a belief or idea. Evidence, or *grounds* such as facts, is the foundation for the *claim* that is made. *Grounds* are statements or reasons that support the *claim*. An *argument* is when one person contests another person's *claim*. When this happens, the person making the *claim* needs to provide the *grounds* that are the basis of their *claim*. The next step becomes the original person defending their *claim*. If, after this, the *claim* is still challenged, then the person needs to provide propositions (hypothetical statements) that provide an explanation of how/why the *grounds* and *claim* are connected, instead of additional evidence. These propositions are referred to as *warrants*. *Warrants* are an elaboration on the reasoning behind why the person believes their *claim* to be true.

A subtle, yet important distinction exists between *grounds* and *warrants* (Toulmin, 2003). *Grounds* are the foundational information, while *warrants* are an elaboration on the implicit and explicit reasons that lead to the *claim*. Toulmin (2003) provides the following example to illustrate the components of an argument while highlighting the differences among *grounds*,

warrant, and *claim*: Harry was born in Bermuda (*grounds*), since a man born in Bermuda will be a British subject (*warrant*), Harry is a British subject (*claim*) (p. 92).

In addition to *grounds*, a *claim*, and a *warrant*, a *qualifier* can be added. A *qualifier* provides strength and clarification to the *grounds* and *warrant*. With a *qualifier*, the claim is valid only during a specific circumstance. Within the above example, a *qualifier* would be inserted before the *claim*. The statement would then read as follows: Harry was born in Bermuda (*grounds*), since a man born in Bermuda will be a British subject (*warrant*), so, presumably (*qualifier*), Harry is a British subject (*claim*) (Toulmin, 2003, p. 94). Adjoining *qualifiers* are *rebuttals*. A *rebuttal* is a particular condition in which the *warrant* becomes void and the *claim* is not valid. For the example argument, a *rebuttal* would be “unless, he has becomes a naturalized American” (Toulmin, 2003, p. 94). The *rebuttal* provides an instance in which the *claim* is not true. If Harry became an American, then he is no longer a British subject.

While a *qualifier* can provide strength and clarification, the *backing* provides support to the *warrant* by stating why the *warrant* is acceptable (Toulmin, 2003). For the example argument, the *backing* needs to answer the question, why would someone born in Bermuda be considered a British subject. With that answer, the *warrant* is supported and acceptable. While Toulmin’s model (2003; 1958) is analytical and provides the structure of an argument, it is not meant to be descriptive of how people argue or evaluative of how people should argue (Nussbaum, 2011). Walton’s argumentation framework provides that missing evaluative component.

Walton’s Framework of Argumentation

Wherever you find two or more people having a conversation, you have the opportunity of observing argumentative discourse. Argumentation is a part of everyday language. In his

examination of the argument, Walton (1989; 1996; 1998; 2000) describes six basic types of dialogues that are present in conversation: persuasion dialogue, the inquiry, negotiation, information-seeking dialogue, deliberation, and eristic dialogue. Persuasion dialogue is when one person is trying to persuade another person that some particular suggestion is true through the use of arguments that show or prove that it is true (Walton, 1989; 1998). Inquiry dialogue involves a group of people investigating the reasons for some event or phenomenon (Walton, 1989; 1998). Negotiation dialogue involves bargaining, while information-seeking dialogue is when one person has, or appears to have, information that another person wants (Walton, 1989; 1998). Deliberation dialogue is making a decision to solve a problem and lastly, eristic dialogue is a quarrel between two people (Walton, 1998).

Parts of a dialogue. A difference of opinion is what starts a dialogue. From that point the issue is established, which is a set of propositions distinguishing what needs to be proven or disproven by those participating in the dialogue (Walton, 1989). In addition to establishing the issue, Walton (1989) includes a confrontation phase (Eemeren & Grootendorst, 1984) within the dialogue in which participants discuss the rules and goal.

Persuasion dialogue. For the purpose of this dissertation and subsequent study, persuasion dialogue will be discussed in more detail. Through persuasion dialogue, critical thinking is at the forefront in order to persuade a person into agreeing that a proposition is true. Through this process a person's thoughts surrounding the issue are learned. Persuasion dialogue involves a conversation or dialogue between two people that uses arguments to prove that a particular proposition is true (Walton, 1989; 1998). Arguments are used to persuade one person that the proposition is true even though they believe in a different proposition (Walton, 1989; 1998). When the dialogue specifically involves two propositions that are opposite each other

such that one person is trying to convince the other of the truth of a direct opposite, the persuasion dialogue is labeled a dispute or an example of strong opposition (Walton, 1998). An example of this would be, when people take opposite stances on a controversial issue, such as abortion. People can be either pro-life or pro-choice.

While an argument is shaped by the type of dialogue (i.e., persuasion dialogue, inquiry, negotiation, etc.) it is also shaped by what Walton (1996; 2007) refers to as argumentation schemes and critical questions. Type of argumentation dialogue, argumentation schemes, and critical questions make up Walton's (2007) dialogue theory. This theory describes argumentation as a pragmatic, goal-direct activity (Nussbaum & Edwards, 2011; Walton, 2007).

Argumentation schemes or lines of reasoning that support the argument provide a way to further analyze argumentative discourse. A total of 24 argumentation schemes exist, with accompanying critical questions that aim at evaluating the scheme used (Nussbaum, 2011). An example of an argumentation scheme is "argument from sign." For this scheme, a factual observation is the evidence that backs the argument. The accompanying critical questions are: What is the strength of the correlation of the sign with the event signified? And are there other events that would more reliably account for the sign (Nussbaum, 2011, p. 89)?

Critical questions are questions someone should ask pertaining to the argumentation schemes discussed in the particular dialogue (Nussbaum & Edwards, 2011). They are a way of evaluating whether the scheme mentioned is valid. Critical questions create a burden of proof on the person providing the argument. A person must answer the critical questions satisfactorily in order to strengthen their argument (Nussbaum & Edwards, 2011), otherwise the argument is negatively impacted. What is key here is that Walton's (1998; 1996; 1989) framework makes

the distinction that many different types of argumentation can occur in discourse. Along with this distinction, he provides an important way to qualify and analyze argumentative discourse.

Other Argumentation Frameworks

It should be noted that a third argumentation theory exists, albeit utilized more in argumentative discourse analysis than as a framework for learning research. Discourse that contains argumentative statements can be studied and analyzed through the lens of the pragma-dialectical theory of argumentation (van Eemeren & Houtlosser, 1999; van Eemeren & Grootendorst, 1984). The dialectical approach to argumentation is one in which all those involved in the argument have the joint intention of resolving the opposing views (van Eemeren & Grootendorst, 1987).

This part of the theory contends with a standard of reasonableness such that those involved in the argument adhere to a code of sorts aimed at reaching a resolution to any disagreement (van Eemeren & Houtlosser, 1999). The pragmatic part of the theory contends that the argumentative statements made within the discourse are done so within the context of disagreement (van Eemeren & Houtlosser, 1999). At the heart of this theory is the idea that argumentation is composed of a series of linguistic and sometimes non-linguistic acts that have a complex function and are within a specific context led by reason (van Eemeren & Houtlosser, 2003). These linguistic or ‘speech’ acts occur when people that disagree about something are willing to resolve that disagreement (van Eemeren & Houtlosser, 2003).

Combining the pragmatic with the dialectical, results in a theory of argumentation that provides an ideal model for how an argument should occur. This model is referred to as the ‘critical discussion’ and provides a four stage resolution process by which to compare other arguments for analysis (van Eemeren & Houtlosser, 1999; 2003). These stages are

confrontation, opening, argumentation, and concluding (van Eemeren & Houtlosser, 1999; 2003). The aforementioned speech acts are a part of each stage of every critical discussion (van Eemeren & Houtlosser, 2003).

What is important to note is that the pragma-dialectical approach to argumentative discourse analysis has been applied to data collected from online discussion forums and newspaper articles/‘letters to the editor’, with moderate success (Morasso, 2012; Richardson, 2001; van den Hoven, 2011). Although this theory and model for argumentation does not follow what would be expected to use for analysis of an argumentative discussion, it is interesting to see that researchers have been able to apply this approach to different areas and types of data (van den Hoven, 2011).

Argumentation and Conceptual Understanding

Through argumentation it is possible to promote conceptual understanding for a learner, which leads to a deeper understanding of a topic and subsequent knowledge reconstruction (Nussbaum, 2008). Posner, Strike, Hewson, and Gertzog (1982) mention that most theories of conceptual change contain some form of the following two phases: assimilation and accommodation, (based on Piaget’s work, 1929; 1974). Assimilation occurs when people utilize their existing knowledge to interpret new information and this new information is then integrated into the existing knowledge. Accommodation is the more radical and less common phase of conceptual change, in which an individual’s existing knowledge is in conflict with the new information, and the conflict causes the individual to replace or restructure their existing knowledge with the new information, thus undergoing conceptual change. For conceptual change to occur, it is not enough for the new information to be integrated into the existing knowledge. This could lead to the new information integrating with existing misconceptions and

exasperating the issue. Conceptual change requires that the existing knowledge be replaced or restructured with the new knowledge. To promote the conflict that is required within accommodation, or true conceptual change, argumentation can be utilized as a catalyst.

In Nussbaum and Sinatra (2003), the case is built for argumentation being an excellent promoter of conceptual engagement, which in turn may lead to conceptual change. The idea is similar in Asterhan and Schwarz (2007), where a case is built for argumentation as a promoter of conceptual understanding. Two studies were conducted, with a total of 86 undergraduate students in the first study and 44 undergraduate students in the second study. Students participated to determine the effect of argumentation on conceptual understanding of evolution. In the first study, results showed those students that engaged in dialectical argumentation with a peer had greater gains in conceptual understanding than the control group. In the second study, results showed those students that engaged in dialectical monological argumentation on their own and then based on another person's work, had greater gains in conceptual understanding than the control group.

Another study that supports the argumentation and conceptual change connection is Yeh and She (2010). Researchers developed two online scientific learning environments, one with an argumentation focus and one without, for 140 eighth grade students to use. The results of their study determined that a learning environment with an argumentation focus appeared to be more effective in promoting conceptual change than a learning environment without. Yeh and She (2010) state, "that it is possible to promote students' conceptual change through strongly theory-based argumentation" (p. 600). It is important to note that utilizing argumentation can be successful if a focus is not only on the student but also on the environment that impacts that student.

Instructional Technology

Studying an instructor's resources for teaching as well as the process of how the resources were designed, developed, and evaluated is a field of education referred to as instructional technology (Richey & Seels, 1994). Within instructional technology is a focus on instruction as well as learning, and the use of technology in education (Richey & Seels, 1994). How an instructor teaches a lesson, what media they use to supplement what they are teaching or the medium used to present the information is important. By paying attention to these aspects of instruction along with how they impact the learner, researchers can determine how best to promote learning and with that, in some cases, incorporate argumentation to do so.

When an instructor uses both words and pictures to present information, they are engaging in multimedia instruction (Mayer, 2005a). Within this definition, words refer to written or spoken text and pictures refer to anything from photos to video (Mayer, 2005a). The rationale behind this type of instruction is that under the right circumstances, students are able to experience deeper learning from multimedia instruction than from just words (Fletcher & Tobias, 2005). This is different from the traditional form of teaching, which is the instructor lecturing and providing the students with books to read. However, since computer technology has advanced, more options exist for instructors and students when it comes to presenting information (Mayer, 2005a).

Current trends in instructional technology and multimedia have started focusing on student interest. New and evolving web-based applications have been developed which, in addition to being free, provide instructors with capabilities such as collaboration when editing student work, videoconferencing with other instructors or classes, and updating the way online discussions are held (Schachter, 2011). Instructors teaching students as young as third-graders

are using applications such as Edmodo and Twitter to facilitate online discussions ranging from continuing classroom conversations to expressing ideas/feelings about educational experiences (Schachter, 2011). Edmodo is a web-based program with similar attributes to Facebook, which provides instructors and students alike with ways to upload content such as text, pictures, video, etc. synchronously and asynchronously (Schachter, 2011).

Through educational psychology and instructional technology, researchers and instructors are able to focus on the learner and design instruction in such a way that a deeper understanding of the information presented occurs. Mayer (2003) defines deeper learning or understanding as learning that leads to problem-solving transfer. It is important for students to not just take in information but also be able to apply that information to different situations.

Collaborative Argumentation

Argumentation provides instructors with a way to promote conceptual understanding for a learner, which then leads to a deeper understanding and subsequent knowledge reconstruction (Nussbaum, 2008). It is a tool that promotes critical thinking as well as providing students with the necessary academic discourse they need to be able to understand complex topics (Veerman, Andriessen, & Kanselaar, 2002). Collaborative argumentation involves students working together to construct and critique arguments and involves, evaluating ideas presented, forming alternative opinions, and connecting information (Golanics & Nussbaum, 2008). Computer-supported collaborative argumentation consists of students engaging in collaborative argumentation within an online learning environment. This combination of argumentation with computer-supported collaborative learning allows for the study of instructional methods and resources that promote better argument construction among students during discussions online (Andriessen, Baker, & Suthers, 2003; Cho & Jonassen, 2002; Golanics & Nussbaum, 2008).

While this educational approach is known by many names, Argumentation-Based Computer Supported Collaborative Learning, Computer-Supported Collaborative Argumentation, Argumentative Computer-Supported Collaborative Learning (Noroozi, Weinberger, Biemans, Mulder, & Chizari, 2012) to name a few, the premise of each is the same. The goal of this approach is to have students build, consider, clarify, and weigh arguments which they can support and ultimately use to understand ill-structured, complex problems (Alexiandre-Jimenez, 2007; Cho & Jonassen, 2002; Noroozi et al., 2012). The following is a review of literature aimed at computer-supported collaborative argumentation and possible research avenues.

Computer-Supported Collaborative Learning

Computer-supported collaborative learning (CSCL) allows for students to engage in learning experiences not previously faced (Fisher et al., 2013). With roots based in the sociocultural theory of Vygotsky (1962; 1978), this emergent branch of education is concerned with the way students learn by interacting with each other and technology, along with sharing knowledge (Lipponen, 2002; Stahl, Koschmann, & Suthers, 2006). Often associated with e-learning, CSCL goes beyond simply interacting with a computer or learning online (Stahl et al., 2006). The main focus is on collaboration, whether it is face-to-face or online and synchronous (instantaneous) or asynchronous (time-delayed). With CSCL, learning takes place because of the interactions students have with each other. Students have an opportunity to see how others are learning, ask questions of one another, and even teach each other, all through the aid of technology (Stahl et al., 2006).

Scaffolding and Computer-Supported Collaborative Learning

With CSCL, collaborative learning experiences occur through the mediated use of scaffolding tools (Vygotsky, 1978) such as online discussion groups, chat, etc. (Lazonder et al., 2003). Students require guidance to develop interaction skills regardless of whether it is a face-to-face classroom or online (Lazonder et al., 2003; Soller, 2001). Depending on the type of online discussions students are having, either asynchronous (time-delayed) or synchronous (instantaneous), researchers have investigated different enhancements to CSCL tools, as well as scaffolding, to promote better and more effective online discussions.

Two types of scaffolding occur in regards to collaborative learning: (a) providing support on a conceptual or content level, and (b) providing support on the process of interaction among collaborators (Kollar, Fischer, & Hesse, 2006). Content-related or conceptual scaffolds provide conceptual support to learners and are related to the topic or task at-hand. Providing learners with prompts or questions that guide them towards a discussion would be an example of this type of scaffold (Kollar et al., 2006). Interaction scaffolds involve guiding learners toward collaboration by providing specific and different roles for the learners, as well as activities related to the topic or task at-hand (Kollar et al., 2006).

One of the most important aspects of collaborative learning is the subsequent peer interaction and elaboration that occurs. This peer interaction has a significant effect on the learning process. When students provide an explanation to others, the action requires them to organize their thoughts; by clarifying and restructuring the information so it is clear to the other person (Lazonder, Wilhelm, & Ootes, 2003). In addition, collaborative learning can involve a co-construction of knowledge that comes from argumentative discussions (Lazonder et al., 2003). When students are able to clarify, restructure their thoughts, and even participate in

argumentative discourse, the quality of learning increases (Golanics & Nussbaum, 2008). The issue is that without scaffolding (i.e., teacher instruction, training, explicit directions), many students are lacking these important interaction skills (Chan, 2001; Lazonder et al., 2003; Okada & Simon, 1997). Voss and Means (1991) define these interaction skills as argumentation skills that are based on reasoning. For a student to be a good “reasoner,” and therefore possess these argumentation skills, he or she must be able to do the following: develop arguments with supporting evidence, state and refute counterarguments or modify initial argument, qualify the argument, provide interrelated arguments, and be persuasive based on the argument (Voss & Means, 1991).

Script Theory of Guidance

When students encounter an experience through CSCL, they participate in an internal collaboration script (Fisher et al., 2013). This script is what guides a student through the collaborative experience. An internal collaboration script consists of the different knowledge components that allow the comprehension and execution of the action the student will perform (Fisher et al., 2013). If the student is faced with a new CSCL experience, then there also is a need for an external collaboration script. This script is presented to the student through an external source, such as an instructor, and represents the CSCL experience in a textual or graphical way (Fisher et al., 2013). The external collaboration script influences the student’s internal script, so that together they shape the CSCL experience.

The script theory of guidance explains how internal collaboration scripts shape the CSCL experience through the influence of external collaboration scripts (Fisher et al., 2013). This theory describes seven principles and the four components of internal and external collaboration

scripts. Four components make up collaboration scripts: play, scene, role, and scriptlet, which are based on Schank's (1999) theory of dynamic memory.

The role component consists of different activities the student will take to perform the collaborative action (Fisher et al., 2013). This component combines with the scene component to describe the situation in which the student will perform the activities. The play component is the action the student will be performing. Lastly, the scriptlet component organizes the different activities the student will perform within the scene (Fisher et al., 2013). Script theory of guidance stresses these four components as flexible guides that change with every collaborative experience the student comes across (Fisher et al., 2013).

Seven principles surround the script theory of guidance (Fisher et al., 2013). If a student participates in a CSCL experience, their actions are guided by an internal collaboration script, which is composed of the ideas behind play, scene, role, and scriptlet (Principle 1). The student's goals and state of mind influence the internal collaboration script (Principle 2). Coming across a new CSCL experience allows the student to modify their existing internal collaboration script into more robust components that accommodate the experience, especially if the existing script is unsuccessful (Principles 3 and 4). If the CSCL experience requires the transfer of application knowledge then the knowledge is better learned through the CSCL experience (Principle 5). An external collaboration script allows the student to go through the CSCL experience with more information and capabilities than if the student only had their internal collaboration script available (Principle 6).

One issue with this line of research has been that there is no way of determining when a student's internal collaboration script is enough to guide them through the CSCL experience and when it is necessary that an external collaboration script be involved. If an internal collaboration

script is adequate, providing an external collaboration script for the CSCL experience could actually increase cognitive load and be disruptive. The external collaboration script is meant to support the existing components of a student's internal collaboration script (Principle 7). It is important to note that a person's internal collaboration script is not a set cognitive structure. Instead it is flexible in that, for any situation a person will have a different internal collaboration script (Fisher et al., 2013). Since an external collaboration script is presented to a student through an external source in a graphical or textual way (Fisher et al., 2013), options exist for the instructor to provide a script.

Scaffolding and Scripting Methods

Example-based learning (drawing from both cognitive and social-cognitive research) has been determined to be effective for learning a wide range of tasks and/or skills (van Gog & Rummel, 2010). Two main types of example-based learning are: worked examples and modeling examples. Worked examples involve providing students with a written and completely worked out solution to whatever problem or question the student is studying (van Gog & Rummel, 2010). Modeling examples involve providing students with an opportunity to observe another person completing whatever problem or question the student is studying (van Gog & Rummel, 2010).

Schworm and Renkl (2007) discuss another type of example-based learning called self-explaining examples. Within this type of learning, a student is provided a worked example of a problem to which, while studying it, they self-explain the principles behind how the solution to the problem was reached. While this self-explaining leads to more successful learners, there is an issue in that most students do not self-explain in an active and effortful way to illicit that success and deeper learning (Renkl, 1997). Schworm and Renkl (2007) determined that an

effective way of leading students to engage in proper self-explanation is by providing prompts. This prompting method was used to teach students how to engage in argumentation. The prompts were successful in aiding students to learn declarative knowledge about argumentation (Schworm & Renkl, 2007).

Another type of prompt that has shown some success in improving students' arguments has been sentence openers. Sentence openers are predetermined sentence fragments that a student may choose and then add their own ending (Lazonder et al., 2003). The idea is that sentence openers can improve the quality and dialogue surrounding a student's argument, which will then lead to a better learning experience (Yiong-Hwee & Churchill, 2007). In addition, these prompts have been shown to encourage students to contemplate different viewpoints, specifically in an online environment (Nussbaum, Hartley, Sinatra, Reynolds, & Bendixen, 2004). The ultimate goal is to promote collaborative learning. Yiong-Hwee and Churchill (2007) developed a list of 29 sentence openers that support argumentation in an online learning environment. The sentence openers are grouped into six types. For example, "An improvement to the suggestion..." is a sentence opener characterized under the 'Probe Reasons' group. In general, sentence openers are meant to facilitate the use of interaction skills by improving the quality of discourse, which would then promote learning (Lazonder et al., 2003).

However a successful CSCL experience is facilitated (through the use of sentence openers), attention also needs to be focused on the online learning environment. The theories surrounding multimedia learning (Mayer, 2005a) dictate that certain aspects of instructional design (e.g., cognitive load) can impact the effectiveness of the environment and the learner's ability to process the information presented. Some scaffolds meant to aid learning can unintentionally increase cognitive load as students learn about and master the scaffold.

Online Discussions

For those researchers in favor of online discussions, the claim is that these types of discussions are more in-depth and can lead to more thoughtful learning than discussions within a traditional face-to-face format (Gao & Putman, 2009). However, just as there has been research in favor of online discussions (Anderson, 1996), there has also been research that has found issue with it, concerning deficiencies in learner to learner interaction and learner to content interaction (Collison, Elbaum, Haavind, & Tinker, 2000; Gunawardena, Lowe, & Anderson, 1997; Larson & Keiper, 2002).

Asynchronous vs. Synchronous Format

Online learning environments offer a range of instructional features that can facilitate interaction among participants leading to collaboration, as well as ways to share information (Clark, Sampson, Weinberger, & Erkens, 2007). One such feature is providing either an asynchronous or synchronous format for discussion. With an asynchronous discussion, there is a time-lag. Students are able to take their time to construct a thoughtful response and then post their comment. The posting is not read by other students at that moment. With a synchronous discussion, the response is instantaneous. All students involved in the discussion are able to post and respond to comments as soon as they are visible. This makes the flow of the discussion constantly moving. While initially preferring asynchronous discussions to synchronous due to the fact that a flexible schedule is associated as well as more time to think about a response, Levin, He, and Robbins (2006) determined that once exposed to both formats, students actually prefer synchronous discussions. Students enjoy having immediate feedback and appreciate that the discussion takes on more of 'real conversation' attributes (Levin et al., 2006).

This research coincides well with two major pitfalls Kreijns, Kirschner, and Jochems (2003) determined surround asynchronous online discussions. They noted an assumption that because evolving technology allows for social interaction, that it will exist among participants in an online discussion. This assumption is essentially saying if you provide someone with the tools to do something, then they will do it and know how to do so correctly. However, providing an option for something to occur does not mean that it automatically takes place (Kreijns et al., 2003).

In actuality, instances happen in which the social interaction within an asynchronous online discussion is minimal, if at all existent. In addition to this assumption, the overall focus of the social interaction is an issue. Especially for educational purposes, a tendency occurs to restrict social interaction to only existing within the confines of executing the required learning task. However, for social interaction to aid the learning process and lead to collaboration, students need to experience a sense of belonging and trust (Kreijns et al., 2003; Rourke, 2000). What this means is that online social interaction needs to move past the learning task or educational purpose, much like it does in a face-to-face learning environment.

Whether the online learning environment is a Blackboard system through a university or an actual environment created for a purpose like tutoring (e.g., 4MALITY – Maloy, Edwards, & Anderson, 2010), the goals are still to provide students with an environment that will facilitate meaningful discussions, provide information in a thoughtful way for cognitive processes to work at their best, and promote collaboration among the students involved. In order to meet some of these goals and share information, online learning environments have features that allow students to share text documents, concept maps, and other intellectual artifacts (Clark, et al., 2007).

However, options exist that move past Blackboard university systems and tutoring environments in terms of general popularity and technology, but are still competitive in meeting learner educational goals. One unlikely option is through social media websites.

Social Media

The term ‘social media’ is used to refer to user-driven websites and services that allow for digital media sharing (Agichtein, Castillo, Donato, Gionis, & Mishne, 2008; Halpern & Gibbs, 2013). This umbrella term includes blogs, social networking (e.g., Facebook and LinkedIn), and microblogging websites (e.g., Twitter). The advent of what is known as social media actually began in the late 1970’s with the creation of a worldwide discussion system called Usenet that allowed for public messages to be posted (Kaplan & Haenlein, 2010).

Technology and creativity has evolved a great deal from that initial discussion system. Currently, social media is defined as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content” (Kaplan & Haenlein, 2010, p. 61). Web 2.0 refers to a different way in which users and software developers are utilizing the World Wide Web; a push away from only a select few people creating and publishing content to a gradual collaboration and evolving modification of content by anyone (Kaplan & Haenlein, 2010). This idea of anyone being able to create and modify content is behind the term User Generated Content, which is used to describe all different types of content that is publicly available to users (Kaplan & Haenlein, 2010).

With online media content available to anyone for the purposes of creating and sharing, there has been a boom in social media websites. This brings forth different opportunities of

incorporating popular social media websites into classrooms through online learning environments. Specifically, Facebook and Twitter could be viable options.

Facebook

Facebook is an online information sharing network that allows users to connect with others and disseminate different media content. The website started in February of 2004 as a way for college students to connect with other college students from their own school as well as other schools around the country (Facebook, 2013). This ‘connection’ took the form of sending messages to other users, posting media content on a personal page or someone else’s, “liking” someone’s posting, and “poking” someone as an introduction or flirtation. To fully be able to interact with someone on the website, the user needed (and still does, depending on privacy settings) to send out a ‘friend request.’ Once a friend request is accepted, the users’ pages are open to each other. As years past, Facebook evolved into the huge powerhouse it is today, open to everyone and anyone, with over one billion active users.

Basics of Facebook

The main way for users to express themselves and share media content on Facebook is through their personal ‘page.’ On a personal page users describes themselves by listing out the college they attended (or where they are attending), where they work, their age, birthday, marital or relationship status, their likes, favorite things, etc. Users are able to “like” a business’ page which will link to the user’s page and show up as something that the user supports, whether it is a business, a musical group/band, a product, etc. In addition to all of this background information, users are able to post a ‘status update.’ This is a posting that the user makes about whatever comes to mind and appears on the personal page as well as other users’ newsfeed. The status update can include a picture, video, text, or a link to another webpage. The newsfeed is a

list of user status updates that appear in the order of the most recent at the top of the page. A user's newsfeed is comprised of only those statuses of people they are 'friends' with on Facebook.

To become friends with someone and allow them access to a personal page, a user must send or accept a friend request. An option of 'unfriending' someone exists if a user no longer wants someone to have access to the user's personal page. A step further in denying access to a personal page is 'blocking' someone, in which the user will then not come up in any name searches. With 'blocking' the option of ever 'friending' that user is removed. Just as in real-life, people have some friends who are closer than others, work friends with whom you may not want to share much, and acquaintances with whom, for some reason or another you have to be friendly. Facebook offers the opportunity of grouping other users into specific groups that have complete or limited access to your personal page.

Affordances of Facebook

The affordances of an environment are what is offered or provided by that environment that enables certain actions. (Gibson, 1977). In the case of Facebook, certain attributes make the social media website a potentially good platform for integration into a classroom, and specifically with argumentative discussions. The first attribute is the fact that Facebook allows the creation of personal pages, with the option of making them completely private. Teachers can essentially create a Facebook page specifically for the class that they are teaching. They can include all the pertinent information about the class, then only friend the students who are enrolled in the class and have the page private to anyone else. In this way, the students have their own online learning environment that will complement anything done face-to-face, with the information also accessible through a platform that many are already using daily. This affords

the teacher and students the opportunity of another way of connecting and interacting in addition to the face-to-face contact in the classroom.

A second attribute is the option of posting status updates. Because no word limit exists on what a person can post, this affords the user the ability to elaborate their points. This is particularly important when engaging in argumentation. Elaboration leads to richer discussion and deeper learning. These postings can be posted to the classroom page, as a comment to something another student posted, or as a private message.

In addition to posting, a third attribute of Facebook is the 'like' button. The user is able to click the 'like' button on another user's comment or status update, which then appears as a thumbs-up symbol under what was posted. This signifies that the user agrees with and/or likes what has been posted. This affords the user the luxury of not having to write out that they agree or like something and can simply respond by clicking a button. This attribute becomes especially important during an argumentative discussion. Usually when students are engaging in online discussion, they have a tendency to just write that they agree with what another student has written or that they really liked it and had not thought of it that way (Marttunen, 1998). This is not conducive to furthering the discussion or actually writing out an argument. With the 'like' button as an option, a teacher can instruct the students to not write these comments out but to simply click the button if they so choose and then actually write a response that furthers the discussion.

The fourth and last attribute is the chat option. Users are able to see when other users (friends) are also online. They can then send them instant chat messages. This can afford a teacher the chance of offering either asynchronous (status update/posting) or synchronous (chat) discussions. Both options provide different opportunities for the teacher and students.

Facebook in the Classroom

It should be of no surprise, with its popularity, that Facebook has begun to find its way into the classroom. Facebook can provide pedagogical advantages to both teachers and students. The first and possibly most important advantage is that Facebook has the potential to take a first step in creating an online learning community, by connecting students with other students (Munoz & Towner, 2009). In addition, Facebook can increase teacher-student interactions, as well as the student-student interactions, through different forms of online communications (postings, chat, private messages, etc.) (Munoz & Towner, 2009). Students who utilize Facebook to contact or interact with their instructor are also more likely to collaborate around classroom activities through Facebook (Lampe, Wohn, Vitak, Ellison, & Wash, 2011). These activities include learning about the course and organizing study groups. These initial studies focused on implementing Facebook into a classroom, provide an interesting foundation for utilizing Facebook to promote argumentation in the classroom. Students are already using Facebook to collaborate on other topics as well as interact with other students on different levels. Facebook's popularity, ability to increase interactions with others (Munoz & Towner, 2009), and overall convenience can translate into greater engagement in academic learning environments more so than with Blackboard, or other traditional discussion platforms.

Twitter

Much like Facebook, Twitter is an online information network that allows users to connect to other users in real-time (synchronous) through the dissemination of stories, opinions, ideas, musings, etc. (Twitter, 2013). This information is communicated through tweets, which are statements that users post on the Twitter website of up to 140 characters in length (Twitter, 2013). Although the number of characters allowed in a posting is limited, users are free to attach

pictures, other conversations, links to websites, and even videos to their postings (Twitter, 2013). They may also post multiple tweets if they need to elaborate their arguments in excess of 140 characters.

Before There Was Twitter

The antecedent to microblogging (and the Twitter craze) is blogging. Blogs are personal websites that users create to discuss different topics of their own choosing with the option of other users commenting on what is posted (see Schmierbach & Oeldorf-Hirsch, 2012 for a discussion on blogs and microblogs). No word limit exists on what can be posted for a blog. Users are able to write whatever and how much they would like in addition to adding pictures, videos, and other multimedia to supplement their discussion. From this one outlet for personal expression has emerged microblogging, a mix of instant messaging and blogging that allows what is posted by the user to be viewed in a feed format to which other users can instantaneously reply or comment (Schmierbach & Oeldorf-Hirsch, 2012). With microblogging, the allure of personal expression from blogging and the quick, succinct connection to others from instant messaging is combined. Users are able to reach several users at once with short bursts of information. Whether or not this access to so many people is a positive or negative thing is one question surrounding Twitter.

Twitter's Credibility

Schmierbach and Oeldorf-Hirsch (2012) researched the credibility of information posted on Twitter as well as how Twitter influences perceptions of what is 'tweeted.' Credibility is defined as having three components: trustworthiness, accuracy, and believability from which individuals assess information (Flanagin & Metzger, 2000; Schmierbach & Oeldorf-Hirsch, 2012). What may be surprising to some is that individuals find online content just as or even

more credible than what is found offline (Flanagin & Metzger, 2000; Johnson, Kaye, Richard, & Wong, 2008; Kioussis, 2001; Schmierbach & Oeldorf-Hirsch, 2012). This is not to say that people view all online content as equally credible.

The most important aspect that individuals look at when assessing credibility of online information is the source (Schmierbach & Oeldorf-Hirsch, 2012). This is why an online news source or website is viewed as more credible than a person's blog or other personal website. Schmierbach & Oeldorf-Hirsch (2012) determined this was the case when it came to Twitter. Participants viewed an online news source as more credible than something posted on Twitter. A possible reason for this result is that Twitter has been associated with musings from celebrities and just 'average Joe' Americans (Schmierbach & Oeldorf-Hirsch, 2012). This can also be what makes it so accessible and easy to use. It was also determined that Twitter use is higher than the average of internet use (Schmierbach & Oeldorf-Hirsch, 2012). Twitter may not always be seen as credible, but people are definitely paying attention to it.

Basics of Twitter

Because of this distinctive way of allowing users to mainstream whatever information they deem fit (i.e., tweeting their musings for the masses), Twitter is the main online creator and distributor of what Zappavigna (2011) refers to as 'searchable talk.' This term 'searchable talk' refers to the ability to post whatever thought comes to mind and then have other people search for a related topic and have that posting appear. Whatever is written is out there for everyone to see, search, and comment about. It is rather amazing how from a microblogging service has emerged a type of online discourse that goes beyond traditional linguistic constraints and forms of punctuation (Zappavigna, 2011). This type of discourse is different in that no expectation exists of a reply when someone tweets something (Zappavigna, 2011). Users can simply follow

another user's tweets without having to reply to them. In addition, previously used symbols (@ and #) have been repurposed as indispensable vehicles for communication.

In order to address another user in a tweet, Twitter requires the "@" symbol to be used. This symbol is placed in front of the username that is being addressed in the tweet signifying that what is tweeted is referring to something they tweeted or is addressed to them. This will also allow the tweet to appear on that user's profile page and newsfeed as well as the user who wrote the tweet. For example, "@ILoveTwitter I don't always agree with what you say, but you find a way to make me laugh." In this example the user ILoveTwitter is being addressed in this tweet. This tweet would appear on their newsfeed and profile page. Other users who are following ILoveTwitter will also see this tweet.

Perhaps even more essential than the "@" symbol to communicating on Twitter would be the hashtag (#). This symbol is what allows users to tag certain keywords from their tweet that they deem important and that they believe other people will follow. The hashtag is also another way that allows a user to follow another user. Whatever word or words are placed after the hashtag can then be searched and followed on Twitter. For example, if the user ILoveTwitter tweeted the following, "Springtime in Paris...never going home! #jadoreParis" other users would be able to follow all the tweets with the hashtag phrase #jadoreParis as well as link their own tweets if they added the same hashtag and phrase. This could produce a flurry of tweets on what users love about Paris. If multiple people use this same hashtag and phrase in their tweet, then it also appears on another section of Twitter labeled 'Trends.' This is a list of hashtag phrases and topics that are most popular, at the moment, on Twitter.

The Affordances of Twitter

In addition to the different punctuation, certain affordances of Twitter might make it an asset as a learning platform and tool in a classroom. Twitter is concise, robust, convenient, nonintrusive, and it is able to track students' learning habits (Lowe & Laffey, 2011). Unlike with email or discussion postings where there is not necessarily a limit on the amount a person can write, Twitter limits each tweet to only 140 characters. This constraint forces the user to be concise and truly think about what they want to write. From the perspective of an instructor, this adds an element of ease when it comes to sending out notifications to a class; if it is done through tweets as opposed to traditional email (Lowe & Laffey, 2011).

The robustness of Twitter is most apparent when users tweet links to other websites and videos. A unique feature of Twitter is a cap on URLs. Through Twitter, users can use URL shorteners (<http://bit.ly/> and <http://tinyurl.com/>) to easily link to other websites, videos, etc. online (Lowe & Laffey, 2011). Instead of having to provide a long, cumbersome link, these shorteners allow the user to link to whatever alternative online media they choose, but still conform to the 140 character limit of their tweet.

Another affordance of Twitter is the options of either tweeting content out to the website at large (and whatever followers the user has obtained), tweeting directly to another user by including their name handle (the “@” whatever), or retweeting (clicking on another user's tweet and then clicking on the button that looks like two arrows circling each other) what another user has tweeted in order to specifically respond to that tweet or to add emphasis to what you are tweeting.

This conciseness and robustness blend well with the convenience that Twitter affords. The network can be accessed through a cell phone, iPad/other handheld tablet, laptop, desktop,

etc. and through the regular network website or an app. A user can be tweeting from anywhere and at any time (Lowe & Laffey, 2011), with only the technology they use to access the network holding them back. While this is also true of other social media websites like Facebook, the applications available for each of these websites (for a smartphone, tablet, laptop, etc.) are what determine accessibility and ease of use. It could be argued that the Twitter application is easier to use than the Facebook application, and vice versa.

With all this flexibility that comes with Twitter's ease of accessibility, conciseness, and robustness when it comes to getting your word out there to the masses, it might be surprising that, on a social website where users are able to 'follow' other users, there can also be a high level of being nonintrusive. The uniqueness of Twitter is that there does not have to be any interaction between two or more users (Lowe & Laffey, 2011). A user is able to follow another user's tweets without having to comment on them. While this may also be true of Facebook, unless a user has an open profile without any privacy settings in place, only a "friend" can follow another user, monitoring status updates, and not necessarily commenting. With Twitter, while a user can "follow" another user, they do not have to ask them permission to do so. With Facebook, a user must ask another user and gain permission to be their "friend."

In this same vein, just as Twitter can be made nonintrusive, a way also exists when it comes to students' learning habits, where it would be important to have more information surrounding tweets and what is being posted. Through Twitter's feature of shortening URLs, an instructor could actually track a student's habits surrounding that URL that the teacher provides. Twitter allows the original user that posted the URL to track the number of people that clicked on the link and how many other tweets were started because of it or in response to it (Lowe & Laffey, 2011). If an instructor were to tweet about their course or incorporate Twitter into the

course, this type of tracking would provide them with valuable information. It could even be used as a tool for tracking class participation.

Twitter in the Classroom

Because Twitter is still relatively new, having burst onto the social media scene in 2006, few studies have been conducted that have attempted to implement Twitter within a classroom environment and determine if it is an effective tool at promoting learning. The following is an in-depth review of the studies that have attempted to evaluate Twitter within a classroom.

In a postgraduate marketing course Lowe & Laffey (2010) assessed how Twitter could impact student learning. Eighty students followed the course on Twitter for a total of eight weeks (Lowe & Laffey, 2011). The researchers tweeted information about marking events, contemporary marketing issues, examples of concepts and ideas discussed in class, and issues based on class discussion to facilitate student introspection (Lowe & Laffey, 2011). Lowe and Laffey (2011) strived to analyze the perceptions students have about Twitter as a pedagogical tool.

Semi-structured in-depth interviews were conducted for an hour with those that followed the course on Twitter and those who did not. Although only 10 students were interviewed, a total of five followers and five non-followers, the results determined that the followers did find Twitter useful in relating what they learned in class to real-world examples (Lowe & Laffey, 2011). The non-followers explained that there are some hurdles that Twitter needs to overcome in the sense that people do not always like having to learn or use a new technology and jump from just following someone's tweets to actually tweeting them back (Lowe & Laffey, 2011).

Based on the results of the semi-structured in-depth interviews, Lowe and Laffey (2011) also conducted a follow-up study in which they surveyed all the students who followed the

course on Twitter to determine whether learning outcomes were enhanced. There were a total of 51 followers and non-followers that completed this follow-up survey. The results of this particular survey were surprising in that, although Twitter was found to be a useful and unique supplement for the course, it did not seem to spark any additional interaction between students (Lowe & Laffey, 2011). The students found the tweets about the marketing events and the tweets that related to what was discussed in class useful, but these tweets did not seem to illicit any extra tweeting among the students.

Instead, students were using Twitter as more of a passive communication tool, where there was even a lack of students responding to tweets (Lowe & Laffey, 2011). That being said, two-thirds of the class (80 out of the 123 students) did choose to follow the course on Twitter and participate in some way, which Lowe and Laffey (2011) believe represents interest in Twitter. These results are interesting because it suggests that students were following tweets from the course and appreciated the tweets that related to class material, but they were not keen on participating through Twitter. So why did the students not embrace the opportunity to combine a social-networking pastime with school?

The lack of student interaction could just be a result of the way Twitter was implemented and used within the course. Miners (2010) references a professor at the University of Texas, Dallas who encouraged class participation and interaction through the use of Twitter. They were able to do so by firstly, taking suggestions from the class on how best to implement Twitter and secondly, by having a screen in the class where tweets were shown, which mostly consisted of questions and comments pertaining to the class (Miners, 2010).

In a straightforward study involving a simple Twitter intervention, Blessing, Blessing, and Fleck (2012) determined that those students, who received an informative tweet once a day

concerning the class discussion that day, remembered the topics better throughout the course exams than the control group. Twitter can be used as a classroom tool to reinforce important information. It would be tedious to send out daily reminders of what was discussed in class and eventually the novelty of the technology would wear off for students, however, incorporating a weekly summary or series of tweets could be beneficial.

Junco, Heiberger, and Loken (2011) go beyond Miners' (2010) University of Texas, Dallas example since they conducted a study to determine Twitter's impact on college students' learning and engagement by implementing Twitter into different academic and co-curricular discussions. A total of 125 students participated in their study with 70 students in the experimental group interacting with Twitter. Level of engagement was measured by the National Survey of Student Engagement (Junco, Heiberger, & Loken, 2011). Their results showed students taking full advantage of Twitter to tweet questions about the class and being involved in discussions (Junco, Heiberger, & Loken, 2011). In addition, what was distinctive about these questions was that there were more of them and different types tweeted, than would have generally been asked in a traditional class setting (Junco, Heiberger, & Loken, 2011). It was determined that the experimental group had significantly higher scores on the pre/post of the engagement measure than the control group (Junco, Heiberger, & Loken, 2011).

Implemented in a proper way, Twitter can promote college student engagement. The key component to this study is that Junco, Heiberger, and Loken (2011) utilized Twitter as a tool that stimulated discussions. This, in a way, forced participants to respond with tweets and actually be a part of a discourse. If the tweets were about events or topics covered in class the results may not have been the same; they may have instead resembled those of Lowe and Laffey (2011).

Computer-supported collaborative learning has emerged as a leading way to have students engage in learning experiences that allow them to share knowledge and have meaningful discussions leading to a deeper understanding of information (Lipponen, 2002; Stahl et al., 2006). One way to promote these types of learning experiences is through argumentation (Andriessen et al., 2003; Cho & Jonassen, 2002; Golanics & Nussbaum, 2008). While current and past research has focused on promoting argumentation in an online learning environment such as a Blackboard learning system through a university, there has been a trend in research to turn to social media as an option, utilizing both Facebook (Lampe et al., 2011; Munoz & Towner, 2009) and Twitter (Junco, Heiberger, & Loken, 2011; Lomicka & Lord, 2012). Both platforms have several affordances that lend themselves as viable options for promoting argumentation and rich discussions within a classroom setting. Because students have a tendency, especially in an online setting, to simply agree with other students' viewpoints (Marttunen, 1998), the use of sentence openers within argumentation opportunities will lead to richer discussions (Nussbaum, et al., 2004; Yiong-Hwee & Churchill, 2007). Research is needed for establishing either Facebook or Twitter as an effective platform for collaborative argumentation. Specifically, research is needed to answer the following question: How does a Twitter discussion format compare to a Facebook discussion format in terms of promoting collaborative argumentative discourse?

Research Questions

The aim of the present study was to answer the following questions:

1. What is the difference in the nature of the discourse that is promoted through Twitter in comparison to Facebook?

2. How many arguments will students form within a Twitter discussion format compared to students participating in a Facebook format?
3. How many reasons will students form within a Twitter discussion format compared to students participating in a Facebook format?
4. How many elaborations will students form within a Twitter discussion format compared to students participating in a Facebook format?
5. How many counter-arguments will students form within a Twitter discussion format compared to students participating in a Facebook format?
6. Do sentence openers promote a greater number of arguments, elaborations, reasons, and counter-arguments within online discussions?

Hypotheses

1. Students that participate in discussions within Twitter will post a greater number of arguments than students that participate in discussions within Facebook.
2. Students that participate in discussions within Facebook will post a greater number of reasons than students that participate in discussions within Twitter.
3. Students that participate in discussions within Facebook will post a great number of elaborations than students that participate in discussions within Twitter.
4. Students that participate in discussions within Twitter will post a greater number of counter-arguments than students that participate in discussions within Facebook.

Twitter allows for a synchronous or asynchronous discussion. It is up to the user how quickly they want to respond. The fact that students will be able to monitor other student responses and determine whether they want more time to think about their own comment before they post it, allows for benefits from both synchronous and asynchronous discussions

(Hrastinski, 2008). While Facebook has a synchronous chat feature, it is primarily used as an asynchronous platform when the chat option is not enabled.

The character limit on Twitter also forces a person to be succinct, encouraging one to think about what they are going to post before posting it. The postings will need to be clear and to the point. Within Facebook, there is no character limit, which means a guard for being succinct is not present. However, this lack of character limit is also what makes Facebook a potentially better platform for students to elaborate on their arguments and the reasons for those arguments.

The possible issues with asynchronous discussions (students feel isolated and that they are not part of a learning community, discussions are difficult with a small number of participants, etc.) (Hrastinski, 2008) are not necessarily present within Twitter because of the option of synchronous discussions. Because of this it is hypothesized that students involved in discussions through Twitter will post a greater number of arguments and counter-arguments. However, it is also hypothesized that students involved in discussions through Facebook will post a greater number of elaborations and reasons.

1. Students that are provided sentence openers will post a greater number of arguments, elaborations, reasons, and counter-arguments within online discussions than students that are not provided sentence openers.

While there have been studies that evaluate the benefits of adding sentence openers to communication tools (Bereiter & Scardamalia, 1987; Hewitt & Scardamalia, 1998; McManus & Aiken, 1995), studies on evaluating the learning benefits of sentence openers have been few (Lazonder et al., 2003; Yiong-Hwee & Churchill, 2007). However, what has been determined is that using sentence openers can be an effective way to provide students with support when

constructing arguments within an online learning environment (Yiong-Hwee & Churchill, 2007). Based on these findings, it has been hypothesized that providing students with sentence openers will result in a greater number of arguments, counter-arguments, elaborations, and reasons than with those students not provided sentence openers.

Chapter 3: Methodology

Research Design

This was a quasi-experimental, mixed methods study. Specifically, a sequential explanatory (Creswell, 2003) mixed methods research design was employed. Data were collected throughout a 15-week course. There were four different treatment groups of participants within this study: Twitter/Sentence Openers, Twitter/No Sentence Openers, Facebook/Sentence Openers, and Facebook/No Sentence Openers. Data were collected on number of arguments, number of counter-arguments, number of reasons, and number of elaborations formed within each treatment group.

Appropriateness of the Research Design

To be able to explore the impact social media has on collaborative argumentation in an online course, a specific existing online course offered by the university, that also incorporated collaborative argumentation, was utilized. This course had two sections offered in the same semester, both taught by the same instructor. It was important to have two groups of participants for comparison (Twitter vs. Facebook) but it was also necessary that the groups were learning the same material, during the same semester, by the same instructor to reduce any potential limitations and error. The option of including both comparison groups in each course was explored but deemed not a good option due to the potential to decrease internal validity with participants wanting to use a different social media website than they were assigned and not wanting to complete the study requirements (resentful demoralization), and an increase in number of argument components due to knowledge that one is in a comparison group (compensatory rivalry). Because of this, a quasi-experimental research design was the best fit.

Although each participant was not randomly assigned to either comparison group (Twitter or Facebook); the two courses as a whole were randomly assigned.

With the focus of this study being collaborative argumentation, there was a need to pay particular attention to the argument components being used by participants as well as specifics about the discourse among them. Utilizing methods that were strictly quantitative or qualitative would not have addressed all the different aspects of the data collected. It was important to make sure data were analyzed in different ways. Because of this, in addition to quasi-experimental, a sequential explanatory (Creswell, 2003) mixed methods research design was employed. Specifically, a quantitative analysis was conducted followed by a qualitative analysis which explored in detail aspects of the discourse in each discussion. Ordering the analyses in this way allowed for a broad view of the data that then narrowed to provide more detail.

Participants

Participants of this study were 27 undergraduate university students enrolled in one of two sections of an online introductory Educational Psychology course at a large public Southwestern university. The students were predominantly female (93%, 25) and Caucasian (70.4%, 19). The racial self-identifications were as follows: 70.4% (19) Caucasian; 14.8% (4) Hispanic; 7.4% (2) Asian; and 7.4% (2) Pacific Islander. Recruitment emails, complete with an informed consent form, were sent to each student enrolled in one of two sections of the online introductory Educational Psychology course after the university's institutional research review board approved the study. A total of 54 students received the email, of which 33, across both sections of the course, agreed to participate in the study. Of the 33 participants, 27 completed the required small group discussions. Sample size attrition was due to students either dropping the course or not completing all small group discussions.

Although convenience sampling was used, the selection of the specific courses was purposeful. The Educational Psychology course aimed at preparing students for classroom instruction by studying and evaluating general principles, theories, and recent research evidence within human development, human learning, and human motivation. This course in particular was important because an argumentation requirement was implemented into the course by way of online discussions. This meant that the participants would be exposed to argumentation and how to partake in different types of discourse as part of the course, not requiring an additional component to the study.

Measures

Four instruments were specifically developed for this study. The first instrument, a Pre-Twitter Survey, was a questionnaire developed to determine a participant's previous exposure to and attitude towards Twitter. The questionnaire consisted of the following open-ended questions: Please describe what you know about Twitter; Do you currently have a Twitter account? Why or why not? Define your comfort level with using Twitter; Have you used Twitter before within an educational context? If so, describe the class in which you used it and in what capacity; and What is your opinion on using Twitter in this course for small group discussions?

The second instrument, a Post-Twitter Survey, was a questionnaire used to determine a participant's reactions after they have utilized Twitter in the course. The questionnaire consisted of the following open-ended questions: What are your thoughts on Twitter being a part of this course? What changes would you make to this course on how Twitter is used? and What effect did Twitter have on your participation in this course?

The third instrument, a Pre-Facebook Survey, was a questionnaire used to determine the participant's previous exposure to and attitude towards Facebook. The questionnaire consisted of the following open-ended questions: Please describe what you know about Facebook; Have you used Facebook before within an educational context? If so, describe the class in which you used it and in what capacity; Define your comfort level with using Facebook; and What is your opinion on using Facebook in this course for small group discussions?

The fourth and final instrument, a Post-Facebook Survey, was a questionnaire used to determine a participant's reactions after they have utilized Facebook in the course. The questionnaire consisted of the following open-ended questions: What are your thoughts on Facebook being a part of this course? What changes would you make to this course on how Facebook is used? and What effect did Facebook have on your participation in this course?

In addition to these instruments, a brief form was utilized to obtain demographic information from participants. The form included questions soliciting participants' gender, age, major, ethnic identity, and number of credits taken.

Pilot Study

To ensure the feasibility of utilizing a social media platform for this study, as well as identifying any potential logistical issues, a pilot study was conducted in an online section of the mentioned introductory Educational Psychology course, during a previous semester. Of the course requirements, one small group discussion question was chosen for students to respond to, either through Twitter or Facebook. The option of either social media platform was allowed so that participants could use their existing profiles. A total of twelve students volunteered to participate in the pilot study. Those students participating through Twitter were provided a handle to follow (UNLV_EPY303) and a hashtag that corresponded to the small group

discussion question to include in their tweet (#KenKelly). The discussion question was tweeted and participants responded. Tweets that did not include the hashtag were retweeted by the Twitter handle UNLV_EPY303 to ensure that all participants would be able to search and find all related tweets. Those students participating through Facebook were invited to a private group (UNLV EPY 303). The discussion question was posted to the group page for participants to respond. The pilot study determined that conducting small group discussions on Twitter was possible as long as students were provided instructions on how to follow group members. In addition, students needed to be provided hashtags that corresponded to the discussion questions to make searching for tweets feasible. The discussion on Facebook did not identify any logistical issues. Based on the results of this pilot study, the following procedure was employed.

Procedure

The length of the study was 15 weeks, which was the length of the course. The two sections of the course were randomly assigned to either the Twitter condition or the Facebook condition. In each course, the participants were then randomly assigned to a small group consisting of no more than five students. Participants were asked to complete small group discussions on Twitter or Facebook, depending on their treatment group. In addition, as part of the course, students were required to complete a quality participation in discussion assignment. This assignment, while not analyzed as part of this study, provided students with knowledge about the importance of making concise, organized arguments and counterarguments that they could apply to their discussions. Specifically, students were provided with a rubric that described important components to a quality discussion. Once the assignment was completed, students were provided with feedback on whether rubric requirements were met.

Small group discussions required students to respond to the original instructor posting and then one other student posting. The small group discussions were an existing part of the course, but were not graded. Instead, a participation point system was applied in which the student received one point for responding to both the original instructor posting and one other student posting. The fact that the postings were not graded is particularly important because it addressed potential error in which the grading could have encouraged students to include more argument components than they would have otherwise. The topics of these small group discussions ranged from cooperative learning to classroom management, constructivism, etc.

Social Media Procedure

All participants were required to set up a profile on either Facebook or Twitter, depending on treatment group, if a profile did not already exist. An email was sent to each participant with directions for setting up the appropriate social media profile as well as the mechanics of using that particular format. Each small group was provided with either a group Facebook page or a group Twitter hashtag phrase.

Twitter. The students within the Twitter treatment were provided instructions on how to follow a designated Twitter handle. The Twitter handle UNLV_EPY303 was chosen for this study. Through this handle, the small group discussion questions were tweeted. By following UNLV_EPY303, participants were alerted when the handle tweeted a question or statement. The tweet appeared on participant Twitter feeds. Participants were also asked to follow fellow group members. For example, everyone assigned to Group 1 would follow all Group 1 members as well as UNLV_EPY303. In addition, by following all participants within the Twitter treatment through the UNLV_EPY303 handle, any tweets made by the participants also appeared on the Twitter feed of UNLV_EPY303.

The participants within the Twitter treatment were also asked to tweet two specific hashtag phrases when replying to the instructor tweet or another student tweet. For example, when replying to the small group discussion question surrounding competition in the classroom, participants assigned to Group 2 were asked to include hashtags #comp and #g2 with every tweet. The hashtag #g2 referenced that they were a member of Group 2. The hashtag #comp referenced that they were responding to the small group discussion question surrounding competition in the classroom. This allowed participants within each group to search for responses their group members tweeted about each of the small group discussions.

Facebook. Students within the Facebook treatment were invited to a private group on the social media website. Facebook provides users with an option to create a private group page where members have to be invited to join. The creator of this private group becomes the group administrator which means they alone have access to invite people to the group; this is unless they grant the same access to someone else. To invite someone to a group, the administrator enters the potential member's email address on the group page under an option of 'invite by email.' The potential member then receives an email from Facebook, inviting them to the group. Once a user joins the group, they can see the other members of the group, and create/respond to postings within that group page.

A private group page was created for each of the Facebook course groups. For example, participants in Group 3 were invited to the private group UNLV EPY 303 - Group 3. Participants within the Facebook treatment were able to respond directly to postings, so that postings were nested.

Measures Procedure

In addition to the two comparison groups, participants in both sections of the online Educational Psychology course were randomly assigned by discussion group to either being provided sentence openers or not being provided sentence openers. A modified list of sentence openers from Yiong-Hwee and Churchill (2007) were used in this study (as seen below in Table 1).

Table 1: List of Sentence Openers

<u>Questions</u>	<u>Statements</u>
My question is...	My opinion is...
Do you mean...	An unusual idea is...
Is there...	The indicators/facts supporting my opinion are...
Should...	An improvement to the suggestion...
Can this...	To summarize...
Please clarify...	I am looking from the point of view of...
Please elaborate...	This idea is from...
	This viewpoint is...
	A different viewpoint is...

This list of sentence openers was emailed to each assigned participant through the course online platform (Blackboard). While participants were encouraged to use sentence openers in the email, use of this list was not a course requirement. Participants were only emailed the list of sentence openers once and were not reminded to use the list.

At the start of the course, participants were asked to complete the Demographics Form and the Pre-Twitter Survey (or Pre-Facebook Survey depending on section of course). At the end of the course, participants were asked to complete the Post-Twitter Survey (or Post-Facebook Survey depending on section of course).

Data Analysis

For the purpose of this study, three small group discussions were chosen for quantitative and qualitative analyses. While there were a total of ten small group discussions across four units of study as a part of the course, some discussions were deemed to facilitate more discourse than others. This assertion was determined by instructor opinion (based on previous experience with other sections of the course while administering the same small group discussion questions) and a review of the small group discussion questions and topics by the researcher.

To be able to analyze data across time, it was determined that the best option would be to choose three small group discussion questions at three different time points throughout the course. The time points were at the start, middle, and end of the course. The three small group discussions addressed the topics of learning styles, television violence, and competition in the classroom. Table 2 outlines the three small group discussions used for this study.

Table 2: Overview of Small Group Discussions

<u>Period</u>	<u>Topic</u>	<u>Discussion Question</u>
Start of Course	Learning Styles	<p>Mrs. Thomas is a second grade teacher at New Day Elementary School who prides herself on helping children learn to read. She has recently been instructed by her principal to teach reading using a learning styles approach. Because she considers herself to be a team player, she revised her curriculum accordingly. She administered a learning styles inventory to her class and put her students into groups based on the results. She has each group engage in literacy activities that match their style. Her visual learners are encouraged to use the pictures to guess at words they do not know. Her auditory learners are listening to books on CDs while following along with a copy of the story. Tactile learners are working with magnetic letters to learn to write. Finally, she has her kinesthetic learners acting out the story line of books she reads to them.</p> <p>Is this good educational practice? Should students be groups by “learning style”? Give reasons to support your view.</p>
Middle of Course	TV Violence	<p>Does TV viewing make children more violent? When discussing this question, think about Bandura's concept of observational learning, but also the fact that we don't necessarily copy every model we see. Relate this to the question: Does TV always tend to make children more violent, or only under certain circumstances? As a group, please think of reasons on both sides of the issue.</p>
End of Course	Competition	<p>From a motivational standpoint, is using competition in the classroom a good educational practice? Is competition healthy or detrimental? Some people argue that competition makes learning activities fun and prepares students for the world of work. Others argue that competition is demoralizing for students who always lose and that cooperation is more important in the work world. What do you think?</p>

Quantitative Analysis and Coding

The quantitative analysis of this study included descriptive and nonparametric statistics. For the analysis of the Twitter tweets and Facebook discussion posts, a coding scheme was created. Each tweet and post was examined for presence of a claim, counter-claim, argument, counter-argument, elaboration or reason. A claim was defined as an assertion regarding the main

question under consideration. An argument was defined as a statement possessing both a claim and a reason. A reason provides the rationale or evidence for the claim and an elaboration expanded on that evidence or rationale.

For the purpose of this study, claims and counter-claims were coded separately from arguments and counter-arguments. For this study, each discussion question had one side that was deemed the counter-argument position. For example, for the TV Violence discussion question, an answer stating that viewing TV does not make a child more violent, would be considered a counter-argument position, whereas an answer stating that viewing TV does make a child more violent, would be considered an argument position. An argument (or counter-argument) was coded as such only if a claim was present with an accompanying reason. If a reason was not present, then the statement was coded as a claim. For example, during the learning styles small group discussion, a participant posted the following statement, “I think this is good educational practice because each student is able to learn based off of what suits their learning styles,” which was coded as a claim. The next sentence in the posting was as follows, “Allowing children to learn based off of how they learn best sets them up to better succeed on an assignment for while studying,” which was coded as a reason. Those two statements together (the claim and reason) make up an argument. This particular example produced one count for claim, one count for reason, and one count for argument. Due to the subjective nature of identifying argument components, and to ensure the coding of tweets and postings was appropriate, inter-rater agreement was calculated for each tweet and post.

Total counts were calculated for number of claims, counter-claims, arguments, counter-arguments, reasons, and elaborations. Counts for each argument component were calculated per treatment, per group within each treatment, and per each participant. A Mann-Whitney statistical

test was conducted to determine any differences between Twitter and Facebook participants in terms of the amount of argument components included in each small group discussion. A probability of superiority statistic was also calculated as an effect size measure.

Qualitative Analysis

The qualitative analysis of this study consisted of analyzing the answers to the open-ended Pre/Post Twitter Surveys, Pre/Post Facebook Surveys, discussion tweets, and discussion postings. While not a traditional method, computer-mediated data gathering can be an alternative to face-to-face interviewing in qualitative studies (Marshall & Rossman, 2011). Similar to questions asked in an in-person interview, participants of this study were provided with surveys consisting of only open-ended questions. It should also be noted that for the purpose of this study, the view was there is difficulty in distinguishing between discourse that involves negotiation/persuasion, and argumentation with a dialectical approach (Provis, 2004). The stance of this study was that there is an ever-present persuasive element to argumentation (Provis, 2004), which is in alliance with Walton's (1998) description of persuasion dialogue.

In analyzing the tweets and postings, a content analysis was conducted. Because the focus of this study was on the discourse and argument components within each tweet and posting (across the three small group discussions), a content analysis was the appropriate method to be able to provide detailed information on what and how participants were communicating (Merriam, 2009).

Internal and External Validity

While there were threats to internal and external validity within this study, measures were taken to minimize these threats. For internal validity, because the study was the length of the course, experimental mortality was a threat. There was the possibility of participants becoming

bored with the study, bored with the course, and less motivated to participate in the study due to their grade in the course. For this reason, three small group discussions at three different time points throughout the course were analyzed. By viewing the data across time, a decline in participation or including argument components could be identified. In addition there were participants that did not complete all three small group discussions and other participants that dropped the course and therefore, did not complete the study. Any partial data collected from these participants were excluded from analysis. To be certain that there was no difference between the participants that were excluded and those that completed the study, a Mann-Whitney statistical test was conducted. Results showed that there were no statistically significant differences between the two groups of participants in using argument components within their answers to the first small group discussion question.

Since this was a mixed methods study, it was important to make sure that multiple sources of data were present for the qualitative analysis. Triangulation of the artifacts, researcher-generated documents, and pre/post surveys ensured that the data collected was cross-checked, which helped establish credibility. For example, the researcher-generated documents (participant tweets and posts) were compared to the pre/post surveys each participant completed. The amount of tweets and posts, whether or not the participant completed the minimum requirement (respond to one other group member) or more was compared to comments made about the social media in the pre/post surveys.

For external validity, because participants were not randomly selected, they do not constitute a representative sample of all undergraduate students but are likely representative of preservice teachers at the institution involved (since all preservice teachers are required to take

this course). The course being used has idiosyncratic aspects which other online courses may or may not share, and these aspects could limit the generalizability of the results.

Chapter 4: Results

There was one overarching question that guided this research: How does a Twitter discussion format compare to a Facebook discussion format in terms of promoting collaborative argumentative discourse? To answer this question, data analysis focused on the difference in the amount of arguments, counter-arguments, reasons, and elaborations generated by participants between the two social media platforms, Twitter and Facebook. In addition, the impact of participant use of sentence openers on the amount of argument components was also examined.

Participants and Tweets/Postings

Of the 27 participants, 9 were enrolled in the section of the course that utilized Twitter and 18 were enrolled in the section of the course that utilized Facebook. For each section, participants were divided into five groups, with a total of ten groups across the two sections. For some groups, not all members were participants in this study. The data from those group members was not included. A total of 319 tweets/postings were analyzed. This number includes tweets/postings from both course sections and across the three small group discussion questions. The Twitter section contributed 200 tweets while the Facebook section contributed 119 postings.

It should be noted that to determine this total number of tweets/postings, each tweet was counted separately. However, to determine the existence of argument components within the tweets, the tweets were grouped by a complete thought. For example, if one participant was responding to the learning styles discussion question and their answer required them to post seven tweets, all seven tweets were grouped together to analyze for argument components, as 140 characters would at times not include a complete argument (a claim and reason). Table 3 shows the total count of argument components per social media platform.

Table 3: Count of Argument Components by Social Media Group

	Total	Social Media Group	
		Twitter (N=9)	Facebook (N=18)
Claims	417	92	325
Counter-Claims	38	7	31
Arguments	205	41	164
Counter-Arguments	29	5	24
Reasons	234	46	188
Elaborations	118	21	97

Although there was double the number of participants in the Facebook section, this section also had four times the number of arguments and five times the number of counter-arguments as compared to the Twitter section.

Inter-Rater Agreement

Because of the subjectivity involved in coding for argument components, inter-rater agreement was calculated for each tweet and posting ($n = 319$). According to Stemler (2004), values ranging from 75% to 90% provide an acceptable level of agreement. Table 4 shows the percent agreement per discussion.

Table 1: Inter-rater Agreement per Discussion

	Discussions		
	Learning Styles	TV Violence	Competition
Agreement	387	289	332
Total Components	468	353	399
% Agreement	83%	82%	83%

Argument Components by Group and Discussion

To address uneven group size and the lack of statistical independence within discussion groups, group averages were calculated for argument components within tweets and postings on Twitter and Facebook. Table 5 shows the average of argument components by group and discussion. Table 6 shows the mean ranks of argument components by condition.

Table 2: Average of Argument Components by Group and Discussion

	Discussions											
	Learning Styles				TV Violence				Competition			
	A	CA	R	E	A	CA	R	E	A	CA	R	E
Groups												
F1	2	1	3	1	2	1	3	1	3	0	3	1
F2	4	1	5	3	3	0	3	2	4	0	4	2
F3	3	0	3	1	4	0	4	3	4	0	4	4
F4	3	1	4	4	3	0	3	2	4	0	4	3
F5	3	0	3	1	3	0	3	3	2	0	2	1
T1	1	0	1	1	1	0	1	1	3	0	3	2
T2	2	0	2	0	3	0	3	2	1	0	1	1
T3	2	0	2	0	2	0	2	2	2	3	1	2
T4	1	0	1	0	1	0	1	0	1	0	1	1
T5	0	1	1	0	0	0	0	0	2	0	2	1

Note. A = argument; CA = counter-argument; R = reason; E = elaboration; F = Facebook; T = Twitter.

Table 3: Mean Rank Results by Component, Discussion, and Condition

Component	Discussion Topic	Condition	Mean Rank	Condition	Mean Rank
Argument	Learning Style	Facebook	7.80	Twitter	3.20
Counter-Argument	Learning Style	Facebook	6.50	Twitter	4.50
Reason	Learning Style	Facebook	8.00	Twitter	3.00
Elaboration	Learning Style	Facebook	7.70	Twitter	3.30
Argument	TV Violence	Facebook	7.40	Twitter	3.60
Counter-Argument	TV Violence	Facebook	6.00	Twitter	5.00
Reason	TV Violence	Facebook	7.60	Twitter	3.40
Elaboration	TV Violence	Facebook	7.10	Twitter	3.90
Argument	Competition	Facebook	7.50	Twitter	3.50
Counter-Argument	Competition	Facebook	5.00	Twitter	6.00
Reason	Competition	Facebook	7.60	Twitter	3.40
Elaboration	Competition	Facebook	6.40	Twitter	4.60

Quantitative Analysis Results

This study aimed to answer six research questions. The first research question asked: What is the difference in the nature of the discourse that is promoted through Twitter in comparison to Facebook? This question was answered in conjunction with the sixth research question, through qualitative methods consisting of a content analysis, which will be discussed in the Qualitative Analysis Results section.

Research questions two through five asked how many arguments, reasons, elaborations, and counter-arguments, will students form within a Twitter discussion format compared to students participating in a Facebook format. To answer these research questions, a Mann-Whitney statistical test was conducted to determine the differences between Twitter and Facebook groups in argument components across the three small group discussion questions. Average numbers of arguments, reasons, elaborations, and counter-arguments for each small group discussion were examined.

As detailed below, the results of the test revealed that there was a significant difference in the amount of argument components per discussion between Twitter and Facebook groups, with the Facebook groups including more argument components within their discourse. The Facebook groups included more arguments, reasons, and elaborations within the learning style discussion, more arguments and reasons within the TV violence discussion, and more arguments and reasons within the competition discussion.

It was hypothesized that the Facebook groups would form a greater number of reasons within their discussions due to a greater ability to write more text. This hypothesis was confirmed by the results for all three small group discussions. There was a statistically significant difference in the number of reasons formed by Facebook groups ($n = 5$) compared to the Twitter groups ($n = 5$) across all three small group discussions (for learning styles, $U = .0001$, exact $p = .008$; for TV violence, $U = 2.000$, exact $p = .032$; for competition, $U = 2.000$, exact $p = .032$). It should be noted that the term ‘exact’ in reference to the probability value notes that the probability value was based on an exact table (the values of which are programmed into the SPSS software).

It was also hypothesized that the Facebook groups would form a greater number of elaborations within their discussions. This hypothesis was only partially confirmed by the results. Within the learning style discussion, Facebook groups ($n = 5$) formed a greater number of elaborations than the Twitter groups ($n = 5$), $U = 1.500$, exact $p = 0.16$. Although the Facebook groups did provide more elaborations within the TV violence and competition discussions, the difference in numbers of elaborations for both discussions were not statistically significant between the Facebook and Twitter groups.

While it was postulated that Facebook groups would form a greater number of reasons and elaborations, it was also hypothesized that Twitter groups would form a greater number of arguments and counter-arguments. The rationale being that the Twitter character limit forces a person to be succinct, encouraging one to think about what they are going to tweet before tweeting it. A tweet should be clear and to the point, which creates a good environment to encourage a thoughtful response and the potential for argument components.

These hypotheses however, were not confirmed by the results. There was no statistically significant difference in the number of counter-arguments formed by the Twitter groups as compared to the Facebook groups. There was however a statistically significant difference in the number of arguments formed by the Twitter groups ($n = 5$) as compared to the Facebook groups ($n = 5$) with the Facebook groups posting a greater number of arguments across two of the three small group discussions (for learning styles, $U = 1.000$, exact $p = .016$; for competition, $U = 2.500$, exact $p = .032$). The difference in number of arguments between the Facebook and Twitter groups for the TV Violence small group discussion was close to being statistically significant ($U = 3.000$, exact $p = .056$).

Table 7 shows the results of the Mann-Whitney statistical test with probability values and probability of superiority values for the statistically significant differences in argument components across the three small group discussions. Table 8 shows the statistically non-significant results of the Mann-Whitney test.

Table 4: Results of Mann-Whitney Statistical Test

Component	Discussion Topic	Mann-Whitney (<i>U</i>)	Probability Value (<i>p</i>)	Probability of Superiority (<i>PS</i>)
Argument	Learning Style	1.000	.013	96%
Reason	Learning Style	0.000	.007	99%
Elaboration	Learning Style	1.500	.014	94%
Reason	TV Violence	2.000	.019	92%
Argument	Competition	2.500	.031	90%
Reasons	Competition	2.000	.024	92%

It should be noted that the *U* statistic for the reason component within the Learning Style discussion question was zero. The *U* statistic was zero because all the ranks for Twitter were lower than all the ranks for Facebook. In this case, a result of zero is statistically significant.

Table 5: Non-Significant Results of Mann-Whitney Statistical Test

Component	Discussion Topic	Mann-Whitney (<i>U</i>)	Probability Value (<i>p</i>)	Probability of Superiority (<i>PS</i>)
Counter-Argument	Learning Style	7.50	.310	70%
Argument	TV Violence	3.00	.056	88%
Counter-Argument	TV Violence	10.00	.690	60%
Elaboration	TV Violence	4.50	.095	82%
Counter-Argument	Competition	10.00	.690	60%
Elaboration	Competition	8.00	.421	68%

Qualitative Analysis Results

The sixth research question asked if using sentence openers promotes a greater number of arguments, elaborations, reasons, and counter-arguments within online discussions. There were a total of 27 participants in this study, 15 of which were provided with sentence openers. The sentence openers were randomly assigned to groups in both sections of the course (Twitter and Facebook).

Content Analysis

Of the 15 participants provided with sentence openers, zero actually used the list provided of sentence openers within their discussion tweets/posts. Although no participants utilized the sentence openers provided, variations of these sentence openers were identified throughout the 319 total tweets and postings analyzed. A content analysis was conducted on the total 319 tweets/postings. Table 9 shows the results of the content analysis with each variation of sentence opener present in the tweets/postings corresponding to the originally provided sentence opener.

Table 6: List of Sentence Openers and Variations

<u>Provided Sentence Openers</u>	<u>Variations of Sentence Openers</u>
My opinion is...	In my opinion...
To summarize...	As some of us previously stated...
	In conclusion...
I am looking from the point of view of...	From a motivational standpoint...
	From one standpoint...
	From a negative standpoint...
A different viewpoint is...	On the contrary...
	On the other hand...

Of the 15 participants provided with sentence openers, 7 used variations (47%), with 5 in Facebook groups and 2 in Twitter groups. Of the 12 participants not provided with sentence openers, 4 used variations (33%), with 2 in Facebook groups and 2 in Twitter groups. There was therefore a small qualitative trend for the sentence opener groups to use variations, especially the Facebook group.

In addition to identifying variations of sentence openers used within the discussions, the content analysis also aided in categorizing stative verbs and phrases throughout the tweets/postings that are commonly found in persuasive writing. Stative verbs describe a state of

being as opposed to an action. For example, “I feel” is a state of mind versus “I run” which is an action. These results provided an answer to the first research question which aimed at exploring the difference in the nature of the discourse across both groups. A list of six phrases was compiled. Table 10 shows the list of phrases and counts for each phrase.

Table 7: Results of Content Analysis - List of Phrases and Count

Phrase	Count per Facebook (N=18)	Count per Twitter (N=9)	Total Count
I believe/ do not believe	81	9	90
I feel/I do not feel	36	5	41
I think/I do not think	108	44	152
I agree/I disagree	58	18	76
For example...	11	4	15
If...then...	4	1	5

To provide further detail to these results, a Mann-Whitney statistical test was also conducted to determine the differences between the Twitter and Facebook groups in using the list of phrases identified. The average count of each category was examined. The results of the test revealed that there was a significant difference in the amount of “I believe /do not believe” and “I agree/I disagree” phrases (for “I believe/do not believe,” $U = .0001$, exact $p = .008$; for “I agree/I disagree,” $U = 2.000$, exact $p = .032$) per discussion of Twitter groups and Facebook groups, with the Facebook groups including more of these two phrases within their discussions. In regards to use of the other four phrases, there was no statistically significant difference between the Twitter groups and the Facebook groups. Table 11 shows the results of the Mann-Whitney statistical test with probability values and effect sizes for the statistically significant differences in phrase use.

Table 8: Results of Mann-Whitney Statistical Test - Phrases

Phrase	Probability Value (p)	Probability of Superiority (PS)
“I believe/do not believe”	.009	99%
“I agree/I disagree”	.026	92%

A Mann-Whitney statistical test was also conducted to determine the differences between groups that were provided sentence openers and groups that were not provided sentence openers, in using the list of phrases identified. There was no statistically significant difference in the amount of phrases used by the different groups. Although these statistical tests were conducted using average group counts of each category to reduce error from uneven group sizes and non-independent observations, an analysis was also conducted for the actual counts per Twitter and Facebook to better understand the type of phrases used. Table 12 shows the results of the phrase counts in Table 11 broken down by affirmative and negative of each phrase.

Table 9: Counts of Separated Phrases by Comparison Group

Comparison Group	“I believe”	“I do not believe”	“I agree”	“I disagree”
Twitter (N=9)	7	2	16	1
Facebook (N=18)	75	8	53	2

For all Twitter and Facebook groups, the majority of phrases included in discussions were in the affirmative. For example, participants used the phrase “I believe” more than “I do not believe.”

Pre/Post Survey Results

Of the 27 participants in this study, 9 completed their Pre Survey (5 in Twitter groups and 4 in Facebook groups) and 15 completed their Post Survey (4 in Twitter groups and 11 in Facebook groups). The answers to all surveys were analyzed and coded for themes.

Pre-Survey Twitter. From the Pre-Survey data emerged one main theme: Limitations. All five Twitter participants that completed the Pre-Survey were concerned with the 140 character limit that the website imposes on users. One participant felt that this character limit could negatively impact their work and mentioned, “I don’t like having a limited number of characters to use because it forces me to limit my vocabulary and range of thinking.” Other participants believed “anything worth saying is not going to be with a limited word count,” and “140 characters is hardly enough to write a decent sentence.” Strong feelings concerning Twitter were present with a participant who mentioned, “I rather post in the discussion board and not have so much garbage to sift through just to see other classmates (sic) posts.”

Post-Survey Twitter. From the Post-Survey data emerged one main theme: Functionality. The four Twitter participants that completed the Post-Survey claimed that they were “not comfortable using it as a base for class discussions,” Twitter was “frustrating to use,” and it was “a little confusing and hard to keep track of everyones (sic) discussions.” However, one participant did mention that they thought “Twitter made it easier and faster for me to participate in discussions just because I could send out my tweets while I was out. I liked that it only took me a few moments to put my two cents in.” In addition, one participant provided an alternative idea to utilizing Twitter in the course by “give us the opportunity to not write several posts but to use the media to determine real life situations...like find three things on twitter that can explain authoritative parenting good or something like that...”

Pre-Survey Facebook. From the Pre-Survey data emerged two main themes: Informal-Setting and Privacy. The four participants that completed the Pre-Survey were concerned with the fact that Facebook was “informal.” While they were all “comfortable” using the website, one participant was “unsure of what it can offer” in terms of the course, while another participant felt

that the environment was too comfortable since they “have had an account for the past five years and I went through a stage where I was obsessed with Facebook.” Another participant mentioned that “it [may] make the atmosphere more relaxed. This makes it easier to share my opinions.” Regarding privacy, the participants felt that their previous exposure to this website may provide them with a false sense of security, with one participant explaining, “... [I’m] a little weary about sharing personal anecdotes... [I’m] nervous that the person the anecdote involved would somehow be able to read the post. When you put something out on Facebook it is out there for the world.” Another participant mentioned that while they used Facebook on a daily basis, it was to “share pictures and statuses for friends to see,” not “for an educational context.” The idea of having to post on Facebook for a class “for others to see” was not ideal, “I’m not that comfortable posting, but I will for this class.”

Post-Survey Facebook. From the Post-Survey data emerged two main themes: Convenience and Increased Participation. The 15 participants that completed the Post-Survey were happy with the usability, accessibility, and convenience associated with Facebook. One participant mentioned, “It was very easy to use and convenient since Facebook is accessible from our Smart Phones, so even if I was busy, I could still participate because I had full access from my phone.” Another participant echoed this thought by stating, “Facebook was a convenient for me when I had a discussion due. I could pull Facebook up on my phone and complete the assignment. It was easy to use and I like how accessible [my] group was. I could easily find the group and read my groups responses.” There was an appreciation for the freedom allowed with being able to access the website on a smartphone. One participant explained, “If I’m out an about I could just log onto Facebook to do my posts instead of having to find a computer and click through several links to find somewhere to post online.” In addition, some participants

found that Facebook could alert them to post to a discussion. One participant stated, “I enjoyed being notified when the discussion post went up and when somebody commented on it. It helped me manage my time more efficiently.”

With the accessibility and notifications came the additional result of increased participation. One participant mentioned that the notifications “acted as a reminder to participate and increased my participation.” Another participant stated, “I found that posting on Facebook gave me a sort of illusion that the discussions were not class-rated, which increased my motivation to actually post.” One participant felt Facebook “helped me participate more. I’m very shy and not assertive with my talking, but through these Facebook posts, I was able to post a lot and participate a lot among my group.”

The use of Facebook in the course changed some participant viewpoints with one participant stating, “It was interesting to me that this seemingly trivial social network site could be used in a more serious way.” Another participant mentioned, “Being able to connect with my peers on [a] social networking site made me realize that there is a multitude of ways to connect not only on a personal level, but also on an educational level.”

Chapter 5: Discussion

There were three main objectives of this study: 1) to evaluate Twitter as a viable tool for promoting collaborative argumentation; 2) to determine if scripting through sentence openers promotes a greater number of arguments within an online discussion; and 3) to compare Twitter to Facebook as viable tools for promoting collaborative argumentation. To meet these objectives, the focus of the study was to answer the following overarching question: How does a Twitter discussion format compare to a Facebook discussion format in terms of promoting collaborative argumentative discourse?

Twitter as a Tool

In evaluating Twitter as a viable tool for promoting collaborative argumentation, the findings suggest that Twitter would not be effective in this endeavor. Although error due to different group sizes between the two sections was controlled for through the use of group averages, the Twitter section groups did not utilize more arguments or counterarguments in their discussion tweets than the Facebook groups as was initially hypothesized. In addition, for the other argument components, the Twitter section groups did not utilize more reasons or elaborations than the Facebook section groups.

An evaluation of the pre/post survey results revealed that participants were concerned with the character limit imposed by the platform and felt that it negatively impacted their work. Participants were frustrated with using Twitter for discussions and found it confusion to keep track of what their group members were tweeting. These sentiments were then reflected in the quality and number of tweets per discussion question.

Sentence Openers and Arguments

To answer the research question asking if using sentence openers promotes a greater number of arguments, elaborations, reasons, and counter-arguments within online discussions, a content analysis was conducted. A qualitative trend was discovered with the Facebook section using more variations of the sentence openers than the Twitter section.

Although 15 participants across both course sections were provided sentence openers, zero actually used the list provided within their discussion tweets/posts. The list provided was a modified version of what Yiong-Hwee and Churchill (2007) used with success in their study. Because similar procedures were used as was outlined in Yiong-Hwee and Churchill (2007), participants were emailed the list of sentence openers once and were not reminded to use the list. In addition use of the list was not a course requirement. It is clear that these factors led to no participants using the list because essentially there was no requirement. Another reason could be that the list was emailed through the course platform, Blackboard. Because both sections of the course were online, students could only be emailed through Blackboard. Unfortunately, not all students consistently check messages through the system.

Surprisingly, even though no participants used the list of sentence openers provided, participants still used variations of the sentence openers within their tweets and posts. Of the total participants provided with sentence openers, 47% utilized variations of the sentence openers. Of the total participants not provided with sentence openers, 33% utilized variations of the sentence openers. A qualitative trend was present in which the Facebook section participants utilized more sentence opener variations than the Twitter section participants. However, there was no statistically significant difference in the amount of sentence opener variations used by participants provided with the list and those participants that were not provided with the list.

Although previous research indicates that use of sentence openers promotes argumentation within discussions as part of an online course (Yiong-Hwee & Churchill, 2007), this research does not support this claim. Additional research is needed to which use of sentence openers is a course requirement.

Twitter vs. Facebook

In respect to the research questions regarding how many arguments, reasons, elaborations, and counter-arguments students would form within each social media platform, there was a statistically significant difference between the two sections, with the Facebook section including more arguments and reasons across all three discussion questions. This confirms the hypothesis that the Facebook section would include more reasons in their postings because the social media platform does not have a word or character limit. Users are free to write as much or as little as they choose. In addition, the asynchronicity offered by Facebook would mean that users have the opportunity to think about their posting and take the time to craft a complete answer to each small group discussion question. The fact that the Facebook section also included a statistically significant number of arguments in comparison to the Twitter section shows that the asynchronicity and freedom to write as much as is necessary was beneficial to participants.

Results also showed a statistically significant difference between the two sections in terms of elaborations, with the Facebook section including more elaborations for the Learning Styles small group discussion than the Twitter section. The difference in the number of elaborations for the remaining two small group discussions as well as the difference in the number of counter-arguments across all three discussions was not statistically significant.

Therefore, the hypothesis that there would be more elaborations in Facebook was only partially supported.

Although there was only a statistically significant difference between the two sections with number of elaborations for the first small group discussion, this could be explained by the fact that this question was asked at the start of the course. A plausible explanation could be that in an effort to post a complete and thorough answer to the discussion question, students elaborated on the reasons they provided for their arguments. Alternatively, this result could be explained by the topic of the discussion question. Students could have had more to say about learning styles than the other discussion question topics.

Although it was hypothesized that Twitter participants would use more counter-arguments in their discussions than the Facebook participants, this hypothesis was not confirmed. Instead, it was found that there was no difference in the number of counter-arguments between the two sections. It should be noted that out of all the argument components, counter-arguments had the lowest count across both sections. Counter-arguments are more difficult for people to form. This is especially true within a small group discussion among students. In this case, students are more likely to agree and be complimentary toward each other.

Overall, there was a statistically significant difference in the number of arguments and reasons between the two sections with the Facebook section posting more than the Twitter section. To answer the research question aimed at exploring the difference in the nature of the discourse across both sections of the course, another content analysis was conducted. It was discovered that stative verbs and phrases commonly found in persuasive writing were present throughout participant tweets and postings. A list of six stative verbs and phrases were compiled. There was a statistically significant difference in the amount of “I believe/do not

believe” and “I agree/I disagree” phrases per discussion between the two sections, with the Facebook section including more of these two phrases in postings. This finding is interesting because stative verbs and phrases are commonly found in persuasive writing which corroborates the finding of the Facebook participants posting more arguments.

While the Twitter section participants found their platform frustrating and confusing, the Facebook section participants found their platform comfortable, convenient, and believed it increased their participation. Surprisingly, the main concern Facebook section participants had was privacy. They were weary of the fact that others could potentially read what they posted. This is surprising because the Facebook participants were all grouped in private groups on Facebook. These private groups had their own pages where only the members of the group had access to the page. Each member had to be invited to the group.

Even more surprising, the Twitter participants, who had reason to be weary of privacy, only mentioned that they were concerned with the 140 character limit imposed by Twitter. While there is a character limit on what can be tweeted at one time, there is no limit on the number of tweets a person can send out. Twitter participants had the option of using several tweets to answer a discussion question. This however led to frustration with the participants.

Based on these findings, Facebook appears to be a more viable option as a tool for promoting collaborative argumentation. Participants within this section posted more arguments, utilized more stative verbs and phrases, and appreciated the affordances of the platform such as accessibility and notifications when a question was posted and others responded. This appreciation led participants to also believe that use of Facebook in the course increased their participation. In some participants, a change in viewpoints was reported where initial skepticism

in using a social media website within an educational context was replaced with a belief that the website would positively contribute to their success in the course.

Theoretical Implications

According to Fisher et al. (2013), internal collaboration scripts shape a student's computer-supported collaborative learning (CSCL) experience through the influence of external collaboration scripts. For the purpose of this study, the CSCL experience students engaged in was completing small group discussion questions within either Twitter or Facebook. Half of the participants of this study were provided with sentence openers, which represented their external collaboration scripts. Results showed that none of the students provided with sentence openers actually used them (although it was noted that some participants did use variations of the sentence openers provided).

There are potential reasons for this lack of use of sentence openers. Firstly, it could be that the students possessed a sufficient internal collaboration script to not require the influence of an external script. Because the course used for this study was an upper level undergraduate course, more than likely, students enrolled in this course had previous experience with small group discussions, which could mean that they did not need guidance in how to respond to the questions asked or how to respond to other students.

Secondly, an important aspect of all CSCL experiences, regardless of how the experiences are facilitated (through sentence openers, for example), is the online learning environment. The environment impacts a student's ability to process information. At times scaffolds can unintentionally increase cognitive load (Mayer, 2005a). It could be that as students were mastering the new small group discussion environments (Twitter and Facebook), remembering to utilize the sentence opener's increased cognitive load. While all participants had

knowledge of both social media websites, none of the participants had experience using the websites in an educational setting.

It is difficult to transition from using an environment a certain way to a different way not previously experienced. This could be a reason why students responded to the small group discussion questions and their peers as they normally would (without sentence openers) when the discussions are available in a more common online learning environment (WebCampus). An example of this would also be how Twitter offers the affordance of synchronous and asynchronous formats for discussion. Usually small group discussions for a course are conducted in an asynchronous format. Although the option for synchronous chat was available through Twitter, none of the participants took advantage of this affordance. This is interesting since research has shown students prefer synchronous discussions (Levin et al., 2006). It could be that students were not sufficiently aware of this affordance and therefore how to use Twitter synchronously needs to be modelled for them. Alternatively, it is possible that some students were aware of the affordance but did not take advantage of it because of scheduling issues.

Educational Implications

Although Twitter would not be a viable tool to promote collaborative argumentation, the findings from this study suggest that Facebook would be a good option. The educational implication from these findings is important. With the option to incorporate a popular social media website into a course, instructors are provided with a way to increase participation and equip students with a convenient way to complete online discussions or even assignments. The affordances of the website allow for accessibility through smartphones, tablets, laptops, etc., notifications of when a question/assignment has been posted and whether students have started responding/submitting, and privacy. Instructors do not have to worry about people outside of the

course gaining access to materials, postings, etc. Facebook allows for private groups to be created with pages only visible to invited members. This creates a space specifically for the course that could be an extension of what is already offered in person or online through whatever platform (Blackboard, for example) is currently being used.

Limitations and Future Research

This study was a quasi-experimental design which has selection threats to internal validity (if there were demographic differences between the two classes, or differences in prior technology use). However, both of these threats were addressed. An analysis of the demographic information of participants in both sections of the course revealed that there was no statistically significant difference between both sections as the majority of participants were Caucasian females. In addition, the pre-tests administered to both sections concerning previous knowledge of Twitter or Facebook determined that all participants had knowledge of their section's social media website. No participants had used a social media website in an educational setting. There could of course have been differences between the two groups on variables that were not measured, but there is also no reason to suspect there were systematic differences.

Differential attrition was a limitation because it is unknown whether the participants that did not complete all three small group discussions did so because of the course, the study, or the social media website. However, a Mann-Whitney statistical test was conducted between the group of participants that did not complete all three small group discussions and the group of participants that did. It was determined that there was no statistically significant difference between the two groups in the number of argument components utilized within their answers to the first small group discussion question.

In regards to external validity, the use of a convenience sample limited generalizability. The majority of participants were Caucasian, females within the College of Education. In addition, while the study compared two innovative social media platforms it did not include traditional Blackboard discussions.

In terms of future research, another study should be conducted making the use of sentence openers mandatory to investigate the impact the use has on argumentative discourse within social media. Previous research has shown sentence openers having a positive impact on argumentative discourse in an online course (Yiong-Hwee & Churchill, 2007). If continuing analysis of the current data, it would also be useful to complete a content analysis examining the argument components and overall discussion postings/tweets to determine if there was a difference in the concept facets discussed (Hunt & Minstrell, 1994).

In addition, further research should be conducted on the different options Facebook would allow for a face-to face course versus an online course. For example, which type of course would benefit most from the affordances of Facebook? Would the face-to-face course utilize the chat feature to engage in synchronous discussions? Could the private messaging feature of Facebook be used to submit assignments to instructors within an online course? It would also be interesting to conduct a similar study to the current study that compares Facebook to a traditional online learning environment such as Blackboard.

Closing Remarks

The aim of this study was to evaluate Twitter and Facebook as viable options for promoting collaborative argumentation in an online setting. With the popularity of social media websites among other trends, it makes sense to try to incorporate these current technology trends

into the realm of online learning. The results of this study determined that Facebook would be a viable option for promoting collaborative argumentation within small group discussions.

With the affordances Facebook can provide an instructor, there are several options to incorporate some or all aspects of the website into a face-to-face, blended, or online course. There is the option of asynchronous (through postings on the group page) and synchronous (through the chat feature) discussions. Assignments could be submitted to instructors through the private messaging option. Students can be grouped together, with each small group having their own private group page and another page dedicated to the class as a whole. Course announcements can be posted to group pages, which all members receiving instant notification that an announcement (or update) has been posted. Students could be notified every time the instructor or another student posts something which then reminds them to respond or post something new themselves. The use of the 'like' button could replace student tendencies to agree with or simply complement what others have posted, paving the way for more meaningful discussion to occur. Ultimately, what the results of this study determined is that the use of a social media website could be effectively incorporated into a full-semester online course. There are options for instructors to stay current and incorporate popular trends in the way they teach.

References

- Agichtein, E., Castillo, C., Donato, D., Gionis, A., & Mishne, G. (2008). Finding high-quality content in social media. In *Proceedings of the 2008 International Conference on Web Search and Web Data Mining* (pp. 183-194). Stanford: ACM.
- Aleixandre-Jimenez, M. (2007). Designing argumentation learning environments. In S. Erduran & M. Aleixandre-Jimenez (Eds.), *Argumentation in science education: Perspectives from classroom-based research* (pp. 91-115). New York: Springer.
- Althaus, S. L. (1997). Computer-mediated communication in the university classroom: An experiment with online discussions. *Communication Education*, 46(3), 158-174.
- Amossy, R. (2005). The argumentative dimension of discourse. In Frans H. van Eemeren & Peter Houtlosser (Eds.), *Argumentation in Practice* (87-98). Philadelphia, PA: John Benjamins Publishing Company.
- Amossy, R. (2009). The new rhetoric's inheritance. *Argumentation and discourse analysis. Argumentation*, 23, 313-324. Doi: 10.1007/s10503-009-9154-y
- Anderson, T. (1996). The virtual conference: Extending professional education in cyberspace. *International Journal of Educational Telecommunications*, 2, 121-135.
- Andriessen, J., Baker, M., & Suthers, D. (2003). Argumentation, computer support, and the educational context of confronting cognitions. In J. Andriessen, M. Baker, & D. Suthers (Eds.), *Arguing to learn: Confronting cognitions in computer-supported collaborative learning environments* (pp.1-25). Boston, MA: Kluwer.
- Asterhan, C. S. C., & Schwarz, B. B. (2007). The effects of monological and dialogical argumentation on concept learning in evolutionary theory. *Journal of Educational Psychology*, 99(3), 626-639.

- Bandura, A. (1971). *Social learning theory*. New York, NY: General Learning Press.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26.
- Bandura, A., & Walters, R. H. (1963). *Social learning and personality development*. New York: Holt, Rinehart & Winston.
- Blessing, S. B., Blessing, J. S., & Fleck, B. K. B. (2012). Using Twitter to reinforce classroom concepts. *Teaching of Psychology*, 39(4), 268-271.
- Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2004). *How people learn: Brain, mind, and school* (expanded ed.). Washington, DC: National Academy Press.
- Bruner, J. (1975). From communication to language: A psychological perspective. *Cognition*, 3, 255-287.
- Bruning, R. H., Schraw, G. J., & Norby, M. M. (2010). *Cognitive psychology and instruction* (5th ed.). New York, NY: Pearson Education, Inc.
- Chan, C. K. (2001). Peer collaboration and discourse patterns in learning from incompatible information. *Instructional Science*, 29, 443-479.
- Cho, K. L., & Jonassen, D. H. (2002). The effects of argumentation scaffolds on argumentation and problem solving. *Educational Technology Research and Development*, 50(3), 5-22.

- Clark, D. B., D'Angelo, C. M., & Menekse, M. (2009). Initial structuring of online discussions to improve learning and argumentation: Incorporating students' own explanations as seed comments versus an augmented-preset approach to seeding discussions. *Journal of Science Education and Technology*, 18(4), 371-333.
- Clark, D. B., & Sampson, V. D. (2007). Personally-seeded discussions to scaffold online argumentation. *International Journal of Science Education*, 29(3), 253-277.
- Clark, D. B., & Sampson, V. D. (2008). Assessing dialogic argumentation in online environments to relate structure, grounds, and conceptual quality. *Journal of Research in Science Teaching*, 45(3), 293-321.
- Clark, D. B., Sampson, V. D., Weinberger, A., & Erkens, G. (2007). Analytic frameworks for assessing dialogic argumentation in online learning environments. *Educational Psychology Review*, 19(3), 343-374.
- Cohen, R. (1987). Analyzing the structure of argumentative discourse. *Computational Linguistics*, 13, 11-24. Doi: 0362-613X/87/010011-24
- Collison, G., Elbaum, B., Haavind, S., & Tinker, R. (2000). *Facilitating online learning: Effective strategies for moderators*. Madison, WI: Atwood Publishing.
- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage Publications.
- Cuban, L. (1986). *The classroom use of technology since 1920*. New York, NY: Teachers College Press.
- Duschl, R. A. (2007). Quality argumentation and epistemic criteria. In *Argumentation in science education* (pp. 159-175). Springer Netherlands.

- Duschl, R. A., & Ellenbogen, K. (1999, August). *Middle school science students' dialogic argumentation*. In Proceedings of the 2nd international conference of the European Science Education Research Association "Research in science education: Past, present, and future.
- Duschl, R., Ellenbogen, K., & Erduran, S. (1999, March). *Promoting argumentation in middle school science classrooms: A Project SEPIA evaluation*. A paper presented at the Annual Meeting of the National Association for Research in Science Teaching, Boston. (ERIC Document Reproduction Service No. ED453050)
- Erduran, S., Simon, S., & Osborne, J. (2004). TAPping into argumentation: Developments in the application of Toulmin's argument pattern for studying science discourse. *Science Education*, 88(6), 915-933.
- Facebook. (2013). Facebook about. Retrieved from <https://www.facebook.com/facebook/info>.
- Fisher, F., Kollar, I., Stegmann, K., & Wecker, C. (2013). Toward a script theory of guidance in computer-supported collaborative learning. *Educational Psychologist*, 48(1), 56-66.
- Fletcher, J. D., & Tobias, S. (2005). The multimedia principle. In R. E. Mayer (Ed.), *The cambridge handbook of multimedia learning* (pp. 1-16). New York, NY: Cambridge University Press.
- Gao, F., & Putnam, R. T. (2009). Using research on learning from text to inform online discussion. *Journal of Educational Computing Research*, 41(1), 1-37.
- Gee, J. P. (2011). *An introduction to discourse analysis: Theory and method*. New York, NY: Routledge.

- Gibson, J. J. (1977). The theory of affordances. In R. E. Shaw & J. Bransford (Eds.), *Perceiving, acting, and knowing*, (pp. 127-143). Hillsdale, NJ: Lawrence Erlbaum and Associates.
- Golanics, J. D., & Nussbaum, E. M. (2008). Enhancing online collaborative argumentation through question elaboration and goal instructions. *Journal of Computer Assisted Learning*, 24, 167-180.
- Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research*, 17(4), 397-431.
- Halpern, D., & Gibbs, J. (2013). Social media as a catalyst for online deliberation? Exploring the affordances of Facebook and YouTube for political expression. *Computers in Human Behavior*, 29, 1159-1168.
- Harri-Augstein, E. S., & Thomas, L. F. (1991). *Learning conversations: The self organized learning way to personal and organizational growth*: Routledge.
- Hunt, E., & Minstrell, J. (1994). A cognitive approach to the teaching of physics. In K. McGilly (Ed.), *Classroom lessons: Integrating cognitive theory and classroom practice* (pp. 51-74). Cambridge, MA: MIT Press.
- Jeong, A., & Joung, S. (2007). Scaffolding collaborative argumentation in asynchronous discussions with message constraints and message labels. *Computers & Education*, 48, 427-445.
- Jimenez-Aleixandre, M. P., Rodriguez, A. B., & Duschl, R. A. (2000). "Doing the lesson" or "doing science": Argument in high school genetics. *Science Education*, 84(6), 757-792.

- Junco, R., Heiberger, G., & Loken, E. (2011). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning*, 27, 119-132.
- Kahneman, D., & Frederick, S. (2002). Representativeness revisited: Attribute substitution in intuitive judgment. In T. Gilovich, D. Griffin, & D. Kahneman (Eds.), *Heuristics and biases: The psychology of intuitive judgment* (49-81). New York, NY: Cambridge University Press.
- Kahneman, D., & Frederick, S. (2005). A model of heuristic judgment. In K. J. Holyoak, & R. G. Morrison (Eds.), *The Cambridge handbook of thinking and reasoning* (267-293). New York, NY: Cambridge University Press.
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons*, 53, 59-68.
- Kline, S. L., & Oseroff-Varnell, D. (1993). The development of argument analysis skills in children. *Argumentation and Advocacy*, 30, 1-16.
- Kollar, I., Fischer, F., & Hesse, F. W. (2006). Collaboration scripts – A conceptual analysis. *Educational Psychology Review*, 18(2), 159-185.
- Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in Human Behavior*, 19, 335-353.
- Kuhn, D. (1991). *The skills of argument*. New York, NY: Cambridge University Press.
- Lampe, C., Wohn, D. Y., Vitak, J., Ellison, N. B., & Wash, R. (2011). Student use of Facebook for organizing collaborative classroom activities. *Computer-Supported Collaborative Learning*, 6, 329-347.

- Larson, B. E., & Keiper, T. A. (2002). Classroom discussion and threaded electronic discussion: Learning in two arenas. *Contemporary Issue in Technology and Teacher Education*, 2(1), 45-62.
- Laru, J., Naykki, P., Jarvela, S. (2012). Supporting small-group learning using multiple Web 2.0 tools: A case study in the higher education context. *Internet and Higher Education*, 15, 29-38.
- Lazonder, A. W., Wilhelm, P., & Ootes, S. A. W. (2003). Using sentence openers to foster student interaction in computer-mediated learning environments. *Computers & Education*, 41, 291-308.
- Lepper, M. R., & Hodell, M. (1989). Intrinsic motivation in the classroom. *Research on motivation in education*, 3, 73-105.
- Levin, B. B., He, Y., & Robbins, H. H. (2006). Comparative analysis of preservice teachers' reflective thinking in synchronous versus asynchronous online case discussions. *Journal of Technology and Teacher Education*, 14(3), 439-460.
- Lipponen, L. (2002). Proceedings from CSCL '02: *The Conference on Computer Support for Collaborative Learning: Foundations for a CSCL Community*.
- Lomicka, L., & Lord, G. (2012). A tale of tweets: Analyzing microblogging among language learners. *System*, 40(1), 48-63.
- Lowe, B., & Laffey, D. (2011). Is Twitter for the birds?: Using Twitter to enhance student learning in a marketing course. *Journal of Marketing Education*, 33(2), 183-192.
- Marshall, C. & Rossman, G. B. (2011). *Designing qualitative research* (5th ed.). Thousand Oaks, CA: Sage Publications.

- Marttunen, M. (1998). Electronic mail as a forum for argumentative interaction in higher education studies. *Journal of Educational Computing Research*, 18(4), 387-405.
- Mason, L., & Santi, M. (1994, April). *Argumentation structure and metacognition in constructing shared knowledge at school*. A paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.
- Mayer, R. E. (1997). Multimedia learning: Are we asking the right questions? *Educational Psychologist*, 32, 1-19.
- Mayer, R. E. (2003). The promise of multimedia learning: Using the same instructional design methods across different media. *Learning and Instruction*, 13, 125-139.
- Mayer, R. E. (2005a). Introduction to multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 1-16). New York, NY: Cambridge University Press.
- Mayer, R. E. (2005b). Cognitive theory of multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 1-16). New York, NY: Cambridge University Press.
- Mayer, R. E. (2008). *Learning and instruction* (2nd ed.). Upper Saddle River, NJ: Pearson Education, Inc.
- Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist*, 38(1), 43-52.
- Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, 63, 81-97.

- Miners, Z. (2010, August 16). Twitter goes to college: Students and profs use “tweets” to communicate in and outside of class. *U. S. News & World Report*. Retrieved from <http://www.usnews.com/education/articles/2010/08/16/twitter-goes-to-college->
- Morasso, S. G. (2012). Contextual frames and their argumentative implications: A case study in media argumentation. *Discourse Studies*, 14(2), 197-216. Doi: 10.1177/1461445611433636.
- Morgan, W., & Beaumont, G. (2003). A dialogic approach to argumentation: Using a chat room to develop early adolescent students’ argumentative writing. *Journal of Adolescent & Adult Literacy*, 47(2), 146-157.
- Munoz, C. L., & Towner, T. L. (2009). Opening Facebook: How to use Facebook in the college classroom. Paper presented at *Society for Information Technology and Teacher Education Conference*. Charleston, SC.
- Noroozi, O., Weinberger, A., Biemans, H. J. A., Mulder, M., & Chizari, M. (2012). Argumentation-based computer supported collaborative learning (ABCSCCL): A synthesis of 15 years of research. *Educational Research Review*, 7, 79-106.
- Nussbaum, E. M. (2008). Collaborative discourse, argumentation, and learning: Preface and literature review. *Contemporary Educational Psychology*, 33, 345-359.
- Nussbaum, E. M. (2011). Argumentation, dialogue theory, and probability modeling: Alternative Frameworks for Argumentation Research in Education. *Educational Psychologist*, 46(2), 84-106.
- Nussbaum, E. M., & Edwards, O. V. (2011). Critical questions and argument stratagems: A framework for enhancing and analyzing students' reasoning practices. *Journal of the Learning Sciences*, 20(3), 443-488.

- Nussbaum, E. M. & Sinatra, G. M. (2003). Argument and conceptual engagement. *Contemporary Educational Psychology*, 28, 384-395.
- Nussbaum, E. M., Windsor, D. L., Aqui, Y. M., & Poliquin, A. M. (2007). Putting the pieces together: Online argumentation vee diagrams enhance thinking during discussions. *Computer-Supported Collaborative Learning*, 2(4), 479-500.
- Oh, S., & Jonassen, D. H. (2007). Scaffolding online argumentation during problem-solving. *Journal of Computer Assisted Learning*, 23(2), 95-110.
- Okada, T., & Simon, H. A. (1997). Collaborative discovery in a scientific domain. *Cognitive Science*, 21(2), 109-146.
- Osborne, J., Erduran, S., & Simon, S. (2004). Enhancing the quality of argumentation in school science. *Journal of Research in Science Teaching*, 41(10), 994-1020.
- Peterson, L., & Peterson, M. (1959). Short-term retention of individual verbal items. *Journal of Experimental Psychology*, 58, 193-198.
- Piaget, J. (1929). *The child's conception of the world* (Vol. 213). Rowman & Littlefield.
- Piaget, J. (1972). *Psychology and epistemology: Towards a theory of knowledge*. Harmondsworth: Penguin.
- Piaget, J. (1974). *Understanding causality*. (Trans. D. & M. Miles). WW Norton.
- Posner, G. J., Strike, K. A., Hewson, P. W., & Gertzog, W. A. (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. *Science Education*, 66, 211-227.
- Provis, C. (2004). Negotiation, persuasion, and argument. *Argumentation*, 18, 95-112. Doi: 10.1023/B:ARGU.0000014868.08915.2a

- Renkl, A. (1997). Learning from worked-out examples: A study on individual differences. *Cognitive Science*, 12, 1-29.
- Richardson, J. E. (2001). 'Now is the time to put an end to all this': Argumentative discourse theory and 'letters to the editor.' *Discourse & Society*, 12(2), 143-168. Doi: 10.1177/0957926501012002002
- Richey, R. C., & Seels, B. (1994). Defining a field: A case study of the development of the 1994 definition of instructional technology. *Educational Media and Technology Yearbook*, 20, 2-17.
- Rourke, L. (2000). *Operationalizing social interaction in computer conferencing*. In Proceedings of the 16th Annual conference of the Canadian Association for Distance Education. Quebec City.
- Schachter, R. (2011). Kid 2 kid connections: How to use technology to connect your students to a larger world. *Instructor*, 46-52.
- Schank, R. C. (1999). *Dynamic memory revisited*. Cambridge, MA: Cambridge University Press.
- Schnotz, W. (2005). An integrated model of text and picture comprehension. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 49-69). New York, NY: Cambridge University Press.
- Schunk, D. H., Meece, J. L., & Pintrich, P. R. (2014). *Motivation in education: Theory, research, and applications* (4th ed.). Upper Saddle River, NJ: Pearson Education.
- Schworm, S., & Renkl, A. (2007). Learning argumentation skills through the use of prompts for self-explaining examples. *Journal of Educational Psychology*, 99(2), 285-296.

- Smagorinsky, P., & Fly, P. K. (1993). The social environment of the classroom: A Vygotskian perspective on small group process. *Communication Education*, 42, 159-171.
- Soller, A. L. (2001). Supporting social interaction in an intelligent collaborative learning system. *International Journal of Artificial Intelligence in Education*, 12, 40-62.
- Stahl, G., Koschmann, T., & Suthers, D. (2006). Computer-supported collaborative learning: An historical perspective. In R. K. Sawyer (Ed.), *Cambridge handbook of the learning sciences* (pp. 409-426). Cambridge, UK: Cambridge University Press.
- Stanovich, K. E. (2010). *Decision making and rationality in the modern world*. New York, NY: Oxford University Press.
- Stein, N. L., & Miller, C. A. (1993). The development of memory and reasoning skill in argumentative contexts: Evaluating, explaining, and generating evidence. In R. Glaser (Ed.), *Advances in instructional psychology* (pp. 285-335). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Stein, N. L., & Trabasso, T. (1982). Children's understanding of stories: A basis for moral judgment and dilemma resolution. In C. Brainerd & M. Pressley (Eds.), *Verbal processes in children: Progress in cognitive development research* (pp. 161-188). New York: Springer-Verlag.
- Stemler, S. E. (2004). A comparison of consensus, consistency, and measurement approaches to estimating interrater reliability. *Practical Assessment, Research & Evaluation*, 9(4).
- Sweller, J. (2005). Implications of cognitive load theory for multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 19-30). New York, NY: Cambridge University Press.

- Tippett, C. (2009). Argumentation: The language of science. *Journal of Elementary Science Education*, 21(1), 17-25.
- Toulmin, S. E. (2003; 1958). *The uses of argument*. Cambridge, United Kingdom: Cambridge University Press.
- Tudge, J. R. H. (1992). Processes and consequences of peer collaboration: A Vygotskian analysis. *Child Development*, 63, 1364-1379.
- Twitter. (2013). The fastest, simplest way to stay close to everything you care about. Retrieved from <https://twitter.com/about>
- van den Hoven, P. (2011). Marcin Lewinski: Internet political discussion forums as an argumentative activity type: A pragma-dialectical analysis of online forms of strategic maneuvering in reacting critically. *Argumentation*, 25(2), 255-259.
- van Eemeren, F. H., & Grootendorst, R. (1984). *Speech acts in argumentative discussions: Studies of argumentation in pragmatics and discourse analysis*. Amsterdam, Netherlands: Foris Publications.
- van Eemeren, F. H., & Grootendorst, R. (1987). Fallacies in pragma-dialectical perspective. *Argumentation*, 1(3), 283-301.
- van Eemeren, F. H., Grootendorst, R., & Henkemans, F. S. (1996). *Fundamentals of argumentation theory: A handbook of historical backgrounds and contemporary developments*. Mahwah, NJ: Erlbaum.
- van Eemeren, F. H., & Houtlosser, P. (1999). Strategic maneuvering in argumentative discourse. *Discourse Studies*, 1, 479-497. doi: 10.1177/1461445699001004005.

- van Eemeren, F. H., & Houtlosser, P. (2003). The development of the pragma-dialectical approach to argumentation. *Argumentation*, 17(4), 387-403. doi: 10.1023/A:1026338402751.
- van Gog, T., & Rummel, N. (2010). Example-based learning: Integrating cognitive and social cognitive research perspectives. *Educational Psychology Review*, 22, 155-174.
- van Merriënboer, J. J. G., & Kester, L. (2005). The four-component instructional design model: Multimedia principles in environments for complex learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 71-93). New York, NY: Cambridge University Press.
- Veerman, A., Andriessen, J., & Kanselaar, G. (2002). Collaborative argumentation in academic education. *Instructional Science*, 30, 155-186.
- Voss, J. F., & Means, M. L. (1991). Learning to reason via instruction in argumentation. *Learning and Instruction*, 1, 337-350.
- Vygotsky, L.S. (1962). *Thought and language*. Cambridge, MA: MIT Press (original work published in 1934).
- Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Cambridge, MA: Harvard University Press.
- Walton, D. N. (1989). *Dialogue theory for critical thinking*. *Argumentation*, 3, 169-184.
- Walton, D. N. (1996). *Argumentation schemes for presumptive reasoning*. Mahwah, NJ: Erlbaum.
- Walton, D. N. (1998). *The new dialectic: Conversational contexts of argument*. Toronto, Canada: University of Toronto Press.

- Walton, D. N. (2000). The place of dialogue theory in logic, computer science and communication studies. *Synthese*, 123(3), 327-346.
- Walton, D. N. (2007). Dialog theory for critical argumentation. Philadelphia, PA: John Benjamins.
- Xie, Y., Fengfeng, K., & Sharma, P. (2008). The effect of peer feedback for blogging on college students' reflective learning processes. *Internet and Higher Education*, 11, 18-25.
- Yeh, K. & She, H. (2010). On-line synchronous scientific argumentation learning: Nurturing students' argumentation ability and conceptual change in science context. *Computers & Education*, 55, 586-602.
- Yiong-Hwee, T., & Churchill, D. (2007). Using sentence openers to support students' argumentation in an online learning environment. *Educational Media International*, 44(3), 207-218.
- Zappavigna, M. (2011). Ambient affiliation: A linguistic perspective on Twitter. *New Media Society*, 13(5), 788-806.

Curriculum Vitae

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Education

2015 Ph.D., Learning and Technology, University of Nevada, Las Vegas.

Advisor: Dr. E. Michael Nussbaum

Dissertation: *Tweet vs. Status Update: Exploring Ways to Promote Collaborative Argumentation in an Online Classroom Setting*

2009 M.A., Industrial / Organizational Psychology, Roosevelt University, Chicago, IL.

Advisor: Dr. Brian Siers

2006 B.S., Psychology, Minor in Chemistry, Roosevelt University, Chicago, IL.

Professional Experience

Fall 2014 – Present

Adjunct Faculty and M.Ed. Online Coordinator

Teacher Education Dept.,

Sierra Nevada College, Henderson, NV

Supervisor: Dr. Jeanne Klockow

Teaches TLDR 601 (online) – Exploring Applied Leadership, TLDR 500 - Graduate Writing (online), and Virtual Writing Center (online)

Advises all M.Ed. students on required coursework and program completion. Completes curriculum revisions on existing administrative leadership courses.

Spring 2015

Saturday Stem School Instructor

University of Nevada, Las Vegas

Supervisor: Dr. Hasan Deniz

Taught grades 3rd through 5th science and engineering concepts through modeling. Designed lessons and projects to expose students to engineering.

- Spring 2013 – Spring 2015 **Research Support Consultant**
College of Dental Medicine, AEODO/MBA Residency Program
Roseman University of Health Sciences, Henderson, NV
 Supervisor: Dr. Prashanti Bollu
- Project managed 30 ongoing research studies that ranged in topics from clinical trials to business management practices. Advised residents on research projects along with a faculty research mentor, and was part of the review process for all subsequent manuscript write-ups. Supported the Director of Research in identifying new research opportunities and developing manuscripts, posters, and abstracts to submit to journals and conferences.
- Provided lectures to first-year postdoctoral orthodontic residents on research writing, conducting a literature review, and research methods.
- Summer 2012 – Spring 2014 **Part-Time Instructor**
Educational Psychology and Higher Education Dept.,
University of Nevada, Las Vegas
 Supervisor: Dr. LeAnn Putney
- Taught EPY 451 – Foundations of Educational Assessment (Online)
- Fall 2013 – Spring 2014 **Teaching Assistant**
Educational Psychology and Higher Education Dept.,
University of Nevada, Las Vegas
 Supervisor: Dr. E. Michael Nussbaum
- Assisted in teaching EPY 303 – Introduction to Educational Psychology (Traditional & Online)
- Fall 2011 – Summer 2013 **Research Assistant, Educational Component**
Educational Psychology and Higher Education Dept.,
University of Nevada, Las Vegas
 Supervisor: Dr. E. Michael Nussbaum
- Conducted research to determine what beliefs professors have concerning climate change, their level of acceptance of climate change, and their beliefs concerning what their students know about climate change. Assisted a task force partnered with NSHE that created nine new climate change related college/university courses aimed at filling current curriculum gaps.

Fall 2009 – Fall 2011

Research Assistant, Losing the Lake Project

Educational Psychology Dept.,

University of Nevada, Las Vegas

Supervisors: Dr. E. M. Nussbaum & Dr. G. M. Sinatra

Assisted in the design, dissemination, and research surrounding a web-based simulation game to teach middle-school students about the effect of climate change on Lake Mead and the Las Vegas Valley. Part of a larger NSF Nevada EPSCoR grant.

Spring 2008 – Fall 2008

Intern, Organizational Effectiveness & Leadership Development

Human Resources Dept.,

Exelon Corporation, Chicago, IL

Supervisors: Chris Pett & Diana Montalto

Conducted data collection, implementation analyses, and submissions for external benchmarking surveys. Updated Performance Management and all New Employee corporate communications and training materials. Assisted in data collection and analysis surrounding several operational HR metrics.

Fall 2007 – Spring 2008

Tutor, College Algebra & English

Academic Success Center

Roosevelt University, Schaumburg, IL

Supervisor: Tim McCain

Tutored undergraduate students in College Algebra and all levels of Writing and English classes; Acted as scribe for a special needs student in a creative writing class.

Publications

Peer-Reviewed Journals

Rehmat, A. P., & Owens, M. C. (in press). The time the Cat in the Hat helped build satellites: A lesson promoting scientific literacy and the engineering design process. *Science and Children*.

Nussbaum, E. M., Owens, M. C., Cordova, J. C. (in press). ‘It’s not a political issue!’ The interaction of subject and politics on professors’ beliefs in human-induced climate change. *Journal of Education for Sustainable Development*.

Nussbaum, E. M., **Owens, M. C.**, Sinatra, G. M., Rehmat, A. P., Cordova, J. C., Vesco, J. M., Ahmad, S., Harris, F. C., Dascalu, S. M. (in press). Losing the lake: Simulations to promote gains in student knowledge and interest about climate change. *International Journal of Environmental and Science Education*.

Book Chapters

Olafson, L., Salinas, C., & **Owens, M. C.** (2015). Qualitative approaches to studying teachers' beliefs. In H. Fives & M. Gill (Eds.), *International handbook of research on teachers' beliefs*. New York, NY: Routledge.

Nussbaum, E. M., Sinatra, G. M., & **Owens, M. C.** (2012). The two sides of scientific argumentation: Applications to global climate change. In M.S. Khine (Ed.), *Perspectives on scientific argumentation: Theory, practice and research*. The Netherlands: Springer.

Magazines

Pohan, C. A., Salinas, C., **Owens, M.** with Castellanoz, L., Pierschbacher, P., Brown, V., Frietas, D., Martindale, T., & Sayre, T. (2013, March). Turning the preparation of teachers upside-down: Realism or fantasy? *PDS Partners*.

Presentations

Papers

Nussbaum, E. M., & **Owens, M. C.** (2014, April). *Synchronous discussion tools for promoting interactive dialogue*. Paper presented to panel at the Nevada Conference on Digital Learning, Las Vegas, NV.

Nussbaum, E. M., **Owens, M. C.**, & Cordova, J. (2014, April). *When science, subject, and politics meet: Factors affecting professors' beliefs about climate change*. Paper presented at the 2014 American Educational Research Association annual meeting, Philadelphia, PA.

Nardi, N. M., & **Owens, M. C.** (2013, October). *Measuring the influence of student and teacher perceptions*. Paper presented at the 31st annual conference of the Northern Rocky Mountain Educational Research Association, Jackson Hole, WY.

Cordova, J., Nussbaum, E. M., **Owens, M. C.**, & Rehmat, A. P. (2013, August). *Fostering more interesting learning about climate change through a computer simulation game*. Paper presented at the biannual meeting of the European Association for Research on Learning and Instruction, Munich, Germany.

- Nussbaum, E. M., **Owens, M. C.**, Cordova, J., Rehmat, A. P., Sinatra, G. M. (2013, March). *Simulations to promote student knowledge and interest gains in environmental science and climate change: A 'Losing the Lake' study*. Paper presented at the 24th International Conference of the Society for Information Technology and Teacher Education, New Orleans, LA.
- Nussbaum, E. M., & **Owens, M. C.** (2012, April). *Losing the Lake: An on-line resource for middle-school teachers on water resources and climate change*. Presentation made at the 4th annual NSF EPSCoR Western Consortium Tri-State Meeting, Sun Valley, ID.
- Vesco, J. M., Gilgen, K., Paine, A., **Owens, M.**, Nussbaum, E. M., Sinatra, G. M., Ahmad, S., Crippen, K. J., Dascalu, S. M., & Harris, F. C. (2012, March). *Losing the Lake: Development and deployment of an educational game*. Presentation made at the 27th International Conference on Computers and Their Applications (CATA – 2012), Las Vegas, NV.
- Pohan, C. A., Salinas, C., & **Owens, M.** (2012, March). *Bridging theory to practice: A non traditional institution forges new ground in partnering with a school district*. Presentation made at the Professional Development Schools National Conference, Las Vegas, NV.
- Pohan, C. A., Salinas, C., & **Owens, M.** (2012, March). *"Turning the Preparation of Teachers Upside-Down": Realistic or fantasy?* Presentation made at the Professional Development Schools National Conference, Las Vegas, NV.
- Nussbaum, E. M., Sinatra, G. M., Harris, F., Dascalu, S., Ahmad, S., Crippen, K., & **Owens, M.C.** (2010, February). *Losing the Lake: Designing an educational computer game on water resources in Southern Nevada*. Presentation made at the Annual Nevada NSF EPSCoR Climate Change Meeting, Las Vegas, NV.

Posters

- Rehmat, A. P., **Owens, M.C.**, & Bailey, J.M. (2015, January). *The Earlier the Better: Teacher Beliefs About Design, Engineering, and Technology Instruction*. Poster presented at the 2015 Association for Science Teacher Education conference, Portland, OR.
- Owens, M. C.**, & Grandy, C. S. (2014, February). *Addressing misconceptions of the greenhouse effect and the ozone layer: Using arguing the other side to lead to conceptual engagement*. Poster presented at the 2014 American Association for the Advancement of Science annual meeting, Chicago, IL.
- Owens, M. C.**, & Nardi, N. M. (2014, February). *An exploratory study on argumentative discourse in an undergraduate online classroom*. Poster presented at the 17th annual American Association of Behavioral and Social Sciences conference, Las Vegas, NV.

Nussbaum, E. M., **Owens, M. C.**, Rehmat, A. P., & Cordova, J. R. (2013, June). *Towards collaborative argumentation in "Losing the Lake."* Poster session and paper presented at the International Conference on Computer-Supported Collaborative Learning, Madison, WI.

Owens, M. C., Rehmat, A. P., & Nussbaum, E. M. (2013, March). *Implementing Losing the Lake in K-5 science curricula.* Poster presented at workshop, Climate change science for effective resource management and public policy in the Western United States, Las Vegas, NV.

Owens, M. C. & Nussbaum, E. M. (2012, February). *Political orientation and climate change at the university: A look at professors' political views and beliefs concerning climate change.* Poster presented at the Annual Nevada NSF EPSCoR Climate Change Meeting, Las Vegas, NV.

Nussbaum, E. M., Sinatra, G. M., & **Owens, M. C.** (2011, February). *Losing the Lake: Identifying and addressing misconceptions about water resources and climate change.* Poster presented at the annual meeting of the American Association for the Advancement of Science, Washington, D.C.

Owens, M. C., Nussbaum, E. M., & Sinatra, G. M. (2010, February). *Losing the Lake: Misconceptions regarding water resources and climate change.* Poster presented at the Annual Nevada NSF EPSCoR Climate Change Meeting, Las Vegas, NV.

Awards and Honors

2015 Honorable Mention at UNLV Graduate Professional Association (GPSA) Annual Research Forum

2011 – 2012 College of Education General Scholarship – \$1,000
University of Nevada, Las Vegas